

## Career development impact on architecture undergrads' employment: learning motivation mediation

Zi Ming Fan, Juo-Lan Yeh

International College, Krirk University, Bangkok, Thailand

### Article Info

#### Article history:

Received Aug 25, 2023

Revised Jan 24, 2024

Accepted Feb 19, 2024

#### Keywords:

Architecture undergrads

Career development

Career planning

Employment capabilities

Learning motivation

### ABSTRACT

This study, utilizing the expectancy-value theory, examines the relationship between career development, learning motivation, and employment capabilities among Chinese architecture undergraduates. Surveying 319 students from five Chinese universities, the research reveals that career development has a positive impact on both employment capabilities and learning motivation. Learning motivation, in turn, positively affects employment capabilities and acts as a mediator between career development and employment capabilities. These findings underscore the significance of proactive career planning, goal setting, and intrinsic learning motivation in enhancing students' employment capabilities. For practical applications, educational institutions can design comprehensive career development programs to assist students in defining career goals and igniting intrinsic motivation for learning, thereby fostering career success and employability among architecture students.

*This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.*



### Corresponding Author:

Zi Ming Fan

International College, Krirk University

No. 3 Soi Ramintra 1, Anusawari Subdistrict, Bang Khen District, Bangkok 10220, Thailand

Email: arcgunpla@gmail.com

## 1. INTRODUCTION

In today's rapidly changing and highly competitive job market, the development of employment capabilities among university students has become crucial [1]. Among various disciplines, the field of architecture stands out for its need to closely integrate theoretical knowledge with practical applications, making success particularly vital [2]. As the architectural landscape continues to evolve and demand innovative solutions, the employment capabilities of architecture graduates rely on their ability to adapt, learn, and effectively contribute to the industry [3].

Over the past few decades, the landscape of global higher education has undergone significant changes [4]. Shifting from traditional knowledge-based education to a more holistic approach that emphasizes acquiring and applying skills in university curricula has prompted educators, policymakers, and employers to emphasize the cultivation of employability skills within university programs [5]. This shift is particularly evident in disciplines like architecture, where a theoretical understanding of design principles, construction techniques, and environmental considerations must be combined with practical proficiency and innovative thinking.

For architecture students, employability encompasses more than just technical expertise [6]. Skills such as communication, creativity, critical thinking, teamwork, and problem-solving are essential components of the skillset required for architecture graduates [7]. Furthermore, the ability to adapt to rapidly changing technological and design demands is equally important [8]. Therefore, understanding the factors influencing the enhancement of these skills in architecture undergraduates is paramount.

Career development encompasses a series of activities individuals undertake to manage their work lives, including career planning, skill development, building interpersonal relationships, and seeking growth opportunities [9]. It is widely recognized that effective career development initiatives can significantly impact an individual's employment capabilities. For architecture students, engaging in career-related activities such as internships, workshops, seminars, and exposure to real-world projects can bridge the gap between academia and industry [10]. These experiences not only provide practical knowledge but also foster a deeper understanding of the professional context.

Furthermore, the role of career development in shaping students' career development and choices cannot be underestimated [11]. Students involved in career-related activities often have a clearer understanding of their future career paths, better aligning their educational pursuits with industry needs. However, the relationship between career development and employment capabilities may be influenced by various factors. One potentially significant factor is students' motivational orientation toward learning experiences [12].

Learning motivation involves the intrinsic and extrinsic factors that drive individuals to engage in learning activities [13]. It plays a crucial role in shaping students' depth and breadth of engagement as well as their persistence in pursuing educational goals. In the context of architectural education, students with intrinsic motivation may engage more deeply in courses, projects, and extracurricular activities [14]. Conversely, students with extrinsic motivation might focus more on meeting academic requirements but may not fully immerse themselves in a comprehensive learning experience [15].

In the field of architecture, the role of learning motivation in the relationship between career development and employment capabilities is a dynamic research area [16]. Understanding how career development experiences influence students' motivational orientation can reveal mechanisms through which these experiences translate into enhanced employment capabilities [17]. Furthermore, examining how motivational orientations impact the utilization of employment capabilities can aid in developing educational strategies tailored to the needs of architecture students.

