

A Social Cognitive Conceptual Framework of Career Aspiration in Product Design Education

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Abstract: *Career aspiration plays a critical role in shaping students' learning engagement, professional development, and career-related decision-making in higher education, particularly in practice-oriented disciplines such as product design. Despite growing attention to employability and career outcomes, existing studies often examine teaching quality, industry engagement, and career aspiration as separate constructs, providing limited insight into the cognitive mechanisms through which educational experiences are translated into students' career aspirations. Drawing on Social Cognitive Career Theory (SCCT), this study proposes a conceptual framework that explains how perceived teaching quality and industry cognition influence career aspiration among product design students through the mediating role of self-efficacy. Within this framework, perceived teaching quality and industry cognition are conceptualized as contextual educational inputs that shape students' self-evaluative beliefs regarding their professional competence, while self-efficacy functions as a central cognitive mechanism linking contextual experiences to career aspiration. The proposed framework contributes to the literature by contextualizing SCCT within product design education and introducing industry cognition as a domain-specific contextual learning construct. In addition, this study aligns with Sustainable Development Goal 4 (SDG 4) by emphasizing the role of quality and inclusive educational processes in fostering students' career aspirations and long-term employability. By clarifying the cognitive-contextual pathways underlying career aspiration formation, this conceptual framework provides a theoretically grounded foundation for future empirical research and offers practical implications for enhancing teaching quality and industry-oriented learning in practice-based higher education.*

Keywords: Career Aspiration; Self-Efficacy; Perceived Teaching Quality; Product Design Education; SDG 4

1. Introduction

Recent research has increasingly examined the relationship between career aspiration, employability, and higher education, particularly in practice-oriented disciplines where academic learning is closely integrated with professional outcomes. Career aspiration refers to students' long-term orientations and intentions regarding their future careers and professional development. Prior studies suggest that career aspiration functions both as an outcome of educational experiences and as a motivational force shaping students' learning engagement, professional identity formation, and career-related decision-making (Chen et al., 2021; Li et al., 2023).

Students studying and participating in practice-oriented fields, such as product design, rely on the integration of creative and technical thinking, along with professional judgment, as they assess and develop their readiness to enter the workforce. Product design education utilizes experiential learning environments such as project-based and studio-based learning, which require students to convert academic knowledge into professional competency. Li et al. (2021) found that students' perceptions of the effectiveness and relevance of their educational experiences significantly influenced their confidence when transitioning into the workforce.

Recent studies highlight the importance of perceived teaching quality on students' career development. Perceived teaching quality refers to students' evaluations of instructional effectiveness, including teaching organization, the quality of feedback, and the alignment between instruction and professional expectations within specific curriculum contexts. High-quality teaching environments help students develop a sense of competence through the mastery of academic and professional tasks (Biggs, 2003; Kember & Ginns, 2012). In addition, because of the increased emphasis on university–industry collaboration (in response to increasing demand for relevant students in the workforce and a talent shortage), there has been an increase in students' awareness and understanding of industry structure, expectations, and career pathways. Industry engagement significantly contributes to students' awareness of employability and their ability to prepare for the workforce (Abbas, Kumari, & Al-Rahmi, 2024; Li, Khattak, & Shamim, 2024).

While a growing body of empirical research has confirmed the importance of contextual factors in shaping students' career aspirations, much of the existing literature continues to examine teaching quality, industry engagement, and career-related outcomes as relatively independent constructs, rather than as an integrated cognitive–contextual process (Lent et al., 1994; Liu et al., 2020; Abbas et al., 2024). However, students actively seek out and engage with their educational experiences, as they interpret their learning environment and the factors that contribute to their professional confidence and career decision-making processes through cognitive mechanisms. Social cognitive theory is a key perspective to understand how individuals interpret environmental information and develop their capacity through experiential learning (Bandura, 1986; Schunk & DiBenedetto, 2020).

Despite increasing attention to career aspiration and employability in higher education, there remains a limited understanding of why students exposed to similar educational environments often develop markedly different levels of career ambition and professional orientation after graduation (Healy et al., 2022). In practice-oriented disciplines such as product design, students typically receive comparable curricular content, instructional guidance, and institutional support; however, their post-graduation career aspirations frequently diverge in terms of clarity, confidence, and commitment (McInerney, 2023).

Existing studies tend to explain these differences by isolating external factors, such as teaching quality, curriculum relevance, or industry collaboration, without sufficiently accounting for the cognitive mechanisms through which students interpret and internalize these experiences (Mejía-Rodríguez & Kyriakides, 2022; Wai & Tran, 2022; Zafeer et al., 2024; Zhou et al., 2025). As a result, the process by which educational and industry-related contexts are transformed into individual career ambitions remains under-theorized.

