AMERICAN UNIVERSITY OF BEIRUT

CAREER COUNSELING FOR GIFTED AND TALENTED STUDENTS (1990-2022): A SYSTEMATIC REVIEW

by
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ABSTRACT

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Gifted and talented students may face difficulties and confusion when deciding about their careers. Different factors could affect their decision-making process, like perfectionism, multipotentiality, and underachievement. Career counseling and guidance interventions are essential to guide these students in their career life path. The purpose of this study is to review and evaluate the available research evidence for the use of career counseling in guiding gifted and talented students by identifying methodologically sound studies and classifying whether the practices were evidenced-based. To address the systematic review purpose and questions, the Council for Exceptional Children's (CEC) standards were used. Using career counseling and gifted keywords and terms, a systematic search through online databases was conducted. The databases used to search for the studies are Academic Search Ultimate, Education Research Complete, ERIC, APA PsycINFO, APA PsycArticles, Scopus, Web of Science, and ProQuest Dissertations & Theses Global. Applying a systematic search strategy, the found references were screened for title and abstract and then full text according to inclusion and exclusion criteria. Fifteen experimental studies applying career counseling intervention on gifted school and college students between 1990 and 2022 were reviewed. The studies were both peer-reviewed journal articles and Ph.D. dissertations in English language studies. Findings revealed that none of the 15 studies was a high-quality study, and accordingly, evidence-based classification could not be drawn for this practice. It is recommended to conduct more experimental studies considering the CEC quality indicators.

Keywords: gifted and talented; career counseling and guidance; students; systematic review; PRISMA.

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INTRODUCTION

Gifted and talented students differ from their typical development peers and are considered a group of Exceptional Children. Although they possess high abilities and intelligence in varied domains, they could perceive patterns of difficulties in social-emotional and career development (Chen & Wong, 2013; Smith & Wood, 2020; Vlaardingerbroek et al., 2017). Understanding career development and making a career decision are struggling areas for gifted students (Chen & Wong, 2013).

The National Association of Gifted Children (NAGC) asserts the importance of providing gifted and talented students with specific school programs and interventions that consider their wide range of cognitive, developmental, psychological, and social and emotional needs (Corwith et al., 2019). The NAGC concentrates on providing career guidance and resources to help gifted and talented students identify their future career goals that match their interests and strengths (Corwith et al., 2019). Serving these students should be based on the most effective practices.

CEC developed its standards to categorize evidence-based practices (Cook et al., 2015). Using a systematic review researchers could review and evaluate the experimental studies conducted on an intervention among a determined population of exceptional children. This study systematically reviews the career counseling intervention studies on gifted and talented students by classifying the evidence-based practices using the CEC (2014) standards. It contributes to providing gifted and talented counselors, educators, researchers, and policymakers evidence of the effective career

intervention practices applied to gifted in developing, implementing, and conducting studies on these career counseling practices.

Purpose of this study

The purpose of this study is to evaluate the available research evidence published between 1990 and 2022 and apply career counseling programs or interventions to gifted and talented students. The Council for Exceptional Children's (CEC) guidelines were used to examine the methodological soundness of the studies to address the systematic review questions.

Research Questions

After investigating research studies done on career guidance and counseling interventions, it is important to examine the research evidence present in the literature for the use of career counseling and guidance with gifted and talented students in their career life and career decision-making. Therefore, a systematic review study is needed to address the following research questions:

1- Are the career counseling and guidance interventions on gifted and talented students' high-quality studies according to CEC quality indicators?
2- Are the identified career counseling practices applied to gifted and talented students, evidence-based practices based on CEC classification guidelines?

Rationale

There is an assumption that gifted students have the potential to decide about their careers and do not need career counseling support due to their high abilities (Pfeiffer et al, 2018). However, this group is heterogeneous and shares characteristics of multipotentiality, perfectionism, and underachievement, which could affect their career

decision-making (Pfeiffer et al, 2018). During the adolescence developmental stage, individuals start exploring their identity and decide about their life path. Among gifted and talented individuals, career development starts earlier than other typical development peers (Smith & Wood, 2020). The early development and confusion the gifted student could face when deciding about a career requires supportive and effective services of career counseling (Smith & Wood, 2020).

Multipotentiality results in confusion when choosing a career path (Smith & Wood, 2020). Perfectionism leads to avoidance of making a decision that could result in failure, or increase the pressure on these students as they think about only one perfect career (Chen & Wong, 2013). Identity foreclosure leads gifted to skip interest exploration and commit to a career not fitting them. Being socially affected (Chen & Wong, 2013) and the influence of significant others could lead gifted to believe and adopt others' opinions and perceptions about them and their talent and choose a career based on other's selection, not their strength and interests (Smith & Wood, 2020). These students' characteristics require effective interventions to help them deal with the struggling factors and guide them in their career-making decision process.

In reviewing the gifted interventions, Jen (2017) reviewed 17 empirical studies of affective social-emotional intervention with high-ability students in gifted education, published between 1984 and 2015. The included studies were peer-reviewed journal articles, have a method and empirical findings, apply a direct effective intervention, and include K-12 high-ability students and/or K-12 professionals. The review included both qualitative and quantitative research designs. This review focuses on social-emotional interventions including but not limited to career intervention, additionally, it included only peer-reviewed journal articles.

In reviewing career intervention studies conducted in a school setting, Prideaux et al. (2000) comprehensively reviewed the methodologically sound of 30 career education studies. They exclude career counseling practices with a short-term focus and gifted population participants. They recommended conducting future research with a sound experimental methodology to maintain confidential inferences. They pointed out that the studies used descriptive analyses or single-group post-test design (Prideaux et al., 2000).

Although researchers recommended an in-depth systematic review of career development to support career counseling programs for gifted students (Kim, 2010), no previous systematic review targeted career intervention with gifted students until now.

Among the typical individual population, Soares et al. (2022) systematically reviewed career interventions for university students to explore and synthesize the studies' theoretical framework, structure, evaluation system, and outcomes reported. The review includes 26 articles published between 2000 and 2021. Both qualitative and quantitative studies that analyze the differences between before and after the applied intervention in clients' career skills were included.

Whiston et al. (2017) examined the effectiveness of career choice intervention by conducting a meta-analysis of 55 articles representing 57 published and unpublished studies, resulting in a mean effect size of 0.352. The analysis includes the studies published between 1996 and 2015, examining the effect of career choice intervention, comparing the intervention effects between treatment and control groups, using a specific measure related to career measures, and providing data to calculate effect size.

Both Soares et al. (2022) systematic review and Whiston et al.'s (2017) meta-analysis of career interventions were on typical students and did not recognize the gifted population (Figure 1.1).

Special education learners, like gifted, need highly effective instruction to acquire their potential (Cook et al., 2014). Practice and training in special education should be based on accurate search findings, which could be drawn only from well designed and conducted studies from which the effect of an intervention could be inferred confidently (CEC, 2014). Effective practice should be identified based on multiple high-quality studies that apply an experimental research design and demonstrate robust effects on student outcomes (Cook et al., 2014). Therefore, this study reviews the quantitative studies that establish the causality of the intervention effect on student outcomes, which are group comparisons and single-subject studies only. Qualitative studies are not considered as they do not establish causality (Cook et al., 2014).

Developing effective career interventions for gifted should be based on evidence-based practice which requires identifying high-quality career intervention studies. the systematic review is the research method used for identifying the quality and characteristics of impact studies through predefined criteria (Mallett et al., 2012), in which evidence-based practice of a specific intervention and population could be classified, as it is a secondary-level analysis that gathers findings of primary research to answer a research question (Zawacki-Richter et al., 2020). As no evidence-based review was conducted on career intervention programs among gifted students, this study aims to evaluate the methodological rigor of career intervention studies applied to school and

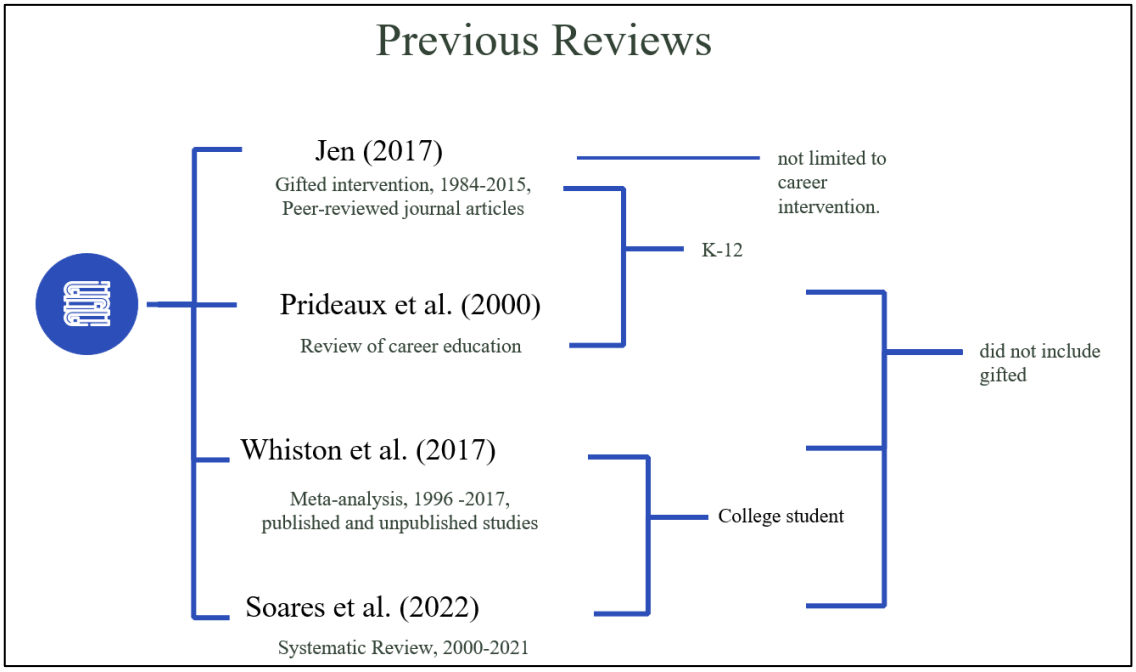
college-gifted students by reviewing the available studies through a systematic review research method.

Examination of the studies' methodological soundness and evidence-based classification is guided by CEC standards which are the most recent standards of evidence-based developed mainly for special education which its quality indicators demonstrated adequate inter-rater reliability (Cook et al., 2015).

Figure 1.1 represents the previously conducted reviews' article types, the participants' grade level, or the exclusion of the gifted population.

Figure 1.1

Previous Reviews on Career Counseling or Gifted Intervention



Significance of This Study

As no systematic review on career counseling for gifted conducted previously, this review will fill the gap by systematically reviewing the previously done studies. It is an insight into the need for experimental career intervention studies among gifted

students. As it investigates and evaluates the study's aspects based on a rigor criterion, it provides empirical evidence results rather than relying on the previous studies' results like the traditional literature review (Mallet et al., 2012). It contributes as evidence of casual studies quality, as it evaluates the studies' methods, validity, causality, and impact based on quality indicators to provide researchers and policymakers with evidence about the appropriate practices. This would insight into the gap between research and practice in the field of career counseling and gifted.

It contributes to helping practitioners, counselors, educators, and policymakers to decide about effective interventions for gifted students. It is built on the previously done work to provide an in-depth understanding of career counseling interventions when applied to gifted and talented students.

CHAPTER 2

BACKGROUND

This chapter presents an overview of systematic review, giftedness conceptualization, and career counseling and guidance.

Systematic Review

Systematic review initiated in the medical field. The use of it has increased within the humanities field to assess the impacts of interventions (Mallett et al., 2012).

A Systematic Review is a secondary-level analysis that gathers findings of primary research to answer a research question (Annous et al., 2022; Zawacki-Richter et al., 2020). It aims to identify, synthesize, and assess the available evidence to generate an empirically derived answer to a research question (Mallet et al., 2012). Systematic review allows for classifying the quality and characteristics of impact studies through standardized criteria. This enables conducting comparisons across-study and meta-analyses, which are valuable for evidence-informed policymaking (Annous, 2022; Mallett et al., 2012).

Systematic review is described as the golden standard for evaluating practices (Bölte, 2015). It produces an objective baseline to determine which future research and evidence on a specific intervention can be assessed and allows for measuring the research program knowledge over a range of years (Mallet et al., 2012).

Systematic Review versus Literature Review

Both literature review and systematic review are reviews of existing research to answer a research question. However, the systematic review is a rigorous and transparent form of literature review (Mallet et al., 2012).

Systematic review focuses on empirical evidence, whereas literature review considers preconceived knowledge (Mallet et al., 2012). Literature reviews do not use specific identified methods for reviewing existing literature, whereas, systematic reviews use fixed and explicit rigorous research methods (Zawacki-Richter et al., 2020). Systematic review applies search strategies and specific inclusion and exclusion criteria. It is tightly focused and more able to generate an answer to a research question because it requires constructing the research question in terms of population, intervention, and outcome (Mallett et al., 2012).

Literature review relies on the studies' results regardless of the studies' design, data analysis, and methods. Whereas, systematic review guarantees evidence results as it asserts considering the studies' research design, impact, validity, and causality (Mallet et al. 2012). It uses a protocol that facilitates methodological transparency and enables future replication which reduces the research bias (Mallett et al., 2012).

Conceptualizing Giftedness

Defining giftedness and identifying methods are based on different theories and concepts influenced by specific values and priorities (Dai & Chen, 2013). It is defined in terms of general intelligence, multiple intelligences, behavioral development, culture, and socioeconomic diversity.

The standardized IQ test has been a common source of defining giftedness since 1905 (Pfeiffer et al., 2018). Although Binet's goal in developing the IQ test was to obtain school success, it was considered a tool to measure and determine individuals' intelligence (Al-Hroub, 2008, 2010a, 2010b, 2011; Al-Hroub & El Khoury, 2018a; El Khoury & Al-Hroub, 2018). IQ-based theories consider intelligence as a personality trait and believe that giftedness is an endowment innate and shaped before

environmental exposure (Pfeiffer et al., 2018). That is, intelligence develops as a matter of natural development (Sternberg, 2007). IQ tests can only measure linguistic and logical-mathematical abilities without including spatial, personal, musical, and artistic skills (Al-Hroub, 2012, 2013, 2020; EL Khoury & Al-Hroub, 2018). It excludes the environmental and historical factors that could influence intelligence.

