

Do Career Guidance Interventions Boost Career Decision-Making Self-Efficacy and Career Adaptability Among College Students? A Systematic Review and Meta-Analysis of Controlled Studies

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ABSTRACT

Career guidance is widely used in higher education, yet its effects on career decision-making self-efficacy (CDSE) and career adaptability (CA) have not been jointly synthesized across controlled studies. Following PRISMA 2020, OpenAlex, ERIC, and Europe PMC were searched on 11 September 2026 for randomized or non-randomized controlled studies of post-secondary students published from 2010. Fourteen studies met the inclusion criteria; 12 studies contributing 13 effect sizes were meta-analyzed with random-effects models using Hedges' g . After excluding three statistical outliers, career guidance produced a moderate improvement in CDSE ($g = 0.50$, 95% CI [0.27, 0.72]). The pooled effect on CA was moderate to large ($g = 0.79$, 95% CI [0.41, 1.17]). Effects did not differ significantly by design, region, or delivery format, although subgroup analyses were underpowered. Structured career guidance appears to improve both CDSE and CA, but evidence certainty is low and more rigorous trials are needed, particularly in vocational and private-college settings.

Keywords: career guidance, career decision-making self-efficacy, career adaptability, college students, meta-analysis.

Introduction

The transition from higher education to work has become one of the most consequential and least predictable stages of early adulthood. In China alone, the graduating cohort of 2026 was projected to reach 12.7 million students (Ministry of Education of the People's Republic of China

[MOE], 2025b), while the higher vocational (junior college) sector enrolled 17.6 million students across 1,562 institutions in 2024, and 390 of the country's 803 private higher-education institutions were higher vocational colleges (MOE, 2025a). Students in vocational and private institutions may have access to fewer career-

related social and informational resources than their peers at research universities, which places a premium on the career guidance that colleges provide. Chinese higher-education institutions have been required to offer career development and employment guidance courses since 2007 (MOE, 2007), yet the evidence base that could inform how such guidance should be designed and what outcomes it can realistically change remains fragmented.

Two psychological resources are especially relevant to a successful school-to-work transition. The first is career decision-making self-efficacy (CDSE), defined as individuals' confidence in their ability to complete the tasks required to make career decisions — accurate self-appraisal, gathering occupational information, selecting goals, planning, and solving problems (Betz et al., 1996; Taylor & Betz, 1983). Grounded in social cognitive career theory (SCCT; Lent et al., 1994), CDSE is thought to shape career exploration, choice commitment, and persistence. The second is career adaptability (CA), a central construct in career construction theory (Savickas, 2005) that refers to the self-regulatory psychosocial resources of concern, control, curiosity, and confidence that people draw on to cope with vocational development tasks and transitions (Savickas & Porfeli, 2012). CA has been measured across cultures with the Career Adapt-Abilities Scale, including a validated China form (Hou et al., 2012), and meta-analytic evidence links it to adaptive attitudes, behaviours, and outcomes such as employability, career satisfaction, and well-being (Rudolph et al., 2017). CDSE and CA are strongly and positively associated (Stead et al., 2022), and both are, in principle, malleable through intervention.

Career guidance interventions in higher education take many forms, from credit-bearing career planning courses and structured group programmes to individual counselling, coaching, mentoring, and online modules. Earlier syntheses have established that career choice interventions are generally effective and have identified “critical ingredients” such as written exercises, individualised interpretation and feedback,

occupational information, modelling, and attention to support building (Brown et al., 2003; Whiston et al., 2017). With respect to CDSE specifically, a meta-analysis of 20 studies with university students reported a large average increase following career interventions (Ulaş Kılıç, 2019), and a systematic review of career interventions for university students concluded that most interventions yielded positive outcomes but that designs and outcome measures were heterogeneous (Soares et al., 2022).

Three gaps nevertheless remain. First, no meta-analysis has pooled the effects of career interventions on CA — the core outcome of the career construction and life-design paradigms that now underpin many guidance programmes — alongside CDSE in the same framework. Second, the earlier CDSE meta-analysis pooled studies up to the late 2010s; a substantial number of controlled evaluations, many from East Asia and increasingly delivered online, have appeared since then. Third, pooled estimates can be distorted by small studies reporting implausibly large effects; previous reviews have rarely examined how robust estimates are to such outliers, to the choice of effect size metric for pre-post-control designs, or to small-study effects. For practitioners in vocational colleges, who must decide how to allocate scarce guidance resources, a transparent and conservative estimate of what can be expected from guidance is more useful than an optimistic one.

The present systematic review and meta-analysis therefore addressed four research questions: (RQ1) Do career guidance interventions improve CDSE among post-secondary students relative to control conditions? (RQ2) Do they improve CA? (RQ3) Do effects vary by study design, geographical region, or delivery format? and (RQ4) How robust are the pooled estimates to outliers, analytic assumptions, and small-study effects? Implications are drawn for career guidance in vocational and private colleges.

2. Methodology

2.1 Protocol and reporting

The review was conducted and reported in accordance with the PRISMA 2020 statement (Page et al., 2021). The protocol was not prospectively registered. All deviations from the planned procedures are reported below. The extracted data and analysis code are provided as supplementary material.