In this context, the primary aim of this study is to explore the impact of career development on the employment capabilities of architecture undergraduates. Specifically, the study aims to investigate the mediating role of learning motivation in this relationship. By delving into the motivational factors influencing students' engagement in career development initiatives, this research seeks to uncover mechanisms through which these experiences foster enhanced employment capabilities. While investigating the influence of career development on the employment capabilities of architecture students, this study will address the following research questions: i) research question 1: how does career development affect the employment capabilities of architecture undergraduates?; ii) research question 2: how does career development influence the learning motivation of architecture undergraduates?; iii) research question 3: how does the learning motivation of architecture undergraduates affect their employment capabilities?; and iv) research question 4: does learning motivation mediate the relationship between career development and the employment capabilities of architecture undergraduates?

## 2. RESEARCH FRAMEWORK AND HYPOTHESES

The expectancy-value theory is a social psychology theory used to explain why individuals choose to engage in specific behaviors or make particular decisions in certain contexts [18]. This theory focuses on how individuals' expectations and values influence their behaviors and decisions, particularly concerning goal setting, task execution, and effort allocation. Career development, as an independent variable, represents university students' goals and visions for their future development in the field of architecture. This encompasses their expectations for career success and achievement, i.e., the expectancy of the likelihood of success. Learning motivation, as a mediating variable, affects individuals' level of engagement in learning and development [19]. Employment capabilities, as the dependent variable, reflect individuals' actual levels of competence in their professional field, including technical expertise, communication skills, creativity, and more. In the context of the expectancy-value theory, these capabilities hold specific value for university students [7]. If individuals believe that by investing effort in learning and development, they can enhance their employment capabilities in the field of architecture, they are more motivated to actively improve these skills.

Therefore, this paper posits a connection between individuals' career expectations (expectancy of success) and learning motivation (degree of engagement in learning and development). Learning motivation can influence individuals' efforts to enhance their employment capabilities, consequently affecting their actual employment competence levels. Thus, the research model in Figure 1 is proposed.

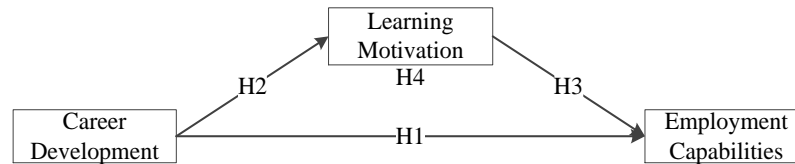


Figure 1. Research model

Based on this, the paper proposes the following four research hypotheses: i) career development positively influence the employment capabilities of architecture undergraduates (H1); ii) career development positively influence the learning motivation of architecture undergraduates (H2); iii) learning motivation of architecture undergraduates positively influences employment capabilities (H3); and iv) the learning motivation of architecture undergraduates mediates the relationship between career development and employment capabilities (H4).

In Iran, scholars have employed an integrated approach to teaching foundational courses in the field of architecture, such as practical geometry, which has been found to increase the interest, intrinsic and extrinsic motivation of architecture students, thereby enhancing the quality of education [20]. This method has improved the quality of education, indicating that the use of diversified and integrated teaching strategies in architectural education can enhance students' learning experiences. Concurrently, learning motivation significantly enhances students' innovation and creative thinking in the field of architecture [21]. Architectural education methods face challenges known as "21st-century skills," which affect the employability of new graduates. In Egypt, many higher education institutions are changing their teaching methods to equip students with skills that support lifelong learning capabilities [6], aiming to prepare students for lifelong learning, impacting the employability of new graduates. In China, there is relatively less research on career development and learning motivation in architectural studies. Some scholars have proposed that Industry 4.0 is reshaping the future of education, broadening the perspective for universities to consider what knowledge and skills college graduates should have, when to accelerate workforce retraining, and the building blocks and connections of the educational supply chain, introducing and creating the concept of the 'educational supply chain' for the first time [22].