From a social cognitive perspective, students are not passive recipients of educational input; rather, they actively interpret teaching practices and industry-related information through self-evaluative cognitive processes (Chong et al., 2018; Irvine et al., 2019; Zakiah & Fajriadi,

2020). This perspective highlights the need for an integrated framework capable of explaining how similar educational contexts may lead to divergent career aspirations among students.

Social Cognitive Career Theory (SCCT) further explains the relationship between career-related outcomes through interactions between cognitive beliefs and environmental context, specifically, self-efficacy (Lent, Brown, & Hackett, 1994). Self-efficacy refers to the belief that individuals have in their ability to successfully perform the tasks that will help them achieve their goals, and is widely recognized as a key indicator to predict successful career outcomes (Liu et al., 2020; Li et al., 2022).

Research suggests that self-efficacy serves as a key mediating mechanism between educational experiences and career-related behaviours, including career commitment and employability development. The importance of studying career aspiration also supports Goal 4 of the United Nations Sustainable Development Goals (SDG 4), which states that all individuals should have access to high-quality and inclusive educational experiences that create pathways to developing skills for employment and lifelong learning. Current definitions of quality educational experiences demonstrate the importance of developing students' professional competency, providing psychological empowerment, and being adaptive to changes in the labour market (UNESCO, 2021).

Private degree-granting postsecondary institutions provide an example of a specific environment where examining the relationship between the above-mentioned constructs will naturally occur. Private degree-granting postsecondary institutions compared to public universities tend to be more focused on the market in which they operate; therefore they also have a greater commitment to develop applied learning and employability. Further, students attending private institutions often rely on their evaluation of teaching quality and industry relevance when evaluating their education and potential career opportunities (Zhou et al., 2018; Zhang & Chen, 2023).

Private higher education institutions provide a particularly relevant context for examining employability-oriented career formation due to their market-driven educational orientation. Against this background, the purpose of the present conceptual study is to develop a social cognitive framework that explains how perceived teaching quality and industry cognition impact students' career aspirations through the mediating effect of self-efficacy within product design education. In addition, the current study provides educators an explanation that integrates contextual factors that influence career aspiration with cognitive mechanisms that are associated with the career-related decision-making processes, and will also contribute to the ongoing dialogue related to employability and the quality of education in practice-oriented degree-granting postsecondary institutions.

2. Literature Review and Propositions

2.1 Career Aspiration in Higher Education

Career aspiration refers to individuals' long-term orientations, expectations, and intentions regarding their future professional roles and career development. Within higher education, career aspiration has increasingly been conceptualized as a dynamic and cognitively constructed outcome shaped by students' interpretations of their learning experiences and perceived professional competence.

From a social cognitive perspective, career aspiration does not emerge solely from external educational conditions or institutional structures but is closely linked to individuals' beliefs about their capability to perform future professional tasks. Social Cognitive Career Theory (SCCT) suggests that students form career aspirations based on how they evaluate their learning experiences, perceived competencies, and anticipated occupational demands, rather than on static personal traits alone (Lent et al., 1994; Schunk & DiBenedetto, 2020).

Empirical studies consistently demonstrate that career aspiration is strongly associated with students' academic engagement, persistence, and professional development. For example, Li et al. (2023) found that career-related self-beliefs significantly predict students' satisfaction with career choices and long-term planning, while Liu et al. (2023) showed that students with stronger professional confidence exhibit clearer career orientation and adaptability. These findings suggest that career aspiration reflects students' cognitive evaluation of their readiness for future professional roles.

In addition, the growing emphasis on career aspiration within higher education is closely aligned with the United Nations Sustainable Development Goal 4 (SDG 4), which advocates inclusive and equitable quality education and the promotion of lifelong learning opportunities for all. SDG 4 highlights not only access to education but also the importance of educational quality in fostering relevant skills, professional competence, and meaningful career pathways (UNESCO, 2021).

From this perspective, career aspiration can be understood as a key indicator of whether educational experiences successfully empower students to envision and pursue sustainable professional futures. In practice-oriented disciplines such as product design, where learning outcomes are closely tied to professional readiness, examining the cognitive mechanisms underlying career aspiration provides important insights into how quality education contributes to long-term employability and personal development.