2.2 Eligibility criteria

Eligibility was defined using the PICOS framework. *Population*: students enrolled in post-secondary education (universities, colleges, higher vocational or community colleges, and graduate programmes) or graduates in the transition year; studies of secondary-school students, employees, or adult job-seekers were excluded. *Intervention*: any structured career guidance intervention whose stated aim was to promote career development, including courses, group programmes or workshops, individual counselling or coaching, mentoring, and online programmes; interventions primarily targeting other goals (e.g., physical exercise, mental health, service learning) were excluded. *Comparison*: a no-intervention, wait-list, or treatment-as-usual control group. *Outcomes*: CDSE measured with a CDSE scale or an adaptation thereof and/or CA measured with the Career Adapt-Abilities Scale or another validated CA measure. *Study design*: randomised controlled trials and non-randomised controlled studies with pre- and post-intervention (or post-intervention only) measurement in both groups; single-group pre-post studies were excluded. Studies had to be published in English in a peer-reviewed journal between January 2010 and the search date. The start date was chosen to capture contemporary interventions following the introduction of the career construction/life-design paradigm and the international CAAS (Savickas & Porfeli, 2012).

2.3 Information sources and search strategy

OpenAlex (a comprehensive open bibliographic index covering journal articles across publishers), ERIC, and Europe PMC (which includes MEDLINE/PubMed) were searched on 11

September 2026. The search combined three concept blocks applied to titles and abstracts: (a) outcome terms (“career adaptability”, “career adapt-abilities”, “career decision self-efficacy”, “career decision-making self-efficacy”, “career decision making self-efficacy”); (b) intervention terms (intervention, program, programme, course, counseling, counselling, workshop, training, guidance, experiment, randomized, “quasi-experimental”); and (c) population terms (student, students, undergraduate, college, university, vocational, graduates). Full database-specific search strings are provided in Supplementary Table S1.

2.4 Selection process

Records from all sources were merged and de-duplicated using DOIs and normalised titles. Records that were not journal articles (e.g., dissertations, conference papers, book chapters, preprints) or that were published before 2010 were removed. Because the concept-based search retrieved a large number of correlational studies, a transparent rule-based filter was applied before screening: records with an abstract were retained only if the title or abstract contained terms indicating an evaluated intervention (e.g., control, comparison, experimental or intervention group; wait-list; randomised; quasi-experimental; pre-/post-test; effectiveness; evaluation), and records without an abstract were retained if the title referred to an intervention, programme, course, counselling, training, or similar. The remaining titles and abstracts were screened against the eligibility criteria, and the full texts of potentially eligible reports were assessed. Screening and full-text assessment were conducted with the assistance of an AI tool (Claude, Anthropic) under the supervision of the first author.

2.5 Data collection and data items

For each study, the following information was extracted: bibliographic details; country; participants’ educational level and discipline; design and method of allocation; intervention content, theoretical basis, format, number of sessions, and duration; control condition; outcome measures; and group sample sizes, means, and standard deviations at pre-test and

post-test. Numerical values were copied from tables or text in the original reports and recorded together with their location in the source (Supplementary Table S2). [AUTHOR ACTION: all extracted values must be verified independently against the original PDFs by a second reviewer before submission.] When results were reported only for subscales, a composite effect was computed (see Section 2.7). When group-specific standard deviations were not reported but the total-sample standard deviation was, the latter was used (one study; Hui et al., 2021). Where a study included more than one active arm, the arm that best matched the review question was compared with the no-intervention control (Kim, 2022).

2.6 Study quality (risk of bias)

Because most studies were non-randomised, methodological quality was appraised with the nine-item JBI Critical Appraisal Checklist for Quasi-Experimental Studies (Tufanaru et al., 2020), which was also applied to randomised studies for comparability. Items address clarity of the causal sequence, baseline similarity of groups, similarity of treatment other than the intervention, presence of a control group, multiple measurements, completeness of follow-up, consistency and reliability of outcome measurement, and appropriateness of the statistical analysis. Each item was rated as yes, no, or unclear.

2.7 Effect measures

The effect size was the standardised mean difference of change for pretest–posttest–control designs, d_{ppc2} (Morris, 2008): the difference between the intervention and control groups' pre-to-post mean changes divided by the pooled pre-test standard deviation, multiplied by the small-sample correction factor, yielding an estimate equivalent to Hedges' g . Its sampling variance was computed with Morris's (2008) formula, which requires the pre–post correlation; because this correlation was not reported, $\rho = .50$ was assumed and $\rho = .30$ and $.70$ were examined in sensitivity analyses. Positive values indicate greater improvement in the intervention group. For studies reporting only subscale scores (da

Silva et al., 2026; Ünder et al., 2023), subscale effects were averaged and the variance of the composite was computed assuming an inter-subscale correlation of $.70$ (Borenstein et al., 2009), with $.50$ and $.90$ examined in sensitivity analyses. In Ünder et al. (2023), the post-test value for one of five subscales was missing from the published table, so the composite was based on the four available subscales.

2.8 Synthesis methods

Separate meta-analyses were conducted for CDSE and CA because they are distinct constructs. Random-effects models were fitted with restricted maximum-likelihood (REML) estimation of the between-study variance (τ^2), and confidence intervals were computed with the Hartung–Knapp–Sidik–Jonkman (HKSJ) adjustment, which performs better than conventional methods when the number of studies is small (IntHout et al., 2014). Heterogeneity was quantified with Cochran's Q , I^2 (Higgins & Thompson, 2002), τ^2 , and 95% prediction intervals (Riley et al., 2011). Influential outliers were identified iteratively with studentised deleted residuals ($|z| > 2.5$; Viechtbauer & Cheung, 2010), and pooled estimates are reported with and without outliers. Sensitivity analyses comprised leave-one-out analyses, alternative values of ρ and of the inter-subscale correlation, and restriction to randomised or non-randomised studies. To examine moderators with adequate numbers of studies, a study-level data set was created in which each study contributed one effect (the average of the CDSE and CA effects for the single study reporting both, assuming a correlation of $.60$ between them); subgroup analyses by design (randomised vs. non-randomised), region (East Asia vs. other), and delivery format (course-based, structured group programme, individual/dyadic) were conducted on this data set with separate τ^2 estimates per subgroup and a Q -between test. Small-study effects were examined with funnel plots, Egger's regression test (Egger et al., 1997), and Duval and Tweedie's (2000) trim-and-fill method, bearing in mind that these tests have low power when fewer than ten studies are available (Sterne et al., 2011).