This study investigates the role of career development in improving architecture students' employability and how learning motivation mediates this relationship. It aims to fill gaps by exploring the impact of career development activities like internships and workshops on employability, the role of learning motivation as a mediator, the application of expectancy-value theory in architectural education, and the effects of different types of motivation on employability. This can offer valuable insights for educators and policymakers on enhancing employability through targeted educational strategies.

### 3. RESEARCH METHOD

In this study, multiple projective scales were selected and adapted from the existing literature review to measure the concepts of the proposed model. These scales have been used and validated in previous research. The final questionnaire covers aspects such as career development, learning motivation, and employment capabilities. To measure individuals' career development, the validated student career construction inventory (SCCI) scale by Jiang *et al.* [23] for Chinese university students was employed, consisting of 4 dimensions and 18 items, with the overall second-order factor structure of SCCI being reliable [23], the scale has a Cronbach's  $\alpha$  of 0.829,  $\chi^2/df=2.987$ , GFI=0.912, AGFI=0.871, RMSEA=0.072, indicating good reliability and validity. To assess learning motivation, a scale comprising twelve items developed by Peter and Tarpey [24] was utilized. For the evaluation of employment capabilities, the scale developed by Thomas *et al.* [25] was adopted, the scale has a Cronbach's  $\alpha$  of 0.731,  $\chi^2/df=2.458$ , GFI=0.949, AGFI=0.902, RMSEA=0.064, indicating good reliability and validity. The motivated strategies for learning questionnaire (MLSQ) [26], widely used to assess students' personality and behaviors in higher education environments, was used with 4 dimensions and 20 measurement items to adaptively gauge participants' overall learning motivation. Employment capabilities are a socio-psychological structure encompassing both subjective and objective aspects [27], consisting of 4 dimensions and 18 items. In the context of a survey involving Chinese graduate students, the second-order factor structure was found to be reliable [28], the scale has a Cronbach's  $\alpha$  of 0.913,  $\chi^2/df=2.253$ , GFI=0.954, AGFI 0.915, RMSEA=0.069, indicating good reliability and validity. A seven-point Likert scale was employed for responses, where 1 indicates 'strongly disagree' and 7 indicates 'strongly agree'.

The data for this study was collected from participants whose native language is Chinese. To ensure questionnaire accuracy, the ‘translation-back translation’ procedure proposed by Brislin [29] was used to translate the English version of the questionnaire into Chinese. Specifically, the original English questionnaire was sent to a professor in the school of foreign languages for Chinese translation. Subsequently, the translated Chinese questionnaire was back-translated into English by another English professor. By comparing these two English versions of the questionnaire, the quality of the measurement tool was ensured. Additionally, a pilot test was conducted to further validate the questionnaire content. The questionnaire was distributed to 10 junior and senior researchers, collecting their feedback and making appropriate modifications based on the feedback.

This study employed a stratified random sampling method and conducted surveys at five different universities. Each of these universities had a total of 1,600 full-time undergraduate students majoring in architecture. The sample size needed was calculated using the formula proposed by Dillman [30] as (1)

$$N_s = (Np)(p)(1 - p) / [(Np - 1)(B/C)^2 + (p)(1 - p)] \quad (1)$$

Where,  $N_s$ =required sample size;  $Np$ =population size;  $(p)(1 - p)$ =degree of heterogeneity in the population;  $B$ =tolerable sampling error, set at 0.05 ( $\pm 5\%$  sampling error);  $C$ =tolerable confidence interval (confidence level), typically set at 1.960 (corresponding to a 95% confidence interval). Thus, the minimum required sample size was approximately  $N_s \approx 310$ . With a sample size of  $N_s = 310$ , the sampling error precision was  $\pm 5\%$ , and the confidence level was 95%.

This study surveyed architecture undergraduates from five Chinese universities, with a total of 347 survey questionnaires collected. After removing invalid questionnaires that had consistently identical responses or contradictory answers between different sections, a total of 319 valid questionnaires remained, resulting in an effective response rate of 91.93%. Male students accounted for 86.21% of the participants, with 27.27% being third-year students. The distribution of the survey across the five schools was relatively even, reflecting a close alignment with the actual situation. The survey results from this study are in accordance with the real-world circumstances, thus possessing representativeness.

