AN INVESTIGATION OF THE PSYCHOMETRIC PROPERTIES OF THE CAREER EDUCATION AND DEVELOPMENT SCALES

A Thesis submitted by

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ABSTRACT

Career practitioners require access to valid and reliable measures of career development in young people in order to: provide students with a valid self-report tool; determine importance and need; and facilitate evidence-based practice. A suite of four Career Education and Development Scales (CEDSs): Primary; Junior; Senior; and Tertiary, were developed using the Career Education and Development Framework (CEDF) for use with students at varying stages of their educational timeline. The research undertook three studies to determine the measurement properties of the CEDSs. Study 1 tested the proposed factor structure of the CEDS-Senior in a sample of N = 567 students recruited from four schools across Australia and a sample of N = 272 students in an educational jurisdiction in Australia. Both Confirmatory Factor Analyses (CFAs) recovered the hypothesised eight factors and correlations with the comparator measures provided evidence of concurrent validity. In Study 2, translated versions of CEDS-Senior and CEDS-Tertiary were utilised to collect data from a sample of Vietnamese students; N = 1463 for the CEDS-Senior Vietnam and N = 641 for the CEDS-Tertiary Vietnam. The two CFAs revealed an excellent fit for the eight-factor model, consistent with the original design for each scale and also reported strong correlations with the respective comparator measures. Study 3 examined the psychometric properties of CEDS-Junior and CEDS-Primary. For CEDS-Junior, across a sample of N = 462 students, the CFA revealed a good fit for the hypothesized three-factor solution. For CEDS-Primary, across a sample of N = 212 students, the CFA revealed a good fit for the hypothesized three-factor solution. Strong correlations with the comparator measures provided additional evidence of concurrent validity of both scales. Applications of this research are outlined.

CERTIFICATION OF THESIS

I, Colin McCowan declare that the PhD Thesis entitled, *An investigation of the psychometric properties of the career education and development scales* is not more than 100,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references, and footnotes. This Thesis is the work of Colin McCowan except where otherwise acknowledged, with the majority of the contribution to the papers presented as a Thesis by Publication undertaken by the student. The work is original and has not previously been submitted for any other award, except where acknowledged.

Date: 5 September 2023

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STATEMENT OF CONTRIBUTION

Paper 1:

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Colin McCowan contributed 70% to this paper. Collectively McIlveen, and McLennan others contributed the remainder.

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Paper 3:

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CHAPTER 1: INTRODUCTION

Researchers are building a strong evidence-base around the importance and effectiveness of the introduction of career education and development (CED) activities in schools, colleges and universities in terms of personal, social and economic and health benefits and outcomes (Hooley & Dodd, 2015; Hooley et al., 2011; Hughes et al., 2016; Kashefpakdel & Percy, 2016; Magnussen, 2020 and Mann et al., 2020). Through their meta-analytic studies, Brown and Ryan Krane (2000) and Whiston et al. (2017) have discerned critical ingredients for the implementation of effective CED programs and practices. Whiston et al., (2017) partially replicated Brown and Ryan Krane's (2000) study by analysing over 400 studies of career interventions. Between both studies, they discovered critical ingredients that contributed to the effectiveness of career interventions (e.g., written exercises, individualised interpretations and feedback, and information on the world of work).

This evidence base can be used by contemporary CED practitioners as they design, implement, and evaluate their own work. It can contribute to a "curricular vision" (Bransford et al., 2012, p. 35) of CED which guides decisions about what kinds of transformative career learning outcomes are desirable for students and how we can best facilitate them (Whiston, 2017). Healy (2018) argues that this evidence-base should be used by career educators not only to advocate for the career profession and the need for CED, but also to justify the space we need for CED in a crowded curriculum.

Within the Australian context of the present research, Whiston (2018) presented at the 2018 Career Development Association of Australia (CDAA) national conference and advocated that the audience—of predominantly career development practitioners—undertake evidence-based practice. Further discussions reflected that the range of employable measures available for Australian career practitioners to create this evidence, is limited. The former President of the Career Industry Council of Australia, argued strongly for a need to develop such instruments

suitable to use in Australia (P. Tatham, Personal communication, 3 May, 2018). Furthermore, in a recent review of approaches to quality assurance in school-based career development, no jurisdiction in Australia reported using any measures to support career development in students or guide career education practices (Rice at al., 2021).

Career practitioners and educators require access to relevant instruments and methodologies to contribute to, and apply these two sets of findings in their own contexts: one demonstrating the importance and effectiveness of CED, the other developing evidence-based practices. However, existing measures do not align with the recent implementation frameworks, which educators have developed to guide their career education and development programs and practices. Furthermore, nor do the existing measures directly align with the range of vocational and career constructs being addressed within these programs and practices.

For example, the recently developed Career Resources Questionnaire-Adolescent Version (Marciniak et al., 2021) is adapted from an adult model of career preparedness (Hirschi et al., 2018) and assumes that adolescents aged approximately 14 years have already decided on an occupation. Hence, there exists no dimension on decision-learning and there is a focus on career management, as if appropriate career decisions have been already established.

Career practitioners must be assured that CED measures reflect current practice and demonstrate adequate evidence of reliability and validity. Subsequently, they can be used with confidence, to promote the importance and effectiveness of CED, to provide policy makers with data; to allocate resources and develop appropriate policies, to support the delivery of evidence-based practice, and to provide their students with a sound, formative self-assessment measure to guide their career thinking and actions.

The measures need to be age appropriate and relevant to the different stages of education. Accordingly, the present research filled a gap in the CED literature and resources by

creating four new instruments for specific age and developmental stages, the Career Education and Development Scales (CEDS):

- *CEDS-Primary* for use with students in Grades 5 and 6 (age range: 10 and 11 years).
- *CEDS-Junior* for use with students in Grades 7, 8 and 9 (age range: 12, 13 & 14 years).
- *CEDS-Senior* for use with students in Grades 10, 11 and 12 (age range: 15, 16 & 17 years).
- *CEDS-Tertiary* for use with students in all year levels (age range: 18+ years).

1.1 Research problem

The aim of this research is to investigate the psychometric properties of the four Career Education and Development Scales (CEDS; McCowan & McIlveen, 2019) which measure vocational and career constructs that educators address within CED curricular frameworks (e.g., *career decision making* and *knowledge of pathways*). The CEDSs are designed for primary, junior secondary, senior secondary school and tertiary settings. The present research sought to answer three overall research questions:

1. Do the CEDS reflect the Career Education and Development Framework (CEDF) based on the empirical model by Marciniak et al. (2022) and published by McCowan et al. (2017; 2022)?
2. Do the CEDS exhibit appropriate psychometric properties such that they can be considered to be empirically valid, provide valuable data for practitioners and administrators and can be used by career practitioners with confidence and assurance?
3. Do any of the CEDS have applicability in other international contexts?

More specifically, do the four versions of the CEDS: Primary; Junior Secondary; Senior Secondary; and Tertiary, demonstrate acceptable evidence of their measurement properties via:

- Testing of their hypothesized factor structures (as full-scales and sub-scales where appropriate);
- Testing across different samples (e.g., different schools and different countries); and
- Analysing whether the scales correlate with established measures of similar vocational/career constructs that are available in the literature?

1.2 Methodological approach to the research

The present research follows a methodological approach similar to that used by Dodd et al. (2021) when they were developing the Student Career Readiness Index (SCRI) in the UK. However, the present approach has expanded their six steps with the more explicit addition of steps 2, 5 and 10.

1. Mapping of relevant policy and practice frameworks such as examining the existing Australian Blueprint for Career Development;
2. Searching for a relevant empirical/theoretical framework which has emerged from recent meta studies;
3. Examining career/vocational constructs in common use as determined by research over the past 20 years;
4. Reviewing available measures that are in use across Australia in particular;
5. Item generation by allocating and modifying relevant items from existing measures into the proposed framework and generating items which reflect recent career curricular interventions;
6. Expert review by forwarding the proposed items to a selection of career practitioners to assess the relevance of the items and the language used;
7. Cognitive testing through asking a selection of career practitioners to have a small group of their students complete the draft scales and answer questions around the students' understanding of the statements;
8. Gathering data through seeking appropriate ethics approvals to have students complete the draft scales;
9. Factor analysis and invariance testing though the use of Principal Axis Factoring (PAF) and Confirmatory Factor Analysis (CFA); and

10. Correlations with comparator measures through including a selection of existing measures for students to complete at the same times as they complete the scales.

In the data collection phase, attention was focused on collecting cross-sectional data from a wide range of schools and universities, and across age and grade levels as appropriate. Apart from gender, specific data on individual student ethnicity or socio-economic status was not collected. However, the Index of Community Socio-educational Advantage (ICSEA) was collected from each participating school in Australia as this provides an indication of the socio-educational backgrounds of students in each school. (ACARA, 2020). The mean ICSEA for all Australian schools is 1000 so the nearer schools are to 1000, then the more proximal they are to the Australian average.

The complete case approach was taken to dealing with missing data (Tabachnick & Fidell, 2019) where missing data cases were not included in the analyses.

Where there was no predetermined factor structure in CEDS-Junior and CEDS-Primary, initial data analysis involved Principal Axis Factoring (PAF) to explore possible factor structures. Pending item elimination and the possible factor structure determined by the PAF, the next step in data analysis involved using Confirmatory Factor Analysis (CFA). For CEDS-Senior and CEDS-Tertiary, CFAs were undertaken without first completing PAFs, because those two scales were developed using the predetermined eight factor model of the revised CEDF (McCowan & McIlveen, 2019). The final data analysis involved correlational analysis of the CEDS subscales with comparator validity measures (i.e., outcomes and expectations, and self-esteem and future thinking).

1.3 Personal statement

I have made substantial contributions in the career education and development field in educational jurisdictions and institutions across Australia in terms of policies, programs, resources and training. I have also completed similar work in countries such as India, Oman Thailand and Vietnam, but it is the work I did in Mongolia that prompted me to think about

undertaking this research. The Government of Mongolia commissioned me to develop a comprehensive CED strategy for implementation in their secondary schools. It consisted of policy briefings and statements, communications to schools and parents, a detailed curriculum framework, sample lesson plans, appropriate information and resources, and the training of key trainers (McCowan, 2017). Notwithstanding, nowhere in that work did I have any indication of the level of career thinking of their students, who had not been exposed to any career-related programs, information or activities in their school life. Nor did I have access to any relevant data and there were no appropriate measures that I could use to evaluate my interventions. In fact, no measures existed that could be used to glean student data to inform my work and the project leaders of our progress.

At a subsequent national conference of the Career Development Association of Australian which was held in Hobart, one of the lead presenters, Professor Whiston (2018) strongly advocated use of evidence-based practice but it became obvious that without access to appropriate theoretically-informed measures of career constructs, how could career practitioners enact evidence-based practice?

As a personal response to Whiston's challenge, I set about developing a suite of measures that reflected the developmental approach to my work and also reflected the career education and development curriculum framework that is gaining momentum and popularity in usage across Australia and other selected countries. I began enlisting colleagues to assist me trial the four measures but soon realised that I required appropriate ethics approvals and rigorous analyses of the data, if the measures were to be recognized as valid and reliable, and be used universally with confidence by career practitioners. This meant enrolling in a PhD program. By enrolling in this program, I have been able to access people and resources and be challenged by experts, all of which has made my quest more valuable and of a much higher quality that I could have possibly achieved by myself. I am pleased that this research has the

potential to add valuable resources to the suite of resources needed by career practitioners and administrators working in schools, colleges, and universities.

1.4 Significance, overall aim and anticipated contributions of the research

There are three major contributions of this research.

At a student level, practitioners will have access to age- and stage-appropriate measures to facilitate formative self-assessment by the students in terms of their career-related thinking at specific stages in their career development and levels of schooling. Because the measures reflect a well-researched framework, areas for consolidation and further exploration can be identified and acted upon.

At a practitioner level, the measures will facilitate evidence-based practice. Data from the use of these measures will not only assist practitioners to identify at-risk students but also to assist them adjust their programs and interventions in terms of content and process. They will also become a communication and collaboration tool for feedback with parents.

At an administrator level, the data obtained from these measures will assist administrators develop appropriate policies and plans around the career development of their students and allocate the personnel and material resources required to implement effective career education and development programs, and interventions successfully.

1.5 Overview of thesis

The thesis is a portfolio of three related but independent studies which have been prepared for publication and are presented in the form of a “thesis by publication”. The thesis is organized into six chapters.

Chapter 1 provides an introduction and overview of the present investigation, including the research problem, objectives, and questions.

Chapter 2 presents an overview of the literature pertaining to career development and vocational psychology, the substantive disciplines in which the present research is situated.

Study 1 (McCowan et al., 2023) is presented in Chapter 3. This study was designed to validate a measure of the career thinking of students in senior secondary schools across Australia. The measure used, CEDS-Senior, was developed from relevant career and vocational constructs, the CED curriculum framework developed by McCowan et al. (2017) and based on the integrated model of career development produced by Marciniak et al. (2022). CFAs confirmed the eight-factor structure was validated and it correlated well with comparator measures.

Study 2, presented in Chapter 4, was designed to validate the structure of the CEDS-Senior and CEDS-Tertiary which were translated into Vietnamese and made suitable for use with senior secondary and tertiary students in Vietnam. In both translated measures, the hypothesised eight-factor structure was upheld and strong correlations were obtained with comparator measures.

Study 3, presented in Chapter 5, was designed to validate two measures of the career thinking of students in junior secondary schools (CEDS-Junior) and students in primary schools (CEDS-Primary), in a large educational jurisdiction in Australia. For CEDS-Junior, a three-factor structure reflecting the three major components of the revised CEDF (*Understanding, Action and Attitudes*), was confirmed through a detailed analysis using CFA. A three-factor structure also emerged for the CEDS-Primary after subjecting the responses to CFA. Strong correlations were obtained with comparator measures.

Chapter 6 presents a general overview of the key findings and the unique contribution of this work to the career field.

CHAPTER 2: LITERATURE REVIEW

The present research sets out to empirically test the measurement properties of a set of four career education and development scales (CEDS), based on the career education and development framework (CEDF; McCowan et al., 2017)). Therefore, this literature review commences with an overview of relevant terminology and the historical aspects of the emergence of career education (CE) within the Australian context of the research.

Watts (2015, p. 330) defines career as, "lifelong progression in learning and work" in which progression is where life takes a certain direction based on the different forms of learning and work we undertake along the way and the learning can be formal or informal and the work can be paid, unpaid or voluntary. CE starts with the concept of career and extends it to enable students in their early stages of development at school, college or university, to understand their own career growth. It is located through the institution's activities that support the building blocks required to develop appropriate levels of career maturity defined as "the readiness to cope with vocational developmental tasks" (Savickas, 1984, p. 222).

Over the years there have been a range of definitions of CE but the one adopted in this research is that by the Australian Government which established a national career education working group in 1989 to develop the first national career education curriculum ([1]McCowan & McKenzie,1997). The Australian Education Council (AEC) career education working group defined CE as "the development of skills, attitudes and understanding through a planned program of learning experiences that assist students to make informed decisions about school and post-school options and directions, to enable effective participation in working life" (AEC 1992, p. 1). The recent Australian Government National Career Education Strategy adopted the same definition, twenty-seven years later, with the addition of "in education and training

[1] In this chapter I referred to myself in the third person (McCowan) in order to preserve the integrity of the citations and references.

settings" after "learning experiences" (Department of Education, Employment and Training, 2019, p. 3).

2.1 The emergence of career education in Australia

CE is distinct from career counselling, career assessment, career advising, career guidance, and career informing. As a deliberate educational activity, CE began to emerge in Australian schools in the mid 1970's (Morgan & Hart, 1977). Patton (2019) argued that the term career education has struggled to be clearly understood in its early days because it had not been well defined. Patton (2019) investigated the emergence of CE in the USA and the UK as a precursor to exploring its emergence in Australia. She hypothesised that the emergence of CE in Australia was significantly influenced by what was occurring in the career space in those two countries.

Morgan and Hart (1977) cited the earliest evidence of CE in the USA to be in the late 1960's which was later consolidated by Sidney Marland Jnr. who was appointed the US Office of Education Commissioner from 1970 to 1975. Marland wrote key papers and provided funding for the implementation of CE in schools (Marland 1973, 1974). He was subsequently followed by Kenneth Hoyt, who was appointed the first Director of the US Office of Career Education in 1974 (Patton, 2019). This concerted effort was in response to numerous social and educational challenges, including high unemployment and the criticisms that education was tailored only for university-bound students and not responsive to life after school and the changing world of work (Patton, 2019). The approach taken was greatly influenced by the career development theories of Ginsberg (1984) and Super (1957). Consequently, the programs were initiated in the earliest pre-school years and extended through primary and high schools to higher education, infused into all subject areas across the curriculum.

In the UK in the late 60's and early 70's, similar social and economic changes and pressures emerged to those in the USA. Their distinctive response was a strong call for schools to focus on the additional responsibilities of pastoral care, student welfare and student

development. Schools developed sophisticated pastoral care structures, which assisted and facilitate the teaching of integrated and extra-curricular content in smaller groups. This in turn facilitated the introduction of CE (Morgan & Hart, 1977). Unlike in the US, schools in the UK introduced CE predominately at age 13 (secondary school), focused on exit points and was taught by pastoral care teachers and subject-matter teachers, who began to access specific training courses in career guidance. The curriculum was focused on three elements, which was later extended to four; self, opportunities, decision & transitions (Watts and Herr, 1976). Again, this varied to its introduction in the US, where CE encompassed eight broad elements at all levels of schooling including higher education, and it also extended to delivering programs in other organisations outside schools to assist people in the workforce, in communities, and for the disadvantaged (Hoyt, 1975).

Unlike the USA and the UK, CE in Australia began as a grass roots movement with dedicated teachers responding to recognised needs (Patton, 2019). This was followed by individual State responses. For example, the New South Wales Department of Education conceived a revised Guidance Syllabus, which provided examples of CE programs at different levels of schooling, however, it was up to individual schools and dedicated personnel to enact this Syllabus (Patton, 2019). The policy context at that time was heavily influenced by the AEC *Report of the Working Party on the Transition from Secondary Education to Employment*. It focused on the inadequacies of the preparation of students for the post-school world of work. Hart (1976) believed this was seminal in promoting CE in secondary schools.

Further, in 1977, the Organisation for Economic Cooperation and Development (OECD) report commented on the fragmented nature of career programs and services, their lack of acceptance, and central leadership (OECD, 1977). They made several significant recommendations including the utilisation of trained personnel and being continuous rather than episodic. Significant Commonwealth Government funding followed for enhanced transition

resources, programs and services. In some instances, this heavy focus on transition programs drew attention away from developmentally-focused career education programs (Patton, 2019).

Some States began to take a more developmental approach. For example, in 1984 the Queensland Department of Education produced *Career Education for Year 8, 9 and 10: Curriculum Guidelines for Secondary Schools* (Department of Education, Qld, 1985) and in 1985 the Secondary School Board of New South Wales produced the *Life and Career Syllabus for Years 7 to 10* (NSW Secondary School Board, 1985).

The importance of CE was recognised nationally in 1989 by the inclusion of its concepts in Goals 1, 2, 3 and 4 and as the specific Goal 10 in the Hobart Declaration of the Common and Agreed National Goals for Schooling in Australia: *"*to provide appropriate career education and knowledge of the world of work, including an understanding of the nature and place of work in our society*"* (AEC; Australian Education Council, 1989, p. 1).

In April 1989, the Commonwealth Government established a working party to conduct an examination of current arrangements for the provision of CE, and within that, of options which might be jointly adopted for the national coordination of the provision of careers and course information. The AEC broadened the focus in June 1990 to include all phases of schooling and requested a comprehensive document be produced to assist schools with its implementation. (AEC, 1992).

In 1992 the working party delivered the document *Career Education in Australian Schools: National Goals, Students, School and System Outcomes and Evaluative Arrangements* (AEC, 1992). Within the document the curriculum framework adopted was based on the four distinct but interrelated student tasks identified in the United Kingdom by Law and Watts (1977); Self-Awareness, Opportunity Awareness, Decision Learning and Transition Learning, and across all grade levels from Kindergarten through to Grade 12.

In 1992 all Australian States and Territories examined and independently supported the work of the AEC, however, it needed to be formally ratified by the 1992 Council of Australian Governments (COAG) for it to be supported nationally. This COAG meeting was never convened because of political change in some of the States at the time. Consequently, the agenda was held over to a future meeting that never eventuated.

Not long after the failed meeting, the relevant Australian Government officials approached two members of the working party and a potential publisher to write up the general findings into a commercial publication which could be purchased for a minimal cost. The resultant book, *Guide to Career Education for Careers Personnel Working in Australian Schools,* was published in 1994 and later updated in 1997 (McCowan & McKenzie, 1997).

Over the next few years there existed strong interest in building on this work via numerous reports and working parties. They included:

- The National Curriculum Corporation (Clements, 1996);
- The Ministerial Council on Education, Employment, Training and Youth Affairs, through its Career Education Taskforce Report (MCEETYA; Ministerial Council on Education, Employment, Training and Youth Affairs, 1995);
- The National Board of Employment, Education and Training though its report, Charting a Course: Students' Views of their Future (NBEET,1995); and,
- a variety of post compulsory task group reports for Queensland 1996, Western Australia, 2000 and Victoria, 2000, (Patton, 2019).

The necessity for a unifying career development (not CE) framework was identified in 2001 by the Prime Minister's Youth Pathways Action Plan Taskforce in its report *Footprints to the Future*. This Taskforce found that career and transition services were inconsistent in quality and availability around Australia and there was an urgent need for a quality framework in Australia. (Prime Minister's Youth Pathways Action Plan Taskforce, 2001). The Career and

Transition Services Working Group of MCEETYA acted by recommending to Ministers (through the Transition from Schools Taskforce) that a national framework for career development be developed and that the *Canadian Blueprint for Life/Work Designs* should be used as its starting point. Following MCEETYA approval in 2003, Miles Morgan Australia was commissioned to develop the new framework. (Patton, 2019).

In 2005, the Australian Blueprint for Career Development (ABCD) was trialled in 26 sites across Australia, including public and private sector organisations, schools, universities, training organisations, and companies. Subsequently in 2008, MCEETYA commissioned the refinement and roll out of the Blueprint. In 2010 the Blueprint was officially launched. The framework was based on 11 competencies which could be developed during all levels of schooling and post schooling (MCEETYA, 2010). See Table 1 for the full list of competencies in the revised ABCD.

There was significant activity across Australia following the production of the ABCD. However, delivery of curriculum in schools was a State responsibility at that time and several States did not formally support the introduction of the ABCD in their schools - probably because of the crowded nature of the curriculum and the complex and extensive content of the Blueprint.

The Australian Curriculum and Reporting Authority (ACARA) was established in 2008 to provide some standardisation to curriculum offerings across Australia. In 2012 they began working on a related curriculum named, *The Shape of Australian Curriculum: Work Studies Years 9 –10*. This delivered a school-based subject in 2015 that provided opportunities for students to undertake vocational learning and develop work-readiness skills in preparation for further study towards a skilled occupation or further education after leaving school, (ACARA, 2013b). The elective curriculum is available for students in Years 9 or 10 (one-year subject), or across Years 9–10 (two-year subject). The curriculum focuses on further strengthening the of

the Australian Curriculum General Capabilities, particularly Capability 5 – Personal and Social Responsibility (ACARA, 2013a). Unfortunately, its focus is more on a study of work than career development per se, it is only written for two grade levels, and it is only an elective.

2.2 Career education frameworks

Some Australian States have developed their own career education frameworks. For example, the Victorian Department of Education, produced the *Victorian Career Curriculum Framework* based around three stages of career development and six learning tasks for students (Department of Education, Victoria State Government, 2021). At a national level, the 1989-1992 AEC working party on career education adopted the career education framework proposed by Law and Watts (1977). This framework stretched from early primary school years through to Grade 12 and provided detailed lesson material based around the four tasks of the Law and Watts model: Self Awareness; Opportunity Awareness; Decision Learning; and Transition Learning, at four broad ranges of schooling: K-Grade 4; Grades 4-7; Grades 7-10; and Grades 10-12, and was labelled the *AEC Career Education and Curriculum Framework* or *AEC Framework*. (AEC, 1992). It also became known as the DOTS model, the acronym emerging through changing the order of the four tasks by using the first letter of each task, namely: Decision, Opportunity, Transition, Self.

The second national career education framework was developed, trialled, and published by Miles Morgan for MCEETYA in the period from 2002 to 2010 and was called the *Australian Blueprint for Career Development* (ABCD). The framework was based around 11 competencies, and it stretched across educational-aged groupings from kindergarten to adulthood. The framework came with very detailed lesson plans and resources (MCEETYA, 2010). In 2022, the ABCD was revised in collaboration between the Australian Government, the National Careers Institute (NCI) and the Career Industry Council of Australia (CICA). The 11 competencies became 12 when *Manage wellbeing, mental and physical health* was added and

the positioning of *Understand the changing nature of life & work roles* changed. (NCI, CICA, 2022). The competencies contained in the second edition of the ABCD are listed in Table 1.

Table 1

The competencies listed in the ABCD 2nd edition (NCI, CICA, 2022)

Competencies	
Personal Management	• Build & maintain a positive self-concept • Interact positively& effectively with others • Change & grow throughout life • Manage wellbeing, mental and physical health
Learning & Work Education	• Participate in lifelong learning supportive of career goals • Locate & use career information effectively • Understand the relationship between work, society & the economy • Understand the changing nature of life & work roles
Career Building	• Secure, create and maintain work • Make career enhancing decisions • Maintain balanced life & work roles • Understand, engage in, and manage the career building process

2.3 Career education and development framework

McAlpine and McCowan (2007) sought to devise a career development framework to deliver eModules of career-related material to university students. They found that both the AEC and ABCD frameworks were unsuitable – one was too brief (viz. AEC) and the other too complex (viz. ABCD) for their purposes – and they were too specific to a school setting. They set about developing a framework which would be more generic but still meet their identified need.

Ultimately, McAlpine and McCowan decided to use a framework which was based around a career planning process that their experienced career counsellor colleagues were using with individual students. The Career Development Framework (CDF) had seven components which could be undertaken in any order (McAlpine & McCowan, 2007; Thompson, 2010). The seven components which reflected what tended to occur in individual career planning sessions

by students with their staff were: *Understanding Self; Understanding Opportunities, Understanding Influences, Setting Goals, Making decisions, Implementation, Review*.