2.2 Self-Efficacy as a Core Social Cognitive Mechanism

Self-efficacy refers to individuals' beliefs in their ability to organize and execute actions required to achieve specific goals (Bandura, 1986). As a central construct within social cognitive theory, self-efficacy influences individuals' motivation, persistence, learning behavior, and career-related decision-making processes.

Within SCCT, self-efficacy functions as the primary cognitive mechanism through which contextual educational experiences are translated into career-related outcomes. Educational environments do not directly determine students' career development; rather, they shape how students perceive their competence and readiness to perform professional tasks (Lent et al., 1994). Students who perceive themselves as capable of meeting professional demands are more likely to form strong career aspirations and commit to future career pathways.

A substantial body of empirical research supports the pivotal role of self-efficacy in higher education. Previous studies have shown that self-efficacy positively predicts students' academic engagement, professional confidence, and employability development (Chen et al., 2021; Li et al., 2022). In addition, self-efficacy has been identified as a key antecedent of career commitment and career planning, particularly in practice-based disciplines.

In product design education, self-efficacy is especially salient due to the iterative, project-based, and evaluative nature of design learning. Students continuously assess their ability to

generate innovative solutions, respond to feedback, and meet professional standards. Mastery experiences, authentic projects, and constructive feedback contribute to the development of self-efficacy, which in turn shapes students' confidence in pursuing design-related careers. Accordingly, self-efficacy is positioned as the central cognitive mechanism linking educational and industry-related contexts to career aspiration in the present study.

2.3 Perceived Teaching Quality in Product Design Education

Perceived teaching quality refers to students' evaluations of instructional effectiveness, including teaching organization, clarity of instruction, quality of feedback, and alignment between learning activities and professional expectations. In higher education research, perceived teaching quality has been widely recognized as a critical contextual factor influencing students' learning experiences and academic development (Biggs, 2003; Kember & Ginns, 2012).

From a social cognitive perspective, teaching quality influences career development indirectly by shaping students' beliefs about their competence. High-quality instructional environments provide structured learning experiences, timely feedback, and opportunities for mastery, which enhance students' confidence in performing academic and professional tasks. These experiences contribute to the development of self-efficacy rather than directly determining career outcomes.

In product design education, perceived teaching quality is particularly important due to the reliance on studio-based and project-based pedagogies. Effective teaching practices support students' ability to translate theoretical knowledge into professional design competence. Previous studies indicate that innovation-oriented instruction and constructive feedback significantly enhance students' professional confidence and learning engagement in design-related programs (Hu et al., 2021).

In private higher education institutions, where employability oriented education is emphasized, students often rely heavily on their perceptions of teaching quality when evaluating the relevance and value of their educational experiences. Consequently, perceived teaching quality serves as a key contextual input that shapes students' self-efficacy, thereby influencing their readiness to pursue future careers in product design.

2.4 Industry Cognition and Career Aspiration

Industry cognition refers to students' understanding of industry structures, occupational requirements, professional standards, and career pathways within a specific field. Rather than representing direct exposure to industry, industry cognition reflects a cognitive process through which students interpret and internalize information about professional expectations and labor market conditions.

According to SCCT, career development is influenced by individuals' perceptions of environmental opportunities and constraints. In the context of product design, industry cognition provides students with external reference information that allows them to evaluate whether their current competencies align with industry demands (Lent et al., 1994).

Empirical research suggests that participation in industry-oriented learning experiences enhances students' professional awareness and innovation capability. Hu et al. (2021) found that industry-integrated design education improves students' readiness for professional

practice, while Zhang and Chen (2023) reported that university industry collaboration enhances students' understanding of professional roles and employability expectations.

Importantly, industry cognition does not directly shape career aspiration; rather, it influences students' self-evaluative judgments regarding their professional capability. When students perceive a strong alignment between their skills and industry expectations, they are more likely to develop higher self-efficacy and clearer career aspirations. Conversely, limited or inaccurate industry cognition may lead to uncertainty and weakened career commitment. Therefore, industry cognition is conceptualized as a contextual factor that influences career aspiration through its impact on self-efficacy.

2.5 Integrating the Conceptual Framework and Propositions

Drawing on Social Cognitive Career Theory (SCCT), the present study integrates perceived teaching quality and industry cognition as two key contextual factors influencing the formation of career aspiration among product design students. Within this framework, self-efficacy is positioned as a central cognitive mechanism through which educational and industry-related contexts shape students' career-related motivation and aspirations.

From a broader educational policy perspective, this framework aligns with Sustainable Development Goal 4 (SDG 4), which emphasizes the provision of quality education that equips learners with relevant skills for employment, decent work, and lifelong learning. By focusing on perceived teaching quality and industry cognition as contextual inputs, and self-efficacy as a core psychological mechanism, the framework highlights how quality educational processes contribute to students' career aspiration development rather than treating employability as an isolated outcome.