Therefore, theories not relying on the IQ test criteria in measuring intelligence arose, like Gardener's (1983) theory of Multiple Intelligences. Gardener believed that measuring a single general intelligence does not measure human potential and capability such as creativity. He proposed seven distinct types of intelligence, which are musical, spatial, bodily-kinesthetic interpersonal, and intrapersonal, additionally to the traditionally identified forms of intelligences which are logical-mathematics and linguistics (Al-Hroub, 2009, 2012; Al-Hroub & Whitebread, 2008, 2019; Allix, 2000). Later, the eighth and ninth intelligence were added, the naturalist and existential (Allix, 2000). The multiple intelligence theory broadens the individuals' intellectual profiles through the different strengths and weaknesses in approaching cognitive tasks.

Renzulli’s (2005) theory views giftedness as a developmental set of behaviors, in which giftedness is not fixed and could be developed through enrichment programs (Renzuli, 2005). He reconceptualized the Three-Ring Conception of the Giftedness model that represents the interaction between individuals and their environment and represents the creative productivity dimensions (Renzuli, 2005). His theory consists of three interacting clusters of traits and their relationship with the individual's general and specific area of performance. These traits are above-average ability, task commitment, and creativity (Renzuli, 2005).

Gagné (1985) realized that Renzulli's identification does not consider the accommodation of talented individuals in athletics, musical, leadership, and trades talents. Gagné (1985) developed the Differentiated Model of Giftedness and Talent (DMGT) distinguishing between gift and talent. He viewed giftedness as an exceptional competence in the ability's domains, and talent as an exceptional performance in the activities domain (Gagné, 1985). According to the DMGT, giftedness "designates the possession and use of outstanding natural abilities (called aptitudes or gifts), in at least one ability domain, to a degree that places an individual at least among the top 10 percent of age peers" (Sternberg, 2007, p. 99). Whereas talent "designates the outstanding mastery of systematically developed abilities (or skills) and knowledge in at least one field of human activity to a degree that places an individual at least among the top 10 percent of age peers who are or have been active in that field or fields" (Sternberg, 2007, p. 99).

Other theorists consider the cultural context as a factor that should be taken into consideration when identifying a gifted individual. Sternberg (1999) argues that understanding children's performance should be based on the culture where they are born, and accordingly assessing their strengths and weaknesses that allow them to work on their abilities. His theory of successful intelligence considers the gifted individuals' abilities within their cultural relevance (Sternberg, 2007). This theory values that each culture has its intelligence conceptions characterized by the individuals' abilities. Sternberg (2007) assumes that testing gifted individuals outside their cultural context leads to misidentifying those who may be gifted within their culture.

In the Arab and Middle Eastern world, the view and identification of giftedness are adopted from the Western view (Al-Hroub, 2020, 2021, 2022, 2023; Al Khoury &

Al-Hroub, 2018). The conception of giftedness is characterized by having “(1) high ability (meaning high intelligence), (2) high creativity, (3) high task commitment, and (4) behavioral characteristics” (Al Khoury & Al-Hroub, 2018, p. 22). Jordan, Bahrain, and Egypt added having specific academic achievement as a fifth criterion. Al-Hroub and El Khoury (2018b) investigated the teachers’ view of giftedness based on the Lebanese culture and concluded their study with a giftedness definition:

> A combination of three parts: High intellectual ability, high academic performance, and social intelligence. High intellectual ability includes high logical thinking, and the gifted student's scores on the report cards should be the highest among the class. High academic performance means that gifted students excel in one or more academic subject areas. Giftedness also encompasses social intelligence, which means that the student should be a natural leader, take charge of small groups, and be able to deal with real-life situations that are mainly applicable in Lebanon, for example, the ability to bargain for better prices, and cutting in line to get the service or product faster (p. 104).

Considering the economically disadvantaged, diversity, and underachievement of students, the NAGC describes gifted and talented as students who "perform or have the capability to perform at higher levels compared to others of the same age, experience, and environment in one or more domains. They require modification(s) to their educational experience(s) to learn and realize their potential" (NAGC, 2019, p. 1).

Career Counseling and Guidance

Career counseling and guidance (CGC) emerged through three paradigms; vocational guidance, career education, and life design (Cohen-Scali et al., 2018). Interventions throughout the CGC history were built on each paradigm.

Career counseling arose from the industrial revolution when a wide range of occupational options emerged and workers were needed (Pfeiffer et al, 2018). Vocational guidance was built on a person-environment fit (Cohen-Scali et al., 2018). Parsons, who developed the first framework, believed that individuals should solely and actively make their own decisions about their careers, which is a fundamental concept in career counseling until today (Pfeiffer et al, 2018). His three-point framework consists of (1) self-knowledge, which is the clear understanding of one's abilities, aptitudes, interests, ambitions, and limitations; (2) occupational knowledge, like the advantages and disadvantages, conditions of success, and opportunities; and (3) career decision making, which is built from a reasonable relation between the self- and occupational knowledge. Parson's framework facilitates developing psychometric tools to assess the individuals' interests, intelligence, attributes, and define profiles for each occupation. He aimed to assist young people in selecting a vocation, preparing for it, and preparing them for the transition from school to work through an expert counselor and guidance (Cohen-Scali et al., 2018).

With the revolution of the information era upon the industrial era, the process-oriented approach to career education arose. It aimed to understand individual career decision-making processes and develop their abilities. Career interventions then were built on Super's developmental stage theory and Holland's six-factor structure vocational interest patterns (Cohen-Scali et al., 2018).

Super believed that individuals may lack the readiness to make a decision, thus assessing the individual's abilities and interests is not sufficient. Super emphasized building a sense of meaning in individuals' lives and careers by considering their maturity, identity, self-concept, and perspectives of oneself. Hollands's (1985) RIASEC

model of vocational interests consists of "realistic (R), investigative (I), artistic (A), social (S), enterprising (E), and conventional (C)" (Cohen-Scali et al., 2018, p. 54). Interest profiling helps individuals in career decision-making, which results in achieving better career outcomes like career satisfaction (Cohen-Scali et al., 2018).

The life design paradigm guides individuals in constructing their careers and lives by themselves. The paradigm focuses on guiding individuals to adapt to the changeable society and identities reconstruct. Career counseling interventions, the contemporary interventions, influenced by this paradigm prioritize narrative and dialog-based approaches in counseling (Cohen-Scali et al., 2018). These interventions' frameworks emphasize enabling the counselees to narrate stories and reflect on them "to find a meaning, express new intentions, and plan exploratory activities" (Arnoux-Nicolas et al, 2018, p.134) which leads to autonomy and proactively constructing their career paths.

Conclusion

Giftedness identification and definitions differ according to the underlined theory or countries' identification base, it could rely on general intelligence, multiple intelligence, behavior development, differentiation between gift and talent, cultural context, and socioeconomic factors. Career counseling interventions could be based on different theories or influenced by a paradigm. To examine whether a career counseling intervention practices with gifted evidence-based practices, a systematic review is used.

In line with the historical revolution of career counseling and guidance and the different bases of giftedness identification, this systematic recognized any experimental study applying career counseling intervention to gifted. In this review, both career intervention and gifted identifications are considered from a broad perspective. This

means that this systematic review recognized all the studies that applied career intervention on gifted without narrowing the approach used or adopted by the studies' authors, which could differentiate between vocational guidance and the contemporary career counseling approaches or focus on a specific theory. Also, this systematic accepted any student described by the study's author as a gifted student or equivalent to gifted term. This would facilitate reviewing all the career counseling intervention studies applied to gifted students and relevant to this systematic review's inclusion and exclusion criteria.

CHAPTER 3

METHODOLOGY

This chapter represents the research purpose and questions, design, search procedures, data extraction, and data analysis process. A description of the Council of Exceptional Children's (CEC) standards is provided.

Purpose and Questions

The purpose of the study is to evaluate the available research evidence for the use of career counseling with gifted and talented students between 1990 and 2022. This study aims to compare the studies' different and specific elements to identify and examine the studies that can be considered high-quality studies. A systematic review study was conducted to address the following research questions:

1- Are the career counseling and guidance interventions on gifted and talented students high-quality studies according to CEC quality indicators?

2- Are the identified career counseling practices applied to gifted and talented students, evidence-based practices based on CEC classification guidelines?

Research Design: Systematic Review

The current research uses the systematic review, which is an attempt to systematically collect empirical evidence of existing literature on the use of career counseling with gifted and talented students. The systematic study aims to review all the existing studies by using online databases as a research process. Peer-reviewed journal articles and Ph.D. dissertations were identified through the educational and psychological databases which target the majority of educational and psychological fields. The Databases are Academic Search Ultimate, Education Research Complete,

ERIC, APA PsycINFO, APA PsycArticles, Scopus, Web of Science, and ProQuest Dissertations & Theses Global. Searching the databases was through the keywords/terms related to the major two concepts of the topic “career counseling” and “gifted”.

Following the systematic review process, each study’s title and abstract were checked to determine its relevance to be included in the review. Then, the full texts of the studies were screened to confirm the study’s relevance (Zawacki-Richter et al., 2020). This systematic will focus on quantitative experimental studies done between 1990 and 2022.

Inclusion Criteria for Systematic Review

The studies in the current systematic review meet the following inclusion criteria:

1- The intervention was a career counseling program/intervention,

2- The study’s participants were gifted and talented students;

3- Participants were in middle school, high school, or college;

4- The intervention was implemented in a school or university setting;

5- An experimental design was obtained and screened;

6- Research studies obtained were limited to (1990-2022);

7- Research studies are peer-reviewed journal articles or Ph.D. dissertations; and

8- Research studies were printed or published in English.

Given the limited number of published journal articles studies applying career counseling intervention to gifted, this systematic considered the Ph.D. dissertation studies, investigated the gifted school and college students, and extended the years to start from 1990.

To ensure that all experimental studies were included, searching for all career counseling studies done with gifted was essential, then excluding the irrelevant to the inclusion criteria studies. Two researchers (O.E. and N.S.) identified and approved the databases, keywords/terms, inclusion criteria, and the search procedure including study selection. A professor (A.A.) in counseling and gifted was consulted to agree on the terms, database, inclusion criteria, and the final included studies in the review.

Council of Exceptional Children (CEC) Standards

This systematic review uses the Council of Exceptional Children (CEC) Children's (CEC) standards and quality indicators to evaluate the methodological rigor of each study and then determine the evidence-based practices.

CEC standards were chosen upon other evidence-based practice standards in education like the What Works Clearinghouse's (WWC) standards because CEC was developed mainly for special education. WWC considered practices in only three areas of the special education population: learning disability, emotional disturbance, and early childhood education interventions for children with disabilities. Additionally, CEC allows special education researchers to apply its standards and classify evidence-based practice on their own, while WWC requires training and certification before working on its reviews (Cook et al., 2015).

The CEC standards were developed by seven special education scholars who are experts in disabilities areas and research designs (Cook et al., 2015). To determine whether the practice is evidence-based or not, CEC requires following specific steps and criteria. The studies should target the specific intervention and topic area. The studies under consideration should be quantitative experimental design studies that establish causality. Correlation and qualitative design studies are not considered

because they do not establish the effectiveness of the instructional practices (Cook et al., 2015). CEC considers group comparison studies in which the authors manipulate an intervention with randomly or non-randomly assigned participants to two or more groups, like control randomized traits and quasi-experimental studies, and single-subject research designs that establish causality (Cook et al., 2015). The quality indicators and criteria are specified to be applied to the studies that examine the effectiveness of an operationally defined practice on students' outcomes, rather than on instructors' or parents' behavior. Practice should be among specific learners' populations and outcome areas within a specific setting (CEC, 2014).

To classify the evidence-based practice, the studies' methodological soundness is examined, and then the classification of evidence-based practices is done based on the sound studies (CEC, 2014). Following these two steps, the studies of this systematic review were examined. A brief description of CEC quality indicators and evidence-based classification is presented.

Quality Indicators (QIs)

CEC identified 28 quality indicators, 18 for both group comparison and single-subject studies, 6 for group comparison studies only, and 6 for single-subject studies only (Table 3.1). This systematic examined the methodological soundness of each study based on the 8 areas of CEC's QIs; which are context and settings, participants, intervention agent, practice description, implementation fidelity, internal validity, outcome measures or independent variables, and data analysis (Cook et al., 2015). A study must meet all the QIs to be classified as a high-quality study, methodologically sound study.

Context and Setting. The study's authors should describe the context and setting's features, like the type of classroom, type of school, community setting, geographic location, and socioeconomic status. In which reviewers can determine about including the study in the review. CEC specifies this indicator for the reviews that are specific to a particular context and setting (Cook et al., 2015).

Participants. The study's authors should describe the participants' characteristics sufficiently to determine whether to include the study in the review and meet QI 2.1 by identifying the participants' demographics like gender, age, race, socioeconomic status, and language status (Cook et al., 2015). QI 2.2 requires authors to describe the participants' disability status and report criteria and methods of identifying the specific disability. Studies stating that participants have a specific disability and naming it only without providing information to determine the disability status do not meet IQ 2.2 (Cook et al., 2015).

Intervention agent. Authors should identify the intervention agents' role to inform who implemented the intervention, like the teacher, parents, researchers, or technological device. Authors should identify the background variables, like race and educational background. However, if the review is not specific to a particular interventionist population, the role is considered only. Also, the authors should mention if the study applies any specific training or qualifications that are required to implement the intervention and specify that the interventionists had achieved them (Cook et al., 2015).

Description of Practice. The study authors should describe the practice by reporting the intervention's procedures and agents' actions. Also, they should report the materials used in the intervention (Cook et al., 2015).

Implementation Fidelity. The study's intervention should be implemented in fidelity. That is, the study authors should use and report direct and reliable measures; like observing specific elements of the practice using a checklist. The study should assess and report the implementation fidelity that relates to the exposure of the intervention using direct and reliable measurements, like self-report or observation of the duration or frequency. The study's authors should specify when, where, and for whom fidelity was assessed and report the implementation fidelity regularly throughout the intervention and for each setting and participant (Cook et al., 2015).

Internal Validity. The intervention should be under the control of the researchers. Authors should describe the baseline conditions in the single-subject studies and the control/comparison conditions in the group comparison studies, like the definition, duration, frequency, and length. The participants should have limited or no access to the treatment, authors should indicate how the access was limited to treatment. Also, the study should report procedures of assigning participants to the groups; like random; or non-randomly but the groups are very closely matched. Single-subject design's baseline phases should include at least three demonstrations of experimental effect, baseline phases should include at least three data points, and the design should control for common threats to validity. For group comparison studies, the overall attrition across the groups should be low and the deferential attrition should be low or controlled (Cook et al., 2015).

Outcome Measures/Dependent Variables. Outcomes should be socially valid and important. Authors should describe and define the dependent variables' measurements. The study should report the intervention's effects on all the outcome measures targeted by the review. The outcome measurement's frequency and timing

should be appropriate. However, only for investigating the long-term effect of the intervention, delays in the posttest are acceptable. For single-subject studies, authors should measure three data points for each phase. The study should provide and report evidence of adequate internal reliability for outcomes relevant to the review. Finally, authors should report evidence of adequate validity. Both reliability and validity could be addressed by citing a published reference (Cook et al., 2015).