Three of the four elements of the AEC Framework based on Law and Watts (1977) were included and *Transition Learning* was replaced by a more action-based concept of *Implementation*. The inclusion of *Understanding influences* was prompted by career counselling staff working with Asian students whose career decision making was heavily influenced by their cultural context and family directives. This inclusion was also influenced by the tendencies for students to take disproportional notice of their friends and social media, while often accepting personal blame for structural and political changes which impacted their career decisions. The inclusion of *Setting Goals* came directly from the work of the staff with elite athletes. These high performing athletes managed to deal successfully with their full lives, while still attaining excellence in their chosen sporting disciplines, by establishing very clear goals. This translated effectively into career planning sessions, as did the concept of reviewing previous work, hence the addition of the component, *Review*. This framework proved useful for categorising the eModules in the on-line career development program for university students and for seniors in their final years of high school (McAlpine & McCowan, 2007; Thompson, 2010).

In 2014, McCowan and Nguyen were looking for a suitable framework for use in an Australian University and a bilingual school system in Vietnam. They re-examined the AEC framework, the ABCD, and the McAlpine and McCowan (2007) frameworks and decided to take the CDF framework and modify it to be suitable, as a more contextual framework, which would encompass both career education and career development and could also be used to guide career curriculum development.

McCowan and Nguyen found five of the seven components translated well to a career development / career curriculum / career education framework. However, two components

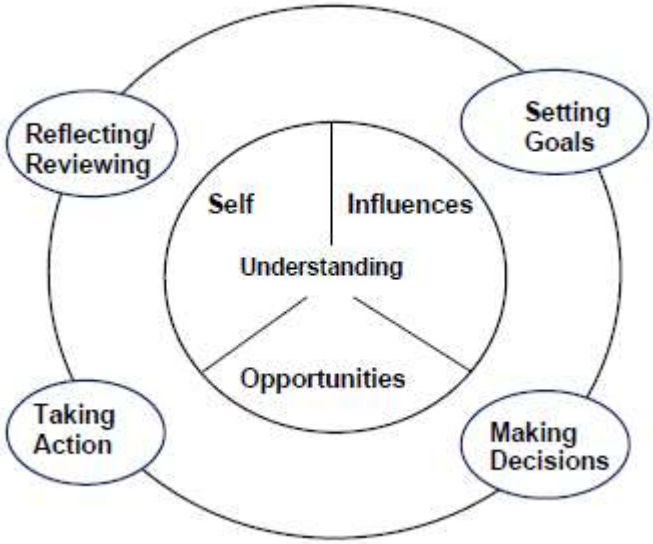
required modifications. *Implementation* is an important phase in career planning with individuals, where there is an immediate call to action upon their career decision making. Notwithstanding, in a career development sense there are a whole raft of actions they can take at all levels of schooling to enhance their career thinking at each stage; hence the *implementation* component was changed to *taking action*.

Reviewing is an important step in the career planning process but in a learning sense, *reflecting* is the more powerful learning action, so these two concepts were combined (McCowan & Nguyen, 2014).

The new framework was also presented as a diagram to enable a clearer insight into the three *Understanding* components in the middle circle together with the four *Action* concepts in the outer circle. The model was renamed the *Career Education & Development Framework* (CEDF) when used for career education purposes in educational settings. The word, *Development*, was added to the title based on the work McCowan had completed in India, where the work was influenced by its introduction to the Indian Career Education and Development Council (ICEDC; McCowan et al., 2017, p. 104). See Figure 1 for the complete diagram.

Figure 1

The Career Education and Development Framework (CEDF; McCowan & Nguyen, 2014)



The definition for CE now shifted to a definition for Career Education and Development. (CED). CED contains the full range of proactive, educational, and developmental activities that combine to enable individuals to manage their career thoughts and actions (McCowan et al 2017 p. 26). CED is defined by the Indian Career Education & Development Council (ICEDC) as "an inclusive, structured, focused and continuous approach to empower youth to aspire, explore (internally and externally), understand, decide, plan and execute personal, educational and vocational roadmaps based on real world scenarios and source of truth knowledgebases towards achieving a self-informed, self-directed and evolving life, learning and career vision starting from school" (ICEDC,2014, p.1). The key to this definition is the notion of empowering students to take positive action in promoting their own career development.

CED is "a planned program of learning experiences aimed at building students' personal and work-related knowledge, skills, and understanding so that they are empowered to make informed career decisions and constructively manage their own career pathways." (McCowan et al., 2017, p. 26). The aims of CED are expressed in terms of the seven components of the CEDF. It aims to:

- Develop the knowledge and understanding of themselves and others as individuals, including the actual and potential personal resources they bring to life;
- Develop knowledge and understanding of the general structures of post-school life, the range of opportunities and pathways, and the demands, rewards, and satisfaction associated with each;
- Develop an understanding of the range of influences that may have significant impact on the options available, the choices made, and the implementation of these choices. They could be as indirect as the location in which one lives, or as direct as the opinions of friends;
- Develop short-term, mid-term and long-term career-related plans and goals;

- To learn how to make considered choices in relation to anticipated careers, occupations, and life roles;
- Be proactive and take actions to effectively manage the implementation of considered choices and the transitions from school to post-school educational and vocational opportunities; and
- Effectively use the key learning task of reflecting on past choices and actions, learn from them, and apply this learning to future choices and actions.

CED contains activities and learning that transcend other areas of student development and learning, as it not only involves a cognitive function, but also a behavioural, physical, and psycho-social function. Students require self-awareness of their personal values and the ability to self-assess, as well as accurate knowledge of the world of work, and the capacity to make sound choices to ensure successful applications and transitions. Additionally, students are required to reflect on and learn from these actions and choices.

Following the successful introduction of a CED program into a university and school context in Vietnam, McCowan (2017) then applied the model for use in Mongolian schools. It was received so favourably that McCowan et al. (2017) developed formal structures and resources to surround the CEDF and produce a comprehensive book to enable the material to be available to interested career practitioners. Subsequently, they used this framework to develop student competencies and specific example lesson plans for Years 7 to 12. The seven components consisting of three understanding components and four action-orientated components across four major stages of learning are outlined in Table 2.

Table 2

The initial Career Education and Development Framework (CEDF; McCowan et al., 2017)

Component	Sub-components	Years P-6	Years 7-9	Years 10-12	Post-school
Understanding	Understanding self				
	Understanding the world of work/Opportunities				
	Understanding influences				
	Goal setting				
	Decision making				
Action	Taking action				
	Reviewing/Reflecting				

This CEDF framework can be compared with the updated version of the ABCD (NCI, CICA, 2022) and the AEC (1992) framework based on Law and Watts (1977) framework as seen in Table 3. The seven components of the CEDF are compared with the four elements of the AEC one and the 12 competencies of the revised ABCD. All three frameworks are developmental in nature and span four similar segments of educational levels from early school to senior school and even beyond.

Table 3

Comparison of three career education frameworks

AEC (Law & Watts) (4 elements)	Career Education & Development Framework (CEDF) (7 components)	Australian Blueprint for Career Development (ABCD) 2nd ed. (12 competencies summarised)
Self-awareness	Understanding self	Self-concept
		Manage well-being
	Understanding influences	Interaction skills
		Change management
		Lifelong learning
Opportunity awareness	Understanding the World of Work/ Opportunities	Career information
		Work, society & the economy
		Changing life & work roles
Transition learning	Taking action	Securing work
Decision learning	Making decisions	Decision making
	Goal setting	Work/life balance
	Reviewing / Reflecting	Career building process

At this first stage of development, the CEDF is based primarily on the process of reflection by experienced career practitioners on their perception of the critical components of careers work with young people. Later in this body of work, the CEDF is checked against the career constructs considered to be in common use in careers work with young people and the extensive work by Marciniak (2022) on career preparedness. The CEDF was ultimately modified with an *Attitudinal* component being added after reviewing the extensive research available, to become the revised CEDF.

Following is a brief overview of the evaluative processes undertaken to provide information that can be used in the performance of evidence-based practices.

2.4 Evidence-based practice

Each of the previously discussed curriculum frameworks included suggestions for evaluation including undertaking a needs analysis, surveying students, teachers and parents, and examining outcomes. For example, McCowan et al. (2022) provided a summary of six different types of processes and data collection for determining the quality of the programs being delivered. These were: satisfaction data; continuous improvement data; outcome data; impact data; return on investment data; and benchmarking data.

In the publication *Evaluation of Career Education and Guidance*, Anathasou (2007) provided a framework for evaluating career education and guidance programs, and a range of formal designs for determining effectiveness. He does not however, propose any instruments, which might be used to assist the process. Hooley and Rice (2018) and Rice et al. (2022) focused on approaches and quality assurance in, career guidance and development both internationally and in Australia. They developed a new typology of approaches to assuring quality with six domains – policy, organisation, process, people, outputs and outcomes and users. They did not, however, recommend any measures that might be used within these domains to facilitate their quest for quality assurance.

Brown and Ryan Krane (2000) identified five critical ingredients that had a significant impact on the effectiveness of career interventions. They found that critical ingredients are most effective when combined, so that interventions that included three or more ingredients were likely more effective than those that included only one or two. Whiston et al. (2017) partially replicated Brown and Ryan Krane's (2000) findings, supporting the importance of the same five critical ingredients, but adding three new critical ingredients. The full list of eight critical ingredients is: written exercises, individualised interpretations and feedback, information on the world of work, modelling by more competent others, support from social networks, counsellor support, values clarification, and psychoeducation (exploring the process of making and working toward decisions).

These studies aggregated decades of research and hundreds of career intervention program evaluations (Whiston et al. 2017). Taken together, they can be used to inform a model of evidence-based best practice in the provision of career education as summarized below:

- Repeated interventions are more effective than one-off interventions (Brown & Ryan Krane, 2000; Oliver & Spokane, 1988; Whiston et al., 2017).
- Interventions facilitated by a career development expert are more effective than self-directed or computer-mediated interventions (Brown & Ryan Krane, 2000; Whiston et al., 2003; Whiston & James, 2013; Whiston et al., 2017).
- Group interventions can be as effective as individual interventions (Brown & Ryan Krane, 2000; Oliver & Spokane, 1988; Whiston et al., 2003; Whiston et al., 2017).
- Structured group interventions, such as workshops, are more effective than unstructured group interventions, such as group counselling (Whiston et al., 2003).
- Interventions that include critical ingredients (written exercises, individualised interpretations and feedback, labour market information, modelling from experts, and support from social networks (Brown & Ryan Krane, 2000); counsellor support, values clarification, and psychoeducation (Whiston et al., 2017)) are more effective, particularly in combination with each other, than those that do not.
- Interventions should be targeted to the needs of specific client groups and incorporate relevant career development theories in full (Hughes et al., 2016; Whiston & James, 2013).

This evidence base should be used by career education practitioners as they design, implement, and evaluate their own work. It can contribute to a ‘curricular vision’ (Bransford, et al., 2012, p. 35) of career education which guides decisions about what kinds of transformative career learning outcomes we want for our students and how we can best facilitate them (Whiston, 2018).

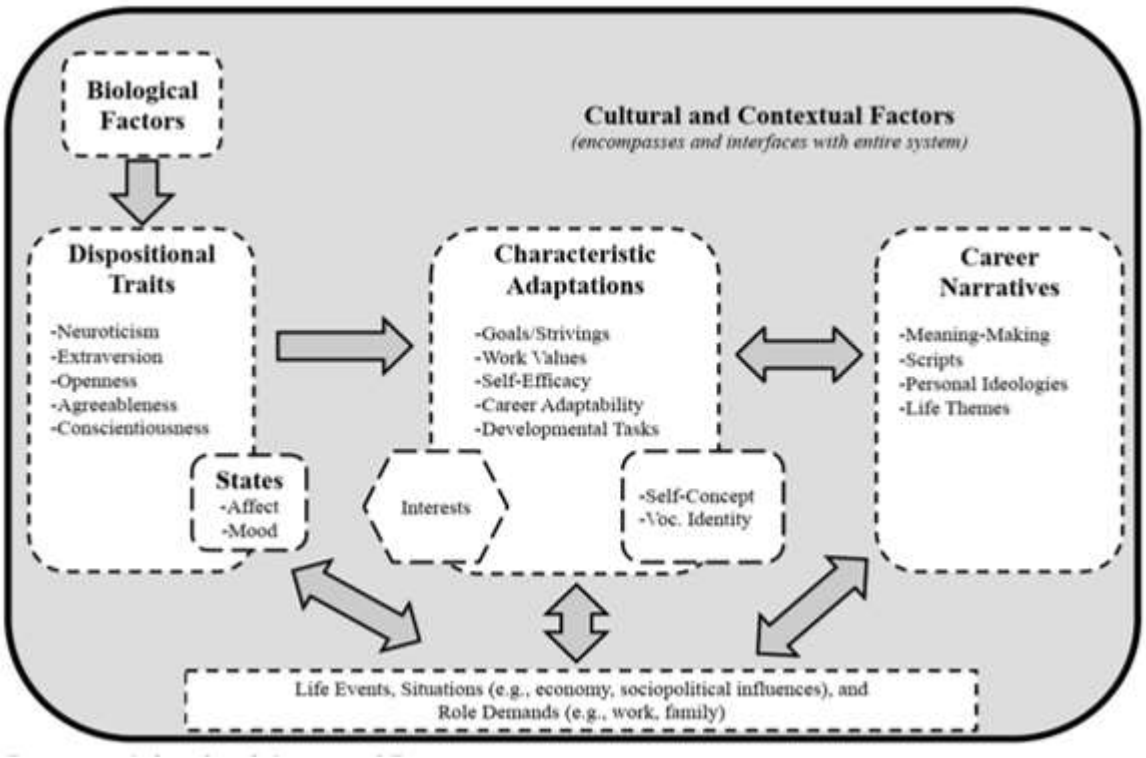
Importantly, this evidence-base should also be used by career educators to advocate for the profession and support efforts to assert expertise in their collaborative and consultative roles. It can also be used to justify the space required to take in the curriculum, the need to have repeated exposure to students, and the time required to develop relationships with students, promote social learning, and provide effective feedback. Careers educators owe it to their students and themselves to base their work on, and evaluate it against, evidence such as this, and to inform their institutional colleagues and communities of their knowledge.

2.5 Career and vocational constructs

Before examining career-assessment instruments, there is a need to examine the career/vocational constructs upon which these instruments are based and which they are attempting to assess. Although these constructs are at an individual level, they also underpin the CED programs and interventions introduced in schools at early career development stages and at transition points in the lives of their students.

Rottinghaus and Miller (2013) proposed an interdisciplinary framework for consideration of the constructs covered and presented to tie together all the different components of personality as they apply to careers work. They based their work on the earlier work of McAdams and Pals' (2006) New Big Five (NBF) levels of personality – human nature, dispositional traits, characteristic adaptations, integrative life narratives and culture. The Rottinghaus and Miller (2013) model of cultural and contextual factors as outlined in Figure 2, offers a broad and tentative overview of an integrative personality system that serves as a guide for vocational/career research and practice.

Figure 2. *Rottinghaus and Millers' integrative framework for considering cultural and contextual factors of a personality system*



Adapted with permission. Rottinghaus, P. J., & Miller, A. D. (2013). Convergence of personality frameworks within vocational psychology. In B. W. Walsh, M. L. Savickas, & P. J. Hartung (Eds.), *Handbook of vocational psychology: Theory, research, and practice* (4th ed., pp. 105-131). Routledge.

Rottinghaus and Miller (2013) begin with *biological factors* that serve as the foundations of personality and yield tendencies and variations of consequence to survival (McAdams & Pals, 2006). These factors influence the development of *dispositional traits* that reflect the stable patterns of thoughts, feelings and behaviours exemplified by the Big Five personality measures. These in turn are influenced by mood and affect states. Variations in

traits and states combine to influence how the person interacts with the environment to establish personality features related to vocational behaviour (Rottinghaus & Miller, 2013).

Characteristic adaptations are central to the personality system because they are in the middle between traits, environmental contexts, and personalised views of one's evolving life story (Rottinghaus & Miller 2013). McCrae and Costa (2008) explained that "characteristics reflect the enduring psychological core of the individual while adaptations help the individual fit into the ever-changing social environment" (p. 163). "Because characteristic adaptations address how people adjust to the environment many pivotal qualities featured in social-cognitive (e.g., self-efficacy, outcome expectations) and developmental (e.g., career adaptability) career theories are included in this domain" (Rottinghaus & Miller, 2013. p. 109). This domain also includes motivational and developmental qualities such as interests and vocational identity. McAdams and Pals (2006) summarised the multiple components of this level of personality as "motives, goals, plans, strivings, strategies, values, virtues, schemas, self-images, mental representatives, of significant others, developmental tasks and other aspects of human individuality that speak to motivation, social-cognitive and developmental concerns" (p. 208).

The last piece of the Rottinghaus and Miller (2013) framework is the *career narrative* component that includes the person's life story which is continually modified and informed by reflection on one's constructed career (Savickas, 2005). From a narrative perspective, life stories primarily function to aid individuals in meaning making and Savickas (2003) noted the importance of this meaning making in conceptualising career issues.

This cultural and contextual personality framework, and the *characteristic adaptations* component is particularly pertinent to career/vocational constructs and CED programs and interventions. It is these many qualities, strategies and processes through which individuals operate, that can be shaped by these career programs and interventions. They are amenable to

change. It is this crucial level of personality that can be adapted by career interventions to enhance a student's understanding of their careers, through the developmental tasks and strategies involved in exploring, committing to, and executing career plans (Rottinghaus & Miller, 2013).

Watkins et al. (1994) took a different approach to addressing the identification and labelling of vocational/career constructs. After extensive surveying of career counsellors and psychologists across America, they found that career assessments focused predominantly on the three career constructs of interests, needs/values and abilities. These three constructs, based on trait-factor career theories and linked to career choice, were the prime ones measured within career counselling up until then.

Watkins et al. (1994) acknowledged that career professionals would address constructs beyond these big three as additional career theories and approaches have emerged. Swanson and D'Achiardi (2005) introduced additional career constructs which could be measured other than the original three. They presented these additional career constructs under two categories: process-orientated and outcome-orientated, as relevant to individuals' careers, especially career decisions. The process-oriented constructs deal with how career decisions are made, or the circumstances surrounding those decisions and are listed under three subheadings: career exploration, career choice and implementation, and adjustment to change.

The outcomes constructs include the results of career interventions and overlap with some of the process-oriented constructs. These can be sub-divided into two subcategories: the longer-term target outcomes and the intermediate outcomes which facilitate the attainment of those target outcomes. Many of the constructs overlap in the different categories and subcategories. A brief representation of some of the key constructs by Swanson and D'Achiardi (2005) is presented in Table 4.

Table 4

A representation of process-orientated and outcomes orientated constructs over the life span

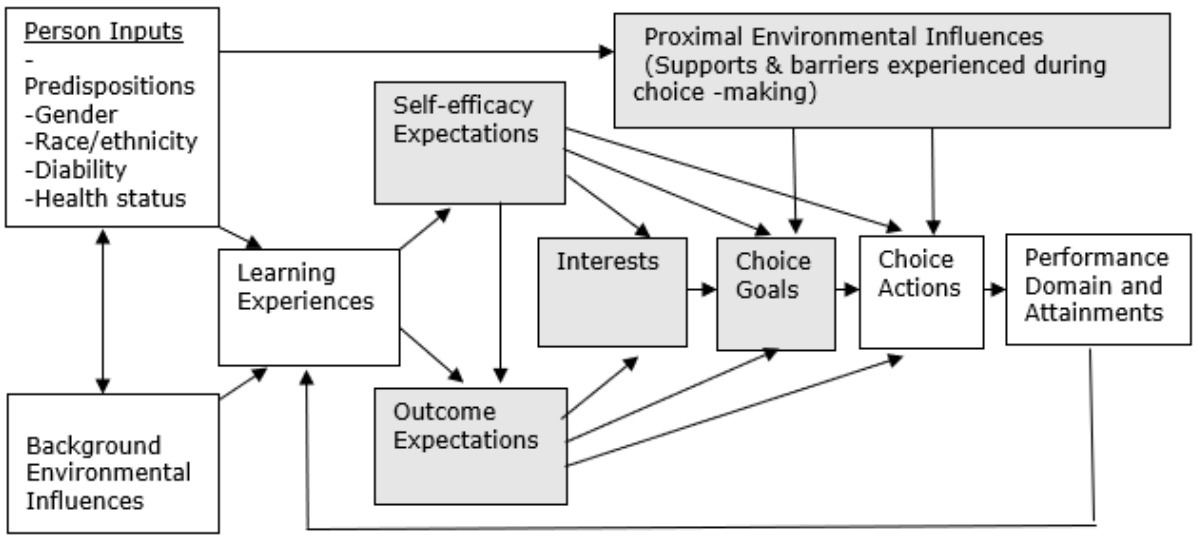
	Process orientated	Outcome orientated
Career exploration	Career maturity Career beliefs Self-efficacy beliefs Outcome expectations	Intermediate Self-efficacy beliefs Occupational information Target Career decision
Career choice and implementation	Career decision making -style, -indecision -decision making self -efficacy The career instruments related to all the constructs Career beliefs & thoughts	Intermediate Outcome expectations Target Career certainty
Adjustment or change	Career adaptability Perceived barriers Personality	Intermediate Career adaptability Target Career satisfaction

Swanson and D'Achiardi (2005) used this framework to systematically examine the career instruments which are directly related to each construct in the full list of constructs.

Lent and Brown (2006) built a different framework in which to examine the career/vocational constructs that are specifically related to the more recent, Social Cognitive Career Theory (SCCT). This framework or model has been adapted from their original (Lent et al., 1994) and focussed on the factors affecting career-related choice behaviour as displayed in Figure 3. This model more closely follows the workflow in a career choice intervention. There are conceptual similarities with the CEDF proposed by McCowan and Nguyen (2014). See Table 5 for a comparison of the components of the two frameworks.

Figure 3

Model of person, contextual, and experiential factors affecting career-related choice behaviour



Source: Adapted from Lent et al. (1994) with permission
Note: The variables in the shaded boxes are the primary focus of the current study.

Table 5

A comparison of the components in the Lent and Brown (2006) model and the McCowan and Nguyen (2014) CEDF

Lent & Brown (2006) SCCT model (10 components)	McCowan & Nguyen (2014) CEDF (7 components)
Personal traits	Understanding self
Background & environmental influences	Understanding influences
Learning experiences	Understanding influences
Self-efficacy expectations	Understanding self
Outcome expectations	Understanding the WoW and opportunities
Interests	Understanding self
Choice goals	Goal setting
Choice actions	Decision making
Performance domains	Taking actions
Personal, environmental influences and barriers	Reviewing, reflecting, Understanding influences.

Larson, et al. (2013) proposed a comprehensive framework for placing vocational assessment within the context of a clients' individual life experiences and around research on career counsellor interventions. It was built from the vocational literature review conducted by Larson (2012) and was organized by vocational outcomes and processes. The vocational outcomes section was supported by predictors which emerged from 47 meta-analytic reviews from 1991 to 2008. Larson stated that the list was not exhaustive, nevertheless, it acted as a reasonable overview that researchers and practitioners may want to consider. (Larson, 2012).

Larson et al. (2013) went on to focus on the client predictors and not employer ones to build their framework. They added outcome predictors which were empirically grounded and where counsellors required help with career assessment. Their final framework was designed to assist researchers and practitioners understand the operational definitions of the constructs they were using in their work with clients.

Because the framework of Larsen et al. (2013) is considered representative, it does allow for it to be juxtaposed against the CED model and curriculum framework of McCowan and Nguyen (2014). One framework is based around the 17 constructs used predominantly in career counselling interventions, whereas the other has the seven components of a CED curriculum framework. Not surprisingly there are areas of overlap but each of the components of the CEDF has a least one corresponding construct from the Larsen et al (2013) framework and the Lent and Brown (2006) framework in Figure 3. The constructs listed in both frameworks are represented by the McCowan and Nguyen (2014) framework.

Larson et al. (2013) conducted a review of the extent to which assessment measures related to the constructs, were used between 2000 and 2012. This enabled them to systematically describe each construct and list the measures commonly used to operationalise each of them. They noted that not all the constructs had related assessment measures and that some had many measures related to them. Listed beside the assessment instrument related to

each of the constructs of Larsen et al. (2013) are equivalent instruments as illustrated in Table 6. Instruments such as these, will be addressed in more detail later in the Measures section.

Table 6

Comparison of the Larsen et al. (2013) framework of vocational and career constructs with the McCowan & Nguyen (2014) CEDF and assessment devices related to each component.

Vocational constructs Larsen et al	CEDS Framework McCowan & Nguyen	Example Instruments identified by Larson et al
Key person predictors		
Objective cognitive abilities	Understanding self	Armed Services Vocational Aptitude Battery
Personality	Understanding self	NEO 5 Factor Inventory
Values	Understanding self	Work Values Inventory
Confidence /Self - efficacy		Expanded Skills Confidence Inventory
Vocational outcomes		
Interests	Understanding self	Strong Interest Inventory, Self-Directed Search
Educational achievements	Setting goals	School performance measures
Educational & occupational aspirations	Understanding opportunities	
Educational/Vocational choice	Setting goals	
Job search behaviours	Taking action	
Job search outcomes	Taking action	
Job satisfaction	Reviewing / reflecting	Minnesota Satisfaction Questionnaire
Life satisfaction & well being	Reviewing / reflecting	Job Satisfaction Survey
Vocational processes		
Career exploration & awareness	Taking action	DISCOVER, Vocopher: the career Collaboratory
Career decision making	Decision making	Career Decision Making Self Efficacy Scale
Career Maturity/Adaptability	Review / reflecting	Career Development Inventory
Decision making style	Decision making	
Identifying career barriers	Decision making/ Understanding/Influences	

The comparisons in Table 6 show that the confidence/self-efficacy construct is not represented in the McCowan and Nguyen (2014) CEDF so, a construct labelled 'confidence' has been added to the revised CEDF for the purposes of investigating assessment measures.

Marciniak et al. (2022) conducted a comprehensive review of the different constructs such as career maturity, career readiness and career adaptability, that have been used to measure the career preparedness of adolescents. They defined career preparedness as "the attitudes, knowledge, competencies and behaviours necessary to deal with expected and unexpected career transitions and changes" (p. 2). Based on this review, they developed an organizing framework which resembles that of Lent and Brown (2006) and Rottinghaus and Miller (2013).

The core components of career preparedness derived from the meta study were knowledge/competencies, behaviours and attitudes. These reflect the major components of the revised CEDF namely: understandings (knowledge/competencies), actions (behaviours) and attitudes (attitudes). Their framework was amended to accommodate the concepts used in the revised CEDF and the modified form is presented in Figure 5. Note that this model has been influenced by the systems theory of Patton and McMahon (2014) in that the predictors, influencers, components, and outcomes combine together to form a dynamic system.

This revised form of the integrated model by Marciniak et al. (2022) is now adopted as the updated version of the original CEDF by McCowan and Nguyen (2014) and is the framework used to underpin the development of the four CEDSs.