According to SCCT, contextual conditions may influence career-related outcomes both directly and indirectly through cognitive mechanisms. In product design education, perceived teaching quality provides structured instructional experiences that support mastery, while industry cognition offers professional reference information regarding occupational expectations. These contextual factors contribute to students' self-efficacy, which subsequently guides their career aspiration.

Based on this theoretical integration, the conceptual framework is presented in Figure 1, and the following propositions are proposed:

- P1: Perceived teaching quality is positively associated with students' self-efficacy in product design education.
- P2: Industry cognition is positively associated with students' self-efficacy in product design education.
- P3: Self-efficacy is positively associated with career aspiration among product design students.
- P4: Perceived teaching quality is positively associated with career aspiration among product design students.
- P5: Industry cognition is positively associated with career aspiration among product design students.
- P6: Self-efficacy mediates the relationships between perceived teaching quality, industry cognition, and career aspiration among product design students.

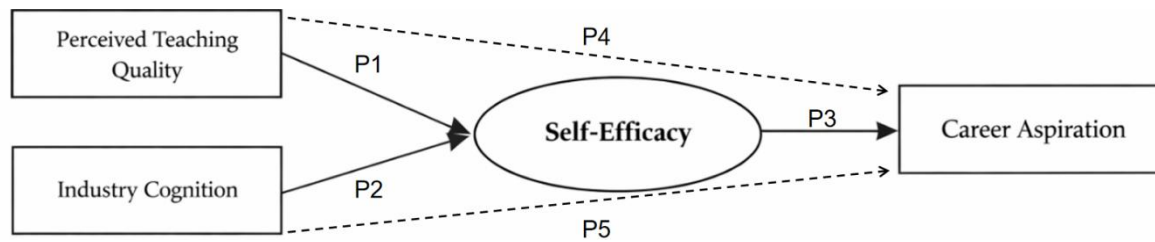


Figure 1: Conceptual framework based on Social Cognitive Career Theory (SCCT)

3. Discussion

This study contributes to the literature by proposing a social cognitive conceptual framework that explains how career aspirations are formed within product design education. By contextualizing Social Cognitive Career Theory (SCCT), the framework clarifies how perceived teaching quality and industry cognition operate as contextual educational inputs that shape students' self-efficacy, thereby influencing career aspiration development. Rather than introducing new theoretical constructs, this study advances existing theory by specifying domain-relevant contextual mechanisms within practice-oriented higher education.

Second, this research integrates perceived teaching quality in the context of the SCCT framework to represent a formal educational context/environmental input for influencing the cognitive and motivational development of students in becoming professionals. By linking the development of student self-efficacy through instructional design and quality of educational experiences, this research contributes to a more education-centric application of SCCT, particularly within post-secondary educational settings.

Third, this study provides a clear conceptual framework that systematically defines how the teaching and learning processes impact students' career aspiration. In contrast to previous studies examining employability from a separate, independent perspective, this study demonstrates the mediating role of self-efficacy and provides a better understanding of the interaction between educational experiences and professional career development. Therefore, this research provides a theoretical bridge between theory and research on career development and more emergent areas of research addressing product design education.

3.1 Theoretical Contributions

This study contributes to the research literature by applying and expanding Social Cognitive Career Theory (SCCT) to the product design education setting in private post-secondary institutions. Although SCCT has been used extensively to study and describe the process of developing a career across the disciplines of academia, limited research has been conducted to study the application of SCCT in the context of design education. This study has integrated perceived teaching quality and industry cognition as contextual antecedents and has used self-efficacy as a central mediating trait within the development of career aspirations formed by product design students.

1) This study builds on SCCT to include teaching quality as a structured educational context/environmental input. Previous research utilizing SCCT to examine or explain employability outcomes has provided evidence that learning experiences are important predictors of self-efficacy and related career outcomes (Lent et al., 1994; Schunk & DiBenedetto, 2020). More recent research in the area of post-secondary education suggests that the effectiveness with which an instructor teaches is a great contributor to the professional competency and employability of students (Abbas et al., 2024; Chen et al., 2024). Therefore,

the inclusion of perceived teaching quality within the SCCT framework allows for a more contextualized explanation of how an institution's instructional environment impacts the career development of its students. Additionally, unlike traditional SCCT literature that has defined learning experiences in general as providing a contextual basis for developing self-efficacy, perceived teaching quality also represents a structured institutional influence that provides students with the cognitive basis for determining whether they are learning effectively and are prepared to perform as a professional.