All analyses were conducted in Python (NumPy/SciPy) with purpose-written code that implements the procedures above (Supplementary File S5). Effect sizes of 0.2, 0.5, and 0.8 were interpreted as small, medium, and large (Cohen, 1988).

2.9 Certainty of evidence

The certainty of the evidence for each outcome was judged informally following GRADE principles, considering risk of bias, inconsistency, indirectness, imprecision, and publication bias.

3. Results

3.1 Study selection

The searches yielded 2,329 records (OpenAlex, 1,876; ERIC, 360; Europe PMC, 93). After removing 407 duplicates, 335 non-journal records, 116 records published before 2010, and

479 records flagged by the rule-based filter, 992 records were screened, of which 917 were excluded. Of the 75 reports sought for retrieval, 55 could not be obtained in full text (predominantly subscription articles; listed in Supplementary Table S3). Of the 20 full-text reports assessed, four were excluded because they lacked a control group and two because the full text was not in English (Supplementary Table S4). Fourteen studies met the inclusion criteria. Two of these could not be included in the meta-analyses: Nik Yusoff et al. (2024) reported only within-group repeated-measures statistics, and Ulaş Kılıç (2024) reported a post-test mean (219.3) that exceeded the reported maximum observed score (216), indicating an error that precluded reliable effect size computation. Twelve studies contributing 13 effect sizes were meta-analysed (Figure 1).

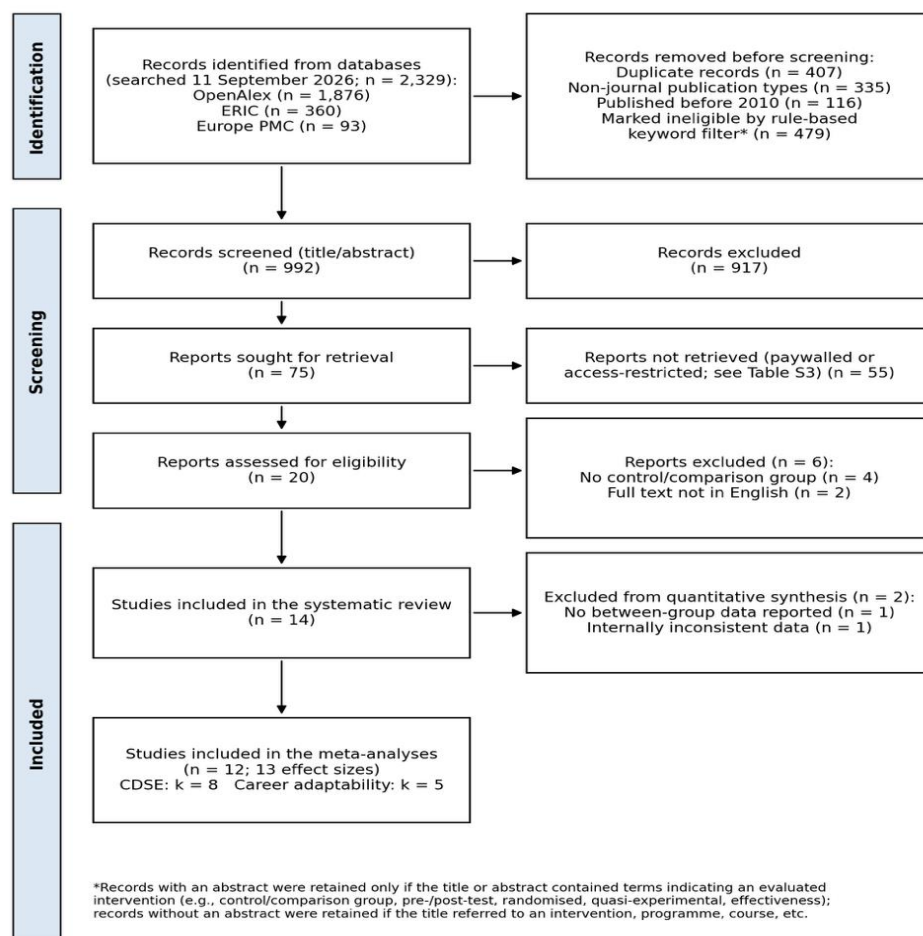


Figure 1. PRISMA 2020 flow diagram of study selection.

3.2 Characteristics of included studies

Table 1 summarises the 14 included studies. The 12 studies in the meta-analyses involved 1,050 participants and were published between 2010 and 2026, ten of them since 2021. They were conducted in China (two studies), Hong Kong (one), South Korea (two), Türkiye (two), Malaysia, Thailand, Italy, the Netherlands, and Brazil (one each). Nine studies sampled undergraduates (three of them final-year or graduating students), two sampled postgraduate students, and one sampled a mix of bachelor's and master's students. No included study specifically sampled students of higher vocational (junior) colleges. Four studies used random

allocation and eight were non-randomised. Four interventions were course-based (e.g., a 15-week career planning course), four were structured group programmes or workshops (including one online programme and one extracurricular experiential programme), and four were individual or dyadic (career coaching, career construction counselling, peer mentoring). Interventions were typically grounded in career construction/life-design theory or SCCT, and ranged from three sessions to a semester-long course. CDSE was measured with the CDSE-Short Form or adaptations in most studies, and CA with national versions of the CAAS or the Korean Career Adaptability Scale.