Figure 4

Integrative framework of predictors, influences, components, and outcomes of career preparedness (Marciniak et al. 2022)

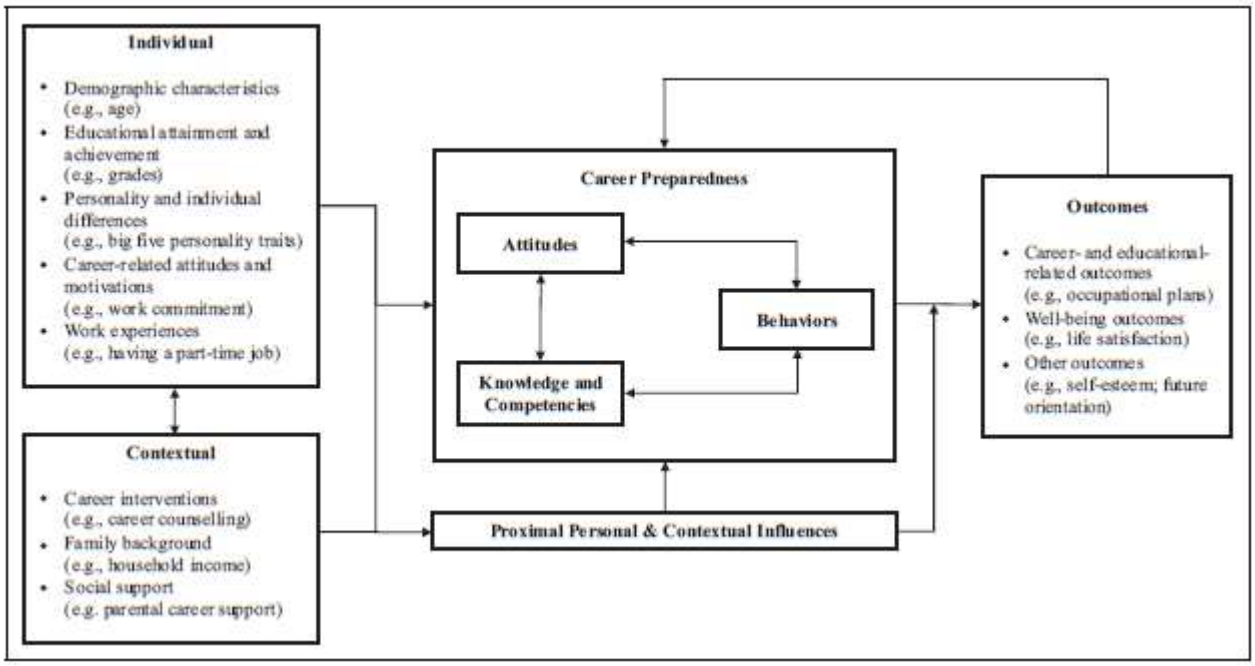
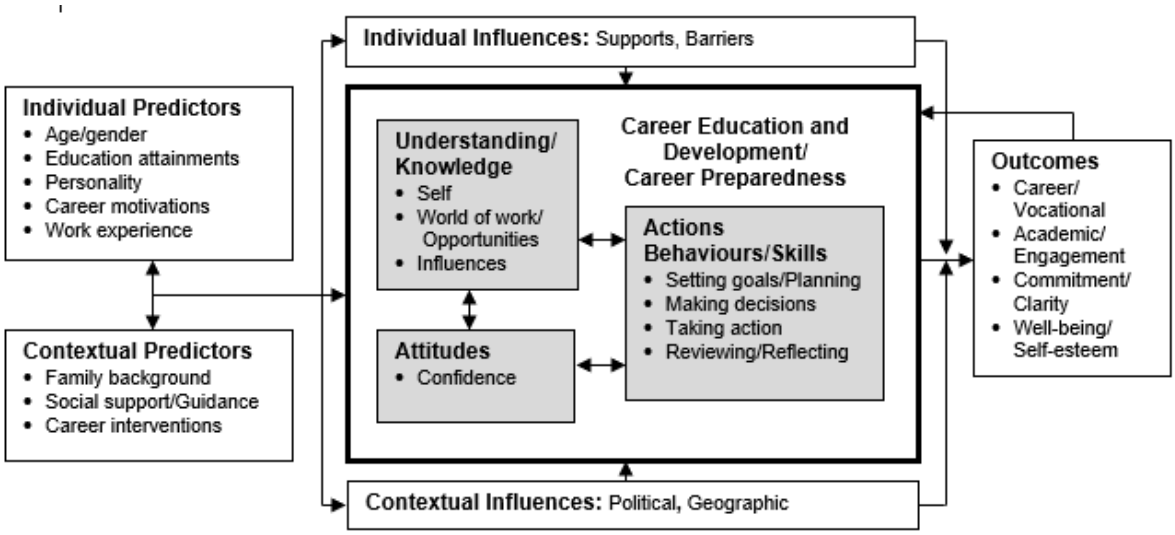


Figure 5

Integrated model for the revised CEDF based on the framework of career preparedness by Marciniak et al. (2022)



Thus far, the literature review focuses on students in general. Because the four scales that were developed begin with students in their early years of schooling, the following section focuses on those students in junior secondary and primary schools.

2.6 Younger students

A detailed examination of two literature reviews by Hartung et al. (2005) and Watson and McMahon (2005) generated five key findings of childhood career development (Porfeli et al., 2008) that:

1. children by the age of four have the capacity to learn about careers and can differentiate occupations based on gender;
2. career stereotypes based on gender tend to consolidate over time;
3. career stereotypes impact on career aspirations and negatively influence later subject and course choice;
4. social and cultural stereotypes impact negatively on career aspirations; and,
5. as children grow, they begin to lean towards more realistic aspirations rather than more sensationalised careers (Porfeli et al., 2008)

McMahon and Carroll (1999) drew the conclusion that school is an early influence on the career development of children and that career-learning integrates naturally into the primary school curriculum, enhancing the teaching and learning activities that already occur. They recognised that at the time, this thinking and practice was not commonplace (Proctor, 2005).

In 2014, the New South Wales Department of Schools and Communities (DSC NSW) demonstrated its commitment to ensuring that all students are equipped and prepared to face the challenges and opportunities of an emerging world of work by hosting a Primary Schools Symposium, *Integrating career skilling through the curriculum…what has been learnt*? It was an opportunity for school principals who implemented career-related learning, to note and share the impact on student aspiration, engagement, and achievement.

At primary-school level, the NSW *School to Work Career Development Curriculum Framework* recognised that children develop ideas and beliefs about the working world from family, peers, and the media, which they act out and practice through play. It also embraced the role of parents and carers in young peoples' career planning.

Participants indicated that where schools implemented career-related learning and connected their students' educational experiences to the community, children developed a sense of what they could do in the future, a sense of social engagement, a sense of belonging and a belief that they can create a positive future (DSC NSW, 2014). Examples of the principles of good practice, benefits of career-related learning in primary schools and a way forward, were all shared and promoted.

The Career Development Institute (CDI) in the United Kingdom developed a new Career Development Framework in early 2021. A few months later they published an accompanying Handbook for Key Stage 3, Key Stage 4 and Post 16 as part of a suite of resources for secondary schools and colleges. Later in 2021 they published the accompanying Handbook for Primary Schools as a resource for leaders and staff in primary schools. Taken together, they are designed to help school leaders and staff ensure continuity in career-related learning across the primary-secondary transition (CDI, 2021).

The new CDI framework identifies six areas of learning that facilitate positive careers and career development which for many people they suggest would be around: personal autonomy; making choices and managing their progress in learning leisure and work; realising their aspirations; experiencing wellbeing; and contributing to the wellbeing of others (CDI, 2021). The Primary School Handbook highlights that career-related learning begins at a very early age where children absorb ideas about work from many sources including home and the media. Primary schools need to ensure that the more formal aspects of this learning provide opportunities for personal growth, enjoyment, and challenges that assist all children have

positive future careers. The Careers and Enterprise Company summarise career-related learning in primary schools for the CDI as being about "broadening pupil's horizons, challenging stereotypes, and helping them to develop a sense of self that will enable them to reach their full potential" (CDI, 2021, p. 3).

One prominent career development theorist, Gottfredson (2005) asserted that children move through four stages as they use the two processes of *compromise* and *circumscription* in the development of occupational aspirations. The hypothetical stages include: orientation to physical size and power (ages 3 to 5 years); orientation to sex roles (ages 6 to 8); orientation to social valuation (ages 9 to 13); and, orientation to an internal, unique self (ages 14 and above).

The process, *compromise*, involves eliminating less compatible but more accessible occupations while *circumscription* is the process of narrowing the zone of acceptable occupations by eliminating unacceptable alternatives. This process occurs by comparing self-concept to images of possible occupations and determining the level of compatibility between the two. At the first stage, children are beginning to recognise that occupations are adult roles and that they, one day, will assume this role. At the second stage, children use concrete, dichotomous thinking to rule out occupations they deem inappropriate for their sex.

At the third stage, around ages 9 to 13 years, children rank occupations by prestige and social value. This ranking is heavily influenced by sensitivities to social evaluation by peers and society. "Children now array occupations two-dimensionally, by prestige level as well as sex type. Whereas they had earlier aspired to jobs low and high alike, they now rank those same occupations differently" (Gottfredson, 2005, p. 79). At the fourth stage (14 years of age and older), individuals become orientated toward their internal, unique selves and devote to identifying alternatives that are most preferred and most accessible.

The work of Gottfredson (2005) highlights the need for more formal CED programs and activities at these early stages of career development, to support students through these important processes and stages.

Two other prominent career development theorists Ginsberg (1984) and Super (1990), each postulated several stages that people go through during their lifespan. These are outlined in Table 7.

Table 7

A comparison of career development stages by Ginsburg and Super (McCowan et al., 2017)

Ginsberg		Super	
Stage (age)	Sub stage	Stage (age)	Sub stage
		Decline (65+)	Retirement Deceleration Innovating
		Maintenance (45-64)	Updating Upholding Advancing
	Specification	Establishment (25-40)	Consolidating Stabilising
Realistic (19+)	Crystallisation Exploration		
	Transition	Exploration (15-24)	Implementing Specifying Crystallising
Tentative (11-18)	Values Capacities Interests		Capabilities Interests
Fantasy (0-10)	Fantasy	Growth (0-14)	Fantasies Curiosity

Both theorists identified the earliest stages of career development in terms of the concepts of, fantasy and curiosity, then moving on to interests, and later capabilities. These are the fundamental building blocks for the next stages which include the concepts of exploration, values, and crystallisation.

Super (1990) elaborated on the childhood period by proposing a theoretical model of childhood career development which consisted of nine dimensions: curiosity, exploration, information, key figures, interests, locus of control, time perspective, self-concept and planfulness. He theorised that successful development across these dimensions leads to effective problem solving and decision making,

The literature review to date has examined historically and defined the concept of CED, together with relevant frameworks, approaches to quality assurance and a review of the constructs in common use. The next section reviews a broad sample of measures relevant to CED to determine if any, or some of them, could be used to address the constructs pertinent to the revised CEDF.

2.7 Measuring career constructs

Larson et al. (2013), Lent and Brown (2006) and Swanson and D'Achiardi (2005) explained each career/vocational construct and then listed a range of common assessment instruments associated with each.

When examining the collection of data across the career education frameworks and publications in Australia, there is not a consistent and reliable instrument which is recommended for use. Researchers have tended to focus on the use of a relatively small number of instruments. In some of the early Australian work for example, American-based instruments like the Career Maturity Inventory by Crites (1978) were used along with measures of intelligence, interests and aptitudes, to understand the level of career thinking and suitability. Slowly over time, career practitioners started to employ instruments which were more related to career development, were more contemporary, were often shortened, and were modified for the Australian context. The Career Development Inventory-Australian-Short Form (CDI-A-SF; Creed & Patton, 2004) is one such instrument and is detailed later in this section. Some instruments like the Career Interest Test (Athanasou, 1988) were developed in Australia.

The present research also has a focus on younger children and their career development needs and measures appropriate to their developmental stage. Stead and Schultheiss (2003) set out to test these theoretical assumptions by developing a measure that would assess childhood career development across the nine dimensions of Super's (1990) model. They developed two versions of the Childhood Career Development Scale (CCDS) -- one for use in South Africa with 48 items resulting in eight sub scales (Stead & Schultheiss, 2003) and one for use in the United States with 52 items and eight slightly different factors (Schultheiss & Stead, 2004). The scales were administered to students in Grades four to seven in South Africa and Grades four to six in the United States (U.S.). Most of the factors proved to be stable in both studies with no or minimal significant differences in gender and grade for each study.

Schultheiss et al. (2006) conducted follow up studies to test the relationship between the CDDS subscales and academic self-efficacy among U.S. students in grades four to six. In general, the relationships were positive with slightly different relationships with different sub scales. Stead and Schultheiss (2010) used a Confirmatory Factor Analysis (CFA) to confirm the eight-factor structure of the South African version and a range of parallel measures to test the concurrent validity of some of the sub-scales of the CDDS. The results provided additional support for the reliability and validity of the CDDS (Stead & Schultheiss, 2003).

Nazli (2007) explored the career development of primary school children in Turkey by using elements of the CCDS to interview 145 primary school students. He simplified the measure by collapsing the nine dimensions from Super (1990) into four dimensions: curiosity-exploration-information; key figures; self-concept; and locus of control, time perspective and planning. He was able to draw a range of conclusions which included that primary school students were aware of their own self-concepts and that their time perspectives and planning concepts were well developed, and they could link their educational experiences to professions.

Several follow up studies in the U.S. also used the CCDS to explore career development in primary school students. For example, Wood and Kaszubowski (2006) used the CCDS to establish the career development needs of students in rural primary schools. They identified four priority areas of focus for career development programs for students in rural areas: curiosity/exploration; information; time perspectives; and key figures.

In the United Kingdom, Dodd et al. (2021) could not locate a suitable measure to evaluate and determine the impact of a pilot career education program in UK schools, so they created their own. They developed the Student Career Readiness Index (SCRI), which is based around a blend of existing career development frameworks and the career decision making self-efficacy scale of Betz et al. (1996). It is a single-factor scale of 9 items for application with students aged 12 to 18 years (Dodd et al., 2021).

Another recently developed scale is the Career Resources Questionnaire-Adolescents (CRQ-A) developed by Marciniak et al. (2021) for use with adolescents, which was adapted from the adult Career Resources Questionnaire and based upon their work with adolescents on career preparedness.

Career practitioners, require access to relevant measures like these to contribute to and apply their findings in their own jurisdictions, to establish the need for career education, to demonstrate the importance and effectiveness of careers work, and to facilitate evidence-based practices as advocated by Whiston et al. (2017), Whiston, (2018) and Winter and Yates (2021). Existing measures tend not to reflect curriculum frameworks which educators have developed to guide their career education and development programs and practices. Nor do the measures tend to reflect the full range of vocational and career constructs being addressed within these programs and practices.

2.8 International applicability

One of the research questions guiding this study, asks whether any measures developed would be relevant just to Australian students or would they also have relevance to international

students. The career assessment literature strongly endorsed the revision of existing instruments and the development of new measures to address cultural diversity more adequately (Spokane & Jacob, 1996; Subich, 1996; Oliver et al.1998; and Leong & Hartung, 2000). Leong and Hartung (2000) in particular, offer the theoretical framework of cultural validity and cultural specificity as a guide moving forward (Leong & Brown, 1995). Blustein and Ellis (2000; p. 379) propose that "the major challenge facing career assessment scholars and practitioners in the 21st century is the need to affirm cultural diversity". They go on to offer "the theory of generalizability and item response theory as viable approaches to developing culturally affirming measures" (Blustein & Ellis, 2000; p. 379).

One outstanding example of cross-country collaboration was that undertaken by Savickas and Porfeli (2012) who facilitated the construction of a psychometric scale to measure career adaptability by researchers from 13 countries. Each of the researchers contributed items and discussed the various interpretations of these items in their own countries so that the items that were developed, contained commonality of concept across the countries. The resulting Career Adapt-Abilities Scale (CAAS) demonstrated metric invariance but not strict scalar invariance across all countries. The reliabilities of the subscales and the overall scale however, ranged from acceptable to excellent across countries and the internal consistencies estimates were excellent across all countries. Many countries have successfully replicated this work.

2.9 Vietnam and career development

The opportunity presented itself to translate the CEDS-Senior and CEDS-Tertiary and investigate their properties for potential use in Vietnam. The Director of *Song An*, a career development social enterprise company, was familiar with the CEDF and had used it in country-wide training, The International Labour Organization, Vietnam (ILO Vietnam) were wanting to conduct research into the career thinking of Vietnamese students and approached *Song An* for advice on measures to use. *Song An* staff knew of the development of the CEDSs

and suggested to use CEDS-Senior and CEDS-Tertiary. ILO Vietnam sought approval to use the measures and in return they committed to be responsible for the operational management of the research and obtained all the appropriate ethics approvals within Vietnam.

Vietnam was an appropriate country to trial the use of the CEDSs because the Vietnam government had been releasing relevant policies in the career development area since the 1980s. For example, after issuing Decision 126/CP of the Government Council in 1981 (The Central Committee and the Politburo, 1981), the Party and State paid great attention to regularly directing the education sector *"*to promote career guidance education for high school students". This emphasis has been reflected in a number of statements from Party Congresses since then. For example, in 1986 the 6th Party Congress stated "high schools must strongly shift towards including career guidance..." (Thayer, 1987). In 1989 the Council of Ministers issued Decision No. 23/HDBT on a number of urgent issues including "promoting career guidance education" (Council of Ministers - Socialist Republic of Vietnam, 1989) and in 2018, the Prime Minister approved the project 'Career guidance education and students streaming in general education for the period 2018-2025' under Decision No. 522/QD-TTg. According to this document, *Experiential activities and career guidance*, issued together with Circular No. 32/2018/TT-BGDĐT (Ministry of Education and Training, 2018) from the Minister of Education and Training, career guidance activities will parallel general education activities, in which career guidance activities account for 30% of the total time of activities in high school.

Simultaneously, there had also been an increase in career education and development (CED) activities and actions at institutional and professional levels. For example, there were annual career activities usually organized by State-owned media associations such as: Tuoi Tre News, Giao Duc News, and Thanh Nien News which aim to connect the high school students with the colleges and universities.

From 2012 to 2015, the Flemish Association for Development Cooperation and Technical Assistance (VVOB Vietnam) trained more than 2000 teachers to undertake careers work in two provinces: Quang Nam and Nghe An with Phoenix Ho as the lead consultant (VVOB, 2015). In that same time period, The International Labour Organization, (ILO Vietnam), operated a career training program for teachers and leaders in Non-Profit and Non-Government Organisations (NPOs/NGOs). Since 2018, *Song An* trained 1138 career practitioners, career teachers and parents and organized/co-organized four national/international career development conferences which encouraged career practitioners in Vietnam to adopt more professional and ethical approaches to their career education and development (CED) practice.

A selection of educational institutions supported the implementation of CED. For example, Van Lang University introduced a one-unit college career education course in their general education program and RMIT Vietnam University, conducted year-round career activities and had implemented the career e-portfolio program, Personal Edge. Career workbooks and materials for schools/parents had been developed synchronously according to the demands of students and parents. Sources of these resources, included ILO Vietnam's Career Workbook for students and parents and *Song An's* public career resources website, www.huongnghiepsongan.com. *Song An* in cooperation with Asia Pacific Career Development Association (APCDA) published the initial version of *Vietnam's Competency Framework for Career Practitioners* (APCDA, 2021).

ILO Vietnam made major efforts to provide support to youth employment with a series of tools, such as, *Career Guidance Tools for Vietnamese students aged 14-19, Handbook for young Vietnamese workers seeking jobs*, and *Internship Guidance for Enterprises, Teachers and Students*. (ILO, 2020).

According to a report by one of the leading groups in the recruitment industry in Vietnam, a survey of 1,600 new graduate students, found huge gaps in the transition from school to employment (Navigos Group, 2018). The report revealed that only 54% of fresh graduate students had a full-time job; and the remainder were unemployed, freelance, or in internships and had no intention of finding a full-time job. Only 40% of the surveyed students shared that they worked in their area of expertise. Almost all students found great difficulty in obtaining employment after graduation. Thirty-eight percent of the surveyed students said that they had no career orientation, 35% did not know how to look for a job efficiently, and 35% could not meet the employers' requirements. According to the Employment Report announced by General Statistics Office (GS0), Vietnam (GSO, 2020), the unemployment rate of Vietnamese students who graduated from university was three to four times higher than graduates from colleges and secondary schools, due mainly to a lack of skills, knowledge and attitudes. These two reports highlighted the need for proactive measures to be introduced in secondary schools and universities to address these shortfalls in CED-related skills, knowledge and attitudes in their students.

In this climate of the importance and growth of CED in Vietnam, education leaders, policy makers, career practitioners, academic staff and student support staff need access to relevant measures to: determine the need for CED; assist individual students to understand their own career development progress; establish the career development profile of students at different education levels; demonstrate the effectiveness of careers work; target and evaluate interventions; and facilitate evidence-based practices.

A review of selected measures that have been used in careers work in Australia is provided in the next section.

2.10 Measures of career constructs aligned with the CEDF

Relevant measures in use across Australia are presented in alphabetical order. After describing each of the instruments, a summary is provided in Table 9 which presents a list of the instruments.

Career Adapt-Ability Scale (CAAS):

The CAAS was developed by Savickas and Porfeli (2012). It consists of 24 items over four subscales and has strong validation in many countries across the world. Career adaptability is one of the key enabling meta-competencies in a fast-paced and evolving work context (Savickas et al., 2009). It refers to a set of "attitudes, competencies, and behaviours that individuals use in fitting themselves to work that suits them" (Savickas, 2013, p. 45). A multidimensional construct, it is comprised of four self-regulatory strengths (i.e., concern, control, curiosity, and confidence) that facilitate preparation for current and anticipated occupational changes.

Concern pertains to a time perspective towards preparation for one's career future such as developing a career vision. Control indicates a sense of ownership and responsibility to exert influence on one's career. Curiosity refers to the interest in exploring possible selves and career opportunities in one's environment. Lastly, confidence pertains to the pursuit of career aspirations and an anticipation of success in face of obstacles. Overall, these four adapt-abilities enable adjustment to career-related changes, person–environment integration, and successful transitioning across the career lifespan (Savickas & Porfeli, 2012).

Hughes (2017) used the CAAS with Grade 10 students in a Hobart secondary school as a pre and post measure of their career thinking before and after an extensive career education program. She found no significant difference in the pre-post scores and postulated that the CAAS items were too general to resonate with the more specific career thinking developed during the program.

Mitchell (2017) used the CAAS as a pre-post measure of students' career thinking after they participated in the Bond University, *Beyond Bond* career development program. She found no significant difference in the pre and post scores and questioned the appropriateness of the general style of items in the CAAS in relation to the more specific outcomes the students were achieving after the program.

Career Development Inventory, Australian Short Form (CDI-A SF)

Lokan (1984) from the Australian Council for Educational Research (ACER) crafted an Australian version of the original Career Development Inventory (CDI) developed by Super (1981), which became the CDI-A. The CDI A consisted of 72 items over four basic scales which combined to provide scores on seven single and composite scales.

Creed and Patton (2004) then developed a short form of this inventory (CDI -A (SF) that reduced the CDI-A from 72 items to 32 items. They continued to use this instrument in their follow up research (Creed & Patton 2003a; Creed & Patton 2003b; Patton, et al., 2003, Patton, et al., 2005, Patton & Creed, 2007). Other researchers continued to build on their work. For example, Hughes & Thomas (2006) employed the CDI-A-SF to investigate its appropriateness with 160 Thai secondary school students but found some subscales to be unreliable for use in a Thai context. It should be noted that the focus in the CDI-A is on knowledge and attitude whereas the focus in the CEDF is on understanding, action and attitude.

Career Decision Making Self Efficacy Scale -Short Form (CDMSES; SF):

The 25-item short form of this scale was developed by Betz et al. (1996) and measures confidence regarding ability to make career-related decisions. A number of researchers in Australia have included this scale in their studies, particularly when they examined a number of variables in relation to a criterion. (Patton, et al., 2003, Creed et al., 2004, Patton et al., 2005, Patton & Creed, 2007).

Career Decision Difficulty Scale (CDDS)

Amir and Gati, (2006) developed this scale with a focus on the difficulties students faced when making career decisions. Researchers like Albion & Fogarty (2005) have used this scale to ascertain students' thinking when making career decisions, however, it doesn't address the other six components of the CEDF

Career Exploration Survey: (CES)

Stumpf et al. (1983) developed this scale to investigate how an exploration approach and activities affect career decisions, career development and job outcomes such as job satisfaction, commitment, and turnover. They also intended the scale to examine the effects of personal characteristics and educational treatments on career exploration behaviours and beliefs. They developed a 57-item scale which represented 16 dimensions of career exploration grouped under three categories:

- Exploration process: 1. Environmental exploration, 2. Self-exploration, 3. Intended systematic exploration, 4. Frequency,5. Amount of information, 6. Number of occupations consideration and 7. Focus
- Reactions to exploration: 8. Satisfaction with information, 9. Explorational stress, and 10. Decisional stress
- Beliefs: 11. Employment outlook, 12. Certainty of CE outcomes, 13. External search instrumentality, 14. Internal search intentionality, 15. Method instrumentality, and 16. Importance of obtaining preferred positions.

The CES has since been employed by researchers like Blustein (1989) to determine the differential emphasis placed by students at different stages off their career exploration.

Career Futures Inventory Short Form (CFI-9)

McIlveen et al. (2013) developed a short form of the Career Futures Inventory (Rottinghaus et al., 2005) as a measure of Career Optimism, Career Adaptability, and Perceived Knowledge.

The authors concluded the properties of the CFI-9 were sufficient to explore its application, as a measure of perceptions of employability and as a screening tool for educational interventions. This development work was done at a university level and not a school level.

Career Interest Test (CIT)

Anathasou (1988) developed the Career Interest Test as a simple interest test, which could be self-administered and contained transparency in the calculation of results. It is a specific test focused on career interests and provides idiographic forced choice assessment of vocational interest (126 items derived from 64 paired choices; Athanasou, 1993). The CIT provides data only on the Self Understanding component of the CEDF. Bartlett et al. (2015) created the short form of the CIT which is integrated into the Australia's national career information site, (myfuture.edu.au).

Career Resources Questionnaire-Adolescent Version (CRQ-AV)

Marciniak et al. (2021) applied a career resources framework to assess key aspects of career preparedness among in-school adolescents, and adapted and validated the Career Resources Questionnaire to do so. The questionnaire assesses 12 distinct aspects of career preparedness (i.e., occupational expertise, labour market knowledge, soft skills, career involvement, career confidence, career clarity, social support from school, family, and friends, networking, career exploration, and self-exploration)

Career Thoughts Inventory (CTI)

The CTI is based on a cognitive information processing theoretical approach to career development and career services. It focusses on dysfunctional career thinking that can impair an individual's ability to solve career problems and make decisions. Clients respond to 48 item statements using a four-point rating scale. Career thoughts are defined by the authors as outcomes of one's thinking about assumptions, attitudes, behaviours, beliefs, feelings, and/or strategies (Sampson et al., 1996).