Data Analysis. For group comparison studies, authors should use appropriate statistical analyses for comparing changes in two or more groups' performance, like t-tests and ANOVA. Additionally, authors should report an appropriate effect-size (ES) statistic, like Cohen's d, or provide data from which a common ES could be calculated for each analysis. CEC requires authors to justify using atypical data analysis procedures or atypical ESs. Reporting statistical significance without providing data is not acceptable. For single-subject design, authors should provide legible and complete graphs that represent the data across all the study's phases for all participants. (Cook et al., 2015).

Meeting all the quality indicators means that the study is a high-quality study or considered a methodologically sound study. Sound studies are then classified based on the effect size, as having a positive, neutral, or negative effect. Based on the outcomes' effect size of the sound studies, the study's design, and the number of participants CEC classifies the evidence-based practices.

Evidence-Based Practices

CEC classifies evidence-based practices (EBP) into five classifications, which are evidence-based practice, potentially evidence-based practice, mixed effects, insufficient evidence, or negative effects. This classification considers the number of

sound studies with positive, neutral, and negative effects and the total number of participants (Figure 3.1).

Evidence-based practices must be supported by at least two methodologically sound group comparison studies with random assignment to groups and 60 total participants across studies. For non-random assignment studies, CEC requires four methodologically sound group comparison studies, with positive effects, and at least 120 participants across studies. For the single-subject studies consisting of small sample size, five methodologically sound studies with positive effects and at least 20 participants across studies are required (Cook et al., 2015).

The studies could be a combination of designs, in which they meet at least 50% of the previously mentioned criteria. For example, 2 methodologically sound non-random assignment studies with positive effects practice and 60 participants, and 3 methodologically sound single-subject studies with 10 participants (Cook et al., 2015).

When the methodologically sound studies do not show negative effects and the positive effect studies to the number of sound studies with neutral/mixed effects are for a ratio of 3:1, random and non-random group comparison and single-subject studies are considered to classify as evidence-based practice.

To be classified as potentially evidence-based practice, the study should be supported by fewer than the previous criteria of the EBPs' studies with positive effects classification, no specific total number of participants, and a smaller ratio (2:1) of sound studies with positive to sound studies with neutral effects (Cook et al., 2015).

The classification of practice with a mixed effect should meet the criteria of having the same number of positive effects as the EBP or potentially evidence-based studies based on the studies design, however, the number of sound studies with positive

effects to sound studies with neutral/mixed effects' ratio is less than 2:1, or both (Cook et al., 2015).

The insufficient evidence means that the studies do not meet any evidence-based category classification criteria. That is, the evidence is insufficient to classify meaningful effects of the practice (Cook et al., 2015).

Finally, negative effects classification requires two or more of any design of methodologically sound studies with negative effects, and the number of studies with negative effects to be greater than the number of sound studies with positive effects (Cook et al. 2015).

Table 3.1

Quality Indicators for Group Comparison and Single-Subject Studies

Quality indicator	Research design(s)
1.0. Context and setting. The study provides sufficient information regarding the critical features of the context or setting.	
1.1. The study describes critical features of the context or setting relevant to the review; for example, type of program or classroom, type of school (e.g., public, private, charter, preschool), curriculum, geographic location, community setting, socioeconomic status, and physical layout.	Both
2.0. Participants. The study provides sufficient information to identify the population of participants to which results may be generalized and to determine or confirm whether the participants demonstrated the disability or difficulty of focus.	
2.1. The study describes participant demographics relevant to the review (e.g., gender, age/grade, race/ethnicity, socioeconomic status, language status).	Both
2.2. The study describes disability or risk status of the participants (e.g., specific learning disability, autism spectrum disorder, behavior problem, at risk of reading failure) and method for determining status (e.g., identified by school using state Individuals with Disabilities Education Improvement Act [IDEA] criteria, teacher nomination, standardized intelligence test, curriculum-based measurement probes, rating scale).	Both
3.0. Intervention agent. The study provides sufficient information regarding the critical features of the intervention agent.	
3.1. The study describes the role of the intervention agent (e.g., teacher, researcher, paraprofessional, parent, volunteer, peer tutor, sibling, technological device/computer) and, as relevant to the review, background variables (e.g., race/ethnicity, educational background/licensure).	Both
3.2. The study describes any specific training (e.g., amount of training, training to a criterion) or qualifications (e.g., professional credential) required to implement the intervention, and indicates that the interventionist has achieved them.	Both
4.0. Description of practice. The study provides sufficient information regarding the critical features of the practice (intervention), such that the practice is clearly understood and can be reasonably replicated.	
4.1. The study describes detailed intervention procedures (e.g., intervention components, instructional behaviors, critical or active elements, manualized or scripted procedures, dosage) and intervention agents' actions (e.g., prompts, verbalizations, physical behaviors, proximity), or cites one or more accessible sources that provide this information.	Both
4.2. When relevant, the study describes materials (e.g., manipulatives, worksheets, timers, cues, toys), or cites one or more accessible sources providing this information.	Both
5.0. Implementation fidelity. The practice is implemented with fidelity.	
5.1. The study assesses and reports implementation fidelity related to adherence using direct, reliable measures (e.g., observations using a checklist of critical elements of the practice).	Both

Quality Indicator	Research design(s)
5.2. The study assesses and reports implementation fidelity related to dosage or exposure using direct, reliable measures (e.g., observations or self-report of the duration, frequency, curriculum coverage of implementation).	Both
5.3. As appropriate, the study assesses and reports implementation fidelity (a) regularly throughout implementation of the intervention (e.g., beginning, middle, end of the intervention period), and (b) for each interventionist, each setting, and each participant or other unit of analysis. If either adherence or dosage is assessed and reported, this item applies to the type of fidelity assessed. If neither adherence nor dosage is assessed and reported, this item is not applicable.	Both
6.0. Internal validity. The independent variable is under the control of experimenter. The study describes the services provided in control and comparison conditions and phases. The research design provides sufficient evidence that the independent variable causes change in the dependent variable or variables. Participants stayed with the study, so attrition is not a significant threat to internal validity.	
6.1. The researcher controls and systematically manipulates the independent variable.	Both
6.2. The study describes baseline (single-subject studies) or control/comparison (group comparison studies) conditions, such as the curriculum, instruction, and interventions (e.g., definition, duration, length, frequency, learner: instructor ratio).	Both
6.3. Control/comparison-condition or baseline-condition participants have no or extremely limited access to the treatment intervention.	Both
6.4. The study clearly describes assignment to groups, which involves participants (or classrooms, schools, or other unit of analysis) being assigned to groups in one of the following ways: a) randomly; b) non-randomly, but the comparison groups are matched very closely to the intervention group (e.g., matched on prior test scores, demographics, a propensity score; see Song & Herman, 2010); c) non-randomly, but techniques are used to measure differences and, if meaningful differences are identified— for example, statistically significant difference, difference greater than 5% of a standard deviation (What Works Clearinghouse [WWC], 2011)—to statistically control for any differences between groups on relevant pretest scores or demographic characteristics (e.g., statistically adjust for confounding variable through techniques such as ANCOVA or propensity score analysis); or d) non-randomly on the basis of a reasonable cutoff point (regression discontinuity design	Group comparison
6.5. The design provides at least three demonstrations of experimental effects at three different times.	Single-subject
6.6. For single-subject research designs with a baseline phase (alternating treatment designs do not require a baseline), all baseline phases include at least three data points (except when fewer are justified by study author due to reasons such as measuring severe or dangerous problem behaviors and zero baseline behaviors with no likelihood of improvement without intervention) and establish a pattern that predicts undesirable future performance (e.g., increasing trend in problem behavior, consistently infrequent exhibition of appropriate behavior, highly variable behavior).	Single-subject
6.7. The design controls for common threats to internal validity (e.g., ambiguous temporal precedence, history, maturation, diffusion) so plausible, alternative explanations for findings can be reasonably ruled out. Commonly accepted designs such as reversal (ABAB), multiple baseline,	Single-Subject

Quality Indicator	Research design(s)
changing criterion, and alternating treatment address this quality indicator when properly designed and executed, although other approaches can be accepted if study authors justify how they ruled out alternative explanation for findings or control for common threats to internal validity.	Group comparison
6.8. Overall attrition is low across groups (e.g.,< 30% in a 1-year study).	Group comparison
6.9. Differential attrition (between groups) is low (e.g., ≤10%) or is controlled for by adjusting for non-completers (e.g., conducting intent-to-treat analysis)	Group comparison
7.0. Outcome measures/dependent variables. Outcome measures are applied appropriately to gauge the effect of the practice on study outcomes. Outcome measures demonstrate adequate psychometrics.	
7.1. Outcomes are socially important (e.g., they constitute or are theoretically or empirically linked to improved quality of life, an important developmental/learning outcome, or both).	Both
7.2. The study clearly defines and describes measurement of the dependent variables.	Both
7.3. The study reports the effects of the intervention on all measures of the outcome targeted by the review (p levels and effect sizes [ES] or data from which ESs can be calculated for group comparison studies; graphed data for single-subject studies), not just those for which a positive effect is found. Both	Both
7.4. Frequency and timing of outcome measures are appropriate. For most single-subject studies, a minimum of three data points per phase is necessary if a given phase is to be considered as part of a possible demonstration of experimental effect (except when fewer are justified by study author due to reasons such as measuring severe or dangerous problem behaviors and zero baseline behaviors with no likelihood of improvement without intervention). For alternating treatment designs, at least four repetitions of the alternating sequence are required (e.g., ABABABAB; see Kratochwill et al., 2013).	Both
7.5. The study provides evidence of adequate internal reliability, inter-observer reliability, test–retest reliability, or parallel form reliability, as relevant (e.g., score reliability coefficient ≥ .80, inter-observer agreement ≥ 80%, κ ≥ 60%).	Both
7.6. The study provides adequate evidence of validity, such as content, construct, criterion (concurrent or predictive), or social validity	Group comparison
8.0. Data Analysis. Data analysis is conducted appropriately. The study reports information on ES.	
8.1. Data analysis techniques are appropriate for comparing change in performance of two or more groups (e.g., t tests, ANOVAs/MANOVAs, ANCOVAs/MANCOVAs, hierarchical linear modeling, structural equation modeling). If atypical procedures are used, the study provides a rationale justifying the data analysis techniques.	Group comparison
8.2. The study provides a single-subject graph clearly representing outcome data across all study phases for each unit of analysis (e.g., individual, classroom, other group of individuals) to enable determination of the effects of the practice. Regardless of whether the study report includes visual or other analyses of data, graphs depicting all relevant dependent variables targeted by the review should be clear enough for reviewers to draw basic conclusions about experimental control using traditional visual analysis techniques (i.e., analysis of mean, level, trend, overlap, consistency of data patterns across phases).	Single-subject

Quality Indicator	Research design(s)
8.3. The study reports one or more appropriate effect-size statistic (e.g., Cohen's d, Hedge's G, Glass's Δ, η2) for all outcomes relevant to the review being conducted, even if the outcome is not statistically significant, or provides data from which appropriate ESs can be calculated.	Group comparison

(Cook et al., 2015, p. 5-6)

Figure 3.1

Evidence-Based Classification

Evidence-based Practice:

(a) Must be supported by at least
- two methodologically sound group comparison studies with random assignment to groups, positive effects, and at least 60 total participants across studies;
- four methodologically sound group comparison studies with non-random assignment to groups, positive effects, and at least 120 total participants across studies; or
- five methodologically sound single-subject studies with positive effects and at least 20 total participants across studies; **OR**

(b) Meet at least 50% of criteria for two or more of the study designs described in (a); **AND**

(c) No methodologically sound studies conducted with negative effects and at least a 3:1 ratio of methodologically sound studies with positive effects to methodologically sound studies with neutral/mixed effects. For this item, CEC considers group experimental, non-randomly assigned group comparison, and single-subject design studies collectively.

Potentially Evidence-based Practice:

(a) Must be supported by
- one methodologically sound group comparison study with random assignment to groups and positive effects;
- two or three methodologically sound group comparison studies with non-random assignment to groups and positive effects; or
- two to four methodologically sound single subject studies with positive effects; **OR**

(b) Meet at least 50% of criteria for two or more of the study designs described in (a); **AND**

(c) No methodologically sound studies conducted with negative effects, and at least a 2:1 ratio of methodologically sound studies with positive effects to methodologically sound studies with neutral/mixed effects. For this item, CEC considers group experimental, non-randomly assigned group comparison, and single-subject design studies collectively.

Practice with Mixed Effects:

(a) Must meet criterion (a) or (b) for evidence-based practice or potentially evidence-based practice (regarding number of methodologically sound studies with positive effects supporting the practice); **AND**

(b) The ratio of methodologically sound studies with positive effects to methodologically sound studies with neutral/mixed effects is less than 2:1; **OR** one or more methodologically sound studies conducted with negative effects, as long as methodologically sound studies with negative effects do not outnumber methodologically sound studies with positive effects.

Insufficient Evidence:

Insufficient research exists to meet the criteria for any of the other evidence-based categories.

Practice with Negative Effects:

(a) Must include more than one methodologically sound study (of any acceptable design) conducted with negative effects; **AND**

(b) The number of methodologically sound studies conducted with negative effects outnumbers the number of methodologically sound studies with positive effects.

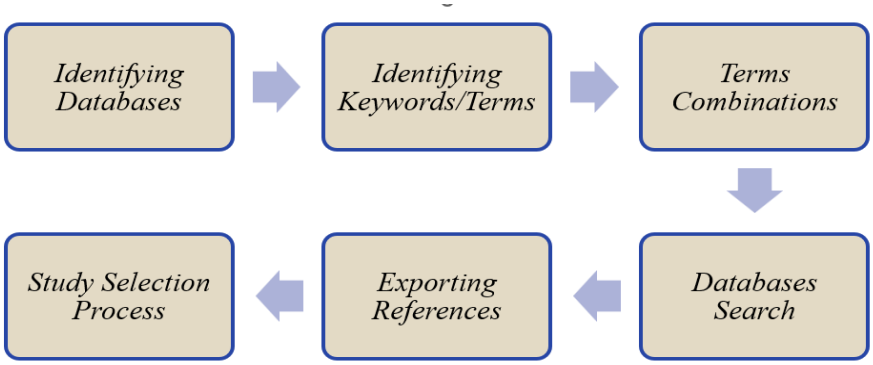
(Cook et al., 2015, p.11)

Search Procedures

This section represents the search strategy which details the sources we searched and how we searched them to identify the relevant studies (Zawacki-Richter et al., 2020). We applied the procedures systematically. The section reports databases, keywords/terms, database search, and references exporting, and then, the process of selecting the studies by screening the title and abstract and the full texts (Figure 3.2).