Table 1. Characteristics of the included studies

Study	Country	Participants	Design	Intervention (format; dose)	Control	Outcome(s); measure	n (I/C)
Zhang et al. (2025)	China	Medical-university undergraduates	Non-randomised (intact classes)	Career planning education course (CCT + SCT); 10 × 1.5 h group sessions over 5 weeks	Wait-list	CA: CAAS-China; CDSE: CDMSE-SF	40/35
Kim (2022)	South Korea	Private-university undergraduates	Random allocation to three arms	Online career adaptability programme in curriculum; 13 weekly 2-h sessions	No programme	CA: K-CAS (44 items)	54/53
Zammiti et al. (2023)	Italy	Psychology bachelor's/master's students	Non-randomised (matched wait-list)	Online group career counselling (life design, positive psychology); 3 synchronous meetings + 13 online activities over 45 days	Wait-list	CA: CAAI (Italian CAAS)	30/30
Hui et al. (2021)	Hong Kong, China	Undergraduates	Non-randomised (self-selected)	Extracurricular active-learning programme; 13 half-day sessions over ~3 months	Non-participating classmates	CA: CAAS-China	32/87
Cheng & Wu (2025)	Thailand	Final-year nursing undergraduates	Random assignment (paired)	Structured one-to-one peer mentoring during internship; ≥ 8 sessions of ≥ 40 min	Traditional internship	CDSE: CDSE-SF	38/38
da Silva et al. (2026)	Brazil	Graduate business students	Non-randomised (alternating allocation)	Individual career construction counselling; 3 × ~1 h	Regular classes	CA: CAAS-Brazil (subscales)	21/20
Fris et al. (2025)	Netherlands	Medical master's students	RCT (wait-list)	Individual solution-focused (GROW) coaching; 5 sessions over ~8 months	Wait-list	CDSE: 3 goal-selection items (CDSE)	94/130
Mustafa et al. (2017)	Malaysia	Education undergraduates	Non-randomised	Career Integration Module (SCCT, Holland); 16 h over 2 days, group	No intervention	CDSE: CDMSE-SF	32/32

Study	Country	Participants	Design	Intervention (format; dose)	Control	Outcome(s); measure	n (I/C)
Jeon & Koh (2025)	South Korea	First-year nursing students	Non-randomised (elective vs. non-elective)	Credit-bearing self-management and career planning course; 15 weeks	Usual university activities	CDSE: CDSE (25 items)	29/28
Ünder et al. (2023)	Türkiye	Final-year undergraduates	Non-randomised	“Transition to Professional Life” course; 10 weekly 1-h online sessions	No course	CDSE: CDMSE (45 items; subscales)	66/103
Wang et al. (2010)	China	Undergraduates with low CDMSE	Random assignment	Group attribution-based training; weekly 90-min sessions	No training	CDSE: Chinese CDMSE (39 items)	17/17
Esen & İpçi (2022)	Türkiye	Final-year business undergraduates	Non-randomised (voluntary)	SCCT-based career coaching; 6 weekly 60-min sessions	No intervention	CDSE: CDSES	12/12
Ulaş Kılıç (2024) ^a	Türkiye	Final-year counselling students	Non-randomised (course selection)	Career counselling interviewing-skills course; 14 weeks	Non-enrolled peers	CDSE: CDMSE (45 items)	26/23
Nik Yusoff et al. (2024) ^a	Malaysia	Second-year computing undergraduates	Randomised (matched)	Career Readiness Module; 15 activities over 8 weeks	Control	CDSE: CDSE-SF	30/30

Note. I/C = intervention/control; CA = career adaptability; CDSE = career decision-making self-efficacy; CAAS = Career Adapt-Abilities Scale; CAAI = Career Adapt-Abilities Inventory; K-CAS = Korea Career Adaptability Scale; CDMSE-SF/CDSE-SF = Career Decision (Making) Self-Efficacy Scale–Short Form; CCT = career construction theory; SCT/SCCT = social cognitive (career) theory; RCT = randomised controlled trial. ^aIncluded in the systematic review but not in the meta-analyses (see Section 3.1).

3.3 Study quality

Preliminary quality ratings are shown in Table 2. All studies had a control group, measured

outcomes before and after the intervention in the same way, and used scales with established reliability in most cases. The most common weaknesses were uncertain baseline comparability in non-randomised studies (one study reported a significant baseline difference in CDSE favouring the control group; Esen & İpçi, 2022), limited information on whether groups were otherwise treated alike, incomplete reporting of attrition, and analyses that did not directly compare change between groups (e.g., separate within-group tests). Only one study (Fris et al., 2025) was a large randomised trial. Overall, the risk of bias was judged to be moderate to high for most non-randomised studies.