The CTI yields a total score as a global indicator of dysfunctional thinking in career problem solving and decision making as well as scores on three construct scales: Decision Making Confusion, Commitment Anxiety and External Conflict. Lower total scores indicate limited dysfunctional thinking while higher scores indicate greater dysfunctional thinking in relation to career problem solving and decision making and can be explored at scale and item level.

Hughes (2019) used the CTI to investigate if it would be useful to use as a pre-post measure to investigate the effectiveness of a career education program with Grade 10 students in a Tasmanian secondary school. Unfortunately, it did not prove to be a useful evaluative tool.

Childhood Career Development Scale (CDDS)

Early adolescent career development research has been limited by a lack of psychometrically sound assessment instruments. Based on Super's theoretical model of childhood career development, the Childhood Career development Scale (CDDS) was developed to assess the career progress of children aged 11-14. (Schultheiss & Stead, 2004). The first stage of Super's career development model across the lifespan was the Growth stage from birth to age 14 with three substages within it – Fantasy, Interest & Capacities (Super 1957).

Super (1990) proposed a nine-dimensional model of childhood career development which included: curiosity, exploration, information, interests, key figures, locus of control, self-concept, time perspective, and planfulness, The CDDS has been built around Super's model. It is a 52 item, 5-point Likert-type scale, that assesses children's career development across eight dimensions where the curiosity and explorations dimension from Super's (1957) model are combined to form one dimension. The validity of the instrument has since been confirmed for Italian middle school students (Ferrari et al 2018).

New General Self-Efficacy Scale (NGSES)

The NGSES was developed by Chen et al. (2001) and consists of 8 items rated on 5-point Likert-type scale from strongly disagree to strongly agree. Self-efficacy was introduced as an integral part of social learning theory by Bandura (1977) and defined as "the conviction that one can successfully execute the behaviour required to produce the required outcome" Bandura (1977 p. 193). It can be seen as situationally specific or as a global concept. Chen et al., 2001) took the General Self Efficacy Scale (Sherer et al., 1982) and modified it to present a new scale which was not only shorter but also proved to have much better psychometric properties (Chen et al., 2001).

Rosenberg Self-Esteem Scale (RSES)

Rosenberg (1965) developed this 10-item scale that determines self-worth by measuring both positive and negative feelings about self. Answers are provided using a 4-point Likert type scale format ranging from strongly agree to strongly disagree. Gray-Little et al. (1997) used item response theory analysis to identify one single common factor for the scale. Australian researchers Patton et al. (2005) used it extensively to compliment the use of other scales to validate their career-related research with Australian students.

Self-Directed Search (SDS Form R)

Shears and Harvey-Beavis (2012) from the Australian Council for Educational Research (ACER) worked on developing an Australian version of the Self-Directed Search and revised their work to produce Form R. This instrument is an interest test based on the Holland classification of vocational interests and occupations (Holland, 1985) It is a self-administered, self-scored, self-interpreted vocational counselling tool with two booklets; the assessment booklet and the occupational classification booklet. When a student completes the test, they receive a three-letter code which simulates what a counsellor and client might do together in a session. The search involves aspirations, preferred activities, rating competencies, and rating

abilities and the resulting score is used to identify related occupations and degrees of agreement between the code letters and occupations.

Student Career Readiness Index (SCRI)

In the United Kingdom, Dodd et al. (2021) could not locate a suitable measure to evaluate and determine the impact of a pilot career education program in UK schools, so they created their own. They developed the Student Career Readiness Index (SCRI) which is based around a blend of existing career development frameworks and the career decision making self-efficacy scale of Betz et al. (1996). It is a single-factor scale of 9 items for use with students aged 12 to 18 years (Dodd et al.2021).

Vocational Outcomes & Expectations Scale (VOES and VOES-R)

Vocational outcome expectations relate to individuals' career related decisions and behaviours including achievement motivation and beliefs regarding consequences of actions and career choice outcomes. That is, expected outcomes when pursuing goals (McWhirter et al, 2000). It is related to Social Cognitive Career Theory (SCCT; Lent & Brown, 2006), which in turn is related to Albert Bandura's Social Cognitive Theory (1986).

The original VOE scale was a 6-item measure designed to evaluate perceptions of vocational outcome expectations using a 4-point scale. Given the original measure's brevity, the inclusion of items that are not specific to career-related choices, and Fouad and Guillen's (2006) critique of the measurement of outcome expectations, 6 items were added to this measure to deliver a revised form. These items represented Bandura's (1986) three types of outcome expectations: self-evaluation or satisfaction (2 items), physical (2 items), and social (2 items). The new items were specific to outcomes, related to the career decision-making process such as, "I will get the job I want in my chosen career." Clark and Watson (1995) and Ali et al. (2005) found that the statistical properties of the revised scale were more than adequate.

Work Aspect Preference Scale (WAPS)

Pryor (1981) developed this scale to measure a student's preference towards a particular work environment. The WAPS is a 52-item measurement of 13 dimensions students and adults consider important in work. It was considered to be a useful measure complementary to interest inventories, enabling a more comprehensive assessment of the affective domain of Australian students. Interests and values are fundamentally distinct domains of human characteristic assessment. Thirteen factors were designated; Security, Self-development, Altruism, Life Style, Physical Activity, Detachment, Independence, Prestige, Management, Co-Workers, Surroundings, Creativity and Money. The second order factors Non-Work Orientation, Freedom People Concern held across samples of Grade 10, Grade 11 & 12 and adults (Pryor, 1981).

In summary, Table 8 indicates how each instrument corresponds to one or more of the components of the proposed CEDF.

Table 8

Career construct measures and the shaded components of the CEDF to which they correspond

MEASURES	Initial CEDF							Attitude
	Understanding			Action				
	Self	WoW/ Opport	Influe	Goal setting	Decision making	Taking action	Review Reflect	Confidence
Career AdaptAbility Scale (CAAS)	■	■		■				■
Career Development Inventory Australia Short Form (CDI-A-SF))		■		■	■			
Career Decision Difficulties Scale (CDDS)					■			
Career Decision Making Self Efficacy Scale -Short Form (CDMSES-SF):					■			
Career Exploration Scale (CES)						■		
Career Future Inventory (CFI)	■	■				■		■
Career Interest Test (CIT)	■							
Career Resources Questionnaire-Adolescent Version (CRQ-AV)	■	■	■			■		■
Career Thoughts Inventory (CTI)			■		■			
Childhood Career Development Scale (CDDS)	■	■	■	■				■
New General Self Efficacy Scale (NGSES)		■						
Rosenberg Self Esteem Scale (RSES)								■
Self-Directed Search (SDS)	■	■						
Student Career Readiness Index (SCRI)	■				■			■
Vocational Outcomes & Expectations Scale (VOES)		■			■	■		
Work Aspect Preference Scale (WAPS)	■	■						

WoW/Opport = World of Work/Opportunities; Influe = Influences

2.11 Need to develop measures

A review of career-related instruments in Table 9 reveals that the measures listed address some but not all of the eight components in the revised CEDF among school students. For example, self-understanding, knowledge of the world of work, decision making and some aspects of taking action are addressed in the CDI-A (SF) but not, understanding influences, goal setting and reviewing/reflecting.

Each of these scales focus on vocational/career constructs like, self-concept, work values and decision difficulties. Some have a single construct focus, and some have a broader focus such as the Childhood Career Development Scale, but none relate to the full range of components of the revised CEDF.

For schools wishing to introduce the revised CEDF, a simple yet holistic scale is required to assist in developing a base line of students' career thinking in accordance with the eight components of the framework. The results could be used to identify and report the overall level of career thinking at any stage of development and be used to advocate for attention.

This could also allow for the same instrument to be applied after any career curriculum intervention, to establish if the students' career thinking had advanced as a result of the intervention. Such pre-post assessment would assist in determining the value of providing such a career intervention in line with a pragmatic framework.

Such an instrument could be used to develop a career curriculum intervention, if the scores were low overall, for example. It could also be used to target an intervention(s) in one or more of the three components and/or the eight elements of the revised CEDF, if the class profile revealed particularly low scores in some areas.

2.12 Development of the Career Education and Development Scales (CEDS)

As a student's career thinking develops over time and moves through different stages as per the career development theoretical models of Ginsberg (1984) and Super's (1980), it is necessary to develop varying but parallel instruments for different ages and stages. Based on

the need identified to develop broader measures, this research proposal is to develop and test the reliability and validity of four versions of scales to cover the four age groupings (stages) of the CEDF.

- CEDS-Primary (Primary School – Grade 5 & 6; ages 10 & 11)
- CEDS-Junior (Junior Secondary School – Grade 7, 8, 9; ages 12, 13, 14)
- CEDS-Senior (Senior Secondary School – Grades 10, 11, 12; ages 15-16, 17)
- CEDS-Tertiary (Tertiary level – all levels)

The development of the four scales would adhere to the following principles: be concise, be under 30 items, be age appropriate in terms of readability, have several items per sub-scale to reflect the components of the CEDF, and contain a consistent Likert scale for the full instrument.

The following steps were implemented to develop the four CEDSs outlined above.

- Develop a set of instructions and a consistent five-point Likert-type rating scale.
- The items used in a selection of the previously used instruments be examined and allocated in a revised form to one of the eight component areas of the revised CEDF.
- The items reflecting the aims and competencies of the CEDF as outlined in Table 10 and the activities listed in Table 11.
- For the CEDS-Senior, a minimum of three items be developed for each of the eight component areas of the revised CEDF.
- The draft scales be forwarded to a range of parents and career practitioners for comment on the suitability and readability of the individual items.
- The scales be revised based on the comments.
- The revised scales be sent to a range of career practitioners to conduct focus groups or interviews with age-appropriate students on the suitability and readability of the individual items.
- The scales be revised based on the student comments.

The scale development undertook a similar process to that recommended by Dodd et al. (2021), namely: Identification of outcomes and review of existing measures; mapping of frameworks and generation of items; expert review; cognitive testing with the intended users; gathering pilot data and exploring the factor structure; and using confirmatory factor analysis to finalise the instrument.

The items used in a selection of previously employed instruments were examined and allocated in a revised form to one of the seven components of the CEDF. For example, the item relating to "How much time and thought have you given to choosing subjects and choosing a career in general?" from Section 2 of the Career Development Inventory-Australian-Short-Form (CDI-A-SF; Creed & Patton, 2004) translated to the item; "I usually consider my course/career options carefully before making decisions".

The items which were developed, reflected the aims, competencies, and lesson content in the revised CEDF. See Table 9 for an example of the broad aims and competencies for a selection of year levels. See McCowan et al. (2017, p.p. 115-139) for the full set of examples activities (lesson plans) which were referred to when developing the relevant items.

Table 9

CEDF Aims and Competencies

Grade 7, 8, and 9	Grade 10 and 11	Grade 12
UNDERSTAND		
➢ Develop an understanding of themselves in relation to career and course-related decisions.		
○ Understand who they are in terms of interests, skills, strengths, and capacities	○ Know how to develop their career capacities as they move through school	○ Understand that motivations and aspirations will change as they develop and mature
➢ Develop knowledge and understanding of the world of work and post-school options.		
○ Know where and how to access reliable and current career and course information	○ Understand the relationship between themselves, work, society, and the economy ○ Know how to and where to explore career and course options suitable for them	○ Understand the realities and requirements of various institutions, training, and work settings
➢ Recognise and understand influences on career/course decisions and how to manage them.		
○ Understand who and what influences their career choices e.g., friends, media	○ Know how to recognise and manage influences on their career and course choices	○ Understand how the local, national and global economy impact on their career options
TAKE ACTION		
➢ Learn to set career goals—short, medium, and long term.		
○ Set goals that are both ambitious and achievable	○ Revisit and adjust their learning and career plans throughout their schooling	○ Know and do what is needed to achieve their goals
➢ Learn how to undertake career and course option planning and make considered choices.		
○ Make informed and effectiv career, course, & subject choices	○ Generate, prioritise, & apply relevant course and career cho	○ Evaluate the appropriateness And consequences of their cour and /career choices
➢ Proactively take action to explore, confirm, and achieve course and career choices.		
	○ Link learning performance with past career, course and subject selections	○ Apply for and secure places in preferred post-school learning or work situations ○ Communicate effectively in print, online and in face-to-face interactions ○ Develop coping strategies during transition periods
➢ Build capacity to review and reflect on choices		
○ Link learning performance with career & course plans	○ Revisit career and study plans on a regular basis	○ Reflect on past course choices and learn from them

For example, in McCowan et al. (2017, p. 111) the activity suggested for *Goal Setting* for Grade 10 was, "to set short/medium/long term career goals" which translated to the item; "My career/course plans contain short-, medium- and long-term goals". Likewise, for the

activity suggested for *Understanding Opportunities* for Grade 11 (McCowan et al., 2017, p. 112) was "to identify all likely post-school pathways", translated to the item; "I have a good understanding of the many different career pathways open to me".

Draft scales were forwarded to a range of stakeholders such as parents and career practitioners for comment on the suitability and readability of the individual items and the scales were revised based on the comments. For example, in Item 4; "I have a good understanding of the thinking of my parents in relation to future courses or careers which might suit me", translated to Item 4; "I have a good understanding of my parent's views regarding future course/careers that might interest me". The revised scales were subsequently sent to a range of career practitioners to conduct focus groups and interviews with age-appropriate students on the suitability and readability of the individual items. Again, the scales were revised based on the student feedback. For example, Item 16 changed from, "I am able to construct a high-quality resume and cover letter" to "I am able to construct a competitive resume and cover letter".

For all scales there was an introductory purpose statement followed by the collection of biographical data and an instructions statement as outlined in Figure 6.

Figure 6

Introductory Statement for Each Scale

This Scale has been developed to better understand the career-related thinking of students in order to provide you with more relevant career programs. Participation in this Scale is voluntary and your responses will be treated confidentially. Please complete the following details: (Name, Grade/Level/Course, Age, Class/Group and Gender). Please rate the extent to which you agree or disagree with the following statements by circling the appropriate number. eg If you agree or strongly agree with the statement you would circle 4 or 5 depending on how strongly you agree with it. If you disagree or strongly disagree with the statement you would circle 2 or 1 depending on how much you disagree with it.

2.13 Summary of research

The suite of CEDS is developmental in nature, which means the same framework needs to be used despite the differences in the items in the scales as we move up the age range. The initial four scales resulted in the representative number of items for each component of the CEDF as presented in Table 10. As the studies proceeded and based on the findings from the PAFs and CFAs, the number of items changed.

Table 10

The initial research framework

Component	Factor	Tertiary	Senior	Junior	Primary
UNDERSTANDING	1.Understanding Self	3	3	2	2
	2.Understanding Influences	3	3	2	2
	3.Understanding Opportunities	3	3	2	2
ACTION	4.Setting Goals	3	3	2	1
	5.Making Decisions	3	3	2	1
	6.Taking Action	5	3	2	1
	7.Reviewing/Reflecting	3	3	2	1
ATTITUDE	8.Confidence	3	3	1	1
Total Number of items		26	24	15	11

There were three phases of research. The first Phase concentrated on CEDS-Senior as there has been previous research activity at this level (students aged 15-17 years; Patton & Creed, 2007) and the scale to be tested contains both the three components and the eight factors of the CEDF. Follow-up research was undertaken on CEDS-Senior with a completely different sample of students to confirm that it would also reveal the same structure as for the first study.

The second Phase focussed on the cross-cultural applicability of both CEDS-Senior and CEDS-Tertiary as these had both shown to represent the structure of the CEDF.

The third Phase focussed on CEDS-Junior and CEDS-Primary once the viability of the other two scales was determined.

2.13.1 Phase 1 research

For CEDS-Senior, an 8-factor structure was pre-determined. Consequently, a CFA was conducted which revealed the 8-factor structure. This is presented in Chapter 3.

2.13.2 Phase 2 research

For efficacy, in CEDS-Tertiary, the lowest factor loadings for the *Taking Action* factor were used to reduce it from 5 items to 3 items, to align with all the other factors and with CEDS-Senior.

Table 11

The research framework for Phase 2 of the analyses

Component	Factor	Tertiary	Senior	Junior	Primary
UNDERSTANDING	1. Understanding Self	3	3	2	3
	2. Understanding Influences	3	3	2	2
	3. Understanding Opportunities	3	3	3	2
ACTION	4. Setting Goals	3	3	2	1
	5. Making Decisions	3	3	2	2
	6. Taking Action	3	3	2	3
	7. Reviewing/Reflecting	3	3	1	1
ATTITUDE	8, Confidence	3	3	7	7
Total Number of items		24	24	21	21

CEDS-Tertiary and CEDS-Senior were translated into Vietnamese and CFAs were undertaken with both and the 8-factor structure was revealed for each scale as presented in Chapter 4.

2.13.3 Phase 3 research

For both CEDS-Junior and CDES-Primary, the initial PAFs revealed a possible three factor solution for both and respective CFAs revealed a 3-factor model as hypothesised after reducing the number of items in each of the three components from seven to six.

Table 12

The research framework after all analyses

Component	Factor	Tertiary	Senior	Junior	Primary
UNDERSTANDING	1. Understanding Self	3	3		
	2. Understanding Influences	3	3	6	6
	3. Understanding Opportunities	3	3		
ACTION	4. Setting Goals	3	3		
	5. Making Decisions	3	3	6	
	6. Taking Action	5	3		
	7. Reviewing/Reflecting	3	3		
ATTITUDE	8. Confidence	3	3	6	6
	8. Self-efficacy	3	3		
Total Number of items		24	24	18	12

2.14 Scales at research phases 1, 2 and 3

The items contained in CEDS-Tertiary and CEDS-Senior at Phases 1 and 2 of the research, are presented in Tables 13 and 14. The items contained in CEDS-Junior and CEDS-Primary at Phase 3 of the research, are presented in Tables 15 and 16.

Table 13

CEDS-Tertiary - phase 1

SELF

1. I have a good understanding of my personal strengths and attributes and how they might relate to future careers or further study options.
2. I understand that I need to develop my graduate attributes in order to make me more attractive to future employers.
3. I can communicate strong evidence of my interests, skills and attributes to future employers

INFLUENCES

4. I understand the importance of making course/career decisions which are mine and not influenced by my friends and/or social media.
5. I understand that access to career opportunities could depend on a range of circumstances like government policies or specific locations or growth industries ….
6. I am able to manage the expectations of significant others on my career/course choices and direction

OPPORTUNITIES/WORLD of WORK

7. I have a good understanding of the world or work and future careers options within it.
8. I have a good understanding of the range of units/subjects/courses/programs which are available for me to choose and where they might lead in terms of careers.
9. I have a good understanding of many different career pathways open to me.

SETTING GOALS

10. I have set myself clear and achievable career/course goals.
11. I have developed a career plan for myself.
12. My course/career plans contain short, medium and long-term goals.

MAKING DECISIONS

13. I am good at making sound career/course choices and decisions.
14. I am able to seek detailed course and career information to assist me make good decisions.
15. I usually consider my career/course options carefully before making decisions.

TAKING ACTIONS

16. I am able to construct a competitive resume and cover letter.
17. I can competently complete job/course/career-related applications.
18. I am confident I will perform well at job/career related interviews
19. I am able to locate appropriate information on entry prerequisites for jobs and/or courses or further study.
20. I am strong at professional networking

REFLECTING/REVIEWING

21. I review my course/career plans often.
22. I regularly check course/career information to see if there are any changes relevant to my course/career planning.
23. I have developed appropriate back-up plans if my first choice(s) don't eventuate.

CONFIDENCE

24. I feel confident that I have a good idea of what career/course direction(s) or pathways I want to take.
25. I am confident I will get appropriate employment/further study opportunities upon graduation.
26. I am confident I will have a successful future

Table 14

CEDS-Senior - phase 1

SELF

1. I have a good understanding of my interests and how they might relate to future courses or careers.
2. I have a good understanding of my personal strengths and abilities and how they might relate to future courses or careers .
3. I am aware of the subject(s) which I like or do well in and how it/they might relate to future courses or careers.

INFLUENCES

4. I have a good understanding of my parent's views regarding future courses and careers that might interest me.
5. I understand the importance of making course/career decisions which are mine and not influenced by my friends or social media.
6. I understand the importance of making course/career decisions which are mine but are done with help from teachers and parents.

OPPORTUNITIES

7. I have a good understanding of the world or work and future careers options.
8. I have a good understanding of the range of subjects/courses which are available for me to study and where they might lead in terms of careers.
9. I have a good understanding of the many different career pathways open to me.

SETTING GOALS

10. I have set myself clear and achievable course/career goals.
11. I have developed a career plan for myself.
12. My course/career plans contain short, medium and long-term goals.

MAKING DECISIONS

13. I am good at making sound career/course choices and decisions.
14. I am able to seek detailed course and career information to assist me make good decisions.
15. I usually consider my course/career options carefully before making decisions.

TAKING ACTION

16. I am able to construct a competitive resume and cover letter.
17. I can competently complete job/course/career-related applications.
18. I am able to locate appropriate information on entry prerequisites for jobs and/or courses of further study.

REFLECTING/REVIEWING

19. I review my course/career plans approximately every six months.
20. I regularly check course/career information to see if there are any changes relevant to my course/career planning.
21. I have developed appropriate back-up plans if my first choice doesn't eventuate.

CONFIDENCE

22. I know what steps I need to take to progress my course/career planning.
23. I feel confident that I have a good idea of what course/career direction(s) or pathway(s) I want to take.
24. I am confident that I will have successful future.

Table 15

CEDS-Junior – phase 2

No	Item
Understanding Self	I have a good understanding of my strengths and interests and how they might relate to future courses or careers
	I am aware of the subject(s) which I like or do well in and how it/they might relate to future courses and/or careers
Understanding Influences	I understand the importance of making course/career decisions which are mine and not influenced by my friends or social media
	I understand the importance of making course/career decisions which are mine but are done with the help from teachers and parents
Understanding Opportunities	I have a good understanding of the world of work and a range of occupations within it
	I have a good understanding of the range of subjects and/or courses which are available for me and where they might lead in terms of careers
	I have a good understanding of career opportunities open to me
Setting Goals	I have set myself clear and achievable subject and/or course goals
	I have developed a career plan for myself.
Making decisions	I make good subject/course decisions based on a great deal of research
	I usually consider my subject/course options carefully before making decision.
Taking action	I am able to locate appropriate information on possible jobs and/or courses of further study
	I have researched what subject choices I need to make in the next few years.
Reviewing	I often review my subject/course/career plans
Confidence	I am confident that I have a good idea of what career/course direction(s) or pathway(s) I want to take.
	I am confident I will be successful in my chosen occupations or career
	I am confident that my talents and skills will be used in my future career/occupation
	I am confident I can succeed at almost any endeavour to which I set my mind
	When facing difficult tasks, I am certain that I will accomplish them
	Compared to most people I can do most tasks quite well
	Even when things are tough, I can perform quite well

Table 16

CEDS-Primary – phase 2

CEDF Component	Item
Understanding Self	I am aware of my interests and how they might relate to future careers for me
	I know what I am good at and how that might relate to future careers for me
	I am aware of my strengths and how they might relate to future careers for me
Understanding Influences	I understand that my parents and teachers will help me with my future course and career choices.
	I understand that my friends may wish to help me with my future course and career choices.
Understanding Opportunities	I have some understanding of possible course/career options available to me
	I have some understanding of the world of work and many of the occupations in it.
Setting Goals	I have had some thoughts about future occupations which might interest me.
Making Decisions	I usually consider my options carefully before making choices.
	I am good at making decisions about which projects, tasks or activities to choose
Taking Action	I have researched a range of occupations
	I have asked some adults about their work.
	I have visited some workplaces
Reviewing/ Reflecting	I often think about my future career plans.
Confidence	I am confident I will be successful in my chosen occupation or career
	I am confident my talents and skills will be used in my future career/occupation
	I am confident about my future
	I am confident I can succeed at almost anything to which I set my mind
	I am confident I can overcome any difficulties which come my way
	Compared to most people I can do most tasks quite well
	Even when things are tough, I can perform quite well

The final versions of all four scales are presented in Appendix C.

2.15 Comparator measures

The comparison instruments chosen to couple with CEDSs came from the list of instruments listed in the Larson et al (2013) study aligning instruments with career/vocational constructs. It was important to select instruments which attempted to measure similar aspects of the CEDF or career/vocational construct and which did not extend the length of the CEDSs too much. Also, the instruments were required to be age appropriate.

The career/vocational constructs chosen to compare were self-efficacy, self-esteem, vocational outcomes and expectations, and child career development. The *New General Self Efficacy Scale* (NGSES; Chen et al., 2001) contains only eight items and has been successfully researched across the full age range from primary school to tertiary level. For vocational outcomes and expectations, the *Career Futures Inventory* (CFI-9; McIlveen et al, 2013) will be used at Tertiary level because that is the level where the research on it focussed and it contains only nine items. The long form of the *Vocational Outcomes and Expectations Scales* (VOES; McWhirter et al., 2000) with its twelve items will be used at the senior school level in both Phase 1 and 2..

For self-esteem in the second study at the senior school level and the two studies at junior-secondary and primary-school levels only the positive items from the *Rosenberg Self Esteem Scale* (RSES; Rosenberg 1965) were included because as an on-line form there would be no one available to support students if the negative items prompted negative thoughts. It consists of six items.

For career development, only two sub-scales from the *Childhood Career Development Scale* (CDDS; Schultheiss & Stead, 2004), namely the *Key Figures* and *Time Perspectives* were included to avoid extending the time taken to complete the full CDDS. These consisted of five items and 4 items respectively.

See Table 17 for the set of measures used in the different phases of the research.

Table 17

Item numbers for the comparator scales for Phases 1, 2, 3 and 4

Scale	Items	Comparison measures	No of items	Total no of items
Phase 1				
Study 1	24	Vocational Outcomes & Expectations Scale (VOES)	12	44
CEDS-Senior		New General Self Efficacy Scale (NGSES)	8	
Study 2				
CEDS-Senior	24	Rosenberg Self Esteem Scale -Positive items (RSES-Positive Items)	6	39
		Childhood Career Development Scale (CDDS): Key Figures (5) and Time Perspectives (4)	9	
Phase 2				
CEDS-Tertiary VN	26	Career Futures Inventory (CFI)	9	43
		NGSES	8	
CEDS Senior VN	24	VOES	12	44
		NGSES	8	
Phase 3				
CEDS-Junior	21	RSES -Positive items	5	35
		CDDS: Key Figures (5) and Time Perspectives (4)	9	
CEDS-Primary	21	RSES -Positive items	5	35
		CDDS: Key Figures (5) and Time Perspectives (4)	9	

The items for each comparator measure are presented in Table 18.