Figure 3.2

Systematic Review Searching Process



Databases

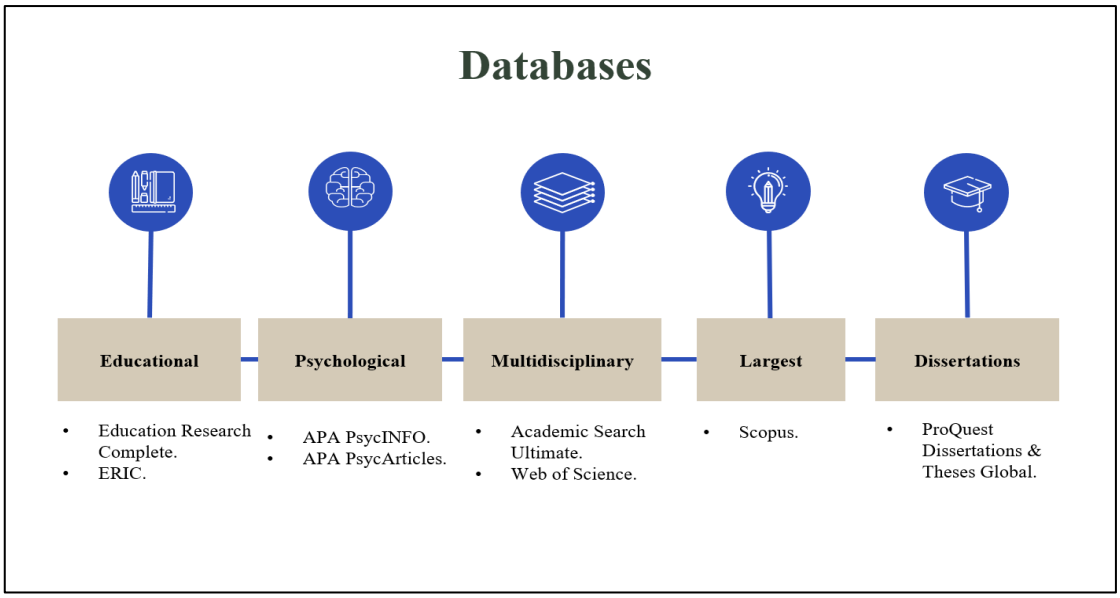
We identified the educational and psychological bibliographic databases that index academic journals related to our review's field. As relevant research could be published in a different range of journals, we identified multiple databases (Zawacki-Richter et al., 2020) including multidisciplinary databases to locate the most references. The databases are two educational databases, Education Research Complete and ERIC. Two psychological databases, APA PsycINFO and APA PsycArticles. Two multidisciplinary databases Academic Search Ultimate and Web of Science. One recognized as the largest peer-reviewed literature database, Scopus. Additionally, one

database to locate the dissertations, ProQuest Dissertations & Theses Global. We electronically searched all of them (Figure 3.3).

Figure 3.3 presents the identified databases based on their subject.

Figure 3.3

Databases



Keywords/Terms

As bibliographic databases index the records based on their topics and using keywords or terms (Zawacki-Richter et al., 2020), we used EBSCO's Thesaurus index terms to identify relevant keywords/terms for the first concept, career counseling, and the second concept, gifted, as represented in table 3.2.

To ensure that some keywords/terms are used for career counseling, like occupational guidance, we searched the term separately through random databases and randomly checked published work. After both of the reviewers agreed on databases and

terms, we consulted the counseling and giftedness professor to agree on the relevancy of the selected terms and databases.

Table 3.2

Keywords/Terms of Concepts

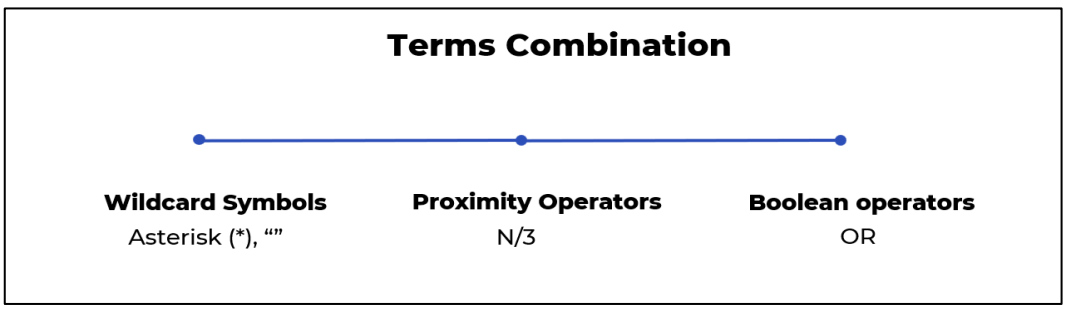
Concept	Keywords/Terms
Concept 1	Career counseling, career guidance, career development, career orientation, career planning, career exploration, career selection, career awareness, career choice, career education, vocational guidance, vocational counseling, occupational guidance, and occupational choice.
Concept 2	Gifted, Gifted children, gifted teenagers, talented, talent, advanced student, exceptional, exceptional children, exceptional teenager, exceptional student. creative, genius, prodigious, high achieving, academically gifted, highly able, intellectually gifted, bright student, and superior.

Terms Combinations

Using wildcard symbols, proximity operators, and Boolean operators, we combined the keywords (Figure 3.4).

Figure 3.4

Operators and Symbols Used to Combine the Terms



We approved the combination shown in Table 3.3. We used the same combination for all the Education Research Complete, ERIC, APA PsycINFO, APA PsycArticles, and Academic Search Ultimate as they are all accessed through the platform of EBSCO which applies the same directions of searching its databases. The proximity operator N3 was replaced with W/3 in Scopus, and Near/3 in Web of Science following these two databases' guides. ProQuest Dissertations & Theses Global's keywords/terms combination is presented in Table 3.3.

The asterisk wildcard symbol (*) is used at the end of a term to find multiple characters. We used it to find all the words starting with the same root but ending differently. For example, using it in high achiev* should locate both high achievers and high achievers. We used quotation marks to find the exact term in the selected search field, like "high able". In this way we eliminated the chance of searching for each word separately which could happen through the databases. The proximity operators are used to find two or more words occurring within the specified number of words from each other regardless of the order they could appear on. We use N/3 to specify a maximum of 3 words apart from one another to keep the same meaning. We did not prioritize the order considering that some words may not appear exactly in the same order, especially in the abstract. These operators were only used with the words we were targeting to see together like career counseling or seeking a specific narrow meaning like academically advanced or advanced academically. We used the Boolean operator "OR" between the terms to find any of the combined words.

Table 3.3

Keywords/Terms Combination for EBSCO's Databases

Concept	Keywords/Terms combination
Concept 1	(career* OR vocation* OR occupation*) N3 (counsel* OR guidance OR development OR orientation OR planning OR exploration OR selection OR awareness OR choice OR education)
Concept 2	(academic* N3 (superior OR talented OR advanced))
	AND
	(gifted* OR talent* OR exceptional* OR creative OR genius* OR prodigious OR prodigi* OR "high achiev*" OR "high-achieving" OR "academically gifted" OR "highly able" OR "highly-able" OR "intellectually gifted" OR "bright student")

Table 3.4

Keywords/Terms Combination for ProQuest Dissertations & Theses Global

Concept	Keywords/Terms Combination
Concept 1	("career*" OR "vocation*" OR "occupation*") NEAR/3 ("counsel*" OR 'guidance' OR 'development' OR 'orientation' OR 'planning' OR 'exploration' OR 'selection' OR 'awareness' OR 'choice' OR 'education')
Concept 2	("academic*") NEAR/3 ('superior' OR 'talented' OR 'advanced')
	AND
	("gifted*" OR "talent*" OR "exceptional*" OR 'creative' OR "genius*" OR 'prodigious' OR "prodigi*" OR "high achiev*" OR "high-achieving" OR "academically gifted" OR "highly able" OR "highly-able" OR "intellectually gifted" OR "bright student")

Databases Search

Using the terms combination, we searched each database. For each concept, first, we searched the terms through their subject index heading, when available in the database. Then, we used the combination to search through Title, Abstract, and Keyword fields combined with "OR" to find results in any field. Both subject index and Title, Abstract,

and Keyword searches were then combined with “OR”. After that, both Concept 1 and 2 search results were combined with “AND” to find the references targeting both career counseling and gifted together (Figure 3.5).

Initial Inclusion and Exclusion Criteria

After each conducted search through each database, we used an initial inclusion criterion through the limitations provided in each database as the following:

1- years between 1990 and 2022;

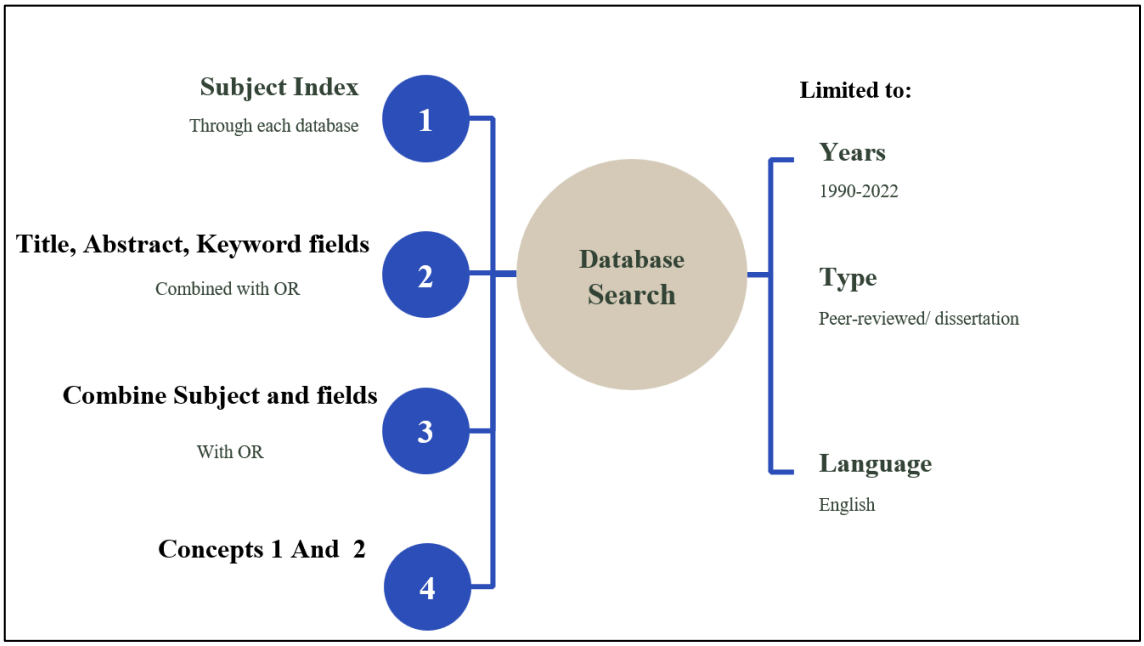
2- peer-reviewed journals or dissertations; and

3- English Language.

Figure 3.5 shows the steps of searching the databases and the limitations applied to the search results in the databases.

Figure 3.5

Searching Databases and Limitations Applied



Exporting References

We exported the results obtained from each database to EndNote. Searching bibliographic databases leads to irrelevant studies, thus, one-by-one reference checking is required to find relevant studies (Zawacki-Richter et al., 2020). EndNote enables exporting references with their full citation including title and abstract, removing duplicates, checking each reference, keeping notes, and categorizing references in groups and group sets. These features were needed to conduct our search.

For all the databases, the initial search yielded (N= 7,366) references. After removing duplicates, the total number became (N=4,187). The systematic review flow chart was used to report the exclusion and inclusion of article numbers through the study selection process.

Study Selection Process

With the 4,187 remaining references, we used a two-phase process to determine the inclusion or exclusion of studies. In phase 1, we review the title and abstract of the studies to determine if the study is relevant (Zawacki-Richter et al., 2020). In phase 2, we screened the full text.

Phase 1: Title and Abstract Scanning. For this phase, we set criteria to exclude any irrelevant reference if it is:

1- not targeting gifted students, like adults and workers;

2- not targeting career counseling;

3- not an empirical study, like a bibliography, review articles, or book reviews;

4- Not quantitative study, like qualitative studies; or

5- Not an English article.

We, the two reviewers, reviewed each title and abstract independently in two EndNote Libraries. We excluded the irrelevant to the review articles by keeping notes on each study to enable differentiation between the included and excluded studies. The remaining articles and the articles that were not clear from the abstract and title to determine excluding them were removed to phase 2, full-text screening. The two reviewers' libraries were merged and categorized as agreements and disagreements. Agreements were the articles both reviewers agreed to include or exclude. Disagreements represented the articles the reviewers differ in coding them as include or exclude. Discussions between the reviewers were held to solve the disagreement. Any unsolved article was removed to phase 2. After title and abstract scanning, 3,644 articles were excluded and 558 moved to phase 2, as reported in the systematic review flow chart.

Phase 2: Full-Text Screening. In this phase, we retrieved the full texts and then proceeded with the full-text screening of each article according to pre-agreed criteria, which represents the reasons for excluding. For each study, we kept notes about the reason for excluding it to compare the two reviewers' notes, refer to when merging libraries, and discuss the disagreements. The percentage of agreement was calculated by dividing agreements by the sum of disagreements and agreements, multiplied by 100. The initial percentage of agreement was 91%. Disagreements were resolved by meeting and discussion until reaching 100% agreement. As represented in the flow chart we excluded 543 articles.