#### 4. RESULTS

This study employed Amos 26.0 software and used confirmatory factor analysis to test the construct validity of variables. Initially, a three-factor model was established. Subsequently, various fit indices such as  $\chi^2/df$ , RMSEA, CFI, GFI, and NFI were used to evaluate the model fit. As shown in Table 1, the three-factor model in Model 1 displayed favorable fit indices, with  $\chi^2/df=2.520$  ( $p>0.05$ ), RMSEA=0.057, CFI=0.961, GFI=0.907, and NFI=0.920. This indicates a good fit of the model to the data. The study also tested three alternative models: Model 2 combining career development and learning motivation, Model 3 combining learning motivation and employment capabilities, and Model 4 combining all variables into a single factor. By comparing the fit indices of these four models, it was found that Model 1 was more suitable for the data compared to the other three models. Burnham and Anderson [31] proposed indicators for model comparison and selection:  $\Delta AIC = AIC - AIC_{min}$ , where  $AIC_{min}$  is the minimum AIC value among a set of related models. This transformation provides robust evidence for model comparison. Regarding AIC, the interpretation rules are: when  $\Delta AIC \leq 2$ , the support for the model is strongest; when  $4 \leq \Delta AIC \leq 7$ , the support is weaker; and when  $AIC \geq 10$ , the model is no longer supported. The  $\Delta AIC$  value for Model 1 is 0, indicating strong support for the distinctiveness of the three variables in this study [31].

The means, standard deviations, correlation coefficients, and reliability coefficients of each variable are presented in Table 2. Employment capabilities were significantly positively correlated with career development ( $r=0.405$ ,  $p<0.01$ ) and learning motivation ( $r=0.508$ ,  $p<0.01$ ). These findings suggest that students who exhibit higher levels of employment capabilities tend to demonstrate more robust career development and a greater motivation to learn. This positive association indicates that the development of employment-related skills may act as a catalyst for students’ career growth and their enthusiasm for continuous learning. Career development were significantly positively correlated with employment capabilities ( $r=0.552$ ,  $p<0.01$ ). Thus, the results of the correlation coefficients provide initial evidence for hypothesis validation. This means that as students make progress in their careers, their employment capabilities tend to improve, and vice versa. These findings lend strong support to the notion that career development and employment capabilities are mutually reinforcing constructs.

The structural model was evaluated using standard assessment criteria, including the ‘‘coefficient of determination ( $R^2$ )’’, as well as the statistical significance and correlations of path coefficients’’. As depicted in Figure 2, the values of  $R^2$  are: learning motivation (18.6%) and employment capabilities (24.1%). The structural model primarily aimed to test hypothesis relationships. This study employed bootstrapping

procedures to test the research model, obtaining path estimate values to validate the hypotheses. Career development positively influenced employment capabilities, confirming H1 ( $\beta=0.223, p<0.001$ ). Career development positively influenced learning motivation, confirming H2 ( $\beta=0.431, p<0.001$ ). Simultaneously, learning motivation positively influenced employment capabilities, confirming H3 ( $\beta=0.397, p<0.001$ ).

Table 1. Results of confirmatory factor analysis

| Model | Factor                     | $\chi^2/df$ | RMSEA | CFI   | GFI   | NFI   | $\Delta AIC$ |
|-------|----------------------------|-------------|-------|-------|-------|-------|--------------|
| 1     | Three factors (CA, LM, EC) | 2.520       | 0.057 | 0.961 | 0.907 | 0.920 | 0            |
| 2     | Two factors (CA+LM, EC)    | 3.801       | 0.082 | 0.902 | 0.831 | 0.886 | 43.150       |
| 3     | Two factors (CA, LM+EC)    | 4.227       | 0.102 | 0.885 | 0.822 | 0.803 | 87.822       |
| 4     | Single factor (CA+LM+EC)   | 7.474       | 0.119 | 0.750 | 0.713 | 0.791 | 94.563       |