2) This study provides evidence of the significance of including industry cognition as an important contextual cognitive variable. The current literature demonstrates the importance of university–industry partnerships as a supporting source to build professional preparedness in students or their employability (Li et al., 2024; Zhang & Chen, 2023). However, little empirical research has been conducted to examine how the cognitive construction of an industry impacts the professional aspirations of an individual student. Defining and conceptualizing industry cognition as a determinant variable for self-efficacy development extends SCCT by including external workplace awareness into the constructed theory of career development.

3) This study further supports the importance of self-efficacy as the central mediating cognitive variable in the relationship between educational experience and professional career development. As described by SCCT, educational experiences impact professional career development primarily through the way students perceive their proficiency in performing job-related tasks and not by direct institutional impact (Bandura, 1986). Recent studies demonstrate that self-efficacy significantly affects employability, career aspirations as reflected in career commitment and professional identity development of university students (Chen et al., 2021; Li et al., 2022; Liu et al., 2023), emphasizing the mediating role of self-efficacy in developing students' future career development plan.

Additionally, this study contributes to the literature examining the relationship between professional identity development and design education. Empirical research suggests that professional identity development is an important factor in developing a career commitment and professionally engaged student within higher education (Tomlinson & Jackson, 2021; Reissner & Armitage-Chan, 2024). The conceptual framework illustrated in this study suggests that self-efficacy serves as the medium that connects professional identity development and career aspiration development in the context of product design education.

3.2 Educational and Practical Implications

The results from this conceptual framework will have a significant impact on curriculum design and educational policies for product design education at private higher education institutions, where the focus is on producing graduates with an emphasis on applied learning and employability outcomes. Because the way in which students develop as professionals is dependent on the structure of the curriculum as well as on the way in which they cognitively interpret their educational experiences, it is important to enhance the quality of instruction as an overarching strategic goal in order to improve their career development. Providing students with structured feedback from their instructors, authentic learning experiences through project-based assignments, and in-class opportunities to participate in experiential learning will help build their confidence when transitioning to the workforce. In discussing his model for constructive alignment between teaching methods and learning outcomes, Biggs (2003) suggests that developing the competence of students in future jobs is greatly enhanced through constructive alignment. Kember and Ginns (2012) provide supporting evidence that the use of

effective evaluation systems for teaching will increase student engagement and improve their professional learning outcomes.

Second, an additional way to support the career development of students is to increase the level of collaboration and interaction with industry partners. Collaborative education has been shown to result in significantly increased perceptions of employability and competence development among students who have engaged in collaborative educational experiences (Li et al., 2024; Liu, 2025). In addition to collaborating with industry through course projects, internships, and collaborative design studios, students can also develop a greater understanding of industry expectations and of the various pathways to professional development by participating in industry-oriented projects.

Third, educators should develop learning environments that intentionally assist the student in building a sense of self-efficacy. There is increasing evidence that mastery experiences, project-based learning, and design thinking approaches enhance the student's confidence in their future performance as a professional and in their ability to solve creative problems (Hu et al., 2021; Carroll et al., 2023). Integrating project-based learning into the curriculum and utilizing an iterative approach to project evaluation will give students many opportunities to develop their professional efficacy as a result of their experiences.

From a broad perspective, this conceptual framework aligns with Sustainable Development Goal 4 (SDG 4), which promotes the provision of quality education and sustainable development of employable graduates. UNESCO (2021) indicates that higher education should foster the adaptability and ability of students to continue learning throughout their lives. By increasing the quality of teaching, strengthening industry cognition, and enhancing students' sense of self-efficacy, product design education can support the development of a sustainable workforce and foster creativity and innovation within the creative industries.

3.3 Implications for Future Research

This conceptual study has produced a theoretical basis for future empirical research. To begin with, the proposed framework should be validated empirically through the application of quantitative methodologies, more specifically, through the use of Structural Equation Modeling (SEM). Previous studies have provided evidence that SEM is an effective method for utilizing mediational models in examining the relationship between antecedents and outcomes in the realms of education and career development (Hair et al., 2019; Preacher and Hayes, 2008).

Future research should, in addition, expand the conceptual framework to include additional contextual variables that may influence the formation of career aspirations, including the level of institutional support, the degree of learning engagement, and the development of professional identity. Few studies have explored the role of both professional identity and learning engagement as mediators in the career development process for university students (Chen et al., 2024; Liu et al., 2023).