Studies were excluded for the following reasons. The study:

1- did not target gifted students, like when the author targeted teachers, counselors, or adults;

2- did not target career counseling;

3- was not applying an intervention or measuring the intervention's effects;

4- was not an empirical study, like reviews and book chapters;

5- was not a quantitative study, like qualitative studies;

6- not experimental design, like correlational;

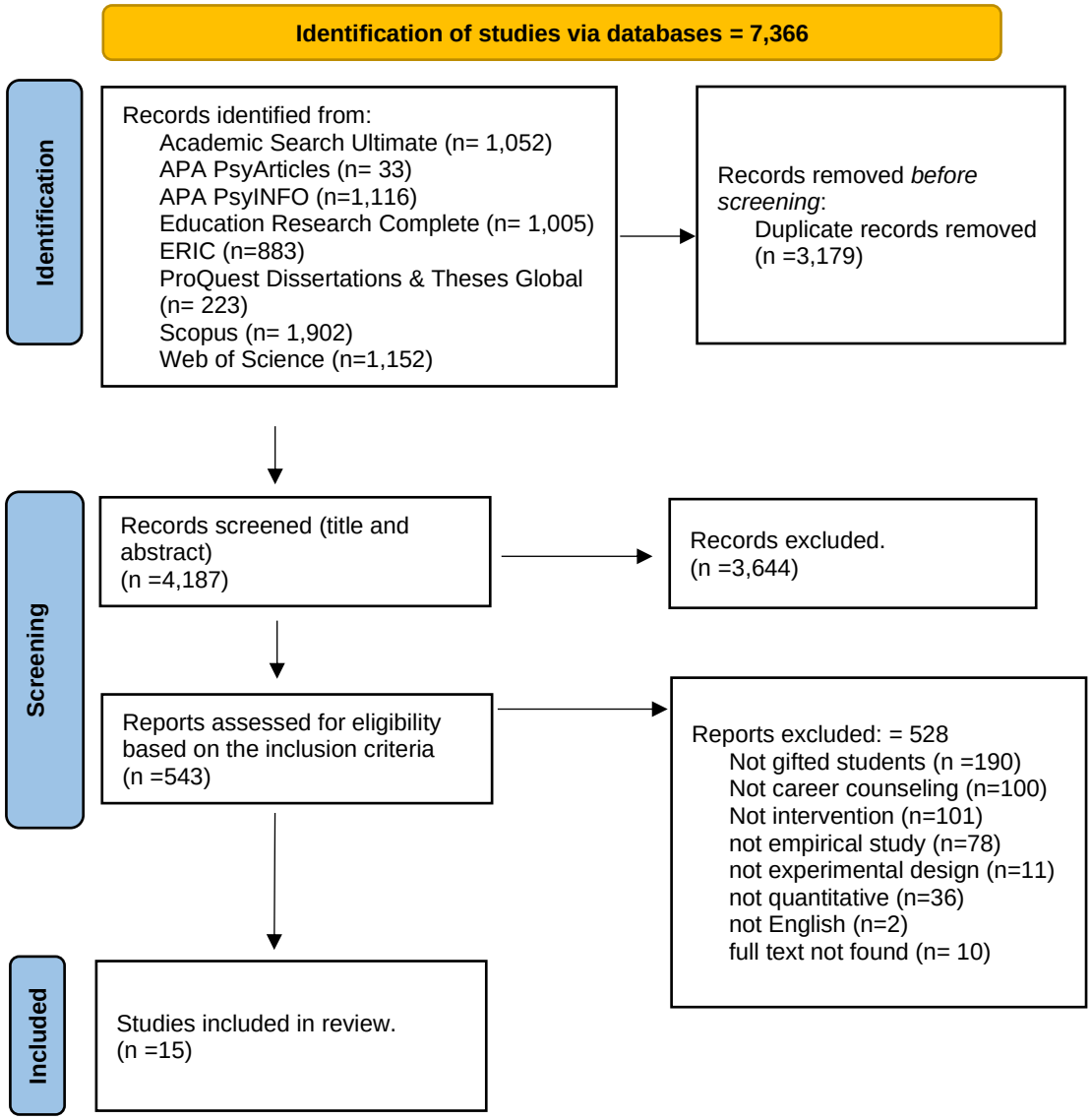
7- was not written in English; or

8- full-text not found.

Before excluding the 10 not-found references, we requested nine of them through the document service of the AUB library system, but a full text was not available; these references were retrieved as peer-reviewed articles. One of the 10 references was a dissertation, we contacted its author, but a copy was not available to the author.

We agreed on 17 studies and consulted the counseling and giftedness professor to make a final decision. Two of the articles were removed because they were not conducting an experimental design. Thus, 15 articles were included to extract data and examine their methodological rigor based on CEC quality indicators, which are presented next in the results chapter.

For the search strategy steps, exclusion and inclusion articles' numbers are represented in the systematic review chart as shown next.



Systematic Review Flow Chart.

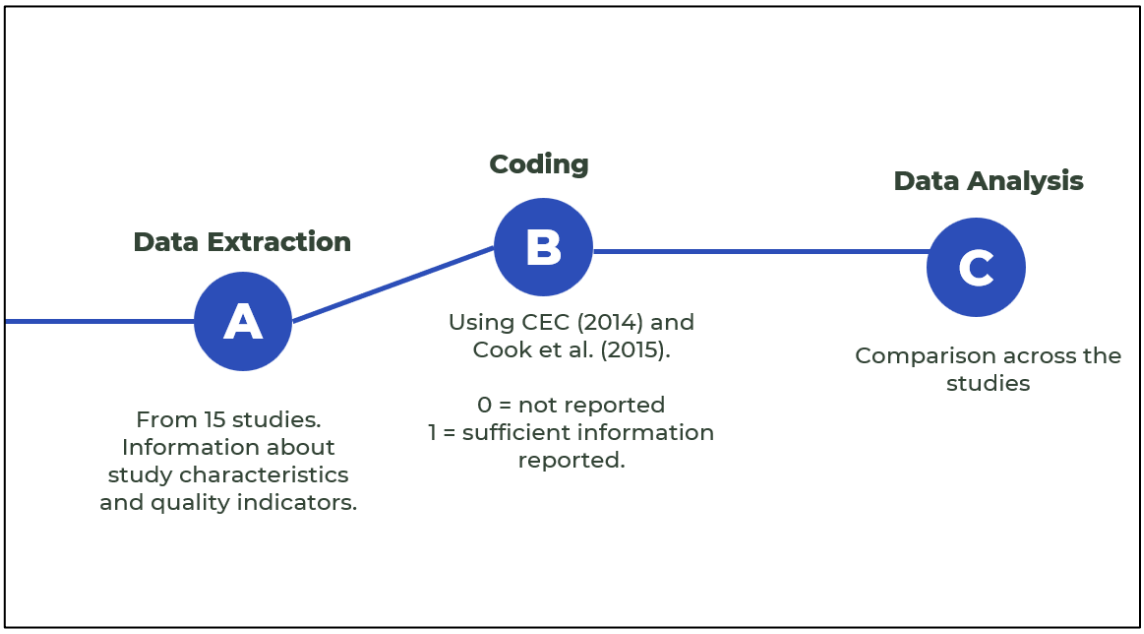
Coding Studies and Data Extraction

After the approval of 15 studies, information from the studies was recorded and extracted to use in the review and answer the research questions (Zawacki-Richter et al., 2020).

Figure 3.6 represents the final steps of conducting this systematic review, which are the extraction of data from the studies, then coding the indicators, and then analyzing the data.

Figure 3.6

Coding and Data Extraction



Information about the study's characteristics and methods was coded and then extracted on papers by hand across the studies. The information is categorized in a table as the study's authors and years, context, design, total number of participants, and participants' age and grade level. This information was used to tabulate studies' characteristics.

For quality indicators coding, Microsoft Word was used to create tables for each study categorized according to each quality indicator and its elements, and then, data

from each study was extracted in detailed information related to CEC quality indicators, which were then examined to assess the quality of the studies.

Coding Procedures

After extracting the required information about each study, a coding sheet was developed by entering each quality indicator and indicators' element into another Word table along with the 15 studies. Coding the study elements was done using the CEC (2014) Standards for Evidence-based Practices in Special Education and Cook et al. (2015) to guide the process. Elements of the studies were coded as 0 if the information was not reported or 1 if sufficient information was reported. The percentage for each study met indicators and across the studies was calculated. A second reader reviewed the codes for reliability and confirmed them.

Data Analysis

As this systematic review focuses on examining the quality of the studies based on CEC quality indicators and then classifying the evidence-based practices, analysis of extracted data was based on each quality indicator. Quality indicators and their elements were compared across the studies to answer the research questions. Also, demographic information about each study was tabulated and comparisons across the studies were done. The characteristics and quality indicators codes tables are represented next in the results chapter. The second reader reviewed the tables and confirmed them.

CHAPTER 4

SYSTEMATIC REVIEW FINDING

The following section represents the reported results of fifteen identified intervention studies conducted between 1990 and 2022.

There were eleven group comparison design studies and four single-subject design studies (Figure 4.1). The codes of the studies are represented in Table 4.1. The table is divided to represent the 8 quality indicators: (a) context and setting; (b) participants; (c) intervention agent; (d) description of practice; (e) implementation fidelity; (f) internal validity; (g) outcome measures/independent variable; and (h) data analysis. A percentage of meeting each study to the quality indicators is represented next to each study, in the right-side column. For each indicator, a percentage representing the quality indicator met across the studies is calculated and reported in the last row of the table. After reading the studies, the elements were identified, then coded as 1 if the study provides sufficient data information regarding the indicator, and 0 if no sufficient information is provided based on the CEC (2014) standards. Quantitative results are reported in Table 4.1 and then explained for each CEC indicator.

Table 4.2 represents information about the reviewed studies' context, design, samples, and participants' age and grade level.

Figure 4.1 represents the main designs of the 15 reviewed studies.

Figure 4.1

Studies' Design

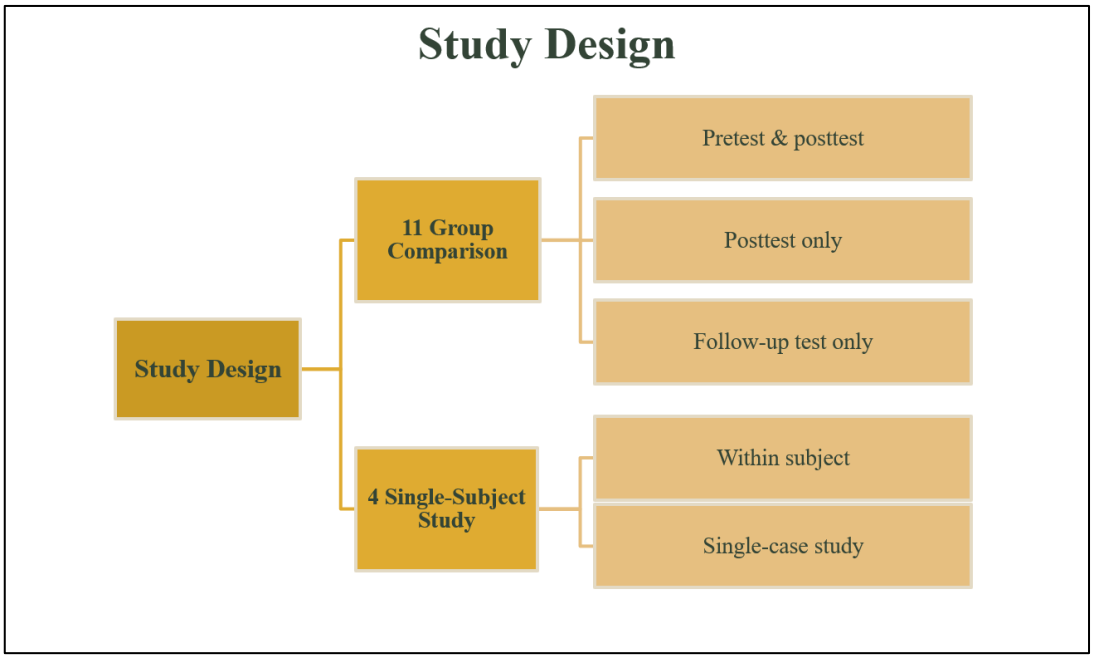


Table 4.1

Methodological Rigor by Quality Indicator (QI)

Study	Quality Indicators								
	Context/setting	participants	Intervention Agent	Description of intervention	Implementation Fidelity	Internal validity	Outcome measures/ dependent	Data analysis	QI met by study %
Brookhouser et al. (1994)	0/1	2/2	0/2	0/2	0/3	3/6	3/6	0/2	12.5
Dungan (1992)	1/1	1/2	1/2	1/2	0/3	6/6	5/6	2/2	37.5
Harris (1990)	1/1	2/2	1/2	2/2	0/3	4/6	5/6	2/2	50.0
Houston (1999)	1/1	1/2	0/2	0/2	0/3	4/6	6/6	2/2	37.5
Kerr and Erb (1991)	1/1	1/2	2/2	2/2	0/3	6/6	6/6	2/2	75.0
Kerr and Robinson Kurpius (2004)	1/1	1/2	0/2	1/2	0/3	2/6	3/5	0/1	12.5
Lotta (2001)	1/1	1/2	2/2	2/2	0/3	6/6	3/6	2/2	62.5
Lowery (2004)	1/1	1/2	2/2	2/2	0/3	6/6	6/6	2/2	75.0
Maree (2022)	0/1	1/2	1/2	1/2	0/3	1/6	3/5	0/1	0.0
Maree (2020)	0/1	1/2	1/2	1/2	0/3	1/6	2/5	0/1	0.0
Maree (2019)	0/1	1/2	1/2	1/2	0/3	1/6	2/5	0/1	0.0
Olszewski-Kubilius & Laubscher (1996)	1/1	2/2	1/2	1/2	0/3	5/6	5/6	2/2	37.5
Rowe (1994)	1/1	1/2	0/2	2/2	0/3	5/6	5/6	2/2	37.5
Taylor (1992)	1/1	1/2	1/2	2/2	0/3	5/6	6/6	2/2	50.0
Way (1994)	1/1	2/2	1/2	2/2	3/3	6/6	5/6	2/2	75.0
QI met across studies %	73.3	26.6	20	46.6	6.6	33.3	26.6	66.6	

Results for Quality Indicators

The finding for each quality indicator across the reviewed studies is reported next, followed by Figure 4.2. which illustrated the mostly reported or missed elements of the indicators.

Indicator 1: Context and Setting

CEC (2014) quality indicator requires providing sufficient details of the critical features of context or setting to determine including the study. Mentioning the setting of the intervention was required for this review. Only 73.3 % of the studies met this indicator by reporting or describing the setting.

Most of the studies were held across the United States (Table 4.2). Three studies were in Africa (Maree, 2022, 2020, 2019).

The interventions were implemented in the school (Dungan, 1992; Houston, 1999; Lotta, 2001; Taylor, 1992; Way, 1994), and university (Harris, 1991; Kerr & Erb, 1991; Kerr & Robinson Kurpius, 2004; Lowery, 2004; Olszewski-Kubilius & Laubscher, 1996) setting. The schools were middle school (Houston, 1999), high school (Dungan, 1992; Lotta, 2001), and vocational-technical school (Taylor, 1992).

The following Authors described the universities' setting interventions specifically. Kerr and Erb's (1991), intervention took place in the clinic of the counselor education department of a large university. The career intervention workshops in Lowery's study (2004) were held in the Counselor Training Center on the Campus of a university. Olszewski-Kubilius and Laubscher's study (1996) implemented the intervention in a private university.