Table 18

Items for each comparator measures

VOES

No	**Item** (*The Short Form (SF) is the first six items only)*
1	My career planning will lead to a satisfying career for me.
2	I will be successful in my chosen career/occupation.
3	The future looks bright to me
4	My talents and skills will be used in my career/occupation.
5	I have control over my career decisions.
6	I can make my future a happy one.
7	I will get the job I want in my chosen career
8	My career/occupation choice will provide the income I need
9	I will have a career/occupation that is respected in our society
10	1 will achieve my career/occupational goals.
11	My family will approve of my career/occupation choice.
12	My career/occupation choice will allow me to have the lifestyle that I want

NGSES

No	Item
1	I will be able to achieve most of the goals that I have set for myself
2	When facing difficult tasks, I am certain that I will accomplish them.
3	In general, I think that I can obtain outcomes that are important to me.
4	I believe I can succeed at almost any endeavour to which I set my mind
5	I will be able to successfully overcome many challenges
6	I am confident that I can perform effectively on many different tasks
7	Compared to other people, I can do most tasks very well.
8	Even when things are tough, I can perform quite well

RSES-Positive Items

No	Item
1	On the whole I am satisfied with myself
2	I feel like I have a number of good qualities
3	I am able to do things as well as most other people
4	I feel like I am a person of worth, at least on an equal plane with others
5	I have a positive attitude towards myself

Table 18 (continued)

CCDS-Key Figures	
No	Item
1	I want to do the same job as someone I look up to
2	I know people who I want to be like
3	I know people who have my favourite job
4	I know people who have very interesting jobs
5	I know people I look up to
CDDS-Time perspective	
No	Item
1	I think about the job I might have after I finish school
2	I think a lot about what I will be when I grow up
3	I think about where I will work when I'm grown up
4	It is important to plan now for what I will be when I grow up

2.16 Translated versions

CEDS-Tertiary and CEDS-Senior were translated into Vietnamese by expert staff of the Song An Career Development Social Enterprise (*Song An)* as described in Chapter 4 and presented in Appendix A. Similarly, the relevant comparator measures were also translated into Vietnamese and are presented in Appendix B

2.17 Published research

This research consisted of three phases of analyses for four separate scales which created the potential to publish a number of pieces of research. The three studies selected for publication were:

1. Establishing the 8-factor model for CEDS-Senior (Phases 1)
2. Establishing an 8-factor model for CEDS-Senior VN and CEDS-Tertiary VN (Phase 2)
3. Establishing a 3-factor solution for CEDS-Junior and CEDS-Primary (Phase 3).

The selected studies are represented in Table 19.

Table 19

Selection of three studies for publication

Scales	Phase 1	Phase 2	Phase 3
CEDS-Tertiary		*N* = 641	
CEDS-Senior	*N* = 567 *N = 272*	*N* = 1463	
CEDS-Junior			*N* = 462
CEDS-Primary			*N* =212

The research papers are presented in Chapters 3, 4 and 5 respectively and the final four scales are presented in Appendix C.

CHAPTER 3: PAPER 1 – A CAREER EDUCATION AND DEVELOPMENT FRAMEWORK AND MEASURE FOR SENIOR SECONDARY SCHOOL STUDENTS

3.1 Introduction

Paper 1 investigated whether the underlying framework (revised CEDF) which was used to guide the development of CEDS-Senior, translated into a measure which is an empirically valid and can be used with confidence by career practitioners and educators. The study utilised two cross-sectional samples of students (N = 567, N = 272) to investigate the psychometric properties of the measure. In both studies, Confirmatory Factor Analyses were used because the development of the CEDSs was based on a pre-determined eight-factor framework.

The two studies each found an acceptable eight-factor model consistent with the original design. Consistent results across grade levels and gender also indicated that the students could make sense of the constructs and vocabulary used and that the items held together to form a coherent scale. Strong correlations obtained with comparator measures indicated of the concurrent validity of CEDS-Senior.

Article

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A Career Education and Development Framework and measure for senior secondary school students

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Abstract
Career development learning is increasingly emphasized as a curricular strategy to prepare students for their post-compulsory school transitions to further study or employment. Educators require career development frameworks and resources to support students' reflective learning. The present research tested a hypothesized Career Education and Development Framework (CEDF) comprising eight factors: The understanding of self; opportunities; influences; goal setting; decision-making; taking action; reflecting/reviewing; and confidence. The hypothesized framework was tested by confirmatory factor analysis (CFA) using data from two independent studies with samples ($n = 567$, $n = 272$) of senior secondary school students from different schools and jurisdictions. In addition to acceptable overall fit, invariance testing revealed consistency across gender on most factors.

Keywords
Career assessment, career development, career education, secondary school students

While there is evidence of career education on students' learning and development (Berger et al., 2019; Hooley et al., 2011; Lapan et al., 1997; McWhirter et al., 2000; Whiston et al., 2017), successive reviews of career education in schools have been critical of the lack of a consistent curricular framework and learning resources (Education Council, 2020; Organisation for Economic Cooperation & Development, 2002). Gonski and Shergold (2021) stated, 'in the absence of help with career development, many students are at significant risk of embarking on educational or training courses they either fail to finish or take much longer to complete than is necessary' (p. 17). Furthermore, the Australian Government's stated vision is that "every school student will have access to high-quality career education" because it 'builds resilient individuals who can adapt to the evolving nature of work and manage multiple careers in their lifetime, according to their circumstances and need' (DEET, 2019, p. 5). These reviews necessitate research and development to improve career education in Australian schools. The present research provides the first evidence for a novel Career Education and Development Framework (CEDF) that may be deployed as a curricular conceptual framework and a self-report tool for use by senior secondary school teachers and students.

Initial development of the CEDF

Career development has been defined by the Career Industry Council of Australia (CICA, 2007, p. 27) as, 'the process of managing life, learning, work, leisure and transitions across the lifespan in order to move towards a personally determined future'. The definition for career education adopted by the Australian Education Council in 1992 and slightly modified in the more recent Australian Government National Career Education Strategy (DEET, 2019: 3) is, 'The development of skills, attitudes and understanding through a planned programme of learning experiences in education and training settings that assist students to make informed

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decisions about school and post-school options and directions, to enable effective participation in working life.'

There have been three career education frameworks in Australia during the past 40 years prior to the CEDF that is the foundation of the present research. In 1992, the national working party delivered the document *Career Education in Australian Schools: National Goals, Students, School and System Outcomes and Evaluative Arrangements* (AEC, 1992). The curriculum framework adopted was based on four distinct but interrelated student tasks proposed in the United Kingdom in 1977 by Law and Watts (1977, p. 8), 'in our view there are four career education tasks to be accomplished with each student facilitating the development respectively of self-awareness, opportunity awareness, decision learning and transition learning'. To date, the framework has not been tested empirically.

In 2003, the Ministerial Council for Employment, Education, Training and Youth Affairs (MCEETYA) commissioned the company, Miles Morgan, to develop a new framework based predominantly on the Canadian Blueprint for Life/Work Designs (Patton, 2019). The framework adopted a modified form of the three learning areas and the 11 competencies from the Canadian version which were an adaptation of the original American version of the framework. It was named the Australian Blueprint for Career Development (ABCD; MYCEETYA, 2010) and has been revised by the National Careers Institute (NCI, 2022). Hooley et al. (2012), note that 'the different versions of the Blueprint have not been derived from any empirical analysis of the process of career management' (p. 5) and 'if the model is to influence policy-makers in a sustained way, it is important that this kind of empirical work is undertaken' (p. 13). Despite strong encouragement from the federal government, neither the AEC nor ABCD was adopted by the jurisdictions responsible for its implementation, the individual State Departments of Education (Patton, 2019).

The third career education curriculum framework is the Victorian Careers Curriculum Framework (VCCF; DET, 2021) which is based on the ABCD but changed the three learning areas to three stages, the 11 competencies to 15 learning outcomes and the career learning model to one of six steps. To date the framework has not been tested empirically.

The CEDF is the fourth framework. This framework was initially developed by six career practitioners, with a combined experience of over 50 years in the industry, for use with individuals in career planning sessions McAlpine and McCowan (2007). McCowan and Nguyen (2014) subsequently modified the framework to become a curricula framework that included three understanding elements (self, opportunities and influences) and four action elements (goal setting, decision-making, taking action and reflecting/reviewing). McCowan et al. (2017) used the CEDF to develop a comprehensive set of aims and student competencies for different stages of schooling as well as over 40 example lesson plans across years 7 to 12.

Career constructs

The CEDF needed to be aligned with relevant theory and research. Numerous career theorists over time have identified through their respective research, the career and vocational constructs in common use in the careers field (Larson et al., 2013; Lent & Brown, 2006; Swanson & D'Archiardi, 2005). Their lists of constructs in common use are representative and allow comparisons to be made with the components and constructs of the CEDF.

Researchers such as Lent and Brown (2006) and Rottinghaus and Miller (2013) assembled their lists of commonly used constructs into integrated frameworks based on theories such as the Social Cognitive Career Theory (SCCT) of Bandura (1977, 1986) and Integrated Personality Theory (IPT) of Barenbaum and Winter (2008), respectively. Marciniak et al. (2020b) conducted a comprehensive review of the use of career development constructs such as, career maturity, career readiness and career adaptability that have been used to measure career preparedness which they define as 'The attitudes, knowledge, competencies and behaviours necessary to deal with expected and unexpected career transitions and changes' (Marciniak et al., 2020b, p. 2). Based on their review, they developed an organizing framework that resembles those earlier frameworks by Lent and Brown (2006) and Rottinghaus and Miller (2013) but also included an emphasis on Career Construction Theory (CCT; Savickas, 2005).

Revised CEDF

After examination of the 17 constructs revealed by Larson et al. (2013), 16 have corresponding constructs in the CEDF, with much overlap occurring, but the construct of optimism/confidence was not contained in the CEDF. Consequently, an eighth construct/factor Confidence was added to the revised CEDF to be tested in the presented research.

The core components of career preparedness derived by Marciniak et al. (2020b) reflect the major components of the revised CEDF namely: Understandings (knowledge/competencies), actions (behaviours) and attitudes (attitudes). These components also reflect the 'development of skills, attitudes and understanding' stated in the national definition of career education (DEET, 2019, p. 3). The framework was amended to accommodate the concepts used in the revised CEDF and the modified form is presented in Figure 1. Note that this model has been influenced by the Systems Theory Framework (STF) of career (Patton & McMahon, 2014) in that the predictors, influencers, components and outcomes all come together to form a dynamic system.

The revised CEDF incorporates activities and learning that transcend other areas of student development and learning, as it not only contains a cognitive function, but also behavioural, physical and psycho-social functions. Students not only require awareness of their own personal

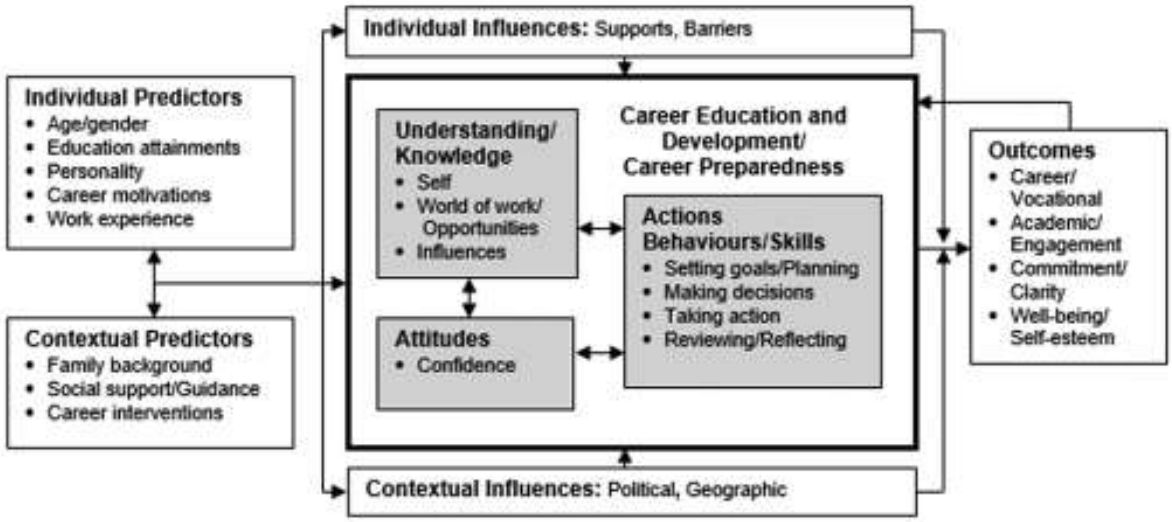

Figure 1. Conceptual model of the Career Education and Development Framework (CEDF) adapted from Marciniak et al. (2020b).

values and the ability to self-assess, but also need to know how to obtain accurate knowledge of the world of work and relevant opportunities. They also need the capacity to make sound choices, if they are to ensure successful applications and transitions beyond compulsory schooling. Moreover, students need to learn from these actions and choices. All this happens in the context of the predictors, influences, barriers and outcomes of the outer subsystem of the revised CEDF.

Indicators of the CEDF factors

For schools introducing a career education and development programme based on the revised CEDF, a self-report tool is needed to assist in determining the students' career understandings, actions and attitudes in accordance with the inner components of the revised CEDF. The self-report results could be used to assist individual students better understand their own career development. The same measure could be given before and after any career curriculum intervention to establish if a student's level of career development had advanced as a result of the intervention and establish the value of the intervention in a similar way that Berger et al. (2019) used the Career Decision-Making Self-Efficacy Scale (CDMSES). The results from the scale scores could also be used in a career curriculum intervention or target the intervention to one or more of the three components and/or the eight constructs of the revised CEDF.

Although research has shown that career development is most meaningful when it is integrated with curricula (Hooley et al., 2011; Lapan et al., 1997), career measures tend not to reflect curriculum frameworks that educators have developed to guide their career education and development programmes and practices. Instead, measures tend to focus on specific vocational and career constructs which are being addressed within programmes and practices such as self-esteem (Rosenberg, 1965); self-efficacy (Chen et al., 2001); work values (Pryor, 1983); career decision-making self-efficacy (Betz et al., 1996); decision difficulties (Gati et al. 1996; Sampson et al., 1996); career adaptability (Savickas & Porfeli, 2012); career exploration (Stumpf et al., 1993); career interests (Athanasou, 1988); and outcomes and expectations (McWhirter et al., 2000).

An exception to this trend is the Career Resources Questionnaire-Adolescents (CRQ-A) developed by Marciniak et al. (2020a) for use with adolescents, which was adapted from the adult Career Resources Questionnaire and based on their work with adolescents on career preparedness. However, CRQ-A was developed in a country where the major educational course decision is made in Grade 9 (aged 14 years) and consequently, the key construct of career decision-making is not included in their measure. Another exception is the measure developed in the United Kingdom by Dodd et al. (2021), the Student Career Readiness Index (SCRI) which is a single-factor scale based on a blend of existing career development frameworks and the CDMSES (Betz et al., 1996). They developed this single-factor measure to ascertain the impact that the career education and development programmes had as a result of the increase in career education generated by the introduction of the Gatsby Benchmarks (Dodd et al., 2021).

Some of the commonly used measures have multiple domains of focus, such as the Childhood Career Development Scale (CCDS; Stead & Schultheiss, 2010) based on the Career Development Theory of Super (1990). The CCDS contains 52 items and includes 8 dimensions from Super's model (1990) but not 3 of the constructs included in the more recently developed, revised CEDF, namely influences, decision-making and reviewing/reflecting. The Career Development Inventory, Australian, Short Form (CDI-A-SF; Creed & Patton, 2004) includes measures of self-understanding, knowledge of the world of work, decision-making, career development attitude and some aspects of taking action but not three of the constructs

in the revised CEDF (i.e. understanding influences, goal setting and reviewing/reflecting).

This brief overview shows that researchers can draw on a breadth of measures that assess various facets of CED. However, this means that there can be much overlap in career constructs sometimes causing confusion; many constructs can be assessed using different measures indicating a lack of consensus on how constructs can be operationalized; many measures assess a targeted dimension (e.g. attitudes), while omitting other relevant facets (e.g. behaviours); and no existing measure captures a sufficiently broad set of the revised CEDF components of understanding, actions and attitudes. As a result of disparate measures, a range of measures would be needed by researchers and practitioners to assess the breadth of CED (Marciniak et al., 2020b).

Present research

The present research involved two studies to test the hypothesized CEDF's eight factors: The understanding of self, opportunities and influences; the behaviours of goal setting; decision-making; taking action; reflecting/reviewing; and the attitude of confidence. The aim of Study 1 was to conduct the initial test of the hypothesized CEDF, its eight factors and their three manifest indicators. The aims of Study 2 were to test the model again with a different sample of students and to explore correlations between its factors and measures of self-efficacy and outcome expectations.

Study 1

Method

Participants. The sample for Study 1 was $n = 567$ students from Grades 10, 11 and 12 (aged 15, 16 and 17, respectively) in four non-government schools across Australia. Participation by girls was $n = 238$ (42%) while participation by boys was $n = 329$ (58%). Participation by school grade was Grade 10, $n = 299$ (53%); Grade 11, $n = 214$ (38%); and Grade 12, $n = 54$ (9%). Participation was spread across the four schools: School 1, a provincial school in inland Queensland had $n = 134$ (24%) participants; School 2, a provincial school in coastal Queensland had $n = 215$ (38%) participants; School 3, a rural school in central-western New South Wales had $n = 104$ (18%) participants; and School 4, a suburban school in Adelaide, South Australia, had $n = 114$ (20%) participants. The Index of Community Social-Educational Advantage (ICSEA; ACARA, 2020) values for the respective schools are, 1019, 1041, 1070 and 1078 which indicates that the four schools have ICSEA values that are close to the Australian ICSEA value of 1000.

Measures

Development of the CEDS-Senior. An empirical representation of the CEDF was constructed as the Career Education and Development Scale-Senior (CEDS-Senior). The scale's development used a similar process to the six steps recommended by Dodd et al. (2021), namely: Identification of outcomes and review of existing measures; mapping of frameworks and generation of items; expert review; cognitive testing with the intended users; gathering pilot data and exploring the factor structure; and using confirmatory factor analysis (CFA) to finalize the instrument.

The items used in a selection of extant instruments (viz. Career Exploration Survey, Stumpf et al., 1993; Career Thoughts Inventory, Sampson et al., 1996; and CDI-A-SF, Creed & Patton, 2004)were examined and allocated in a revised form to one of the eight constructs of the revised CEDF. For example, the item relating to 'How much time and thought have you given to choosing subjects and choosing a career in general?' from Study 1 section of the CDI-A-SF (Creed & Patton, 2004) was amended to become the item 'I usually consider my course/career options carefully before making decisions'.

The other items reflected the aims competencies and lesson content in the revised CEDF. For example, in a study by McCowan et al. (2022, p. 111), the activity suggested for Goal Setting for Grade 10 was, 'To set short/medium/long term career goals' which translated to item, 'My career/course plans contain short-, medium- and long-term goals'. Likewise, the activity suggested for Opportunities for Grade 11 McCowan et al. (2022, p. 112) was 'To identify all likely post-school pathways', translated to the item; 'I have a good understanding of the many different career pathways open to me'.

Drafts of the list of items were forwarded to three school-based career practitioners who were each asked to conduct interviews with three parents and lead a focus group with a cross-section of five, age-appropriate students for comment on the suitability and readability of the items in a draft version of the CEDS-Senior as a fair representation of the CEDF. Modifications were based on the collated comments from the parents. For example, the draft item; 'I have a good understanding of the thinking of my parents in relation to future courses or careers which might suit me', was amended to 'I have a good understanding of my parent's views regarding future course/careers that might interest me'. Revisions were also made based on the collated comments from the students. For example, an item changed from, 'I am able to construct a high-quality resume and cover letter' to 'I am able to construct a competitive resume and cover letter'.

The CEDS-Senior with its 24 items representing the 8 factors of the revised CEDF is listed in Table 1 in the Results section as the table also includes factor loadings for each item. A consistent 5-point Likert-type scale was used throughout the CEDS-Senior. Participants responded to a 5-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5). Higher scores in each of the subscales are reflective of the student's perception of his or her capability to perform the tasks pertinent to that subscale.

Table 1. Items and their standardized factor loadings for study 1 and study 2.

Item	Item text	Factor loading	
		Study 1	Study 2
sel1	I have a good understanding of my interests and how they might relate to future courses or careers	.82	.88
sel2	I have a good understanding of my personal strengths and abilities	.72	.78
sel3	I am aware of the subject(s) which I like or do well in and how it/they might relate to future courses or careers	.65	.83
inf1	I have a good understanding of my parent's views regarding future courses and careers that might interest me	.60	.68
inf2	I understand the importance of making course/career decisions which are mine and not influenced by my friends or social media.	.59	.75
inf3	I understand the importance of making course/career decisions which are mine but are done with help from teachers and parents	.63	.82
opp1	I have a good understanding of the world or work and future careers options	.70	.79
opp2	I have a good understanding of the range of subjects/courses which are available for me to study and where they might lead in terms of careers.	.79	.86
opp3	I have a good understanding of the many different career pathways open to me.	.81	.87
goa1	I have set myself clear and achievable course/career goals	.77	.84
goa2	I have developed a career plan for myself	.86	.91
goa3	My course/career plans contain short, medium and long-term goals	.83	.86
dec1	I am good at making sound career/course choices and decisions.	.74	.83
dec2	I am able to seek detailed course and career information to assist me make good decisions.	.73	.84
dec3	I usually consider my course/career options carefully before making decisions	.68	.80
act1	I am able to construct a competitive resume and cover letter.	.73	.72
act2	I can competently complete job/course/career-related applications.	.85	.87
act3	I am able to locate appropriate information on entry prerequisites for jobs and/or courses of further study.	.65	.84
ref1	I review my course/career plans approximately every 6 months.	.77	.85
ref2	I regularly check course/career information to see if there are any changes relevant to my course/career planning.	.86	.84
ref3	I have developed appropriate back-up plans if my first choice doesn't eventuate.	.62	.76
con1	I know what steps I need to take to progress my course/career planning	.78	.87
con2	I feel confident that I have a good idea of what course/career direction(s) or pathway(s) I want to take.	.79	.87
con3	I am confident that I will have a successful future.	.53	.73

act: taking action; con: confidence; dec: decision-making; goa: goal setting; inf: understanding influences; ref: reflecting/reviewing; opp: understanding opportunities; sel: understanding self.

Procedure. Ethics approval was sought from and granted by the Human Research Ethics Committee (HREC) of the University of Southern Queensland [Approval No. H18REA258] and the parents association and management team of each of the four schools involved across Australia. Sufficient paper copies of the CEDS-Senior were posted to the career guidance counsellor in each school to enable all students in Grades 10, 11 and 12 to participate if they had appropriate parental permission. The school guidance counsellors in each school held training sessions with the relevant teachers on how to administer the scale. Alternative arrangements were made by each school for non-participants but these were not needed as all students had the appropriate parental permissions and were willing to participate. The teachers who agreed to participate administered the scale within class time and collected the completed scales which were posted back for data entry. Teachers reported the average time to complete the scale was approximately 10 minutes.

Plan for analysis. The aim of the research was to test a hypothesized model (Hurley et al., 1997; Kahn, 2006). We subjected the hypothesized 8 correlated factors model comprising 24 items (with 3 items per factor and all factors with covariances) to CFA using IBM SPSS AMOS V18 (Arbuckle, 2009) with maximum likelihood estimation. To appraise fit of the models, we used chi-square test, $\chi^2/df < 3$, and a combination of CFI > .90, RMSEA < .10 and SRMR < .08 (Mvududu & Sink, 2013) and used $\Delta\chi^2$ and $\Delta CFI \leq .01$ to compare models (Cheung & Rensvold, 2002). First, we tested the model with all cases of data to explore overall fit, then tested models for males and females separately, and then tested for model invariance across gender.

Results

Model fit. First, we tested the hypothesized eight correlated factors model and found acceptable fit to the data with all cases used, $\chi^2(df) = 716.575$ (224), $\chi^2/df = 3.199$, CFI = .924, SRMR = .061, RMSEA = .062 (.057, .067). The factor loadings for each of the 24 items are presented in Table 1. All items' loadings on their respective factors were acceptable and ranged from .52 to .86. Analysed separately for gender, the model for boys had acceptable fit, $\chi^2(df) = 515.412$ (224), $\chi^2/df = 2.301$, CFI = .927, SRMR = .063, RMSEA = .063 (.056, .070).

Similarly, the model for girls had acceptable fit, χ^2(df) = 464.046 (224), χ^2/df = 2.072, CFI = .906, SRMR = .069, RMSEA = .067 (.059, .076). The CFI value for girls' model was evidently lower than that for boys' model; nonetheless, overall, the models were acceptable.

Next, we tested for invariance between the genders. Table 2 shows the indices of fit. Configural invariance (M1) was evident in acceptable model fit. We used the AMOS multigroup function (Gaskin, 2022) to test for metric invariance and found acceptable fit (M2) on the χ^2/df, CFI, SRMR and RMSEA indices. Although there was a significant difference between the unconstrained (M1) and constrained (M2) models using the $\Delta\ \chi^2$(df) test, the ΔCFI = .003 was less than .01 criterion (Cheung & Rensvold, 2002). We explored potential sources of variance by comparing items' regression weights for boys and girls. The constraints for items 21 (M3), 20 (M4) and 18 (M5) were sequentially removed because their differences were relatively high. All models had acceptable fit; however, the final model (M5) with no constraints on items 20 and 21 on the Reflection factor and 18 on Action, was not significantly different from the configural model (M1) using the $\Delta\chi^2$(df) test and ΔCFI ≤ .01 criterion (Cheung & Rensvold, 2002). These alternative restrictive models were not superior in fit compared to the initial metric model (M2) and therefore made no amendments to the model. We concluded that the model evinced partial metric invariance in this sample. We then tested for scalar invariance and the models for intercepts (M6) and covariances (M7) had acceptable fit on the χ^2/df, CFI, SRMR and RMSEA indices. The $\Delta\ \chi^2$(df) test between the metric (M2) and scalar model was significant for M6 and M7, their respective ΔCFI values were indicative of diminished fit. To be thorough, given items' 18, 20 and 21 had an influence on the metric model, we explored their influence on the scalar models with the constraints removed. Similarly, the intercepts (M8) and covariances (M9) models had acceptable fit with the partial metric invariance model (M5) as the comparator. We, therefore, concluded the model evinced partial scalar invariance in this sample.