Future studies examining dynamic changes in the development of career aspirations for students as a result of their longitudinal academic journey are also warranted. Career development is a continuous process that is impacted by changing educational experiences and professional experiences (Savickas, 2005). Conducting longitudinal studies of this nature may also provide an opportunity to examine the ways that educational experiences influence students' long-term career development outcomes from design education.

Finally, comparison studies across various cultures and educational systems will continue to contribute to the knowledge of how the formation of career aspirations occurs for students enrolled in higher education. The literature indicates that the institutional context and educational culture have a significant influence upon the development of professional identity and the outcomes of employability (Clarke, 2018). Conducting comparative studies within design education will provide insight into how to improve design education for students around the world. Future empirical studies may test the proposed framework using multi-group SEM to examine whether the mediation mechanisms differ across gender, internship experience, or stages of study.

4. Conclusion

Through the integration of perceived teaching quality, industry cognition, and self-efficacy developed from a social cognitive conceptual framework, this study developed a framework for understanding how career aspirations develop for product design students. The proposed framework highlights the complex interactions between the educational environment, industry-related learning experiences, and individual cognitive mechanisms in the development of student's professional careers.

From a theoretical perspective, this study extends the existing literature on SCCT in practice-based design education by including industry cognition as an industry-specific contextual variable and emphasizing teaching quality as a systematic educational influence. The proposed framework contributes to a better understanding of how a student's awareness of their profession and cognitive self-regulation interact to influence their career aspirations, specifically in creative disciplines or other disciplines where there is a strong practical element.

In addition to making a theoretical contribution, the findings of this conceptual study also have several important implications for product design education in higher education and for growing talent within this context.

By using the resources of Social Cognitive Career Theory (SCCT), this study advances the body of knowledge on career development and design education by expanding the understanding of SCCT in a practice-oriented design educational setting. This study develops a unified conceptual framework for education that merges perceived teaching quality and industry cognition as two contextual factors that influence the development of career aspirations for product design students through the interactions between the student's educational experience and awareness regarding their profession. This study does not aim to modify SCCT, but rather contextualizes SCCT within product design education by specifying industry cognition as a domain-specific contextual learning construct.

Overall, this conceptual study provides a foundation for understanding how students develop career aspirations in product design education and suggests tangible recommendations for improving educational quality, fostering meaningful engagement between educational institutions and their industry counterparts, and developing talent within higher education.

Additionally, this study supports the achievement of Sustainable Development Goal 4 (SDG 4) and its emphasis on students receiving a quality education, having equal access to authentic, industry-relevant learning opportunities, and building the knowledge and skills necessary to be prepared for their future careers in higher education. By utilizing perceived teaching quality and industry cognition as ways of developing self-efficacy in career aspirations, the proposed

framework meets the objectives outlined in the SDG4 initiatives to create an inclusive and effective learning environment for students, thereby preparing them for meaningful employment and the continuation of lifelong learning.

In product design education, building stronger university industry partnerships, as well as offering students authentic and comprehensive professional learning experiences, will strengthen students' readiness for their professions and the development of their professional identities. As these improvements are aligned with the SDG4 objectives of increasing the relevance of higher education and cultivating skills that address the need for the future labor market, the proposed conceptual framework is intended to add value to the academic understanding of the development of students' career aspirations and to provide relevant policy recommendations on improving the quality of education and the sustainable development of talent in the creative industries.

5. Limitation and Future Research

While the present study makes theoretical contributions by proposing a social cognitive conceptual framework for understanding career aspiration in product design education, several limitations should be acknowledged. These limitations also point to meaningful directions for future research.

First, this study adopts Social Cognitive Career Theory (SCCT) as the primary theoretical lens for explaining how career aspirations are formed. Although SCCT provides a well-established and integrative framework for examining the interaction between contextual factors and cognitive mechanisms, it does not fully capture the broader sociocultural and identity-based processes emphasized in other career development theories, such as career construction theory or social identity theory. Future research may extend the proposed framework by integrating complementary theoretical perspectives to develop a more holistic understanding of career development processes in design education.

Second, the conceptual framework positions self-efficacy as the central mediating mechanism linking contextual educational factors to career aspiration. While self-efficacy has been widely validated as a key predictor of career-related outcomes, career development is a multifaceted process influenced by a range of psychological and contextual variables. Future studies could expand the model by examining additional mediators or moderators, such as professional identity, learning engagement, perceived institutional support, or outcome expectations, to better capture the complexity of students' career development trajectories.