Four studies did not meet this indicator as the author did report the setting where the intervention was implemented (Brookhouser et al., 1994; Maree, 2022; Maree, 2020; Maree, 2019).

Indicator 2: Participants

For the participants' quality indicator, CEC (2014) requires the study to (a) describe participants' demographic relevant to the review; and (b) describe participants' disability status and method for determining status. Only four studies (26.6 %) met the two elements of this indicator. All of the studies provide participants with demographics relevant to the review.

Most of the studies' grade levels were high or middle school students. Only two studies targeted college honor freshmen and sophomore students (Kerr & Erb, 1991; Lowery, 2004). Participants' ages across the studies ranged between 10 and 21 years (Table 4.2).

The studies describe the students' status as, gifted and talented (Lotta, 2001; Taylor, 1992), gifted (Brookhouser et al., 1994; Houston, 1999; Maree, 2022; Maree, 2019; Olszewski-Kubilius and Laubscher, 1996), intellectually or academically gifted (Way, 1990), talented (Kerr & Robinson Kurpius, 2004), academically talented (Harris, 1991; Kerr & Erb, 1991; Lowery, 2004; Rowe, 1994), creative (Maree, 2020), and high-achievers (Dangun, 1992).

However, only four studies met the second element of this indicator as they stated the methods of determining the status. In Harris (1991) the students had above-the-norm scores and grades on PSAT-verbal and PSAT-Math. Way (1994) identified gifted students based on superior ability and their achievement based on the California Achievement Test. Olszewski-Kubilius and Laubscher (1996) students Score at or

above the 90th percentile on the reading, writing, and mathematics subtest of a national normed SAT and 95th for the comparison group. Brookhouser et al. (1994) stated that students should obtain 130 or greater nonverbal IQ Wechsler Intelligence Scare of Children Revised, the Hiskey-Nebraska Test of Learning Aptitude, or any measure of nonverbal intelligence used in educational placement.

Indicator 3: Intervention Agent

For the Intervention agents, the study should describe (a) the role of the intervention agent; and (b) specific training or qualifications (CEC, 2014). As this review does not target the specific population of interventionists, describing the role of the interventionists was considered enough to meet the first element (Cook et al., 2015). Three studies (20%) meet this indicator's elements (Kerr & Erb, 1991; Lotta, 2001; Lowery, 2004). In Latta (2001) female counselors are graduate students in counseling and counseling psychology. Each counselor was provided with multicultural training, training to implement the program script under the supervision of the TARGETS project, and they have one semester's experience, at least, in working with TARGETS girls. In Kerr and Erb (1991), counselors and facilitators applied the intervention. Counselors were provided with 16 hours of training. According to Lowery (2004), the staff of interventionists includes female counseling psychology professors and female doctoral-level graduate assistants. The latest had had at least one semester of practicum experience in the project and received 4-hour training from the project assistant.

Eight studies met the first element by mentioning the interventionist role. For example, Taylor (1992) states that the school psychologist was the interventionist. In Maree (2022), Maree (2020), and Maree (2019) a counselor implemented the intervention and led the counseling sessions. The four remaining studies did not meet

this indicator as they did not provide information about the intervention agents (Brookhouser et al., 1994; Houston, 1999; Kerr and Robinson Kurpius, 2004; Rowe, 1994).

Indicator 4: Description of Practice

For the description of practice, authors should (a) describe the intervention and the agents' action or cite accessible resources of the information; and (b) when relevant, describe materials or cite accessible resources (CEC, 2014). Seven studies (46.6%) met both elements of this indicator (Harris, 1991; Kerr & Erb, 1991; Lotta, 2001; Lowery, 2004; Rowe 1994; Taylor, 1992; Way, 1994).

For example, Lotta (2001) stated that the intervention is an adaption of TARGETS and described the modifications done to make it relevant to Navajo girls' culture. Then, sufficiently described the intervention, components, counselor's action, and the materials including a goal chart and instruments for the individual counseling sessions. Lowery (2004) applied Career intervention workshops entitled Gender Equity Options in Science (GEOS), consisting of two workshops led and conducted by the GEOS faculty and staff. The author reported the workshops' components, including discussion about values, Future Day Fantasy guided visualization activity, and individual career counseling sessions applied by graduate-level counselors. The resources applied and used during the workshops and retreats were reported and described. For example, during workshop I, they used the values inventory (Rokeach, 1973) in the discussion about values.

Five studies met only the first element by describing the intervention and the intervention agents' actions (Dungan, 1992; Maree, 2022; Maree, 2020; Maree, 2019; Olszewski-Kulbilius & Laubscher, 1996; Taylor, 1992). One study (Kerr & Robinson

Kurpius, 2004) did not meet the first element as the authors reported the components of the program, but the intervention agents' actions were not stated. Two studies did not meet the elements of this indicator although the authors identified the program without clarifying the agents' actions or materials (Brookhouser et al., 1994; Houston, 1999).

Indicator 5: Implementation Fidelity

CEC (2014) requires authors to assess and report implementation fidelity (a) related to adherence using direct reliable measures; (b) related to exposure using direct reliable measures; and (c) regularly and for each intervention setting, and each participant.

Only one study met this indicator. Way (1994) reported using an integrity form for each student per session to assess the fit between the treatment as designed and implemented.

Indicator 6: Internal Validity

To examine the internal validity of the study CEC requires the following: (a) author control and systematically manipulate the independent variable; (b) describe the baseline or control/comparison conditions; (c) control/comparison conditions participants have limited access to the treatment intervention; (d) for group designs, describe assignment to groups clearly; (e) for single-subject designs, provide at least three demonstrations of experimental effect, the baseline phase include at least three data point, and the design control for common threat to internal validity; additionally to (f) low overall attrition and differential attrition for group comparison studies.

For the control conditions elements, Way (1994) administered the control conditions participants with a similar program to the treatment program. For the limited access to treatment intervention of control/comparison condition participants, Dungan's

study (1992) stated that the control group was enrolled in an elective course. Lotta (2001) stated that the control comparison condition participants received the intervention after completing of posttest measures. Kerr and Erb (1991) stated that the control group was introduced and completed the pretest instruments, stayed on the waitlist until the intervention group was done, then administered the post-test instruments, and after that received the intervention.

Other studies provided information for one element of control/comparison or baseline conditions, for example, in Olszewski-Kubilius & Laubscher's (1996) study, the comparison program received a different three-week summer program in a different setting of the intervention group. However, the author did not describe the comparison conditions. Rowe (1994) did not state how the control participants had no or limited access to the treatment.

Kerr and Robinson Kurpius (2004) stated that the participants were administered the pretest before arriving at the TARGETS- day but did not describe the baseline condition. They provided 4 demonstrations of experimental effects at different times. The single-subject studies (Maree, 2022, 2020, 2019) met only the indicator of controlling and systematically manipulating the intervention.

Indicator 7: Outcomes Measures/ Dependent Variables

Examination of outcome measures and dependent variables requires the following elements; (a) outcomes are socially important; (b) describing the measurements of dependent variable; (c) reporting the effect of the intervention on all measures of outcomes targeted by the review; (d) appropriate frequency and timing of outcome measures; and (e) evidence of reliability; and (f) evidence of validity. Single-subject studies require the first five elements only (CEC, 2014).

Only four studies (26.6%) met all these indicators' elements (Houston, 1999; Kerr & Erb, 1991; Lowery, 2004; Taylor, 1992). All of the studies described the outcomes instrument. For example, Kerr and Erb (1991) used The Student Development Inventory (SDI) subscales of Identity-Confidence and Development of Purpose-Vocational each of them is a nineteen 5-point Likert-scale item, to measure identity and development related to academic and vocational choices and development. Also, they used a questionnaire to measure the students' occupational choice and occupational certainty on a 5-point Likert scale. The author reported the effect of the intervention. For example, the pretest mean was significantly different from the posttest mean both on the Identity-Confidence subscale, [$t(36) = 7.61$, $p < .0001$], and the Development of Purpose-Vocational subscale [$t(36) = 8.04$, $p < .001$]. The internal reliability for the identity confidence subscale is 0.80 and the test-retest reliability ranged from 0.81 to 0.83. For the Development of the Purpose-Vocational Subscale, the test-retest reliabilities range from 0.61 to 0.81. The construct validity is mentioned for the SDI and its scales.

The timing of the outcome measures element was not met in several studies, because the posttest was administered four months after the intervention (Lotta, 2001) or more (Olszewski-Kubilius & Laubscher, 1996) without justifying, the duration between the pretest and posttest is more than 3-month (Dungan, 1992), the author did not report when the second follow-up was administered (Kerr & Robinson Kurpius, 2004), or the study did not provide data points for each phase (Maree, 2019, 2020, 2022). Three studies did not report validity (Brookhouser et al, 1994; Lotta, 2001; Rowe, 1994).

Indicator 8: Data Analysis

For group comparison studies, CEC (2014) requires two items to examine data analysis of the study, (a) provide appropriate analysis techniques for comparing change in variables measured; and (b) report effect-size statistics for all outcomes relevant to the review. For single-subject studies, the study should provide a single-subject graph that represents outcome data for all phases of each unit of analysis.

The group studies used appropriate statistical methods to measure differences between the groups. The studies provide sufficient data to calculate the effect size, but only Lotta (2001) reported the effect size using Eta2. One study (Brookhouser et al., 1994) compared the two groups using frequency and percentages and did not provide data to calculate effect size.

None of these single-subject studies met this indicator, as the authors did not provide single-subject graphs.

Figure 4.2 represents the percentage of meeting the quality indicators across the studies with the main findings of the reported or missed elements.

Figure 4.2

The Main Quality Indicators' (QI) Results

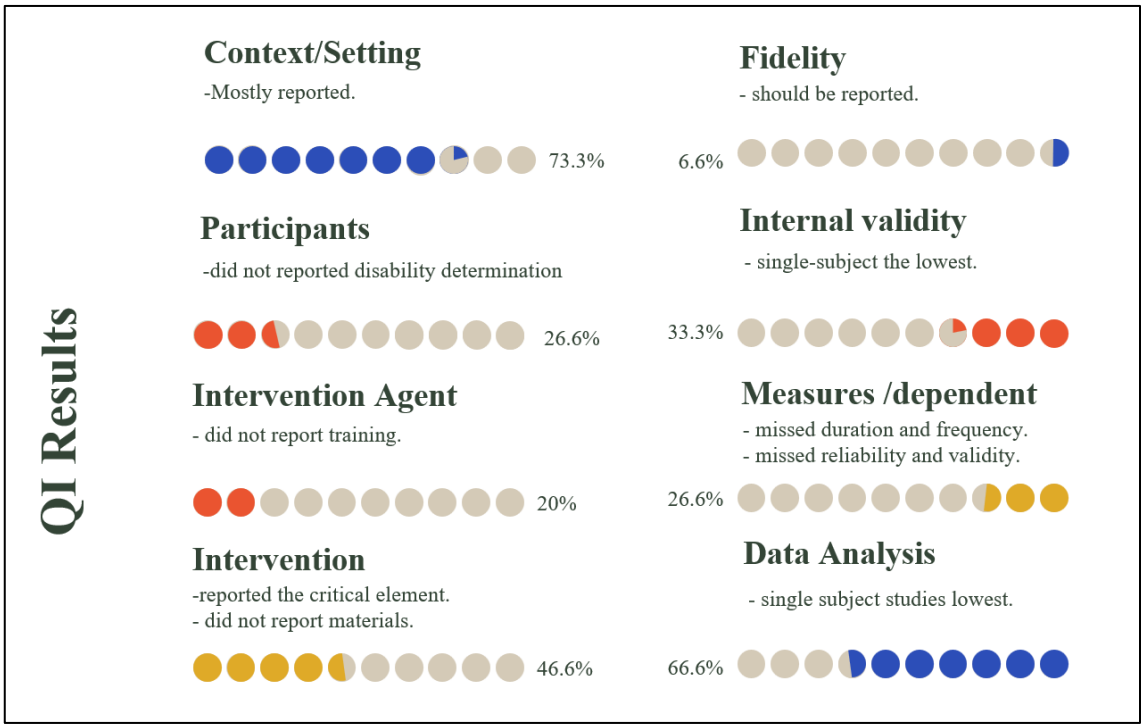


Table 4.2

Context and Demographics Across Reviewed Studies

Author(s)	Research Design	Sample	Context	Age by year	Grade Level
Brookhouser et al. (1994)	Follow-up test with a comparison group	301	United States	13-17	Grades 7 to 12
Dungan (1992)	quasi-experimental-pretest-posttest design with control group	41	United States	16.5-18	High school senior
Harris (1990)	quasi-experimental Pretest Posttest design	98	Florida, United States	Not mentioned	Grades 10 and 11
Houston (1999)	Posttest-only design with a control group	59	South Carolina, United States	10-15	Grade 6 to 8 middle school
Kerr and Erb (1991)	Study 1: one group, simple Pretest posttest design.	41	Midwestern, United States	Mean age 19.6 years	Honors freshmen and sophomores
	Study2: Quasi-experiment	37		Not mentioned	Honors
Kerr and Robinson Kurpius (2004)	Within-subject design	502	Arizona, United States	11-20	Grades 6 to 12
Lotta (2001)	Pretest posttest design with a control group	37	Arizona, United States	15- 17	Grades 10 and 11
Lowery (2004)	quasi-experimental design	150	Southwestern, United States	17-21	Honors college

Author(s)	Research Design	Sample	Context	Age by year	Grade Level
Maree (2022)	Single-case study	1	South Africa	16	Grade 11
Maree (2020)	Single-case study	1	Pretoria, South Africa	17	Grade 12
Maree (2019)	Single-case study	1	South Africa	17	Grade 12
Olszewski-Kubilius and Laubscher (1996)	Pretest posttest design with a comparison group	96	Midwest, United States	Modal age 16	High-school
Rowe (1994)	Pretest posttest design with control and comparison groups	54	United States	15-18	Not mentioned
Taylor (1992)	posttest only control-group	60	United States	Not mentioned	High school
Way (1994)	Pretest posttest design with a control group	70	United States	14 -18	Grades 9 to 12

CHAPTER 5

DISCUSSION AND CONCLUSION

This chapter represents a discussion of the findings in line with answering the research questions, conclusion, implication for research and practice, and limitations of the studies.

Discussion

This systematic review examined the career counseling and guidance intervention studies applied to gifted and talented students using the CEC (2014) quality indicators. Fifteen empirical studies met the inclusion and exclusion criteria of applying career intervention for gifted students between 1990 and 2022. Although previous reviews and meta-analyses were conducted to examine career intervention among the general population (Soares et al., 2020; Whiston et al., 2017), this systematic review was the first attempt to systematically review the quality of the career counseling intervention focusing specifically on gifted students.