Table 3 reports the descriptive statistics, coefficients for internal consistency, correlations, skewness and kurtosis for the subscales. Table A1 in the Supplemental Appendix shows the items' intercorrelations.

Differences between grades and genders. Differences between the mean scores for the eight factors across Grades 10, 11 and 12, and the genders are presented in Table 4. Students in Grade 11 had a slightly lower mean score for Goals. There are trivial differences between the means scores, Influences, Goals, Reflect and Confidence for boys and girls. The low percentage of participants from Grade 12 means that this data much be treated with caution and further investigation is needed.

Summary. The CFA found an acceptable eight-factor model congruent with its original design and conceptual foundations. The CEDS-Senior was consistent across the three grade levels which mean that it has similar properties and can be used with students across Grade 10, Grade 11 or Grade 12. There initially appeared to be minor differences between genders in some factors but these proved to be statistically insignificant. Of note, due to the low participation by Grade 12 students, the data about grade level differences needs to be treated with caution. Having established the initial model and tested for its invariance, we then proceeded to retest the model in a separate data set.

Study 2

There were two aims for Study 2. The first aim was to determine if the model could be recovered from a separate data set from senior secondary students from a set of government schools. The second purpose was to determine the concurrent validity of the model by comparing its

Table 2. Measurement invariance for study 1 (n = 567).

Model	χ^2(df)	χ^2/df	CFI	SRMR	RMSEA (90% CI)	Compare	ΔCFI	$\Delta\ \chi^2$(df)
M1: configural	979.458 (448)*	2.186	.919	.063	.046 (.042, .050)	–	–	–
M2: metric	1014.742 (464)*	2.187	.916	.064	.046 (.042, .050)	M1	−.003	35.222 (16)*
M3: partial metric (no constraints on 21)	1014.114 (463)*	2.169	.919	.063	.045 (.042, .049)	M1	.000	34.656 (15)*
M4: partial metric (no constraint on 21, 20)	1009.632 (462)*	2.185	.916	.065	.045 (.042, .049)	M1	−.003	30.174 (14)*
M5: partial metric (no constraints on 21, 20, 18)	995.676 (461)*	2.160	.918	.062	.045 (.041, .049)	M1	−.001	16.219 (13)
M6: scalar intercepts	1083.026 (488)	2.219	.909	.063	.046 (.043, .050)	M2	−.010	68.284 (24)*
M7: scalar covariances	1143.691 (524)	2.183	.905	.071	.046 (.042, .049)	M2	−.014	128.948 (60)*
M8: scalar intercepts (no constraints on 21, 20, 18)	1063.601 (485)*	2.187	.912	.063	.046 (.043, .050)	M5	−.006	67.924 (24)*
M9: scalar covariances (no constraints on 21, 20, 18)	1131.994 (521)*	2.173	.907	.070	.046 (.042, .049)	M5	−.009	136.317 (60)*

*p < .05.
M: multigroup model.

Table 3. Measures' descriptive statistics, alpha reliability coefficients, skewness, kurtosis, standard error and scale score correlations in study 1 ($n = 567$).

Measure	1	2	3	4	5	6	7	8
1. SEL	.77							
2. INF	.46	.62						
3 OPP	.58	.40	.81					
4. GOA	.51	.26	.54	.86				
5. DEC	.54	.50	.57	.59	.76			
6. ACT	.32	.33	.40	.30	.45	.78		
7. REF	.39	.18	.48	.62	.48	.34	.78	
8. CON	.66	.38	.62	.70	.63	.38	.55	.74
M (SD)	3.87 (.73)	4.15 (.66)	3.76 (82)	3.11 (1.07)	3.61 (.81)	3.77 (.82)	2.76 (1.27)	3.63 (.91)
Skewness	−.72	− 84	−.63	−.21	− .42	− .67	.11	− .64
Kurtosis	.59	.89	.13	−.79	− .16	.47	− .66	.03

Note: Internal consistency coefficients Cronbach's alpha are shown on the diagonal.
All coefficients are statistically significant, $p < .01$.
ACT: taking action; CON: confidence; DEC: decision-making; GOA: goal setting; INF: understanding influences; REF: reflecting/reviewing; OPP: understanding opportunities; SEL: understanding self.

Table 4. Means and difference measures for grades and gender in study 1 ($n = 567$).

	Grade					Gender			
	10	11	12			Boys	Girls		
Factor	M (SD)	M (SD)	M (SD)	*F*	*p*	M (SD)	M (SD)	*t*	*p*
Self	3.87 (.69)	3.88 (.79)	3.87 (.76)	.00	.99	3.90 (.74)	3.85 (.71)	.86	.39
Influences	4.14 (.68)	4.18 (.64)	4.12 (.61)	.39	.68	4.11 (.66)	4.22 (.66)	−1.99	.05
Opportunity	3.81 (.79)	3.69 (.86)	3.76 (.85)	1.22	.30	3.80 (.82)	3.70 (.83)	1.50	.13
Goals	3.19 (1.00)	2.98 (1.33)	3.27 (1.16)	2.94	.05	3.20 (1.10)	2.99 (1.02)	2.28	.02
Decisions	3.67 (.80)	3.52 (.84)	3.65 (.70)	2.24	.12	3.63 (.78)	3.57 (.84)	.87	.38
Actions	3.80 (.80)	3.79 (82)	3.67 (.88)	.53	.59	3.78 (.80)	3.78 (.84)	.02	.98
Reflect	2.84 (.98)	2.68 (1.09)	2.70 (.99)	1.74	.18	2.85 (1.05)	2.66 (.97)	2.21	.03
Confidence	3.69 (.84)	3.55 (.98)	3.59 (1.00)	1.57	.21	3.71 (.91)	3.52 (.91)	2.51	.01

results with two other well-established and related measures of self-efficacy and outcome expectations.

Method

Participants. Study 2 involved students from Grades 10, 11 and 12 in five schools within a large education jurisdiction in Australia. Of the 374 students who responded online, 102 were deemed unsuitable because of incompletion, leaving a sample size of $n = 272$. Participation by girls was $n = 143$ (52%) while participation by boys was $n = 129$ (47%). Participation by school grade was Grade 10, $n = 50$ (18%); Grade 11, $n = 198$ (72%); and Grade 12, $n = 29$ (10%). Participation was spread across five schools: School 1, $n = 164$ (59%; ICSEA = 977); school 2, $n = 93$ (34%; ICSEA = 984); school 3, n = 6 (2%; ICSEA = 1011); school 4, n = 13 (5%; ICSEA = 1027); and school 5, n = 1 (ICSEA 1062). The two schools with the largest number of participating students had ICSEA values that were just under the Australian average value of 1000.

Measures. The CEDS-Senior was used again for Study 2. In order to determine the concurrent validity of the CEDS-Senior, two comparison instruments were added for Study 2. The instruments were selected on the basis of being age appropriate, attempting to measure a similar aspect of the revised CEDF and being relatively short in length. The two measures chosen for comparison purposes were the New General Self-Efficacy Scale (NGSES) (Chen et al., 2001) and the revised form of the Vocational Outcomes Expectations – revised form (VOE; McWhirter et al., 2000, Metheny & McWhirter, 2013).

The NGSES. The NGSES (Chen et al., 2001) is an 8-item measure of self-efficacy or being able to successfully execute behaviour required to produce the required outcome (Bandura, 1977; Bandura, 1986). Participants respond to a 5-point Likert scale ranging from *strongly agree* (5) to *strongly disagree* (1). Sample items include, 'In general, I think I can obtain outcomes that are important to me,' and 'I will be able to achieve most of the goals that I have set for myself.' Higher scores are reflective of higher self-efficacy. Chen et al. (2001) found that the NGSES demonstrated high reliability and high content and predictive validity. For example, the principal components analysis yielded a single factor

solution on three separate occasions ($\alpha = 0.87$, 0.88 and .085, respectively) and the test–retest reliability coefficients for the NGSES were high, $r_{t1\_t2} = 0.65$, $r_{t2\_t3} = 0.66$ and $r_{t1\_t3} = 0.62$. The NGSES was found to be theory based, unidimensional, internally consistent and stable over time (Chen et al., 2001). The work of Alexopoulos and Asimakopoulou (2009) found good psychometric properties when used with a range of 531 Greek students aged around 12 years, indicating its suitability for use with the younger students in this study.

The VOE. The revised form of the VOE (McWhirter et al., 2000, Metheny & McWhirter, 2013) is a 12-item measure of participant's perceptions of their ability to accomplish career aspirations. Participants respond to 5-point Likert scale ranging from *strongly agree* (5) to *strongly disagree* (1). Sample items include, 'My career planning will lead to a satisfying career for me,' 'I have control over my career decisions,' and 'The future looks bright for me.' Higher scores are reflective of higher vocational expectations. Evidence of adequate internal consistency, test–retest reliability and concurrent validity of the measure for high school samples is reported by McWhirter et al. (2000) and Metheny and McWhirter (2013). For example, test–retest reliability over 9 weeks yielded a coefficient $r = 59$ and an internal consistency reliability of Cronbach's $\alpha = 0.83$, and in a subsequent study an $\alpha = 0.93$ was obtained.

Procedure. An amendment to the original ethics approval was granted from the HREC of the University of Southern Queensland [Approval No. H18REA258-v3] and from the senior research officer of a major educational jurisdiction in Australia. The CEDS-Senior was set up as an online scale within the secure environment of a university data management system. The relevant coordinator for the jurisdiction involved, invited schools to participate and provided training and access for the relevant person in each of the schools which agreed to participate. The online version of CEDS-Senior was accessible for 3 months and students who had appropriate parent permission were able to access the scale at any time during that period. Access closed in mid-December 2020 and the data were examined for full completions. The scales took approximately 8 minutes for students to complete online.

Results

Similar to Study 1, we tested the hypothesized eight correlated factors model and found acceptable fit to the data with all cases used, $\chi^2(df) = 462.902$ (224), $\chi^2/df = 2.067$, CFI = .952, SRMR = .049, RMSEA = .062 (.054, .070). Analysed separately for gender differences, the model for boys had acceptable fit, $\chi^2(df) = 383.421$ (224), $\chi^2/df = 1.712$, CFI = .928, SRMR = .059, RMSEA = .075 (.062, .087). Similarly, the model for girls had acceptable fit, $\chi^2(df) = 431.911$ (224), $\chi^2/df = 1.928$, CFI = .928, SRMR = .059, RMSEA = . 081 (.069, .092). The factor loadings for each of the 24 items are presented in Table 1.

We then tested for invariance between models for boys and girls. Indices of fit are shown in Table 5. The model for configural invariance (M1) had acceptable fit. AMOS multigroup labelling function (Gaskin, 2022) was used for testing metric invariance (M2). Again, the fit was acceptable for M2. Furthermore, there was not a significant difference between the unconstrained and constrained models, χ^2_{diff} (24) = 20.424, $p = .672$ and the ΔCFI was in favour of the constrained model. As with Study 1, for consistency's sake, we explored differences in regression weights to detect items with relative differences. Again, items 20 and 21 on the Reflection factor had relatively higher differences. Removal of their constraints revealed a model with acceptable fit, $\chi^2(470) = 829.668$, $\chi^2/df = 1.765$, CFI = .928, RMSEA = .053, CI 90% [.047, .059]. Again, the configural and amended metric model (i.e. 20, 21 unconstrainted) was not significantly different, χ^2_{diff} (21) = 14.337, $p = .889$ and ΔCFI = +.002, which is less than the .01 criterion (Cheung & Rensvold, 2002). In summary, the M2 and amended M3 revealed metric invariance in this sample. Testing for scalar invariance revealed significant differences between M2 and M4 (intercepts) and M5(covariances). Removal of equivalence constraints on the intercepts of items 20 and 21 produced models that were not

Table 5. Measurement invariance for study 2 ($n = 276$).

Model	χ^2(df)	χ^2/df	CFI	SRMR	RMSEA (90% CI)	Compare	ΔCFI	Δ χ^2(df)
M1: configural	815.331 (448)	1.820	.928	.059	.055 (.049, .061)	–	–	–
M2: metric	835.755 (472)	1.771	.929	.063	.054 (.048, .059)	M1	+.001	20.424 (24)
M3: metric (no constraints on 20, 21)	829.668 (470)	1.765	.930	.059	.053 (.047, .059)	M1	+.002	14.337 (22)
M4: scalar intercepts	873.917 (496)	1.762	.926	.060	.053 (.047, .059)	M2	.002	38.1622 (24)*
M5: scalar covariances	906.237 (524)	1.729	.925	.066	.052 (.046, .058)	M2	.004	70.481 (60)*
M6: scalar intercepts (no onstraints 21, 21)	861.592 (492)	1.751	.928	.059	.053 (.047, .059)	M2	.000	31.924 (22)
M6: scalar covariances (no constraints 21, 21)	894.386 (520)	1.720	.927	.063	.052 (.046, .057)	M2	.002	64.718 (50)

*p < .05.
M: multigroup model.

significantly different from the metric baseline M2, for M6, χ^2_{diff} (22) = 31.924, p = .079 and for M7, χ^2_{diff} (50) = 64.718, p = .079. Therefore, we concluded that the model/framework evinced partial scalar invariance on the Reflection factor.

Correlations. As in Study 1, the CEDS subscales correlated moderately with one another. The self-efficacy scale (NGSES), correlated strongly with each of the eight components of the revised CEDF with the coefficients ranging from 0.50 to 0.74. Similarly, the revised outcomes and expectations scale (VOE), also correlated very strongly with each of the eight constructs/factors of the revised CEDF with the coefficients ranging from 0.53 to 0.83 as shown in Table 6. These strong correlations with the two comparator measures provided evidence of the concurrent validity of the CEDS-Senior. Table A2 in the Supplemental Appendix shows the items' intercorrelations.

Differences between grades and the gender. Differences between the mean scores for students in Grades 10, 11 and 12 and for boys and girls are presented in Table 7. As in Study 1, students in Grade 11 had lower scores on some factors than those in Grades 10 and 12 but these were not statistically significant. The low percentage of participants from Grade 12 means that this data must be taken with caution and further investigation is needed.

Discussion

The CEDF was developed as a conceptual curricular framework for career education. The CEDF was derived from practitioner experience, as well as the theoretically and empirically based model of Marciniak et al. (2020b). The CEDS-Senior was developed to empirically represent the eight constructs of the CEDF. The present findings support the revised CEDF and CEDS-Senior. Both studies' CFAs found an acceptable eight-factor model consistent with its original design, and which was

Table 6. Measures' descriptive statistics, alpha reliability coefficients, skewness, kurtosis, standard error and scale score correlations in study 2 (n = 276).

Measure	1	2	3	4	5	6	7	8	9	10
1. SEL	.87									
2. INF	.65	.78								
3 OPP	.70	.59	.87							
4. GOA	.67	.44	.62	.90				/		
5. DEC	.72	.60	.78	.73	.86					
6. ACT	.51	.45	.63	.44	.60	.85				
7. REF	.48	.36	.48	.72	.61	.41	.85			
8. CON	.73	.53	.69	.79	.76	.56	.69	.86		
9. SE	.66	.53	.65	.57	.70	.58	.50	.74	.95	
10. OE	.76	.64	.74	.70	.77	.60	.53	.83	.80	.96
M (SD)	3.55 (.91)	3.80 (.86)	3.53 (.90)	3.06 (1.08)	3.35 (.90)	3.39 (.87)	2.77 (1.00)	3.29 (1.03)	3.46 (.87)	3.56 (.86)
Skewness	−.83	−1.09	−.76	−.23	−.45	−.38	.03	−.48	−.57	−.79
Kurtosis	.89	1.82	.84	−.49	.25	.41	−.59	−.25	.56	1.27

Note: Internal consistency coefficients Cronbach's alpha are shown on the diagonal.
All coefficients are statistically significant, p < .01.
ACT: taking action; CON: confidence; DEC: decision-making; GOA: goal setting; INF: understanding influences; REF: reflecting/reviewing; OE: outcomes expectations; OPP: understanding opportunities; SEL: understanding self.

Table 7. Means and difference measures for grades and gender in study 2 (n = 276).

	Grade					Gender			
	10	11	12			Boys	Girls		
Factor	M (SD)	M (SD)	M (SD)	F	p	M (SD)	M (SD)	t	p
Self	3.78 (.80)	3.49 (.93)	3.57 (.94)	2.07	.13	3.60 (.89)	3.51 (.94)	−.79	.43
Influences	3.93 (.87)	3.75 (.84)	3.98 (.93)	1.52	.22	3.78 (.87)	3.80 (.86)	.17	.86
Opportunity	3.69 (.87)	3.47 (.93)	3.69 (.70)	1.69	.19	3.61 (.86)	3.47 (.95)	−1.23	.22
Goals	3.27 (1.16)	2.97 (1.08)	3.32 9.89)	2.48	.09	3.08 (1.05)	3.07 (1.12)	−.04	.97
Decisions	3.49 (.87)	3.27 (.93)	3.61 (.72)	2.61	.08	3.36 (.88)	3.33 (.94)	−.30	.76
Actions	3.38 (.85)	3.38 (.91)	3.44 (.52)	.06	.95	3.37 (.88)	3.39 (.88)	.18	.86
Reflect	2.84 (1.12)	2.70 (.97)	3.18 (.99)	3.12	.05	2.76 (.92)	2.81 (1.09)	.39	.69
Confidence	3.62 (1.03)	3.18 (1.02)	3.43 (.99)	4.01	.02	3.43 (1.00)	3.16 (1.06)	−2.14	.03
Self-efficacy	3.70 (.95)	3.38 (.86)	3.63 (.70)	3.26	.04	3.56 (.86)	3.39 (.88)	−1.62	.11
Outcomes and expectations	3.83 (.93)	3.47 (.85)	3.68 9.72)	3.96	.03	3.67 (.84)	3.47 (.89)	−1.95	.05

sustained in the two independent data sets. Students across a range of schools indicated consistently that they could make sense of the constructs and vocabulary used in the CEDS-Senior and that the 24 items in the eight factors held together to form a coherent scale.

Having access to this holistic measure supports the integration of CED into a school's provisioning for career development learning. In a crowded curriculum, and with enormous demands made upon them, teachers require resources to alleviate these pressures while attempting to implement important career education and development programmes (Hooley et al., 2011; Mann et al., 2020). The CEDS-Senior has the capacity to provide them with a holistic and economical measure by which to provide students with a self-report mechanism to help them understand their career development; identify areas for attention and further development; provide evidence of the value of an intervention; and facilitate participation by teachers and career practitioners in evidence-based practice. For those schools using the revised CEDF, students' scores on the CEDS-Senior could be used to directly identify areas of strengths and weaknesses in their programme enabling them to review and address them.

The presence of relative similarities and, conversely, relatively few significant differences, among the mean scores of students in Grades 10, 11 and 12, and boys and girls, suggest that the CEDS-Senior has the potential to be used across and between the three grades across genders. The responses from the use of CEDS-Senior could be introduced as a basis for meaningful discussion with parents, particularly around career decision points. School and system administrators could also identify career-related needs and appropriate resourcing based on the outcomes.

Much like the CDI-A-SF (Creed & Patton, 2004), the CEDS-Senior will provide scores for each of the eight career constructs, the three major components of the revised CEDF (viz. understanding, actions and attitudes), and also provide access to a total single score. This variety of data collection options will facilitate future research which may need specific constructs and/or components and/or total scores, to include in the research.

This integrated model resonates with the work of recent Australian researchers, Patfield et al. (2022) and Fray et al. (2020) which examined the important components of the outer sub-system of the revised CEDF – predictors, influences, barriers and outcomes. Their work informs the content and approach that would be introduced in any career education and development intervention guided by the inner sub-system of the integrated model, understanding, action and attitudes, to address the issues of influences and equity. Research using the CEDS-Senior which measures the inside sub-system or 'engine-room' of the revised CEDF, could be used to provide evidence of impact from addressing the important factors from the outer sub-system.

Limitations and future research

In both studies, it was difficult to obtain large numbers of voluntary participation by Grade 12 students, given the pressures of completing their final year of secondary schooling. Because of the low response rate for this cohort of students, the findings involving Grade 12 students need to be considered with caution. Future studies which embed the use of the CEDS-Senior in Grade 12 programmes would likely address this issue and enable stronger testing of invariance.

The schools involved in Study 1 were non-government schools in different locations in three different States across Australia and the schools involved in Study 2 were Government schools across an educational jurisdiction. The design of the studies was cross-sectional. Future research which collects more comprehensive student and school data, could focus on target populations, and provide stronger evidence of the impact of socio-economic status or race/ethnicity, for example, on student responses (Choi et al., 2012). Also, longitudinal studies and regression analyses, connecting student scores to course/career outcomes as a criterion would provide evidence of predictive validity (Hooley et al., 2011; Sikora, 2020).

The CEDS-Senior is based on self-report and thus susceptible to self-report bias (e.g. where participants over- or underestimate their career understandings, behaviours and attitudes (Donaldson & Grant-Vallon, 2002). Dyadic or 360-degree data collection methodology, which compares the self-report with other relevant data and personal observations, would address this concern. In the second study, voluntary participation was online where minimal data were collected on the students who participated. Many students withdrew from the activity after only answering the first one, two or three items. Future studies would need to introduce methods to collect more comprehensive data and obtain higher completion rates.

It is understandable that there would be minor differences between the responses of adolescent boys and girls around the ages of 15–17. In these two studies, the boys reported that they checked the latest career information and possible career pathways marginally more than girls. This needs to be explored further, but in the meantime, the scores for boys and girls on the factor 'Reviewing/Reflecting' should be considered with some caution.

It is also understandable that the scores for students in Grade 11 be lower than for those students in both Grades 10 and 12 where students need to focus their career development in order to make imminent subject, course and career-related decisions. This information provides an opportunity for schools to advocate for increased CED activities for students in Grade 11 and conduct research on possible correlation to course/career outcomes.

Another limitation is that data collection for Study 2 occurred during a period of restrictions associated with the COVID-19 pandemic. The psychological effects of restrictions on students' scores cannot be discerned from the current data. Future studies could also focus on teacher feedback on the use and value of the revised CEDF and CEDS-Senior, as well as continue to explore

further, the minor difference between different user groups.

Conclusion

Career education and development have been found to have an impact on retention, achievement, transition and life success of secondary school students (Hooley et al., 2011). These two studies provide career practitioners, teachers, administrators and researchers, with a conceptual framework and a measure that could identify and report on the career education and development of students in Grades 10, 11 and 12 at individual, class, grade, school and system levels. The results from the use of the scale would provide access to a self-report measure that could be used to facilitate the career development of students, demonstrate the importance and effectiveness of career interventions, and facilitate participation in evidence-based practice. The two studies reinforced the empirically- and theoretically based model developed by Marciniak et al. (2020b) which underpins the revised CEDF and provides a measure that could be used to conduct further research on the framework's application with secondary school students.

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Supplemental material

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Appendix Table B

Item intercorrelations in Study 2 (N = 276)

	sel1	sel2	sel3	inf1	inf2	inf3	opp1	opp2	opp3	goa1	goa2	goa3	dec1	dec2	dec3	act1	act2	act3	ref1	ref2	ref3	con1	con2	con3
sel1	--																							
sel2	.68*	--																						
sel3	.74*	.64*	--																					
inf1	.52*	.41*	.51*	--																				
inf2	.49*	.44*	.47*	.47*	--																			
inf3	.50*	.47*	.51*	.54*	.65*	--																		
opp1	.52*	.55*	.50*	.40*	.43*	.47*	--																	
opp2	.57*	.56*	.57*	.43*	.43*	.46*	.67*	--																
opp3	.59*	.56*	.58*	.48*	.40*	.48*	.68*	.75*	--															
goa1	.64*	.58*	.57*	.38*	.35*	.39*	.54*	.56*	.52*	--														
goa2	.60*	.48*	.52*	.39*	.26*	.32*	.51*	.52*	.51*	.75*	--													
goa3	.55*	.51*	.47*	.31*	.26*	.35*	.46*	.47*	.51*	.72*	.79*	--												
dec1	.62*	.59*	.56*	.46*	.37*	.45*	.61*	.64*	.57*	.65*	.61*	.58*	--											
dec2	.56*	.51*	.53*	.45*	.37*	.47*	.61*	.66*	.74*	.59*	.58*	.57*	.68*	--										
dec3	.60*	.53*	.55*	.47*	.44*	.52*	.55*	.58*	.60*	.60*	.56*	.56*	.68*	.67*	--									
act1	.29*	.33*	.27*	.23*	.27*	.27*	.42*	.40*	.46*	.22*	.21*	.26*	.38*	.44*	.35*	--								
act2	.44*	.42*	.39*	.32*	.27*	.39*	.52*	.53*	.50*	.42*	.40*	.44*	.49*	.47*	.43*	.67*	--							
act3	.52*	.50*	.44*	.42*	.33*	.44*	.50*	.56*	.55*	.45*	.41*	.40*	.57*	.55*	.50*	.56*	.72*	--						
ref1	.37*	.31*	.34*	.26*	.13*	.27*	.34*	.36*	.30*	.50*	.64*	.57*	.47*	.41*	.48*	.18*	.29*	.30*	--					
ref2	.39*	.28*	.33*	.28*	.13*	.29*	.38*	.37*	.36*	.52*	.62*	.56*	.43*	.44*	.44*	.23*	.36*	.39*	.75*	--				
ref3	.50*	.41*	.43*	.30*	.28*	.41*	.40*	.39*	.48*	.52*	.61*	.60*	.51*	.51*	.56*	.33*	.38*	.40*	.63*	.60*	--			
con1	.63*	.59*	.56*	.40*	.34*	.44*	.58*	.55*	.61*	.67*	.73*	.70*	.64*	.61*	.64*	.36*	.44*	.52*	.57*	.58*	.63*	--		
con2	.67*	.56*	.58*	.41*	.35*	.44*	.54*	.54*	.53*	.65*	.70*	.64*	.66*	.59*	.59*	.33*	.48*	.51*	.53*	.54*	.59*	.76*	--	
con3	.55*	.57*	.49*	.45*	.32*	.45*	.55*	.48*	.56*	.55*	.55*	.54*	.60*	.58*	.49*	.36*	.43*	.49*	.42*	.43*	.54*	.59*	.67*	--

Note. sel = Understanding Self, inf = Understanding Influences, opp = Understanding opportunities, goa = Goal Setting, dec = Decision Making, act = Taking Action, ref = reflecting/Reviewing, con = Confidence. * $p < .01$

3.2 Links and implications

For CEDS-Senior, the hypothesised eight-factor model was found to have acceptable fit to the data with all cases used. Analysed separately for gender, the model for males and females had acceptable fits. The model for configural invariance and metric invariance between males and females also had acceptable fits. Furthermore, there was not a significant difference between the unconstrained and constrained models, and the CFI was in favour of the constrained model. Exploration of differences in regression weights revealed items 20 and 21 on the Reflection factor had relatively higher differences. Removal of their constraints revealed a model with acceptable fit. The configural and amended metric model (i.e., 20, 21 unconstrainted) was not significantly different and revealed metric invariance. Testing for scalar invariance revealed significant differences between M2 and M4 (intercepts) and M5(covariances). Removal of equivalence constraints on the intercepts of items 20 and 21 produced models that were not significantly different from the metric baseline so we able to concluded that the model evinced partial scalar invariance on the Reflection factor.