Table 2. Methodological quality of the included studies (JBI checklist for quasi-experimental studies)

Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Yes
Zhang et al. (2025)	Y	U	U	Y	Y	Y	Y	Y	Y	7/9
Kim (2022)	Y	Y	Y	Y	Y	U	Y	Y	Y	8/9
Zammiti et al. (2023)	Y	U	U	Y	Y	Y	Y	Y	Y	7/9
Hui et al. (2021)	Y	U	U	Y	Y	U	Y	Y	Y	6/9
Cheng & Wu (2025)	Y	Y	U	Y	Y	Y	Y	Y	U	7/9
da Silva et al. (2026)	Y	Y	U	Y	Y	Y	Y	Y	Y	8/9

Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Yes
Fris et al. (2025)	Y	Y	Y	Y	Y	U	Y	U	Y	7/9
Mustafa et al. (2017)	Y	U	U	Y	Y	Y	Y	Y	U	6/9
Jeon & Koh (2025)	Y	U	U	Y	Y	Y	Y	Y	U	6/9
Ünder et al. (2023)	Y	Y	U	Y	Y	U	Y	Y	U	6/9
Wang et al. (2010)	Y	Y	Y	Y	Y	Y	Y	Y	U	8/9
Esen & İpçi (2022)	Y	N	U	Y	Y	Y	Y	U	Y	6/9
Ulaş Kılıç (2024)	Y	U	U	Y	Y	Y	Y	Y	U	6/9
Nik Yusoff et al. (2024)	Y	Y	U	Y	Y	U	Y	Y	N	6/9

Note. Y = yes; N = no; U = unclear. Q1 = clear cause–effect sequence; Q2 = participants in compared groups similar; Q3 = groups treated similarly apart from the intervention; Q4 = control group; Q5 = multiple outcome measurements pre and post; Q6 = follow-up complete or differences adequately described; Q7 = outcomes measured in the same way; Q8 = outcomes measured reliably; Q9 = appropriate statistical analysis. Ratings are preliminary (single appraiser).

3.4 Effects on career decision-making self-efficacy (RQ1)

Eight studies (N = 723) contributed CDSE effects (Figure 2). Across all studies, the pooled estimate was large but imprecise and not statistically significant, $g = 1.97$, 95% CI $[-0.17, 4.11]$,

4.11], $p = .066$, with extreme heterogeneity, $Q(7) = 130.57$, $p < .001$, $I^2 = 99\%$, $\tau^2 = 6.14$. Iterative outlier diagnostics identified three studies with studentised deleted residuals above 2.5 — Mustafa et al. (2017; $g = 7.70$), Wang et al. (2010; $g = 4.03$), and Esen and İpçi (2022; $g = 1.99$). All three had small samples (12–32 per group), and two had features that make their estimates implausible: an unusually small standard deviation relative to a 37-point change on a 125-point scale (Mustafa et al., 2017) and a significant baseline difference favouring the control group (Esen & İpçi, 2022). After excluding these outliers, the pooled effect was moderate, statistically significant, and homogeneous, $g = 0.50$, 95% CI $[0.27, 0.72]$, $p = .004$, $Q(4) = 2.74$, $p = .602$, $I^2 = 0\%$, with a 95% prediction interval of $[0.24, 0.76]$.

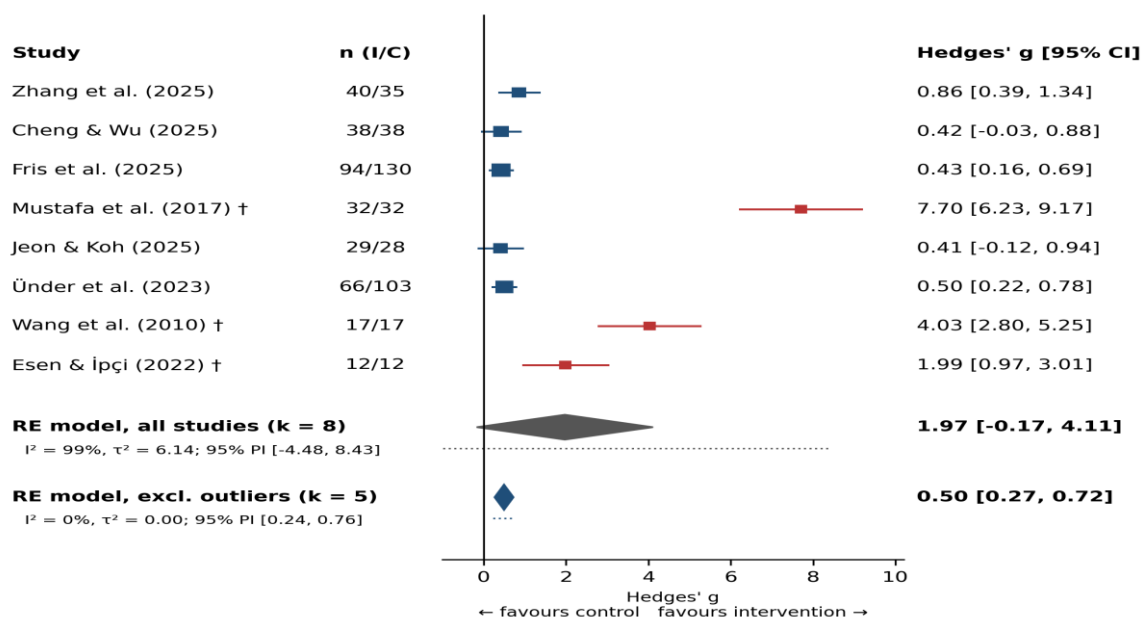


Figure 2. Forest plot of intervention effects on career decision-making self-efficacy. Squares are sized by precision; dotted lines are 95% prediction intervals; † marks statistical outliers.