Notes: \*\* $p<.01$ , \*\*\* $p<.001$  (two-tailed tests); CA=career development; LM=learning motivation; EC=employment capabilities

Table 2. Means, standard deviations, correlations, and reliability coefficients of variables

| Variables | M     | SD    | CA      | LM      | EC     |
|-----------|-------|-------|---------|---------|--------|
| CA        | 3.653 | 0.903 | (.829)  |         |        |
| LM        | 3.306 | 0.750 | 0.552** | (.731)  |        |
| EC        | 3.545 | 0.645 | 0.405** | 0.508** | (.913) |

Note: \*\* $p<0.01$ ; diagonal represents Cronbach's  $\alpha$  coefficient values; CA=career development; LM=learning motivation; EC=employment capabilities

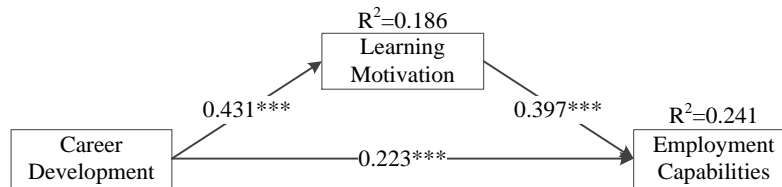


Figure 2. Results of structural model

According to the calculations using the Bootstrap method, the indirect effect of career development on employment capabilities through learning motivation is 0.171, and it is statistically significant. Thus, this supports hypothesis H4: the learning motivation of architecture undergraduates serves as a mediator between career development and employment capabilities. This indicates that part of the influence of career development on employment capabilities is realized through learning motivation.

5. DISCUSSION

Career development positively influences the employment capabilities of architecture undergraduates. This result aligns with the perspectives of Ibrahim *et al.* [8] and Dachner *et al.* [9], indicating that an individual's career planning and goal-setting can positively impact their employment capabilities such as professional skills, communication abilities, and innovative thinking. By engaging in proactive career planning, architecture undergrads can better understand their career positioning and objectives, enabling them to target the cultivation and enhancement of relevant employment capabilities to effectively adapt to the evolving demands of the architectural industry. Therefore, educational institutions can establish more comprehensive career development programs, including career planning, internships, workshops, and more [20]. These programs can help students clarify their career goals, plan their career paths, and acquire the necessary skills for entering the workforce. Such initiatives can promote students' career success and enhance their employability.

Career development positively influences the learning motivation of architecture undergraduates. This suggests that within the context of career development, individuals are more motivated to actively engage in learning and development to enhance their competitiveness in future careers [12]. The clarity and significance of career goals can stimulate individuals' learning motivation, driving them to invest their energy into acquiring the necessary knowledge and skills. Therefore, educational institutions should focus on stimulating students' intrinsic learning motivation. This can be achieved by designing challenging courses with clear real-world relevance and by providing projects and cases related to actual careers [21]. Teachers can also employ teaching methods that inspire students' interest and motivation to learn.

Learning motivation positively influences the employment capabilities of architecture undergraduates. This implies that learning motivation is one of the crucial factors in the development of employment capabilities among architecture undergrads [14], [15]. High levels of learning motivation may prompt students to invest more effort into learning, continuously enhance their technical and innovative abilities, strengthen their communication and collaboration skills, thus better meeting the requirements of future careers. Architecture programs can improve their curriculum by incorporating elements related to career development and motivation. This can include increased interaction with industry experts, practical projects, and a greater emphasis on real-world applications and problem-solving in teaching methods [2]. These enhancements will better prepare students for their careers while boosting their motivation.

The learning motivation of architecture undergraduates serves as a mediator between career development and employment capabilities. This finding suggests that individuals, while pursuing their career goals, can enhance their employment capabilities through active learning motivation [16], [17]. Learning motivation acts as a bridge, linking an individual's career development vision with practical skills development, enabling them to effectively address challenges and opportunities in their professional field. Schools can collaborate with industry partners to provide students with practical experience and exposure to real-world projects. These partnerships can help students gain a deeper understanding of the professional context and acquire the skills needed for success in the field of architecture.