The CEDS subscales correlated moderately with one another. The self-efficacy scale (NGSES), correlated strongly with each of the eight components of the revised CEDF. Similarly, the outcomes and expectations scale (Revised VOE), also correlated very strongly with each of the eight components of the revised CEDF. These strong correlations with the two comparator measures provided additional evidence of validity of the CEDS-Senior. Differences between the mean scores for students in Grade10, 11 and 12 and for male and female students found that students in Grade 11 had lower scores on some factors than those in Grades 10 and 12 but these were not statistically significant.

This confirmed that the insights from years of practice, the detailed review of constructs and measures, and the critical research led by Marciniak et al. (2020) all combined to provide a measure that can be used with confidence by career practitioners and educators.

This research now needed to validate empirically the other three measures, CEDS-Primary, CEDS-Junior and CEDS-Tertiary and investigate whether any of the measures had applicability in an international setting.

CHAPTER 4: PAPER 2 - AN INVESTIGATION OF THE PSYCHOMETRIC PROPERTIES OF THE VIETNAMESE VERSIONS OF THE CAREER EDUCATION AND DEVELOPMENT SCALES FOR SENIOR SECONDARY AND TERTIARY STUDENTS IN VIETNAM.

4.1 Introduction

The International Labour Organisation (ILO) Vietnam sought to collect data and write a report on the career development of students in both school and post-school institutions in Vietnam. With the assistance of colleagues from Song An Social Enterprise (Song An) they agreed to use translated versions of the CEDS-Senior and CEDS-Tertiary with students to collect data and also manage the administrative responsibilities of logistics, ethics approvals and parental consent in Vietnam. This research enabled an investigation of the cross-cultural applicability of the two scales in Vietnam.

Three experienced researchers led the research. The manager of Song An holds a Master's degree in Counselling Psychology from a reputable American University. The senior researcher at Song An is completing a PhD from a reputable Taiwon University and the manager of ILO Vietnam is experienced at conducting research in Vietnam.

The two scales and the comparator scales were forward and backward translated into Vietnamese according to the International Test Commission Guidelines for Translating and Adapting Tests (International Test Commission, 2017). The resultant translated scales were placed in an appropriate on-line platform and all necessary ethics approvals were obtained with the assistance of ILO Vietnam and Song An staff.

The Initial form of CEDS-Tertiary contained five items in the Taking Action factor/ element of the scale on the assumption that students would take increased action at this stage of their career development as they prepared for post-study employment or further study. However, all the remaining sub-scales/factors in CEDS-Tertiary and all the elements/factors in CEDS-Senior proved to be represented by three items per element/factor. Given the empirical

success of CEDS-Senior with its three items for each of the eight elements/factors, it was decided to use this opportunity to trial a version of CEDS-Tertiary which reflected the structure of SEDS-Senior. That meant reducing the CEDS-Tertiary by two items to provide a scale that had three items for each of the eight factors/elements. Although all five items in the Taking Action factor/element correlated strongly in pilot research, the two with lowest factor loadings were removed. These were items 1 and 4. Both CEDS-Senior and CEDS-Tertiary contain 24 items representing eight elements/factors.

Although the structure of CEDS-Tertiary now reflected the same structure of CEDS-Senior, the content of most of the items is different, to reflect the different phases of career development between schools and universities.

Because of the formal assistance from the staff of ILO Vietnam, many institutions agreed to participate and a relatively large number of students across Vietnam participated in the study providing confidence in the outcomes of the research.

The Career Development Quarterly

Career Education and Development Scale for Secondary and Tertiary Students in Vietnam

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Abstract: This article reports on the measurement properties of the Vietnamese versions of the Career Education and Development Scale-Senior and the Career Education and Development Scale-Tertiary. The International Labour Organization Vietnam facilitated collection of data from students in high schools (N = 1463) and universities (N = 645) who completed these new measures along with comparator measures of self-efficacy and career-related beliefs and expectations. Confirmatory factor analyses affirm an eight-factor model equivalent for high school and university students. Correlations with comparator measures of provide evidence of concurrent validity. These new measures of career preparedness support Vietnam's national efforts to advance career development research and practice. Future research recommendations focus on testing the measures' properties across different socio-cultural factors and gender.

Career Education and Development Scale for Secondary and Tertiary Students in Vietnam

The United Nations Sustainable Development Goals (SDGs) provide a global policy framework for career development interventions (Robertson, 2021). The SDGs are particularly pertinent to developing nations which may not have access to career development resources which are readily available to citizens of developed nations. The present research pertains to Vietnam, a developing nation which aims to use career development for its economic and social advancement (International Labour Organization [ILO], 2021a).

Since the 1980s, the government of Vietnam has partnered with international agencies to advance career development strategies (Trang, 2021). ILO, for example, has made a concerted effort to support career education and development (CED) in Vietnam through its national review (ILO, 2021a) and educational resources, such as *Get Prepared for Career Readiness* (ILO, 2021b). CED learning activities are ordinarily the responsibility of teachers, as there is no formally designated profession of career development practitioner; therefore, a key strategy is to enhance teachers' capacity to deliver CED (Trang, 2021). Building teachers' capacity is essential because the government has stipulated levels of CED implementation from primary through to high school (ILO, 2021a). For example, more than 2000 teachers were trained to offer career learning activities in schools (VVOB, 2015) and ILO Vietnam operated a career training program for teachers and leaders in non-profit and non-government organizations. *Song An Career Development Social Enterprise* (Song An) co-organized four national and international career development conferences which encouraged career practitioners to adopt more professional and ethical approaches to their practice. In 2018 the government approved the landmark project, *Career Guidance Education and Students Streaming in General Education for the Period 2018-2025* (MOET, 2018). In cooperation with the Asia Pacific Career Development

Association (APCDA), Song An published the initial version of *Vietnam's Competency Framework for Career Practitioners* (APCDA, 2021). Thus, much progress has been made in Vietnam to ensure access to quality career development learning experiences.

However, a report based on a survey of 1600 new graduates exposed significant gaps in the transition from school to employment (Navigos Group, 2018). Thirty-eight percent of those surveyed reported that they had no career orientation, 35% did not know how to look for a job efficiently, and 35% reflected they could not meet the employers' requirements. According to the Employment Report by General Statistics Office Vietnam (GSO; 2020), the unemployment rate of Vietnamese students who graduated from university was three to four times higher than graduates from colleges and secondary schools, due mainly to a lack of skills, knowledge, and attitudes pertaining to career management. Nguyen et al. (2018) argue that Vietnam's approach to career counseling is outdated and not fit for purpose. Furthermore, Trang's (2021) background report to the ILO review (2021a), states "it is essential to have an exchange with international career guidance experts to access new career guidance tools" (p. 45).

Within this economic environment demanding an expansion of CED in Vietnam, education leaders, policy makers, career practitioners, academic staff and student support staff need access to relevant measures of career development constructs to: determine students' need for CED; assist individual students to understand their own career development progress; establish the career development profile of students at different education levels; demonstrate the effectiveness of careers work; target and evaluate interventions; and facilitate evidence-based practices (Whiston et al., 2017). There is, however, limited evidence of the use of any locally standardized measures to address these needs in Vietnam's education system. A relatively simple, holistic, economical, and culturally-appropriate measure is required by schools and

universities to enhance CED programs and activities. The present research meets that need by providing Vietnamese language versions of the Career Education and Development Scales (CEDS; AUTHOR et al., 2023) for senior high school students (CEDS-Senior VN) and tertiary students (CEDS-Tertiary VN).

The Conceptual Framework

Marciniak et al. (2022) published a comprehensive review of the constructs *career maturity*, *career readiness*, and *career adaptability* that have been used to understand the career preparedness of adolescents; which they defined as "the attitudes, knowledge, competencies and behaviors necessary to deal with expected and unexpected career transitions and changes" (p. 19). Based on their review, Marciniak et al. developed an integrative conceptual framework which builds on extant frameworks (e.g., Lent & Brown, 2006; Rottinghaus & Miller, 2013). The integrative framework consists of individual and contextual predictors, personal proximal and contextual influences, and outcomes. The core components of the career preparedness model created by Marciniak et al. (2022) are: *Attitudes* (e.g., confidence, self-efficacy); *Knowledge and Competencies* (e.g., preferred occupation, world of work); and *Behaviors* (e.g., self-exploration, environment exploration).

AUTHOR et al. (2023) adapted the framework by Marciniak et al. (2022) to inform the design of the four versions of the CEDS for use in elementary, junior high school, senior high school, and college and university. Figure 1 depicts the adapted framework with eight factors specified within their respective core component. The four versions are appropriate to age and developmental stage, holistic, brief, and useful for individual students, teachers, career practitioners, and institutional administrators. The original eight-factor model was affirmed by confirmatory factor analyses with evidence of concurrent validity in correlations with career-

related constructs, and a shorter version was affirmed for students in elementary school (e.g., self-efficacy, vocational outcome expectations; AUTHOR et al., 2023).

The Present Research

The purpose of the present research is to appraise the measurement properties of the CEDS-Senior VN and CEDS-Tertiary VN. The original English-language versions of the CEDS-Senior and CEDS-Tertiary were made available to the experienced and qualified staff of the career social enterprise, *Song An* in Vietnam and were translated into Vietnamese. These translated versions were checked by Vietnamese teachers, parents, and career practitioners, and pilot tested by students. No amendments were recommended by the reviewers. The present research question is: Can the original eight-factor model of the CEDS be affirmed in Vietnamese language versions? An affirmative answer would provide initial evidence of cultural validity of the CEDS (Leong & Brown, 1995). We answered the research question via two separate studies collecting data from students in senior high schools (Study 1) and universities (Study 2) across Vietnam.

Study 1: CEDS-Senior VN

Method

Participants

ILO representatives visited each school, explained the purpose of the study, obtained appropriate ethics clearances, and invited students in the designated grade/year levels to participate in the on-line survey. Most of the schools involved were relatively large (> 1000 students) and Vietnamese was the language of instruction in all of them. The final sample was N = 1283 students in Grades 10, 11 and 12. Unusable responses (n = 180) were removed from the initial sample (N = 1463) because of missing data. There were n = 846 (65.9%) females, n = 409

(31.9%) males, and n = 28 (2.2%) "other". Students were in Grade 10 (n = 458, 35.7%), Grade 11 (n = 520, 40.5%), and Grade 12 (n = 305, 23.8%). There were eleven secondary schools and colleges, with n = 1198 (93.4%) participants from private schools and n = 85 (6.6%) from public schools. Participants were in schools in northern (n = 762, 59.4%), central (n = 484, 37.7%), and southern (n = 37, 2.9%) regions of Vietnam.

Measures

The Career Education and Development Scale-Senior Vietnam (CEDS-Senior VN)

Table 1 shows the English language items of CEDS-Senior VN. The eight subscales represent the three core components of the Marciniak et al. (2022) model: Knowledge/Competencies (Self, Opportunities, Influences); Attitudes (Confidence), Behaviors (Goal Setting, Decision Making, Taking Action, Reflecting/Reviewing). Each subscale has three items. The Cronbach alpha internal consistency coefficients for each subscale found the original studies using two independent samples (AUTHOR et al., 2023) were: Self (.77, .87), Influences (.62, .78), Opportunities (.81, .87), Goals (.86, .90), Decision-making (.76, .86), Taking Action (.78, .85), Reflecting/Reviewing (.78, .85), and Confidence (.74. 86).

The New General Self-Efficacy Scale (NGSES)

The New General Self-Efficacy Scale (NGSES; Chen et al., 2001) is an 8-item measure of self-efficacy or being able to successfully execute behavior required to produce the required outcome. Participants respond to a 5-point Likert scale ranging from *strongly agree* (5) *to strongly disagree* (1). Sample items include, "In general, I think I can obtain outcomes that are important to me" and "I will be able to achieve most of the goals that I have set for myself". Higher scores are reflective of higher self-efficacy. Chen et al. (2001) found that the NGSES demonstrated high reliability and high content and predictive validity. For example, the principal

components analysis yielded a single factor solution on three separate occasions, α = 0.87, 0.88 and 0.85 respectively. The NGSES was found to be theory based, unidimensional, internally consistent, and stable over time (Chen et al., 2001).

The Vocational Outcomes Expectations-revised form (VOE).

The revised Vocational Outcomes Expectations scale (VOE; McWhirter et al., 2000, Metheny & McWhirter, 2013) is a 12-item measure of respondents' perceptions of their ability to accomplish career aspirations. Participants respond to 5-point Likert scale ranging from *strongly agree* (5) *to strongly disagree* (1). Sample items include, "My career planning will lead to a satisfying career for me", "I have control over my career decisions", and "The future looks bright for me". Higher scores are reflective of higher vocational expectations. Evidence of adequate internal consistency, test-retest reliability, and concurrent validity of the measure for high-school samples were reported by McWhirter et al., (2000) and Metheny and McWhirter (2013). For example, test-retest reliability over 9 weeks yielded a coefficient $r = .59$ and an $\alpha = .83$ and in the subsequent study an $\alpha = .93$ was obtained.

Procedure

The ILO VN staff managed the delivery of the measures to schools and universities, and approvals from local schools and parents. Ethical approval came from the Institutional Review Board of the University of [MASKED for REVIEW Approval No: XXXXX]. The CEDS-Senior VN was set up as an on-line survey within the secure environment of the *Song An* data management system. Administration time was an average of eight minutes to complete on-line. Data analysis was performed with IBM SPSS and AMOS v28 and confirmatory factor analyses used cut-offs recommended by Mvududu and Sink (2013).

Results

Model Fit

The eight-factor model of the CEDS Senior VN represented an acceptable fit to the data $\chi^2(224) = 1227.670$, $p = .000$, $\chi^2/df = 5.481$, TLI = .909, CFI = .926, RMSEA = .059, CI 90% [.056, .062], SRMR = .0463. All paths to the latent factors were also significant ($p < .01$) with factor loadings ranging from .535 to .839. The items' standardized weightings are shown in Table 1. Inspection of modification indices indicated a high coefficient for items 2 and 3 in the decision-making subscale. Correlating their error terms produced a better fitting model, $\chi^2(223) = 972.896$, $p = .000$, $\chi^2/df = 4.363$, TLI = .931, CFI = .945, RMSEA = .051, CI 90% [.048, .055], SRMR = .0421. In summary, the overall model had acceptable fit.

Given that the present study is the first to use the NGSES and VOE in Vietnamese language, we tested their measurement models too. The initial model for the NGSES produced an unacceptable fit, $\chi^2(20) = 295.354$, $p = .000$, $\chi^2/df = 14.768$, TLI = .924, CFI = .945, RMSEA = .104, CI 90% [.094, .114], SRMR = .0403. Inspection of modification indices revealed high coefficients among items 3 and 4, 4 and 5, and 7 and 8. Correlating their errors terms produced better fit, $\chi^2(17) = 118.226$, $p = .000$, $\chi^2/df = 6.954$, TLI = .967, CFI = .980, RMSEA = .068, CI 90% [.057, .080], SRMR = .0238. The VOE's initial model was not a close fit, $\chi^2(17) = 684.329$, $p = .000$, $\chi^2/df = 12.673$, TLI = .905, CFI = .923, RMSEA = .095, CI 90% [.089, .102], SRMR = .0457. Correlating error terms for items 11 and 12, 2 and 3, 9 and 11, 5 and 11 based on modification indices produced an acceptable fit, $\chi^2(50) = 463.254$, $p = .000$, $\chi^2/df = 9.265$, TLI = .933, CFI = .949, RMSEA = .080, CI 90% [.074, .087], SRMR = .0371. We chose to not amend the measures (e.g., remove items such as item 4 in the NGSES and 11 in the VOE) to ensure this

report on their first use in Vietnamese language was complete and to provide a baseline for future research and applications.

Correlations

The NGSES and VOE correlated with each of the eight components of the revised CEDF with the coefficients ranging from $r = .32$ to $r = .64$, as shown in Table 2. These correlations with the comparator measure are evidence of concurrent validity of the CEDS-Senior. However, the results related to the two measures used in this study, should be viewed with caution as the measures have not been previously validated in a Vietnamese context.

Mean Differences Across Grade and Gender

The means scores of the measured variables reveal minimal differences among Grades 10, 11 and 12, and between males and females. For students in Grade10, the means for females ranged from 4.13 (Influences) to 3.31 (Actions) and for males from 4.20 (Influences) to 3.34 (Actions). For students in Grade 11 the means for females ranged from 4.12 (Influences) to 3.23 (Actions) and for males from 4.17 (Influences) to 3.29 (Actions). For students in Grade 12, the means for females ranged from 4.15 (Influences) to 3.43 (Opportunities) and for males from 4.13 (Influences) to 3.47 (Reflection).

MANOVA tests of the differences in means were explored. Given differences in sample sizes for each category, Box's test was applied and found equality of variance-covariance matrices for Grade [Box's $M = 92.38$, $p > .05$] and Gender [Box's $M = 50.59$, $p > .05$].

Mean differences were significant for Grade; however, the effect size was small [Pillai's trace = .028, $F(16, 2492) = 2.19$, $p < .05$, partial $eta^2 = .01$]. Levene's test for homogeneity of variance found a significant difference for Actions [$F(2,1252) = 3.93$, $p < .05$] and Confidence [$F(2,1252) = 4.65$, $p < .05$]. Univariate tests found significant mean differences for Self [$F(2,$

1252) = 5.76, $p < .05$, partial eta^2 = .01]; Opportunities [$F(2, 1252) = 6.07$, $p < .05$, partial eta^2 = .01]; Goals [$F(2, 1252) = 4.00$, $p < .05$, partial eta^2 = .01]; Decisions [$F(2, 1252) = 5.89$, $p < .05$, partial eta^2 = .01]; Actions [$F(2, 1252) = 10.07$, $p < .01$, partial eta^2 = .02]; Reflection [$F(2, 1252) = 3.12$, $p < .05$, partial eta^2 = .01]; and Confidence [$F(2, 1252) = 6.69$, $p < .01$, partial eta^2 = .01]. Nonetheless, the effect sizes were small. There were no significant differences for Influences.

The mean differences for Gender were significant; however, the effect size was small [Pillai's trace = .024, $F(8, 1246) = 3.80$, $p < .05$, partial eta^2 = .02]. Levene's test for homogeneity of variance found no significant differences. There were significant differences for Self [$F(1, 1253) = 18.77$, $p < .05$, partial eta^2 = .02]; Opportunities [$F(1, 1253) = 17.45$, $p < .05$, partial eta^2 = .01]; Goals [$F(1, 1253) = 6.32$, $p < .05$, partial eta^2 = .01]; and Confidence [$F(1, 1253) = 9.37$, $p < .05$, partial eta^2 = .01]. Despite the significant differences, the effect sizes were small. There were no significant differences for Influences, Decisions, Actions, and Reflection.

Study 2: CEDS-Tertiary VN

Method

Participants

The Universities involved were relatively large (> 3000 students) and Vietnamese was the language of instruction. The sample for Study 2 was $N = 645$ students from all year levels in universities and colleges across Vietnam. Eleven responses were excluded because of missing data or response bias; thus, leaving a final sample $N = 634$. The sample included females (n = 476, 74.1%), males (n = 155, 24.1%) and those who registered as Other (n = 11, 1.7%). Participation by year level was: First-year (n = 352; 54.8%), second-year (n = 96; 15%), third-year (n = 142; 22.1 %), and a mix of final-year students in their fourth (n = 47; 7.3%), and fifth

years (n = 5; .8%). Participants came from private (n = 241, 37.5%) in North Vietnam and public (n = 401, 62.5%) universities in South Vietnam.

Measures

The Career Education and Development Scale – Tertiary Vietnamese (CEDS-Tertiary VN)

The CEDS-Tertiary VN is like CEDS-Senior VN and has three items per subscale. However, the wording of nine items was changed to reflect the more advanced stage of career development of university and college students. For example, item 2 in CEDS Senior VN "I have a good understanding of my personal strengths and abilities" is in CEDS Tertiary VN "I understand that I need to develop my graduate attributes to make me more attractive to future employers". See Table 4 in the Results section for the English version of CEDS-Tertiary VN together with the standardized factor loadings for each item. Like Study 1, NGSES (Chen et al., 2001) was used as the measure of self-efficacy.

The Career Futures Inventory Short Form (CFI-9)

The nine-item short-form (CFI-9; McIlveen et al., 2013) of the Career Futures Inventory (CFI; Rottinghaus et al., 2005) was used explore possible career planning attitudes. The CFI-9 measures: Career adaptability (CA), Career optimism (CO) and Perceived knowledge (PK). It was also designed to be a diagnostic screening tool for career counselling and educational interventions. The original CFI-9 had a good fit to the data collected from university students, $\chi^2 = 50.80(24)$ $p < .001$; CFI = 0.993; RSMEA = 0.038; and it had internal consistency coefficients of $\alpha = .82$ for CA, $\alpha = .84$ for CO, and $\alpha = .86$ for PK.

Procedure

Study 2 followed a similar procedure to Study 1. The ILO VN took responsibility for data collection and local ethics approvals (ILO, 2021). Overall ethical approval for the research was

granted by the University of [MASKED for REVIEW Approval No: XXXXX]. The survey took on average eight minutes to complete on-line.

Results

Model

The eight-factor model of the CEDS Tertiary VN had a good fit to the data $\chi^2(224, N = 642) = 729.304$, $p = .000$, $\chi^2/df = 3.256$, TLI = .942, CFI = .953, RMSEA = .059, CI 90% [.055, .064], SRMR = .039. All paths to the latent variables were also significant ($p < .01$) with factor loadings ranging from .67 to .86. Items and loadings are shown in Table 3.

Like Study 1, we tested the measurement models for the NGSES and CFI-9 because this is the first to explore their properties in Vietnamese language. The initial model for the NGSES produced a equivocal fit on some indicators, $\chi^2(20) = 212.789$, $p = .000$, $\chi^2/df = 10.639$, TLI = .941, CFI = .958, RMSEA = .123, CI 90% [.108, .138], SRMR = .0275. Inspection of modification indices revealed high coefficients for the same items in Study 1: 3 and 4, 4 and 5, and 7 and 8. Correlating their errors terms produced an acceptable fit, $\chi^2(17) = 82.783$, $p = .000$, $\chi^2/df = 4.870$, TLI = .976, CFI = .986, RMSEA = .078, CI 90% [.061, .095], SRMR = .0168. The CFI-9 model had acceptable fit to the data, $\chi^2(24) = 89.469$, $p = .000$, $\chi^2/df = 3.728$, TLI = .977, CFI = .985, RMSEA = .065, CI 90% [.051, .080], SRMR = .0349.

Correlations

As shown in Table 4, CFI-9 subscales correlated strongly with the eight factors of the CEDS with the coefficients ranging from $r = 0.50$ to $r = 0.67$. The NGCES also correlated with all eight sub-components. Ranging from $r = .59$ to $r = .70$. These correlations with comparators measure are additional evidence of validity of the CEDS-Tertiary. Similar to Study 2, the results

related to the comparator measures used in this study, should be viewed with caution as the measures have not been previously validated in a Vietnamese context.

Mean Differences Across Year-Level and Gender

Differences between the mean scores for students' year of enrolment (first to final), and their gender were examined. For students in first year, the means scores for females ranged from 3.80 (Decisions) to 3.32 (Actions) and for males from 3.84 (Self) to 3.41 (Actions). For students in middle years, the mean scores for females ranged from 3.83 (Decisions) to 3.18 (Actions) and for males, from 3.75 (Goals) to 3.21 (Actions). For students in final year, the mean scores for females ranged from 3.81 (Influences) to 3.36 (Actions) and for males, from 3.89 (Influences) to 3.11 (Action).

Given differences in sample sizes for each category, Box's test was applied and found unequal variance-covariance matrices for year-level [Box's $M = 225.54$, $p < .05$] and gender [Box's $M = 73.08$, $p < .05$]. Therefore, we used Bartlett's test of sphericity to ensure the data were amenable to further analyses. Bartlett's tests were acceptable for year-level [$\chi^2 = 3766.37$, $p < .05$] and gender [$\chi^2 = 3794.95$, $p < .05$].

Mean differences for year-level were not significantly different and Levene's test for homogeneity of variance was non-significant for all subscales. Univariate tests found no significant mean differences for all the subscales except Confidence where the means were significantly different [$F(4, 626) = 2.53$, $p < .05$, partial $eta^2 = .02$].

Mean differences for gender were significantly different [Pillai's trace = .025, $F(8, 622) = 1.97$, $p < .05$, partial $eta^2 = .03$]. Levene's test for homogeneity of variance was non-significant for all subscales except Decisions [$F(1, 629) = 4.06$, $p < .05$]. Univariate tests found no significant mean differences for all subscales.

Discussion

The present research affirmatively answered the research question, "Can the original eight-factor model of the CEDS be affirmed in Vietnamese language versions?" via separate studies which administered the CEDS-Senior VN and the CEDS-Tertiary VN in samples of high school and university students. Both studies found an eight-factor model consistent with the original measure (AUTHOR et al., 2023) that was based on the conceptual framework of Marciniak et al. (2022). The majority of CEDS subscale mean scores were relatively consistent across year levels and gender. Both studies revealed correlations among the CEDS subscales and comparator measures of self-efficacy and vocational expectations and beliefs.

Nguyen et al. (2018) argue that career counseling practices should be culturally relevant to Vietnam. Leong and Brown (1995) differentiate cultural validity and cultural specificity of career development theories and models. The present findings are initial evidence of the CEDS and their conceptual framework's cultural validity (i.e., its transfer from an English language version to a Vietnamese language version). However, there is a need to provide evidence of cultural specificity whereby local, nuanced approaches to the conceptual framework and the CEDS generate new perspectives for their applications and modifications.

Trang's (2021) review calls for collaboration among career counselors to share knowledge about career assessment tools. Having Vietnamese versions of the CEDS available to practitioners enhances the range of resources available to practitioners. Their application and critique of this new assessment resource may lead to enhancements in its cultural specificity.

Implications for Practice

The brevity and holistic nature of the Vietnamese versions of CEDS mean that they can be used for different purposes: as self-assessment tools for individual students' career explorations in counseling; as formative assessment tools to inform students' career learning;

and, as pre- and post-measures of career interventions to evaluate their impact and outcomes (cf. Whiston, et al. 2017). The CEDS may also be a basis for learning and/or discussion with parents and teachers, parents are afforded an opportunity to learn about models of career decision-making to complement traditional parent-oriented decision-making on behalf of their children (ILO, 2021a; Trang, 2021). Nguyen et al. (2018) challenged the cross-cultural utility of psychometric measures originating from Western theories and applied to Vietnam without due regard to local context. Following the recommendations of Nguyen et al. (2018), there is scope to combine the CEDS with narrative counseling so as to enhance their contextualization to local cultural norms and practices.