3.5 Effects on career adaptability (RQ2)

Five studies ($N = 402$) contributed CA effects (Figure 3). The pooled effect was moderate to large and statistically significant, $g = 0.79$, 95% CI [0.41, 1.17], $p = .005$, with low-to-moderate, non-significant heterogeneity, $Q(4) = 6.27$, $p = .180$, $I^2 = 39\%$, $\tau^2 = 0.04$. The 95% prediction interval [0.03, 1.54] lay entirely above zero, suggesting

that similar interventions in comparable settings are likely to produce a positive effect. No outliers were identified. The smallest effect came from the extracurricular active-learning programme with a self-selected control group (Hui et al., 2021; $g = 0.38$), and the largest from a 13-week online programme embedded in the curriculum (Kim, 2022; $g = 1.09$).

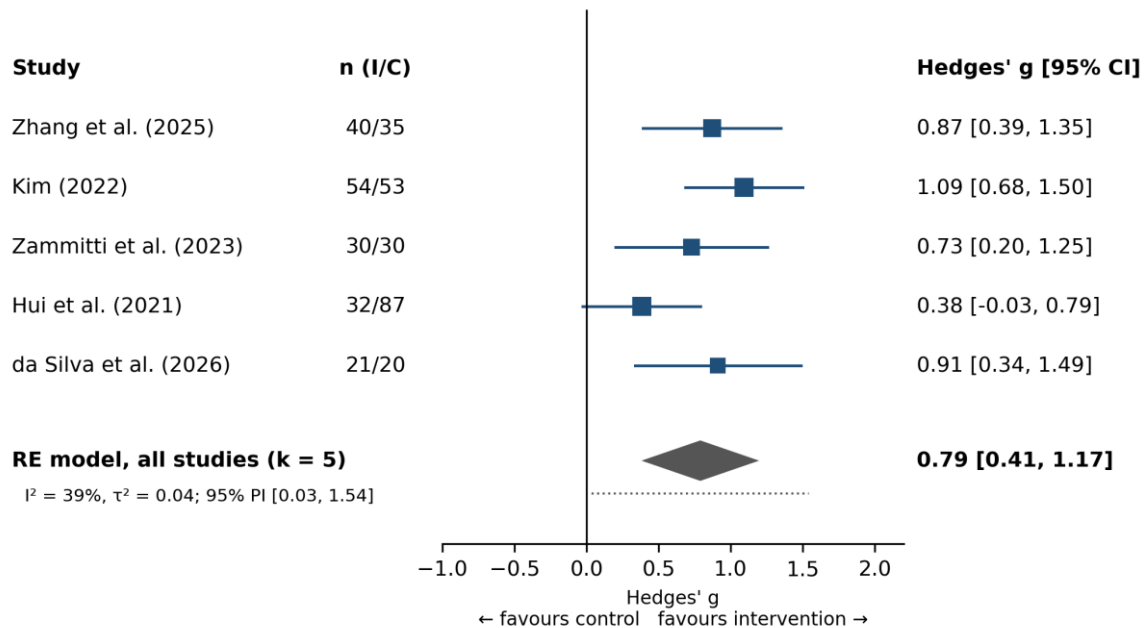


Figure 3. Forest plot of intervention effects on career adaptability. Squares are sized by precision; the dotted line is the 95% prediction interval.

3.6 Moderator analyses (RQ3)

In the study-level data set (one effect per study), the pooled effect across all 12 studies was $g = 1.55$, 95% CI [0.21, 2.88] with extreme heterogeneity ($I^2 = 99\%$). Iterative diagnostics flagged Mustafa et al. (2017) and Wang et al. (2010) as outliers; without them, $g = 0.66$, 95% CI [0.40, 0.92], $p < .001$, $I^2 = 49\%$, 95% PI [0.11, 1.21]. Subgroup analyses on these ten studies (Table 3) showed no significant differences by

design (randomised: $g = 0.64$, $k = 3$; non-randomised: $g = 0.66$, $k = 7$; $QB(1) = 0.01$, $p = .92$), by region (East Asia: $g = 0.70$; other regions: $g = 0.55$; $QB(1) = 0.57$, $p = .45$), or by format (course-based: $g = 0.72$; structured group programmes: $g = 0.51$; individual/dyadic: $g = 0.80$; $QB(2) = 1.11$, $p = .57$). Given the small number of studies per subgroup, these analyses had low power and should be regarded as exploratory.

Table 3. Summary of pooled estimates, sensitivity analyses, and subgroup analyses

Analysis	k	Hedges' g [95% CI]	P
CDSE			
All studies	8	1.97 [-0.17, 4.11]	99%
Outliers excluded (primary)	5	0.50 [0.27, 0.72]	0%
$Q = .30$ (outliers excluded)	5	0.50 [0.23, 0.76]	0%
$Q = .70$ (outliers excluded)	5	0.50 [0.31, 0.68]	0%