Third, the framework focuses specifically on perceived teaching quality and industry cognition as the primary contextual factors influencing self-efficacy and career aspiration. Although these variables are highly relevant within product design education, other contextual dimensions, such as curriculum flexibility, peer learning environments, internship structures, and labor market conditions may also play important roles. Future research could incorporate a broader range of institutional and environmental variables to enhance the explanatory power and comprehensiveness of the framework.

Fourth, the proposed framework is developed within the context of product design education at private higher education institutions in China. Educational systems differ considerably across countries and institutional types in terms of pedagogical traditions, cultural expectations, and employment structures. Future research should examine the applicability and

generalizability of the framework by testing it across different disciplines, institutional settings, and cultural contexts, thereby strengthening its cross-contextual relevance.

Finally, as a conceptual study, the framework has not yet been empirically tested. Future research should employ empirical research designs to validate the proposed relationships among perceived teaching quality, industry cognition, self-efficacy, and career aspiration. In particular, quantitative approaches such as Structural Equation Modeling (SEM) would be well suited to examining the proposed mediation mechanisms and assessing the overall model fit. Longitudinal or mixed-methods designs could further enrich understanding by capturing changes in students' career aspirations over time and providing deeper insight into the cognitive processes underlying career development.

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Conflict of Interest

The author hereby declares there is no conflict of interest related to the publication of this paper.

References

- Abbas, J., Kumari, K., & Al-Rahmi, W. M. (2024). Quality management system in higher education institutions and its impact on students' employability with the mediating effect of industry-academia collaboration. *Journal of Economic and Administrative Sciences*, 40(2), 325–343. <https://doi.org/10.1108/JEAS-07-2021-0135>
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.
- Biggs, J. (2003). *Teaching for quality learning at university* (2nd ed.). Open University Press.
- Chen, Q., Zhang, Q., Yu, F., & Hou, B. (2024). Investigating structural relationships between professional identity, learning engagement, academic self-efficacy, and university support: Evidence from tourism students in China. *Behavioral Sciences*, 14(1), 26. <https://doi.org/10.3390/bs14010026>
- Chen, S., Xue, Y., Chen, H., Ling, H., Wu, J., & Gu, X. (2021). Making a commitment to your future: Investigating the effect of career exploration and career decision-making self-efficacy on the relationship between career concern and career commitment. *Sustainability*, 13(22), 12816. <https://doi.org/10.3390/su132212816>
- Clarke, M. (2018). Rethinking graduate employability: The role of capital, individual attributes and context. *Studies in Higher Education*, 43(11), 1923–1937. <https://doi.org/10.1080/03075079.2017.1294152>
- Carroll, M., Goldman, S., Britos, L., Koh, J., Royalty, A., & Hornstein, M. (2023). Impact of design thinking in higher education: A multi-actor perspective on problem solving and creativity. *Higher Education*, 85, 217–240. <https://doi.org/10.1007/s10798-021-09724-z>
- Chong, W. H., Liem, G. A. D., Huan, V. S., Kit, P. L., & Ang, R. P. (2018). Student perceptions of self-efficacy and teacher support for learning in fostering youth competencies: Roles of affective and cognitive engagement. *Journal of adolescence*, 68, 1-11.
- Healy, M., Hammer, S., & McIlveen, P. (2022). Mapping graduate employability and career development in higher education research: A citation network analysis. *Studies in Higher Education*, 47(4), 799-811.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis*