Practical contributions: career development positively impacts the employment capabilities of students majoring in architecture. Higher education institutions can establish more comprehensive career development programs, such as career planning, internships, and workshops, to assist students in clarifying their professional goals and planning their career paths, thereby enhancing their employability. Career development also positively influences students' learning motivation. Higher education institutions should focus on stimulating students' intrinsic learning motivation, for example, by designing challenging courses and projects relevant to actual professions, and employing teaching methods that inspire students' interest and motivation to learn. Learning motivation acts as a mediator between students' career development and employment capabilities. Educational curricula should strengthen interactions with industry experts and focus on practical projects and problem-solving teaching methods to better prepare students for their future careers and enhance their motivation. Furthermore, collaboration between universities and the industry, providing students with practical experience and exposure to real-world projects, helps students gain a deeper understanding of the professional context and acquire the skills needed for success.

Theoretical contributions: this study explores the relationship between career development, learning motivation, and employment capabilities within the framework of the expectancy-value theory, enriching its application in the field of architectural education. The study emphasizes the importance of career planning and goal setting in enhancing employment capabilities such as professional skills, communication abilities, and innovative thinking. It confirms the mediating role of learning motivation between career development and employment capabilities, suggesting that active learning motivation can enhance an individual's employment capabilities. The findings provide valuable insights for higher education and career development counseling, highlighting the importance of integrating theoretical knowledge with practical application.

## 6. CONCLUSION




This study delved into the relationship between career development, learning motivation, and employment capabilities using the expectancy-value theory as a framework. These findings hold significant theoretical and practical implications for the career development and enhancement of employment capabilities among architecture undergraduates. From a theoretical perspective, this study enriches the application of the expectancy-value theory, emphasizing the roles of career development and learning motivation in the cultivation of employment capabilities. From a practical standpoint, the research results offer valuable insights for higher education and career development counseling. Educators can foster students' awareness of career planning and cultivate positive learning motivation, thereby effectively promoting the enhancement of their employment capabilities.

## REFERENCES




- [1] M. Akour and M. Alenezi, "Higher education future in the era of digital transformation," *Education Sciences*, vol. 12, no. 11, p. 784, Nov. 2022, doi: 10.3390/educsci12110784.
- [2] S. Durdyyev and A. Ihtiyar, "Structural equation model of factors influencing students to major in architecture, engineering, and construction," *Journal of Professional Issues in Engineering Education and Practice*, vol. 145, no. 2, p. 05018019, Apr. 2019, doi: 10.1061/(ASCE)EI.1943-5541.0000402.
- [3] K. Y. Cheng and G. Hao, "New Zealand architectural technology graduates' employability: how the work-integrated learning performance during studies contributes to graduate employment and future career success," in *Applied degree education and the*