Analysis	<i>k</i>	Hedges' <i>g</i> [95% CI]	<i>P</i>
Randomised only (outliers excluded)	2	0.43 [-1.08, 1.93]	0%
Non-randomised only (outliers excluded)	3	0.56 [0.08, 1.04]	0%
Trim-and-fill (outliers excluded; 0 imputed)	5	0.50 [0.27, 0.72]	0%
Career adaptability			
All studies (primary)	5	0.79 [0.41, 1.17]	39%
$\rho = .30$	5	0.79 [0.39, 1.19]	23%
$\rho = .70$	5	0.79 [0.42, 1.16]	58%
Inter-subscale $r = .50$	5	0.79 [0.42, 1.17]	39%
Inter-subscale $r = .90$	5	0.79 [0.40, 1.18]	39%
Non-randomised only	4	0.69 [0.24, 1.13]	19%
Trim-and-fill (2 imputed)	7	0.64 [0.30, 0.98]	56%
Study level (one effect per study)			
All studies	12	1.55 [0.21, 2.88]	99%
Outliers excluded	10	0.66 [0.40, 0.92]	49%
Trim-and-fill (outliers excluded; 3 imputed)	13	0.52 [0.19, 0.85]	74%
<i>Subgroups (outliers excluded)</i>			
Randomised	3	0.64 [0.21, 1.07]	75%
Non-randomised	7	0.66 [0.45, 0.88]	32%
East Asia	4	0.70 [0.35, 1.05]	60%
Other regions	6	0.55 [0.39, 0.71]	0%
Course-based	4	0.72 [0.41, 1.02]	58%
Structured group programme	2	0.51 [0.19, 0.84]	3%
Individual/dyadic	4	0.80 [0.23, 1.37]	80%

Note. Random-effects models with REML estimation; confidence intervals for main and sensitivity analyses use the Hartung–Knapp–Sidik–Jonkman adjustment, and subgroup estimates use normal-theory intervals. ρ = assumed pre–post correlation. CDSE = career decision-making self-efficacy.

3.7 Sensitivity analyses and small-study effects (RQ4)

The outlier-excluded CDSE estimate and the CA estimate were robust (Table 3). In leave-one-out analyses, the CDSE estimate ranged from 0.45 to

0.54 and the CA estimate from 0.69 to 0.93. Varying the assumed pre–post correlation between .30 and .70 and the inter-subscale correlation between .50 and .90 changed the point estimates by less than 0.01. Restricting the CDSE analysis to non-randomised studies ($g = 0.56$) or randomised studies ($g = 0.43$, $k = 2$, with a wide HKSJ interval) yielded similar point estimates; for CA, only one study used random allocation, and the four non-randomised studies gave $g = 0.69$.

For CDSE, Egger's test was significant when all

studies were included (intercept = 7.00, $p = .009$), reflecting the three small outlying studies, but not after their exclusion (intercept = 0.92, $p = .56$), and trim-and-fill imputed no studies. For CA, Egger's test was not significant ($p = .79$), but trim-and-fill imputed 2 studies on the left side of the funnel, reducing the estimate to $g = 0.64$

[0.30, 0.98]. In the study-level data set without outliers, Egger's test was borderline (intercept = 2.78, $p = .050$) and trim-and-fill reduced the estimate from 0.66 to 0.52 [0.19, 0.85] (Figure 4). These tests have limited power with so few studies, but they suggest that the true effects may be somewhat smaller than the pooled estimates.

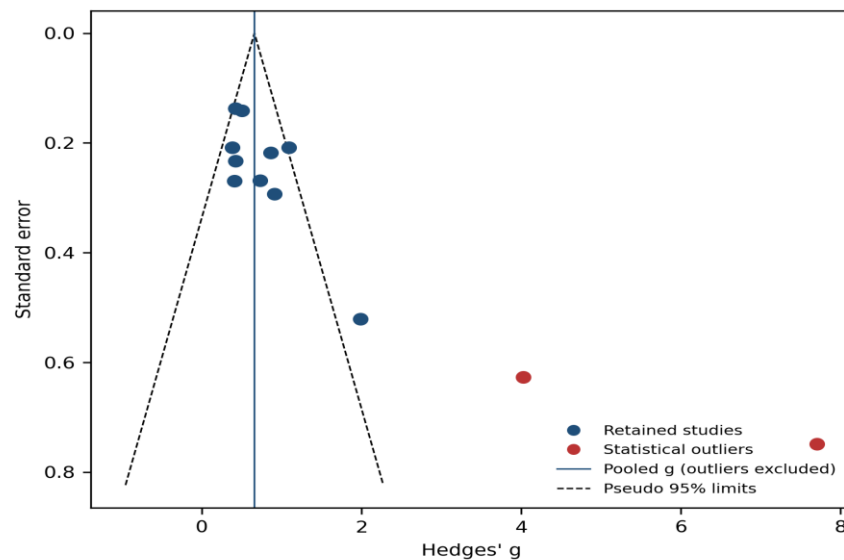


Figure 4. Funnel plot of study-level effect sizes against their standard errors.

3.8 Certainty of evidence

For both outcomes the certainty of evidence was rated as low. Ratings were downgraded for risk of bias (most studies non-randomised, with unclear baseline comparability and incomplete reporting) and for possible publication bias or small-study effects; for CDSE, the inconsistency of the full data set was an additional concern, although the outlier-excluded estimate was consistent and reasonably precise.

4. Discussion

4.1 Principal findings

This review synthesised controlled evaluations of career guidance for post-secondary students and found that such interventions were associated with a moderate improvement in CDSE ($g \approx 0.50$ after removal of three implausible outliers) and a moderate-to-large improvement in CA ($g \approx 0.79$). The CA estimate was homogeneous enough that its prediction interval excluded zero, and the outlier-excluded CDSE estimate was homogeneous and stable across sensitivity

analyses. Small-study analyses nonetheless suggested that the true effects may be somewhat smaller — in the range of roughly 0.5–0.65 — which remains practically meaningful for low-cost, scalable interventions.