A limited number of experimental studies on career counseling intervention with the gifted population were located. Previous reviews with the general student population (Soares et al, 2020; Whiston et al., 2017) also stated that they found few career intervention studies.

Studies' Characteristics

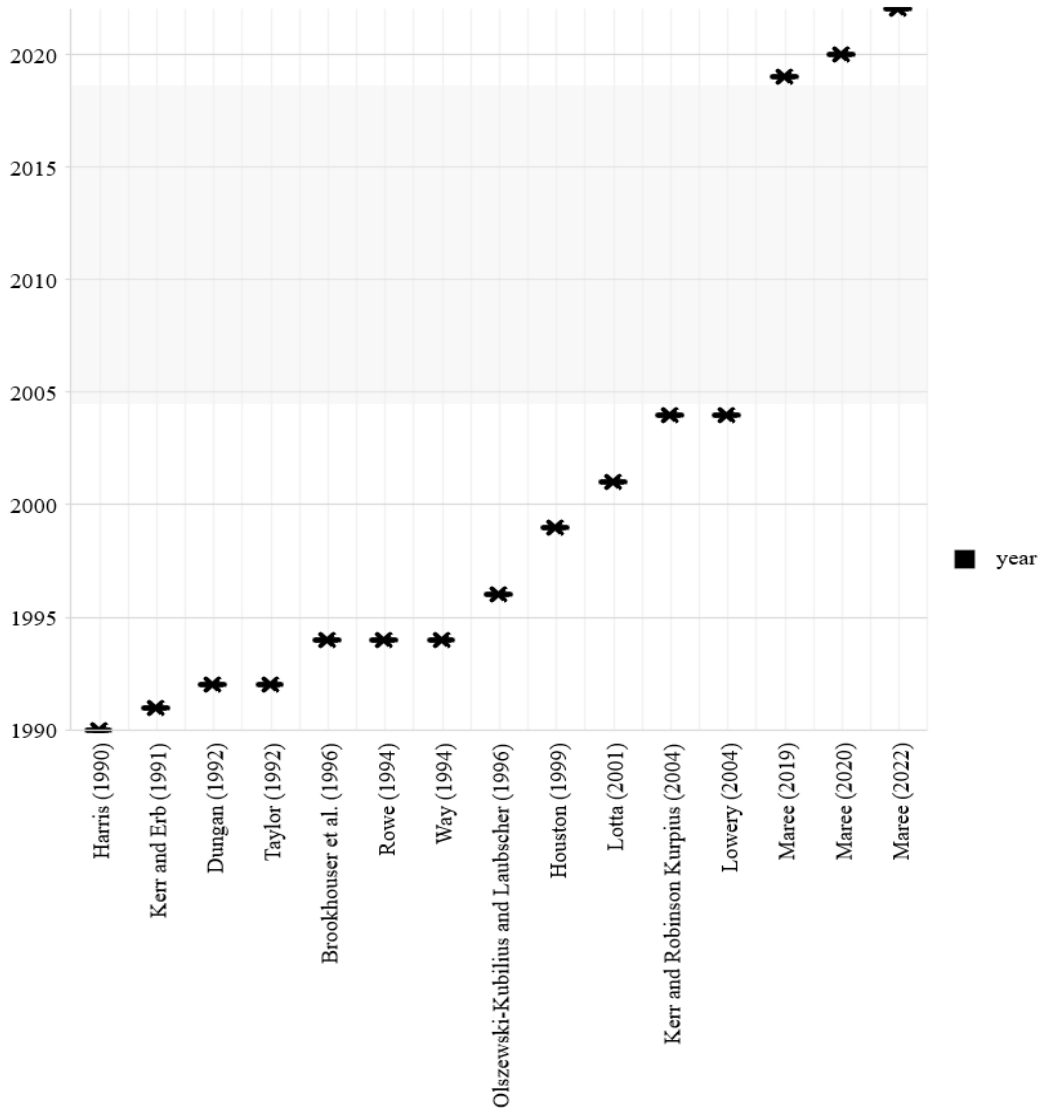
Of the studies, 9 studies, 60%, were conducted before 2000. There was a 15-year gap between the studies as only 3 studies, 20%, were conducted between 2000 and 2004 and then three studies, 20%, were published between 2019 to 2022 (Figure 5.1). These recent studies on career intervention with gifted means that experimental studies

are growing again in the field. However, these recent studies met none of the quality indicators, which is a call for researchers to enrich the gifted career counseling field with more sound experimental studies.

Figure 5.1 represents the distribution of the career intervention with gifted studies from 1990 to 2022 and the 15-year gap from 2004 to 2019 highlighted.

Figure 5.1

The Distribution of Studies from 1990 to 2022



Quality Indicators

Most of the studies, 80%, were conducted across the United States and the remaining in Africa (Maree, 2022, 2020, 2019). This systematic review findings align with previously conducted reviews on career counseling. About 70% of Whiston et al.'s (2017) meta-analysis's reviewed intervention studies were with a sample from the United States. Prideaux et al. (2000) also mentioned that their review resulted in an American sample. Although Soares et al.'s (2022) systematic review resulted in 42.3% of studies in the United States with other studies distributed in different countries prove that career counseling intervention research is being conducted internationally (Whiston et al., 2017), the most reviewed studies in Soares et al. (2022) were American sample also. First, this could reflect the proportion of conducted studies across the United States compared to other countries (Prideaux et al., 2017). Also, it could be that more attention had been given to enhance or fund career counseling programs in America than the other countries (Prideaux et al., 2017) even among gifted.

After examining the studies using the CEC's quality indicator, different levels of meeting the indicators occurred across the studies. None of the studies met all the eight indicators. The single-subject studies were the lowest to meet the indicators, three of them met none of the indicators (Maree, 2022, 2020, 2019). The highest level of addressing the indicators requirements was meeting three studies (Kerr & Erb, 1991; Lowery, 2004; Way, 1994) to 75% of the indicators, which is meeting six indicators (Figure 5.2).

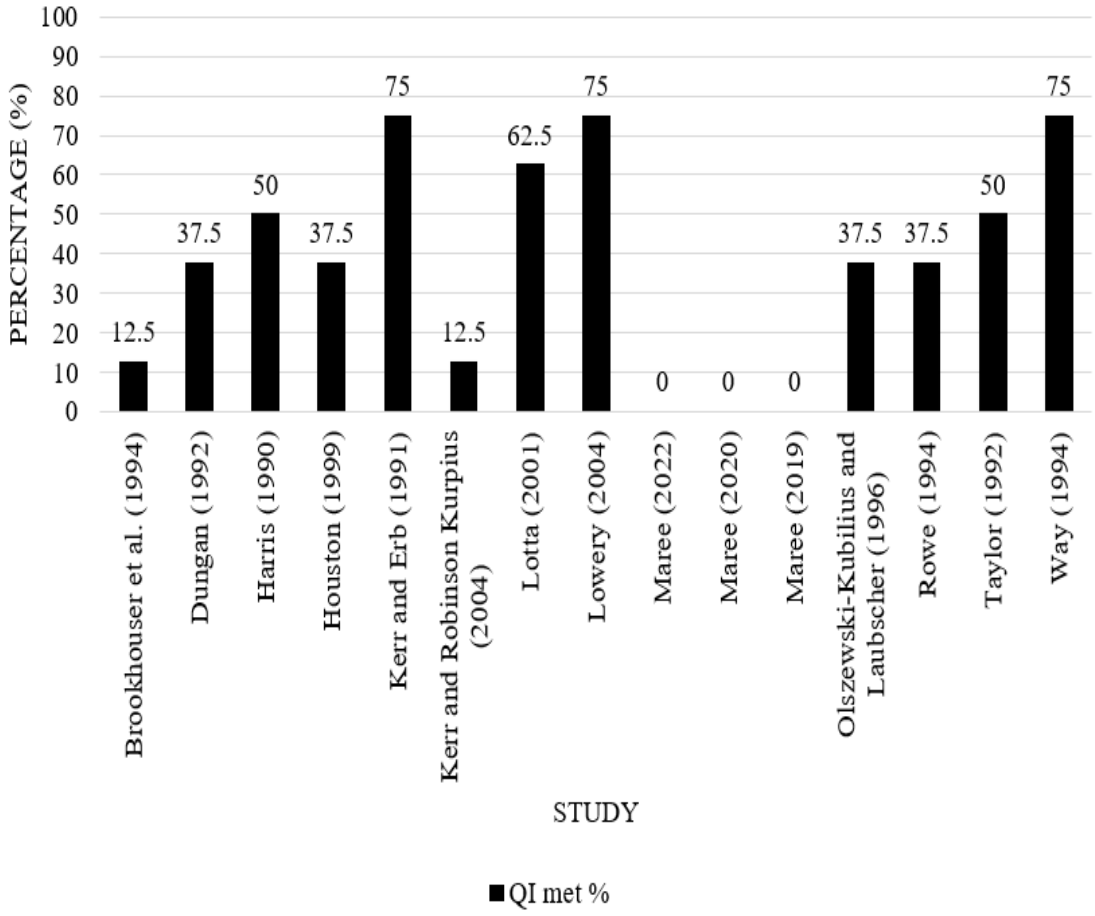
Both Kerr and Erb (1991) and Lowery (2004) did not report the methods of determining the participants' status and the implementation fidelity. Way (1990) did not

describe the intervention agents' training or qualifications and also reported lower than the CEC (2014) recommended validity scores.

Figure 5.2 represents the variation in meeting each study to the quality indicators by percentage.

Figure 5.2

Quality Indicators Met by Study by Percentage

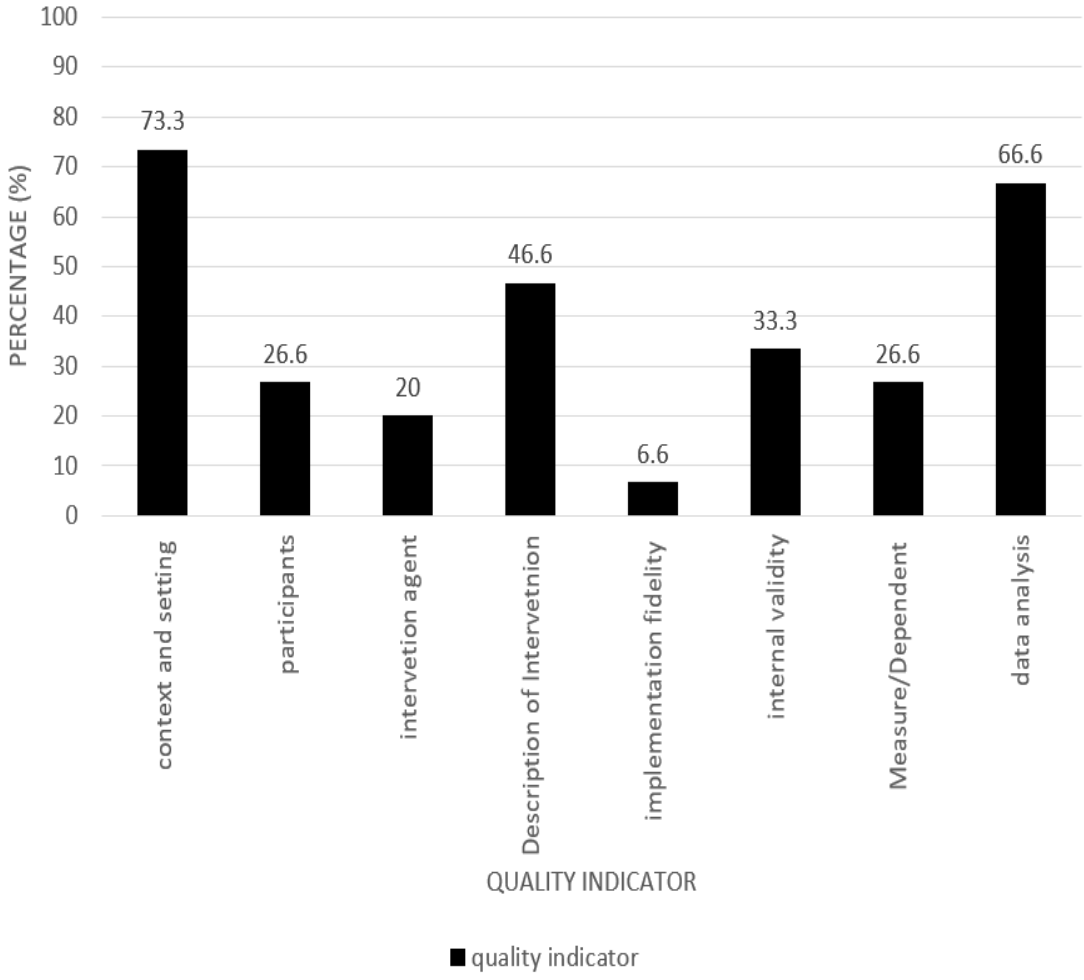


In comparing the indicators, different levels of meeting the quality indicators occurred across the studies (Figure 5.3).

Figure 5.3 represents the variation of meeting the quality indicators across the studies by percentage.

Figure 5.3

Quality Indicators Met Across the Studies by Percentage



The implementation fidelity was the most excluded indicator across the studies, only one study met this indicator. This means that the studies did not implement the intervention with fidelity. Future researchers and practitioners should report intervention integrity.

The intervention agent indicator was the second least met indicator, only 20% of the studies met it. Mainly the studies did not report interventionist's training or

qualifications. When developing and applying career intervention to gifted students, qualified guidance and mentors should be matched to provide effective guidance based on each student's expertise (Yu & Jen, 2021). The National Association for Gifted Children (NAGC) requires delivering effective career guidance programs by qualified counselors who are familiar with gifted students' characteristics and needs (Wood, 2010). It is recommended that future studies prepare qualified interventionists to serve gifted students considering this indicator.

Both the description of participants and outcome measures and dependent variables indicators were from the least indicators to be met across the studies, as 26.6% of the studies met each indicator. The highest indicators to be met across the studies were the context and setting and the data analysis indicators, with 73.3% and 66.6% of the studies respectively.

In describing the setting and context, 11 studies stated the setting of the practice, which was a school or university setting. The remaining four studies (Brookhouser et al., 1994; Maree 2022; Maree, 2020; Maree, 2019) did not report the setting. Applying the intervention in a university setting did not mean that the participants were university students, three studies applied the intervention with high-school students but in a university setting (Harris, 1991; Kerr & Robinson Kurpius, 2004; Olszewski-Kubilius & Laubscher, 1996).

Only 26.6% (n=4) of studies met the participants' quality indicator. Mainly this indicator was not met in the remaining studies because of not reporting the giftedness status determination method. Whereas, studies sufficiently described the participants' demographics.