- shape of things to come*, Singapore: Springer Nature Singapore, 2023, pp. 249–268, doi: 10.1007/978-981-19-9315-2\_14.
- [4] H. de Wit and P. G. Altbach, “Internationalization in higher education: global trends and recommendations for its future,” in *Higher Education in the Next Decade*, vol. 5, no. 1, BRILL, 2021, pp. 303–325, doi: 10.1163/9789004462717\_016.
- [5] C. Succi and M. Canovi, “Soft skills to enhance graduate employability: comparing students and employers’ perceptions,” *Studies in Higher Education*, vol. 45, no. 9, pp. 1834–1847, Sep. 2020, doi: 10.1080/03075079.2019.1585420.
- [6] L. M. Khodeir and A. A. Nessim, “Changing skills for architecture students employability: analysis of job market versus architecture education in Egypt,” *Ain Shams Engineering Journal*, vol. 11, no. 3, pp. 811–821, Sep. 2020, doi: 10.1016/j.asej.2019.11.006.
- [7] M. F. Elaby, H. M. Elwishy, S. F. Moatamed, M. A. Abdelwahed, and A. E. Rashiedy, “Does design-build concept improve problem-solving skills? An analysis of first-year engineering students,” *Ain Shams Engineering Journal*, vol. 13, no. 6, p. 101780, Nov. 2022, doi: 10.1016/j.asej.2022.101780.
- [8] A. F. Ibrahim, A. S. Attia, A. M. Bataineh, and H. H. Ali, “Evaluation of the online teaching of architectural design and basic design courses case study: College of Architecture at JUST, Jordan,” *Ain Shams Engineering Journal*, vol. 12, no. 2, pp. 2345–2353, Jun. 2021, doi: 10.1016/j.asej.2020.10.006.
- [9] A. M. Dachner, J. E. Ellingson, R. A. Noe, and B. M. Saxton, “The future of employee development,” *Human Resource Management Review*, vol. 31, no. 2, p. 100732, Jun. 2021, doi: 10.1016/j.hrmr.2019.100732.
- [10] W. F. M. Yusoff, N. H. Ja’afar, and N. Mohammad, “Perception of architecture students on factors influencing the selection of locations for academic trip and site visit,” *Journal of Technical Education and Training*, vol. 11, no. 3, pp. 22–31, Sep. 2019, doi: 10.30880/jtet.2019.11.03.004.
- [11] P. O. Garriott, “A critical cultural wealth model of first-generation and economically marginalized college students’ academic and career development,” *Journal of Career Development*, vol. 47, no. 1, pp. 80–95, Feb. 2020, doi: 10.1177/0894845319826266.
- [12] J. Ferrer, A. Ringer, K. Saville, M. A. Parris, and K. Kashi, “Students’ motivation and engagement in higher education: the importance of attitude to online learning,” *Higher Education*, vol. 83, no. 2, pp. 317–338, Feb. 2022, doi: 10.1007/s10734-020-00657-5.
- [13] J. Hattie, F. A. Hodis, and S. H. K. Kang, “Theories of motivation: integration and ways forward,” *Contemporary Educational Psychology*, vol. 61, p. 101865, Apr. 2020, doi: 10.1016/j.cedpsych.2020.101865.
- [14] G. Newman, B. George, D. Li, Z. Tao, S. Yu, and R. J. Lee, “Online learning in landscape architecture: assessing issues, preferences, and student needs in design-related online education,” *Landscape Journal*, vol. 37, no. 2, pp. 41–63, Jan. 2018, doi: 10.3368/lj.37.2.41.
- [15] P.-H. Diao and N.-J. Shih, “Trends and research issues of augmented reality studies in architectural and civil engineering education-A review of academic journal publications,” *Applied Sciences*, vol. 9, no. 9, p. 1840, May 2019, doi: 10.3390/app9091840.
- [16] A. Lo Presti, V. Capone, A. Aversano, and J. Akkermans, “Career competencies and career success: on the roles of employability activities and academic satisfaction during the school-to-work transition,” *Journal of Career Development*, vol. 49, no. 1, pp. 107–125, Feb. 2022, doi: 10.1177/0894845321992536.
- [17] T. T. H. Ho, V. H. Le, D. T. Nguyen, C. T. P. Nguyen, and H. T. T. Nguyen, “Effects of career development learning on students’ perceived employability: a longitudinal study,” *Higher Education*, vol. 86, no. 2, pp. 297–315, Aug. 2023, doi: 10.1007/s10734-022-00933-6.
- [18] J. S. Eccles and A. Wigfield, “From expectancy-value theory to situated expectancy-value theory: a developmental, social cognitive, and sociocultural perspective on motivation,” *Contemporary Educational Psychology*, vol. 61, p. 101859, Apr. 2020, doi: 10.1016/j.cedpsych.2020.101859.