- (8th ed.). Cengage Learning.
- Hu, W., Hu, Y., Lyu, Y., & Chen, Y. (2021). Research on integrated innovation design education for cultivating the innovative and entrepreneurial ability of industrial design professionals. *Frontiers in Psychology*, 12, 693216. <https://doi.org/10.3389/fpsyg.2021.693216>
- Huang, X., Ball, R., & Wang, W. (2021). Comparative study of industrial design undergraduate education in China and USA. *International Journal of Technology and Design Education*, 31, 565–586. <https://doi.org/10.1007/s10798-020-09563-4>
- Irvine, S., Williams, B., Özmen, M., & McKenna, L. (2019). Exploration of self-regulatory behaviours of undergraduate nursing students learning to teach: A social cognitive perspective. *Nurse Education in Practice*, 41, 102633.
- Kember, D., & Ginns, P. (2012). *Evaluating teaching and learning: A practical handbook for colleges, universities and the scholarship of teaching*. Routledge.
- Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior*, 45(1), 79–122. <https://doi.org/10.1006/jvbe.1994.1027>
- Li, H., Khattak, S. I., & Shamim, M. A. (2024). Quality culture, university–industry collaboration, and perceived employability among vocational students in China. *Frontiers in Psychology*, 15, 1439097. <https://doi.org/10.3389/fpsyg.2024.1439097>
- Li, M., Fan, W., & Zhang, L. F. (2023). Career adaptability and career choice satisfaction: Roles of career self-efficacy and socioeconomic status. *The Career Development Quarterly*, 71(4), 300–314. <https://doi.org/10.1002/cdq.12334>
- Li, X., Pu, R., & Liao, H. (2022). The impacts of innovation capability and social adaptability on undergraduates’ employability: The role of self-efficacy. *Frontiers in Psychology*, 13, 954828. <https://doi.org/10.3389/fpsyg.2022.954828>
- Liu, J. (2025). Psychological pathways in enterprise participation in university–industry collaboration. *Frontiers in Psychology*, 16, 1578950. <https://doi.org/10.3389/fpsyg.2025.1578950>
- Liu, X., Ji, X., Zhang, Y., & Gao, W. (2023). Professional identity and career adaptability among Chinese engineering students: The mediating role of learning engagement. *Behavioral Sciences*, 13(6), 480. <https://doi.org/10.3390/bs13060480>
- Liu, X., Peng, M. Y. P., Anser, M. K., Chong, W. L., & Lin, B. (2020). Key teacher attitudes for sustainable development of student employability by social cognitive career theory. *Frontiers in Psychology*, 11, 1945. <https://doi.org/10.3389/fpsyg.2020.01945>
- McKim, A. J., & Velez, J. J. (2015). Exploring the relationship between self-efficacy and career commitment among early career teachers. *Journal of Agricultural Education*, 56(1), 127–140. <https://doi.org/10.5032/jae.2015.01127>
- McInerney, D. (2023). Insights into product design students’ perception of, and engagement with, creativity in design education. *International Journal of Technology and Design Education*, 33(3), 1199-1219.
- Mejía-Rodríguez, A. M., & Kyriakides, L. (2022). What matters for student learning outcomes? A systematic review of studies exploring system-level factors of educational effectiveness. *Review of Education*, 10(3), e3374.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879–891. <https://doi.org/10.3758/BRM.40.3.879>
- Reissner, S., & Armitage-Chan, E. (2024). Professional identity formation in higher education: A critical review. *Studies in Higher Education*, 49(12), 2707–2722. <https://doi.org/10.1080/03075079.2023.2224376>
- Savickas, M. L. (2005). The theory and practice of career construction. In S. D. Brown & R.

- W. Lent (Eds.), *Career development and counseling: Putting theory and research to work* (pp. 42–70). Wiley.
- Schunk, D. H., & DiBenedetto, M. K. (2020). Motivation and social cognitive theory. *Contemporary Educational Psychology*, 60, 101832. <https://doi.org/10.1016/j.cedpsych.2019.101832>
- Tomlinson, M., & Jackson, D. (2021). Professional identity formation in contemporary higher education students. *Studies in Higher Education*, 46(4), 885–900. <https://doi.org/10.1080/03075079.2019.1628209>
- UNESCO. (2021). *Reimagining our futures together: A new social contract for education*. UNESCO Publishing. <https://unesdoc.unesco.org/ark:/48223/pf0000379707>
- Wai, J., & Tran, B. (2022). Student characteristics, institutional factors, and outcomes in higher education and beyond: An analysis of standardized test scores and other factors at the institutional level with school rankings and salary. *Journal of Intelligence*, 10(2), 22.
- Zhang, Y., & Chen, X. (2023). Empirical analysis of university–industry collaboration in postgraduate education: A case study of Chinese universities of applied sciences. *Sustainability*, 15(7), 6252. <https://doi.org/10.3390/su15076252>
- Zhou, H., Liu, Q., Tian, J., & Li, Q. (2018). *Private education in China: Development and policy*. Springer.
- Zafeer, H. M. I., Maqbool, S., Rong, Y., & Maqbool, S. (2024). Mapping the relationship and influence of school internal factors with an eye towards students' science academic outcomes. *Heliyon*, 10(19).
- Zhou, R., Vizcarra, G. C., & Sabillano, L. R. (2025). Factors and challenges affecting education quality in selected colleges and universities in China: Inputs for improvement. *Journal of Information Systems Engineering and Management*, 10(53s). <https://doi.org/10.52783/jisem.v10i53s.10836>
- Zakiah, N. E., & Fajriadi, D. (2020, August). Self-regulated learning for social cognitive perspective in mathematics lessons. In *Journal of Physics: Conference Series* (Vol. 1613, No. 1, p. 012049). IOP Publishing.