Most of the studies focused on high school students or a specific high school grade level sample. One study included only middle school students (Hostoun, 1999), two studies included a variety of middle- and high-school students (Brookhouser et al., 1994; Kerr & Robinson Kurpius, 2004), and only two studies targeted college students (Kerr & Erb, 1990; Lowery, 2004). The finding of this review, first, reflects the importance of considering the student's development and applying age-appropriate interventions. Second, most of the studies targeted an adolescent sample. Previously conducted reviews on career counseling intervention targeted general university students' sample (Langher et al., 2018; Soares et al., 2022; Whiston et al., 2017), but only two studies in this review applied interventions to college-gifted students. Although career development begins early in gifted children (Smith & Wood, 2020), both late adolescent and college-gifted girls face challenges in their career development (Yu & Jen, 2021). Gifted in math/science girls' confidence could decrease during their university stages compared to their high-school age. Therefore, Yu and Jen (2021) asserted the need for well-designed career programs both for high school and university levels considering each age group's needs. This review highlighted the need for more studies on the effectiveness of career counseling interventions among gifted-college students.

Some of the studies considered the heterogeneous characteristics of gifted students or the factors that could affect their career decision-making. Among the characteristics, the studies targeted gifted who are underachieving (Way, 1990), multipotential (Kerr & Erb, 1991), or hearing-impaired (Brookhouser et al., 1994). Other studies considered environmental and socio-economic factors like being economically disadvantaged (Olszewski-Kubilius & Laubscher, 1996), being at-risk of

not achieving career goals (Kerr & Robinson Kurpius, 2004) or academic potential (Lotta, 2001) because of poverty, poor family support for goals, and environmental difficulties, or risky behavior (Kerr & Robinson Kurpius, 2004; Lotta, 2001), or being a first-generation and at-risk of dropping out of school or failing a grade (Houston, 1999). Chen and Wong (2013) recommended career counseling practices for gifted to consider these population's different characteristics and barriers that could affect their vocational development and career planning and exploration. Thus, it is recommended for future studies to investigate career interventions with a specific population of gifted students who could exhibit some specific characteristics or barberries.

Description of the intervention, 46.6% (n=7) studies, sufficiently described the practice, the intervention agents' actions, and the materials used. Some studies applied a similar program or approach. For example, three studies (Kerr & Robinson Kurpius, 2004; Lotta, 2001; Lowery; 2004) applied TARGETS or its extension program, and another three studies (Maree, 2022, 2020, 2019) applied the same career construction counseling intervention approach. Almost, not meeting this indicator was because of not reporting the intervention materials. As Cook et al. (2014) recommended, the reviewed studies reported the critical intervention elements to enable an understanding of intervention implementation. It is recommended for future studies to clearly state the materials used.

Five studies met the internal validity indicator. The single-subject studies were the lowest studies to meet the requirements of this indicator. Future researchers must implement well-designed intervention studies to minimize threats to internal validity, especially when using single-subject designs which are widely recognized as experimental designs that establish causality in special education (Cook et al., 2014).

Only four studies met the outcomes and dependent variables indicator. However, when counting by element, most of the studies met this indicator's elements. The most not met elements are the duration and frequency of the outcome measures and reporting adequate reliability and validity, which threaten the studies' internal validity (Cook et al., 2014). To build on the study outcomes and the effect of the intervention that leads to greater reliable results, studies should use valid (Soares et al., 2020) and reliable with strong psychometric properties measures that allow future studies replication (Prideaux et al., 2000). For example, Kerr and Robinson Kurpius, (2004), Lowery (2004), and Lotta (2001) used the Career Exploration Activity Inventory which was developed specifically for TARGETS to assess career search behavior. The internal consistency reliability scores of this measure were 0.67, 0.55, and 0.66 for the three studies respectively. These scores are lower than the CEC (2014) recommended acceptable reliability which is ≥ 80%.

All the group comparison studies except one met the data analysis indicator's requirement. However, the single-subject studies (Kerr & Robinson Kurpius, 2004; Maree 2022; Maree, 2020; Maree, 2019) did not provide visual graphs as an adequate data analysis method. CEC (2014) requires providing graphs with all relevant dependent variables to the review to draw conclusions about the experiment. Future researchers using single-subject designs should ensure providing visual graphs.

Therefore, the first research question if career counseling and guidance intervention studies on gifted and talented students are high-quality studies. CEC (2014) requires the study to meet all the quality indicators to be classified as a high-quality study. As none of the studies met this requirement, none of the reviewed studies is a high-quality study. Avoiding weak designs contributes to confidently infer results and

control over alternative findings explanations (Prideaux et al., 2000). Sound experimental studies are needed on career counseling interventions with gifted students.

The second question is about whether the career counseling intervention studies for gifted and talented students are evidence-based practice. CEC requires sound studies to count and determine the evidence base of practice. As none of the studies is sound study because of not meeting all quality indicators, the career counseling practices for gifted students are not evidence-based practices. This highlighted the need for more well-designed experimental studies considering the CEC (2014) quality indicators and recommendations when conducting and reporting the studies. Applying non-evidence-based practice to gifted students do not guarantee receiving these students effective and intended services of career guidance. Future researchers are encouraged to work on the CEC (2014) standards, thus sound methodological studies could be identified to classify evidenced-based practices that policymakers could confidently use to develop career interventions for gifted students.

Giftedness Identification

All the studies stated that the participants were gifted and talented students using different terms, however, only four studies reported the methods of determining the giftedness status (Table 5.1).

Table 5.1

Giftedness Determination Method

Study	Giftedness Status Reported	Determination Method
Brookhouser et al. (1994)	Gifted and talented hearing-impaired.	Score ≥ 130 on nonverbal IQ Wechsler Intelligence Scale of Children Revised, the Hiskey-Nebraska Test of Learning Aptitude, or any measure of nonverbal intelligence used in educational placement.
Harris (1991)	Academically talented.	Above-the-norm scores and grades on PSAT-verbal and PSAT-Math.
Olszewski-Kubilius and Laubscher (1996)	Gifted.	Above the 90th percentile on the reading, writing, and mathematics subtest of a national normed SAT.
Way (1994)	Intellectually or academically gifted.	Gifted in specific academic area or in general intellectual ability based on the California Achievement Test.

Brookhouser et al. (1994) stated that students should obtain 130 or greater nonverbal IQ Wechsler Intelligence Scare of Children Revised, the Hiskey-Nebraska Test of Learning Aptitude, or any measure of nonverbal intelligence used in educational placement. In Harris (1991), the students had above-the-norm scores and grades on PSAT-verbal and PSAT-Math. Olszewski-Kubilius and Laubscher (1996) stated that students score at or above the 90th percentile on the reading, writing, and mathematics subtest of a national normed SAT. Way (1994) identified gifted students based on superior ability and their achievement based on the California Achievement Test.

Although these 4 studies reported the identification method of giftedness, two studies (Brookhouser et al., 1994; Olszewski-Kubilius and Laubscher,1996) did not meet the description of practice indicator. Next, a discussion is presented about career interventions for gifted based on the studies that sufficiently met the description of practice indicator and ranked the highest percentage of meeting the indicators (Kerr & Erb, 1991; Lowery, 2004; Way, 1994). Two of these studies (Kerr & Erb, 1991; Lowery, 2004) did not report the status determination methods, but they were the nearest studies to be sound studies.

Career Counseling for Gifted

Considering the career counseling interventions in the highest three methodological rigor studies that met 75% of the quality indicators (Kerr & Erb, 1991; Lowery, 2004; Way, 1994), the interventions were built on different goals according to the view of participants' giftedness and characteristics or related to career development barriers these students could experience.

Both Kerr and Erb (1991) and Lowery (2004) applied a value-base intervention to talented college students who could experience barriers when entering college. Kerr and Erb (1991) considered the multipotentiality in talented emphasizing that career decisions should be built on values and meaning rather than interests and abilities only, because talented students are able and interested in many domains. Through the intervention, the student is led to develop a sense of purpose and meaningful identity that is also linked to the development of extraordinary talent. Kerr and Erb's (1991) study's value-base intervention aims to encourage clients to make career decisions based on their values in which counselors apply social influence techniques to enhance

clients' perceptions of their expertness and then change an attitude or viewpoint (Kerr & Erb, 1991).

Lowey (2004) applied the intervention to talented female students whose interests were identified in the science, technology, engineering, or math (STEM) domain. In this study, developmental, social, cultural, and environmental obstacles that affected these young women's achievement of their goals and persistence in STEM majors that could lead to dropout or changing majors were considered, enhanced, and measured. The intervention aimed to provide guidance, support, and encouragement to these Honor women. It provides role models to discuss the challenges women could experience in the STEM field and deal with them (Lowery, 2004).

Way (1994) applied the intervention to intellectually or academically gifted but underachievers on the basis of the discrepancy between potential and performance. This intervention prioritizes the challenge of being an underachiever-gifted female, thus it is built to enhance self-efficacy and goal setting to promote future long-term goals which include achieving academic potential performance and aspiration for educational, vocational, and financial success by broadening career goals in which gifted females could consider non-traditional career choices. It is built on social cognitive theory and designed to help these gifted females deal with the barriers that might inhibit achievement and encourage behaviors that promote achievement. Way (1994) stated that the strategies applied are related to social cognitive theory, which are self-efficacy enhancement, goal-setting, self-monitoring, and attributional retraining.

Each of these studies viewed the career needs of gifted students from a specific perspective based on a domain of challenge these students could experience in career development linked to the giftedness nature, like multipotentiality (Kerr & Erb, 1991),

underachievement (Way, 1994), or barriers and obstacles to education and career (Lowery, 2004). Accordingly, the intervention's components, targeted outcomes, and instruments used were aligned with each intervention's focus according to participants' characteristics. For example, both Kerr and Erb (1991) and Lowery (2004) aimed to foster identity and values for making career-decision, however, Lowery (2004) aimed to help talented STEM women maintain persistent in their STEM majors and careers considering the influence of the university environment and transition challenges on students' self-concept and self-esteem, thus the study and intervention were incorporated with instruments to measure these variables, like using the Rosenberg Self-Esteem Questionnaire (RSE; Rosenberg, 1965) and the College Self-Efficacy Inventory (CSEI; Solberg et al., 1993).

In the three studies, both group counseling sessions and individual sessions are applied. Discussion and activities were implemented in group format sessions. Whereas, individual sessions were personalized to each student's needs, like working between the counselor and each student to interpret assessment results and encourage making career goals (Kerr & Erb, 1991; Lowery, 2004).

Both Kerr and Erb (1991) and Lowery (2004) could be referred to the career education paradigm of career counseling which emphasizes building a sense of meaning in individual lives and careers. The instruments were related to the student's values, like the Vocational Preference Inventory (VPI; Holland, 1985) which is based on Holland's (1985) RIASEC model of vocational interests (Kerr & Erb, 1991). Whereas, Way's (1994) study's intervention includes didactic presentation, discussion, and role-playing to raise gifted students' awareness to acquire coping strategies, as it was built on social cognitive theory (Way, 1994). This intervention is related to the life design paradigm

which emphasizes guiding the individuals in identity reconstruction and helping them to adapt to the changeable society (Cohen-Scali et al., 2018).

Accordingly, when developing career interventions for gifted and talented students, different aspects should be taken into consideration including the heterogeneity of the gifted group, the influence of social and emotional challenges on career development, and the developmental age. Gifted students experience barriers like gender stereotypes, perfectionism, and multipotentiality which could interact with career planning and exploration (Chen & Wong, 2013). As recommended by the American Psychological Association, the results' interpretation should be meaningful and specific to each student either in small groups or individually to allow reflection and discussion (Wood et al., 2018). Tailoring the intervention and future studies to target the barriers by incorporating appropriate strategies (Chen & Wong, 2013) and measuring different variables would be helpful in career interventions to effectively serve these students.

Conclusion

After systematically reviewing the quality of experimental career intervention studies with gifted students, the following conclusion could be drawn. Within the past 32 years, from 1990 to 2022, only 15 journal articles and doctoral dissertations were qualified to be included in this review. There is a need for more experimental studies about the effectiveness of career interventions on gifted. Most of the used designs are group comparison designs. Studies with control or comparison groups are used in this field which is a positive result. The single-subject studies were the least studied to meet the quality indicator requirement. Thus, well-designed single-subject studies are needed. Based on CEC (2014) standards, none of the studies is a methodologically sound study,

and accordingly, classifying the evidence-based practices was not applicable in this review. Future researchers should consider the quality indicators when conducting and applying intervention studies. It is important to consider the base of viewing giftedness and its characteristics when developing career intervention for this specific population, additionally to the challenges gifted students could experience in career exploration.

Implications for Research and Practice

After reviewing the quantitative methodological rigor of the career intervention among gifted and talented students, evidence about the effectiveness of this intervention could not be drawn. Career counseling intervention studies need to be considered with caution. Most of the studies were group comparison designs. Studies with rigor designs building on the quality indicators standards are required in the field of gifted career counseling. Conducting a systematic review that includes qualitative studies and other experimental studies designs on this topic would help to explore the effective methods of enhancing career-making decisions for gifted students. Future research needs to consider the intervention agents' training in the studies and implement practices with fidelity. Internal validity should be improved to limit the threat caused by it. The most recent studies on career counseling for gifted are single-subject studies, however, they are the most lacking methodological rigor design studies. When using this design, authors should be aware of the quality standards.

Future studies targeting gifted-college students are needed as few reviewed studies investigated this age group. It is recommended that more experimental studies across other contexts be conducted to test and ensure contextual evidence of the effectiveness of career intervention with gifted.

Identifying evidence-based practice was not applicable through this review, policymakers need to reconsider the identified career intervention when developing interventions for gifted students. Career counseling should be proven to improve gifted students' outcomes by multiple high-quality studies (Cook & Odom, 2014) to be used, which was not the case in this review, however, this review highlights the strengths and weaknesses of the reviewed studies that policymakers and practitioners need to recognize when developing or implementing career intervention to gifted.

Limitations of the Study

One of the main limitations of this review is including studies conducted before 2000 before the publication of CEC (2014) standards. The limited number of studies is another limitation and could be justified as the following. The review included school and college-gifted students and excluded the adults. This review only considered experimental studies and most of the studies located were not experimental studies, but correlational or qualitative studies. Thus, more experimental studies are needed. This study includes peer-reviewed journal article studies and Ph.D. theses only. Other resources like grey literature were not checked, but this could extend future systematics. Also, searching only for English language studies could be another limitation. Other languages including Arabic literature should be considered in the future.

Future systematic review may extend the review by searching other databases not considered in this review. This review considered experimental quantitative studies, future systematic review could consider other quantitative designs, or mixed method and qualitative studies.

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