- [19] M. A. Qureshi, A. Khaskheli, J. A. Qureshi, S. A. Raza, and S. Q. Yousufi, “Factors affecting students’ learning performance through collaborative learning and engagement,” *Interactive Learning Environments*, vol. 31, no. 4, pp. 2371–2391, May 2023, doi: 10.1080/10494820.2021.1884886.
- [20] B. Motiei, F. M. Saradj, and Q. Bayzidi, “Simultaneous teaching of basic architecture courses: a factor affecting students’ academic motivation; case study: the contents of practical geometry,” *Armanshahrjournal.Com*, vol. 12, no. 29, pp. 183–194, 2020, doi: 10.22034/AAUD.2020.102376.
- [21] M. Sadeghi, H. R. Kolvir, and H. Akbari, “The role of self-efficacy and academic motivation in predicting creativity of architecture students (study sample: Faculty of Architecture, University of Mohaghegh Ardabili),” *Honar-Ha-Ye-Ziba: Memaary Va Shahrsazi*, vol. 26, no. 4, pp. 53–60, 2022, doi: 10.22059/JFAUP.2022.309200.672524.
- [22] L. Li, “Education supply chain in the era of Industry 4.0,” *Systems Research and Behavioral Science*, vol. 37, no. 4, pp. 579–592, Jul. 2020, doi: 10.1002/sres.2702.
- [23] X. Jiang, Y. Li, Y. Hou, N. Chima, and J. Yang, “The reliability and validity of a Chinese version of the student career construction inventory,” *Social Behavior and Personality: an international journal*, vol. 50, no. 5, pp. 1–11, May 2022, doi: 10.2224/sbp.11421.
- [24] J. P. Peter and L. X. Tarpey, Sr., “A comparative analysis of three consumer decision strategies,” *Journal of Consumer Research*, vol. 2, no. 1, pp. 29–37, Jun. 1975, doi: 10.1086/208613.
- [25] I. Thomas, M. Barth, and T. Day, “Education for sustainability, graduate capabilities, professional employment: how they all connect,” *Australian Journal of Environmental Education*, vol. 29, no. 1, pp. 33–51, Jul. 2013, doi: 10.1017/ae.2013.14.
- [26] F. Wang, C. Jiang, R. B. King, and S. O. Leung, “Motivated strategies for learning questionnaire (MSLQ): adaptation, validation, and development of a short form in the Chinese context for mathematics,” *Psychology in the Schools*, vol. 60, no. 6, pp. 2018–2040, Jun. 2023, doi: 10.1002/pits.22845.
- [27] F. Khakunova, A. Bersirova, N. Khakunov, and S. Bersirova, “Psychological and pedagogical aspects of international students’ adjustment to the cultural and educational university environment,” *E3S Web of Conferences*, vol. 210, p. 19009, Dec. 2020, doi: 10.1051/e3sconf/202021019009.
- [28] W. X. Zhao, M. Y. P. Peng, and F. Liu, “Cross-cultural differences in adopting social cognitive career theory at student employability in PLS-SEM: the mediating roles of self-efficacy and deep approach to learning,” *Frontiers in Psychology*, vol. 12, p. 586839, Jun. 2021, doi: 10.3389/fpsyg.2021.586839.
- [29] R. W. Brislin, “Translation and content analysis of oral and written materials,” in *Handbook of cross-cultural psychology: methodology*, Boston: Allyn and Bacon, 1980, pp. 389–444.
- [30] D. A. Dillman, *Mail and web-based survey: the tailored design method*. New York: John Wiley & Sons, 2000.
- [31] K. P. Burnham and D. R. Anderson, *Model selection and multimodel inference: a practical information-theoretic approach*. New York: Springer, 2010.

**BIOGRAPHIES OF AUTHORS**

**Zi Ming Fan**    is currently pursuing a Ph.D. in Educational Management at the International College (IC) of Krirk University in Thailand. His research focuses on university students' employability, particularly in the field of architecture undergraduate programs, learning motivation, and employment capabilities. He can be contacted at email: arcgunpla@gmail.com.



**Juo-Lan Yeh**    is a lecturer at International College (IC) of Krirk University in Thailand. Her research focuses on educational administration, educational leadership, curriculum design and instruction, innovative management and curriculum teaching, health promotion, innovative curriculum, bilingual teaching, comprehensive activities, educational sociology, ASEAN new immigrant cultural interaction, and more. She can be contacted at email: hs27242724@gmail.com.