The contrast between the full and outlier-excluded CDSE analyses is itself an important finding. A handful of small studies reported changes of two to eight standard deviations, magnitudes that are implausible for a psychological self-efficacy construct and that, when pooled naively, inflate the average effect and swamp the signal from larger and better-reported studies. This may partly explain why an earlier synthesis reported a large average CDSE effect (Ulaş Kılıç, 2019). The outlier-excluded estimate reported here is more conservative and, in our view, a more realistic benchmark for practitioners.

4.2 Interpretation in relation to theory

The positive effects on CDSE are consistent with SCCT's proposition that self-efficacy beliefs are shaped by mastery experiences, vicarious

learning, verbal persuasion, and emotional states (Lent et al., 1994), all of which were explicitly targeted by several interventions (e.g., Zhang et al., 2025). Interventions that required students to engage in concrete tasks — gathering occupational information, setting goals, writing plans, or presenting career decisions to peers — provide exactly the kinds of mastery and vicarious experiences that SCCT emphasises, and they overlap with the “critical ingredients” identified in earlier meta-analyses (Brown et al., 2003; Whiston et al., 2017). The somewhat larger effect for CA may reflect the close alignment between the content of career-construction and life-design interventions and the four adaptabilities: many programmes explicitly addressed concern (future orientation), control (decision-making responsibility), curiosity (exploration), and confidence (problem solving), so the outcome measure closely mirrors the intervention content. This alignment strengthens construct validity but may also make CA scores more susceptible to expectancy effects in non-blinded designs.

Delivery format did not moderate the effects. Semester-long courses, structured group programmes, and brief individual coaching or counselling produced broadly similar gains, which accords with the view that the presence of core ingredients matters more than the vehicle through which they are delivered (Brown et al., 2003). Similarly, effects were comparable in East Asian and other settings, although the small number of studies per subgroup means that meaningful differences cannot be ruled out.

4.3 Implications for vocational and private colleges

Although no included study specifically sampled higher vocational (junior) college students, the findings have practical relevance for vocational and private colleges, which serve large numbers of students who often have fewer career-related resources. First, the evidence supports embedding structured, theory-driven career guidance within the curriculum rather than relying solely on optional, ad hoc activities: course-based programmes of 5–15 weeks

produced moderate effects on both outcomes (e.g., Jeon & Koh, 2025; Kim, 2022; Ünder et al., 2023; Zhang et al., 2025). In the Chinese context, the mandatory career development and employment guidance course (MOE, 2007) offers a ready-made vehicle; redesigning such courses around active tasks (self-assessment with feedback, information gathering, goal setting and action planning, and peer presentation) rather than lecture-based delivery is likely to be more effective. Second, brief individual or dyadic formats — three to six sessions of coaching or career construction counselling, or structured peer mentoring during internships — also appear effective and could be targeted at graduating students who are undecided or at risk. Third, online and blended formats (Kim, 2022; Zammitti et al., 2023) performed well, which is encouraging for institutions with high student-to-counsellor ratios. Finally, because graduating cohorts face the most immediate transition demands, guidance delivered in the final year — as in several included studies — may yield particularly timely benefits; programme evaluations in vocational colleges should nevertheless verify whether gains translate into employment outcomes.

4.4 Limitations

Several limitations must be acknowledged. First, and most importantly, 55 potentially relevant reports could not be retrieved in full text, largely because they were published in subscription journals; if these studies differ systematically from the retrieved ones, the pooled estimates could be biased, and the review is best viewed as a synthesis of the accessible evidence. [AUTHOR ACTION: retrieve the reports listed in Supplementary Table S3 through institutional access, assess them against the eligibility criteria, and update all analyses before submission.] Second, the search was limited to three databases and to English-language publications; Scopus, Web of Science, PsycINFO, and Chinese databases such as CNKI and Wanfang were not searched, so relevant Chinese-language evaluations of career guidance in vocational colleges may have been missed. Third, the number of studies per outcome was small (five

for CA), which limits the precision of heterogeneity estimates and the power of moderator and publication-bias analyses. Fourth, most studies were non-randomised, had small samples, relied on self-report measures, and did not blind participants or assessors; follow-up data were too sparse to analyse the durability of effects. Fifth, effect sizes required assumptions about pre-post and inter-subscale correlations and, in one case, imputation of standard deviations; sensitivity analyses showed that these assumptions had negligible influence. Sixth, the rule-based filter used before screening may have excluded a small number of eligible records that did not describe their design in the abstract. Finally, screening, extraction, and quality appraisal were AI-assisted and supervised by a single author; independent verification by a second reviewer is required.

4.5 Directions for future research

Future studies should (a) evaluate career guidance specifically in higher vocational and private colleges, where evidence is lacking; (b) use randomised or cluster-randomised designs with adequate power, active-control conditions, and

pre-registration; (c) report group-specific means and standard deviations at each time point, as well as pre-post correlations; (d) include longer-term follow-up and behavioural and employment outcomes; and (e) test the incremental value of specific components (e.g., individualised feedback, peer modelling) through dismantling or factorial designs.

5. Conclusion

Controlled evidence from 12 studies indicates that career guidance interventions for college students are associated with moderate gains in career decision-making self-efficacy and moderate-to-large gains in career adaptability, with broadly similar effects across delivery formats. The certainty of this evidence is low, and several small studies reporting implausibly large effects highlight the need for better-designed and better-reported trials. For vocational and private colleges preparing large graduating cohorts, embedding structured, active, theory-based career guidance into the curriculum — complemented by brief individual support for students who need it — is a reasonable, evidence-informed strategy.

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8. Author Declaration

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