Limitations

The findings should be treated with caution due to a few limitations. First, the two studies were conducted in a time when COVID-19 had a high presence in Vietnam. There is no way to account for how the pandemic influenced data collection. Future data collections would enable comparison of the measurement models before and after the pandemic's impact on Vietnam's education systems. The data are self-report, collected on-line voluntarily, and some participants did not complete the survey or adopted a response-biased approach to completion. Thus, the findings are susceptible to self-report bias (e.g., where participants over- or under-estimate their career understandings, behaviors, and attitudes; Donaldson & Grant-Vallon, 2002). Dyadic or 360-degree data collection methodology, which compares the self-reports with other relevant data and personal observations, would address this concern. Nonetheless, the present samples are sufficient in size to eliminate missing and biased data. Although data were collected from a range of institutions in different locations, no socio-economic data were collected. Thus, we are unable to discern whether the CEDS factors' mean scores varied across levels of socio-economic status.

Future Research

The present studies could be used as the baseline for future studies using Vietnamese CEDS in different samples of institutions in different locations, and to find evidence of the impact of socio-economic status and/or ethnicity on student responses (Choi et al., 2012). Also, longitudinal studies connecting course/career outcomes as a criterion would provide evidence of predictive validity (Sikora, 2020). Research could also investigate any difference between the responses from students who had participated in career programs and those who have not. Although the effect sizes are small, the significant differences in some sub-scales for gender warrants further investigation (Casale, 2020; Bleidorn et al., 2016).

Conclusion

Vietnam's high schools and universities need contemporary resources to implement their nation's plans for career education and development. The findings of our research partially meet that need by providing two new psychometric measures based in contemporary research and theory: the CEDS-Senior VN and CEDS-Tertiary VN. These tools will be valuable for career development practitioners, teachers, and administrators who are responsible for the implementation and evaluation of career education and development learning in Vietnam.

Note

The Vietnamese language versions of the measures are available upon request from the corresponding author.

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Table 1

CEDS-Senior VN Items and their Standardized Factor Loadings for Study 1.

Item	Item Text	Factor Loadings
sel1	I have a good understanding of my interests and how they might relate to future courses or careers	.77
sel2	I have a good understanding of my personal strengths and abilities	.75
sel3	I am aware of the subject(s) which I like or do well in and how it/they might relate to future courses or careers	.68
inf1	I have a good understanding of my parent's views regarding future courses and careers that might interest me	.54
inf2	I understand the importance of making course/career decisions which are mine and not influenced by my friends or social media.	.67
inf3	I understand the importance of making course/career decisions which are mine but are done with help from teachers and parents	.66
opp1	I have a good understanding of the world or work and future careers options	.77
opp2	I have a good understanding of the range of subjects/courses which are available for me to study and where they might lead in terms of careers.	.84
opp3	I have a good understanding of the many different career pathways open to me.	.75
goa1	I have set myself clear and achievable course/career goals	.77
goa2	I have developed a career plan for myself	.83
goa3	My course/career plans contain short, medium and long-term goals	.76
dec1	I am good at making sound career/course choices and decisions.	.72
dec2	I am able to seek detailed course and career information to assist me make good decisions.	.64
dec3	I usually consider my course/career options carefully before making decisions	.55
act1	I am able to construct a competitive resume and cover letter.	.69
act2	I can competently complete job/course/career-related applications.	.76
act3	I am able to locate appropriate information on entry prerequisites for jobs and/or courses of further study.	.70
ref1	I review my course/career plans approximately every six months.	.68
ref2	I regularly check course/career information to see if there are any changes relevant to my course/career planning.	.80
ref3	I have developed appropriate back-up plans if my first choice doesn't eventuate.	.69
con1	I know what steps I need to take to progress my course/career planning	.74
con2	I feel confident that I have a good idea of what course/career direction(s) or pathway(s) I want to take.	.79
con3	I am confident that I will have successful future.	.57

Note. sel = Understanding Self, inf = Understanding Influences, opp = Understanding opportunities, goa = Goal Setting, dec = Decision Making, act = Taking Action, ref = Reflecting/Reviewing, con = Confidence

Table 2

CEDS Senior VN Measures' Descriptive Statistics, Alpha Reliability Coefficients, Skewness, Kurtosis, Standard Error, and Scale Score Correlations

Measure	1	2	3	4	5	6	7	8	9	10
1. SEL	.78									
2. INF	.39	.64								
3 OPP	.60	.31	.83							
4. GOA	.56	.29	.63	.83						
5. DEC	.49	.42	.53	.52	.69					
6. ACT	.31	.18	.44	.44	.46	.76				
7. REF	.45	.25	.51	.57	.47	.49	.76			
8. CON	.57	.36	.67	.65	.59	.50	.59	.73		
9. SE	.40	.32	.44	.42	.45	.42	.42	.59	.90	
10. OE	.47	.47	.46	.45	.57	.37	.40	.62	.64	.92
M	3.70	4.14	3.37	3.46	3.83	3.32	3.36	3.50	3.68	3.90
SD	.69	.57	.71	.75	.60	.70	.79	.68	.57	.55
Skewness	-.28	-.57	-.12	-.29	-.37	-.46	-.46	-.26	-.02	-.30
Kurtosis	.54	1.01	.75	.46	1.12	.92	.26	.51	.59	1.05

Note. SEL = Understanding Self, INF = Understanding Influences, OPP = Understanding opportunities, GOA = Goal Setting, DEC = Decision Making, ACT = Taking Action, REF = Reflecting/Reviewing, Confidence, SE = Self Efficacy, OE = Outcomes and Expectations. Internal consistency Cronbach coefficient α are on the diagonal. All correlation coefficients are significant $p < .01$

Table 3

CEDS-Tertiary VN Items and their Standardized Factor Loadings.

Item	Item Text	Factor Loading
sel1	I have a good understanding of my personal strengths and attributes and how they might relate to future careers or further study options.	.79
sel2	I understand that I need to develop my graduate attributes in order to make me more attractive to future employers	.77
sel3	I can communicate strong evidence of my interests, skills and attributes to future employers	.77
inf1	I understand the importance of making course/career decisions which are mine and not influenced by my friends and/or social media.	.79
inf2	I understand that access to career opportunities could depend on a range of circumstances like government policies or specific locations or growth industries	.74
inf3	I am able to manage the expectations of significant others on my career/course choices & direction	.67
opp1	I have a good understanding of the world or work and future careers options within it	.81
opp2	I have a good understanding of the range of units/subjects/courses/programs which are available for me to choose and where they might lead in terms of careers	.84
opp3	I have a good understanding of many different career pathways open to me.	.84
goa1	I have set myself clear and achievable career/ course goals	.86
goa2	I have developed a career plan for myself	.84
goa3	My course/career plans contain short, medium and long-term goals	.82
dec1	I am good at making sound career/course choices and decisions	.81
dec2	I am able to seek detailed course and career information to assist me make good decisions	.82
dec3	I usually consider my career/course options carefully before making decisions	.82
act1	I can competently complete job/course/career-related applications.	.78
act2	I am confident I will perform well at job/career related interviews	.84
act3	I am strong at professional networking	.81
ref1	I review my course/career plans often	.76
ref2	I regularly check course/career information to see if there are any changes relevant to my course/career planning	.84
ref3	I have developed appropriate back-up plans if my first choice(s) don't eventuate	.77
con1	I feel confident that I have a good idea of what career/course direction(s) or pathways I want to take	.85
con2	I am confident I will get appropriate employment/further study opportunities upon graduation	.85
con3	I am confident I will have a successful future	.73

Note. sel = Understanding Self, inf = Understanding Influences, opp = Understanding opportunities, goa = Goal Setting, dec = Decision Making, act = Taking Action, ref = Reflecting/Reviewing, con = Confidence.

Table 4

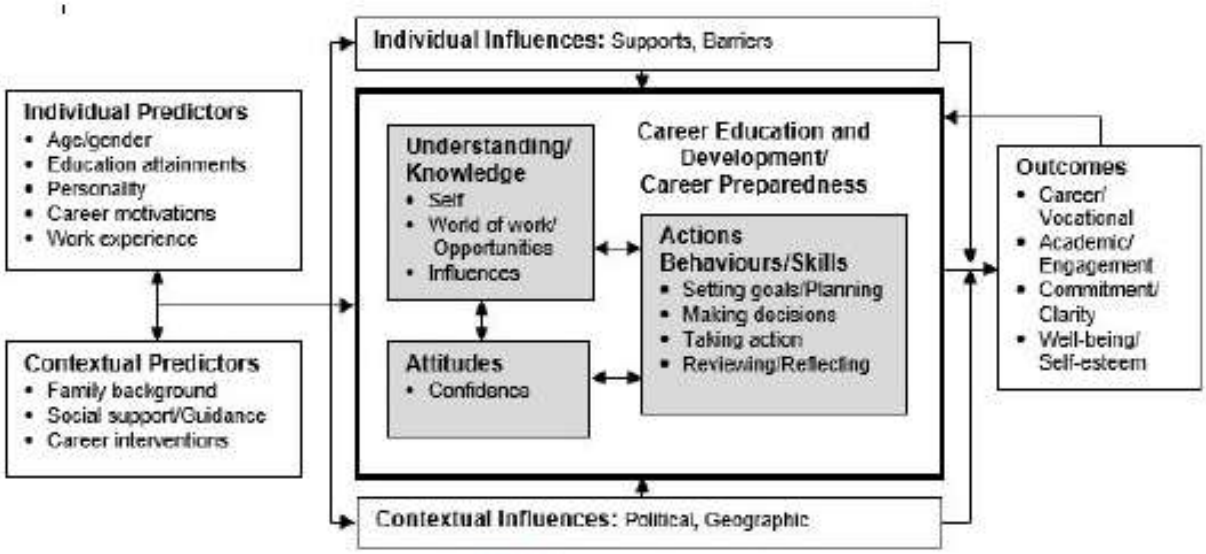
CEDS Tertiary VN Measures' Descriptive Statistics, Alpha Reliability Coefficients, Skewness, Kurtosis, Standard Error, and Scale Score Correlations

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. SEL	.82											
2. INF	.71	.77										
3 OPP	.66	.62	.87									
4. GOA	.63	.59	.73	.88								
5. DEC	.69	.71	.70	.71	.86							
6. ACT	.56	.53	.63	.58	.57	.85						
7. REF	.58	.58	.64	.70	.67	.64	.83					
8. CON	.61	.59	.71	.70	.69	.70	.72	.85				
9. SE	.59	.63	.61	.64	.66	.68	.70	.74	.95			
10. CA	.56	.61	.57	.57	.64	.61	.64	.67	.79	.92		
11. CO	.58	.60	.61	.62	.67	.54	.65	.67	.72	.73	.92	
12. PK	.50	.54	.60	.55	.54	.63	.56	.61	.64	.58	.56	.67
M	3.77	3.76	3.48	3.67	3.77	3.31	3.70	3.59	3.66	3.82	3.86	3.35
SD	.74	.74	.74	.74	.72	.73	.73	.73	.70	.75	.81	.65
Skewness	-1.17	-1.22	-.78	-1.07	-1.42	-.39	-1.09	-.89	-1.08	-1.41	-1.18	-.53
Kurtosis	3.14	3.21	1.95	2.48	4.07	1.40	2.53	2.29	3.36	3.94	2.47	2.93

Note. SEL = Understanding Self, INF = Understanding Influences, OPP = Understanding opportunities, GOA = Goal Setting, DEC = Decision Making, ACT = Taking Action, REF = Reflecting/Reviewing, Confidence, SE = Self Efficacy, CA = Career Adaptability, CO = Career Optimism, and PK = Perceived Knowledge. Internal consistency Cronbach coefficient α are on the diagonal. All correlation coefficients are significant $p < .01$

Figure 1

Conceptual Model for the CEDS



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4.2 Links and implications

The two studies affirmed the measurement properties of the CEDS-Senior VN and the CEDS-Tertiary VN, which were specifically developed for use with senior secondary school students and university students across Vietnam. The factor structures obtained from CFAs found an acceptable eight-factor model consistent with the original measures. The scales were consistent across different schools and universities, across the different levels and across gender. Both studies revealed strong correlations with the comparator measures indicating that both scales had concurrent validity. The cross-sectional data indicated that students could make sense of the constructs and that the items held together to form coherent scales.

These findings indicate that the revised CEDF and the CEDS could also have applicability to other non-English speaking nations. Further studies would be needed to confirm this.

For Vietnam, the findings mean that the two scales can be used as measures to establish the extent of career beliefs in these cohorts as well as to inform the development of CED interventions, provide a basis for career self-development in students, promote career-related discussions with students, teachers and parents, and facilitate evidence-based practice.

Now that CEDS-Senior, CEDS-Senior VN and CEDS-Tertiary VN have been validated empirically, the next phase of this research is to investigate the psychometric properties of CEDS-Junior and CEDS-Primary.

CHAPTER 5: PAPER 3 – CAREER EDUCATION AND DEVELOPMENT SCALES FOR JUNIOR SECONDARY AND PRIMARY SCHOOL

5.1 Introduction

The revised CEDF which underlies the development of all four scales has been validated at the Senior and Tertiary levels.

However, the question remained, will the revised CEDF have applicability to the structure of career beliefs of much younger students? In the first instance, the assumption was that the two scales at these levels would be single factor scales where the items would reflect all eight elements/factors and therefore the three components of the revised CEDF. Hence, the initial versions of CEDS-Junior and CEDS-Primary were developed as short scales with items representing all elements.

The PAF for both these scales however, revealed at least three factors with some cross loadings. The three factors bore some resemblance to the underlying three components of the revised CEDF (Understanding, Action & Attitude). Consequently, more items were written based around the three components and the revised scales were administered to a different cohort of students.

The CFAs for both CEDS-Primary and CEDS-Junior revealed three clear factors which reflected the three components of the revised CEDF. Both scales are now comprised of 18 items (six items for each of the three components: Understanding, Action and Attitude. This means that the revised CEDF has been substantiated for all four scales.

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Career Education and Development Scales for Junior Secondary School and Primary School Students

--Manuscript Draft--

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Response to Reviewers:	Please see the attached response document

Career Education and Development Scales for Primary School and Junior Secondary School Students

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Career Education and Development Scales for Junior Secondary School and Primary School Students

Abstract

The present research provides evidence of the measurement properties of the Career Education and Development Scale-Junior (CEDS-Junior) and the Career Education and Development Scale-Primary (CEDS-Primary). Study 1 tested a theoretically-informed three-factor structure of the CEDS-Junior using a sample of $N = 381$ junior high school students in Grades 7, 8, and 9, and Study 2 tested the CEDS-Primary using a sample of $N = 179$ primary school students in Grades 5 and 6. Three hypothesized factors were recovered from the data: Understanding, Action, and Attitude. These novel measures are a resource for exploring and tracking students' career development learning.

Keywords: career development, students, career assessment, primary school, high school

Career Education and Development Scales for Junior Secondary School and Primary School Students

Educational jurisdictions and policy agencies are increasingly recognizing the importance and effectiveness of careers development learning (CDL) in high schools (Covacevich et al., 2021; Inter-Agency Working Group on Career Guidance; Mann et al., 2020). Watts (2006) defines CDL as being "concerned with helping students to acquire knowledge, concepts, skills and attitudes which will equip them to manage their careers, i.e., their lifelong progression in learning and work" (p. 2). However, it has been known for some time that CDL for younger students is not common practice, and that career education tends to focus on the decision-making of senior high school students preparing for their transition onward from compulsory education to further education, training, and employment (McMahon & Watson, 2022; Patton & McMahon, 2021).

Literature reviews by Hartung et al. (2005) and Watson and McMahon (2005) generated five key findings about childhood career development (Porfeli et al., 2008); these were: that children by the age of four have the capacity to learn about careers and can differentiate occupations based on gender; career stereotypes based on gender tend to consolidate over time; career stereotypes impact on career aspirations and negatively influence later subject and course choice; social and cultural stereotypes impact negatively on career aspirations; and that as children grow they begin to lean towards more realistic aspirations rather than more sensationalized careers. Yet, with the preponderance of theory, research, and curricular resources for CDL focused on senior high school students (Patton & McMahon, 2021), there is a concomitant limitation in the same for younger school students (McMahon & Watson, 2022).

This present research aimed to add evidence about the validity of two new psychometric measures of CDL specifically for students in junior secondary school (i.e., aged 12, 13 and 14 years; in Grades 7, 8 and 9) and in primary school (i.e., aged 10 and 11 years old; in Grades 5 and 6). Respectively titled, the Career Education and Development Scale-Junior Secondary (CEDS-Junior) and the Career Education and Development Scale-Primary (CEDS-Primary), these two novel measures of junior and primary students' career beliefs were designed to be useful resources for teachers, school counsellors, career development practitioners, and educational researchers, for exploring and tracking students' CDL. The research findings contribute new conceptualizations and empirical evidence about young students' career development and in a small way alleviate the dearth of literature about their career development.

Theoretical Background

Two "classical" development theories of career that are relevant to children specify stages and psychological processes. Gottfredson (2005) asserted that children move through four stages as they use the two processes of *compromise* and *circumscription* in the development of occupational aspirations. The hypothetical stages include orientation to physical size and power (ages 3 to 5 years); orientation to sex roles (ages 6 to 8); orientation to social valuation (ages 9 to 13); and orientation to an internal, unique self (ages 14 and above). Stages one to three are relevant to the present research. The process compromise involves eliminating less compatible but more accessible occupations while circumscription is the process of narrowing the zone of acceptable occupations. At the third stage, around ages 9 to 13 years, children rank occupations by both prestige and social status.

The lifespan/life space theory of career development (Super, 1990) posited stages from birth to disengagement from the world of work: growth (birth to 14 years), exploration (14 to 24),

establishment (25 to 44), maintenance (45 to 65), and disengagement (65 and older). Super's model included nine dimensions: curiosity, exploration, information, key figures, interests, locus of control, time perspective, self-concept and planfulness. Super theorized that successful development across these dimensions leads to effective problem solving and decision making.

Stead and Schultheiss (2003) set out to test Super's theoretical assumptions by developing a measure that would assess childhood career development across the nine dimensions (Super, 1990). They developed two versions of the Childhood Career Development Scale (CCDS); with one for use in South Africa with 48 items resulting in eight factors (Stead & Schultheiss, 2003) and one for use in the United States (US) with 52 items and eight slightly different factors (Schultheiss & Stead, 2004). The scales were administered to students in Grades four to seven. Most of the factors proved to be stable in both studies with no or minimal significant differences in gender and grade for each study. Nazli (2007) explored the career development of primary school children in Turkey by using four dimensions of the CCDS to interview primary school students and found that they were aware of their own self-concepts, that their time perspectives and planning concepts were well developed, and they could link their educational experiences to professions.

Contemporary Models of Career Development

The conceptual framework that underpins the measures CEDS-Junior and CEDS-Primary is the Career Education and Development Framework (CEDF; AUTHORS et al., 2023) and the theoretical and empirical framework of career preparedness (Marciniak et al., 2022), which they define as "the attitudes, knowledge/competencies and behaviors necessary to deal with the expected and unexpected career transitions and changes" (p. 19). Figure 1 depicts the CEDF's conceptual framework. The CEDF consists of eight elements/factors contained within three core

components namely: *Understanding* (self, opportunities, and influences); *Action* (goal setting, decision making, taking action and reflecting/reviewing); and *Attitude* (confidence). This study involving younger students, focuses at the three-core-component level of the model by Marciniak et al. (2022). The CEDF was used to conceptualize the Career Education and Development Scale-Tertiary (CEDS-Tertiary; AUTHORS et al., 2023a) and the Career Education and Development-Senior (CEDS-Senior; AUTHORS et al., 2023b).

Existing measures tend not to reflect conceptual or curricula frameworks which educators have developed to guide their career education and development programs and practices. Nor do the measures reflect the scope of vocational and career constructs addressed in educational settings. Indeed, a review of measures reveals that they each address some but not all the eight elements/factors of the CEDF (AUTHORS et al., 2019). For example, in the Career Development Inventory, Australian, Short Form (CDI-A (SF; Creed & Patton, 2004), self-understanding, knowledge of the world of work, decision making and some aspects of taking action are addressed but not, understanding influences, goal setting and reviewing/reflecting. Existing scales focus on vocational and career constructs like, career interests (Athanasou, 1988), work values (Work Aspect Preference Scale; Pryor, 1992) and decision difficulties such as the Career Decision Making Self-Efficacy Scale (CDMSES; Betz et al., 1996). Some scales have a multiple focus, such as the Childhood Career Development Scale (Stead & Schultheiss, 2010) and the Career Resources Questionnaire - Adolescent Version (Marciniak et al., 2021) and some scales have a single construct focus such as the Student Career Readiness Index (Dodd, et al., 2021). None of these scales are based upon a curriculum framework and scales used at these earlier levels of schooling need to be not only relatively simple but also "meaningful, comprehensive and economical" (Marciniak et al., 2021, p. 175).

Purpose of the Present Research

The purpose of the present research was to investigate the measurement properties of the CEDS-Junior and CEDS-Primary. The two measures' construction followed a similar process to the steps recommended by Dodd et al. (2021) and included: allocation of items from existing measures such as the CDI-A-SF, against the CEDF and adaption of these; checking against career constructs in common use (Swanson & D'Achiardi, 2005; Larson et al 2013); examining age-appropriate lesson material (AUTHOR et al., 2022), cognitive testing through enlisting school career counsellors to conduct focus groups with relevant students, teachers and parents; and undertaking pilot studies. These steps are outlined in more detail in AUTHOR et al. (2023) in their work developing the four measures with the number of items generated for testing purposes being: CEDS-Tertiary and CEDS-Senior 24 items each, and CEDS-Junior and CEDS-Primary, 21 items each. Similar career constructs from the CEDF were addressed in all four measures with the cognitive complexity of the items reduced for younger students.

Study 1 explored the measurement properties of the CEDS-Junior and Study 2 focused on CEDS-Primary, and undertook the same methodology as the CEDS-Junior. The two studies included other measures to provide evidence of concurrent validity: the Rosenberg Self-Esteem Scale (Rosenberg, 1965), and the time perspective and key figures subscales (i.e., significant others) from the Childhood Career Development Scale (CCDS; Stead & Schultheiss, 2010). We hypothesized that these measures would have moderate correlations with the CEDS because, according to the CEDF, self-esteem, family and supports, perspective on the future should be associated with the core factors of understanding/knowledge, attitudes, and actions.

Study 1

Method

Participants

Study 1 recruited students from Grades 7, 8 and 9 (aged 12, 13, 14 years old respectively) from three schools within a large education jurisdiction in Australia. Of the 462 students who responded 81 were deemed unsuitable mainly because of missing data, subsequently leaving a sample size of $N = 381$. Female participation was $n = 204$ (54%) while male participation was $n = 164$ (43%). Thirteen students (3%) registered as neither male nor female. Participation by school grade was grade 7, $n = 95$ (25%) and grade 8, $n = 136$ (36%) and grade 9, n = 150 (39%). Participation was spread across three schools: School 1, $n = 25$ (7%); school 2, 12 (4%); and school 3, 344 (89%). The Index of Community Socio-Educational Advantage (ICSEA; ACARA, 2020) is a scale which allows for a fair and reasonable comparisons among schools with similar students and provides an indication of the socio-educational backgrounds of students. The ISCEA is set at an average value of 1000 which can be used as a benchmark, with lower scores representing relative educational disadvantage compared to the average school, and higher scores representing more advantage than the average. The values for the respective schools are 1057, 1019 and 930, which are close to the average value of 1000.

Measures

Career Education and Development Scale-Junior (CEDS-Junior)

The scale development used a similar process to the six steps recommended by Dodd et al. (2021), namely: identification of outcomes and review of existing measures; mapping of frameworks and generation of items; expert review; cognitive testing with the intended users; gathering pilot data and exploring the factor structure; and using confirmatory factor analysis to

finalize the instrument. These steps are outlined in more detail in AUTHOR et al. (2023a) in their work developing CEDS-Tertiary and CEDS-Senior. The items for the CEDS Junior are shown in Table 1.

The measures used for criterion validity were chosen from the list presented by Larson et al., (2013) which aligned instruments with career/vocational constructs. The instruments were selected based on being age appropriate, attempting to measure a similar aspect of the CEDF or relevant career/vocational construct, and being relatively short in length.

Rosenberg Self Esteem Scale (RSES)

The RSES (Rosenberg, 1965) is a 10-item scale that measures global self-worth by measuring both positive and negative feelings about the self. The scale is believed to be uni-dimensional. All items are answered using a Likert scale format ranging from strongly agree to strongly disagree. Only the five positive items were used because the scale was presented on-line and there would be no assistance available if any of the negative items upset the students (e.g., "On the whole, I am satisfied with myself", "I feel that I have a number of good qualities").

Childhood Career Development Scale (CCDS)

The CDDS (Stead & Schultheiss, 2010) is a 74-item scale designed to assess children's' career development across the nine proposed dimensions of Super's (1990) developmental lifespan/life space theory of career. All items are answered using a Likert scale format ranging from strongly agree to strongly disagree. The items from the two sub-scales, Time Perspective (4 items, e.g., "It is important to plan now for what I will be when I grow up") and Key Figures (5 items, e.g., "I know people who I want to be like") were included in the study.

Procedure

Ethics approval was granted from the Human Research Ethics Committee of the University of [MASKED FOR REVIEW, Approval No: XXXX] and from the senior research officer of a major educational jurisdiction in Australia. The CEDS-Junior was set up as an on-line scale within the secure environment of the USQ data management system. The relevant coordinator for the jurisdiction involved, invited schools to participate and provided training and access for the relevant person in each of the schools which agreed to participate. The on-line version was accessible for one month and students who had appropriate parent permission were able to access the scale at any time in that period. The measures took approximately eight minutes for students to complete on-line.

Plan for Analysis

SPSS v.28 and AMOS v.28 were used for data analysis. Given that the CEDS is based on a theoretical framework we used Confirmatory Factor Analysis (CFA) with maximum likelihood estimator to test the measurement models. Model fit was appraised using the χ^2 test; RMSEA < .10; SRMR < .08; and CFI > .90 (Mvududu & Sink, 2013). Model testing was followed by analysis of mean differences across genders and grade levels, and correlational analysis of the CEDS' mean scores with the measures of self-esteem, time perspective, and significant others.

Results

The initial CEDS Junior model comprised the original seven items per factor. The model had an unacceptable fit: $\chi^2(186, N = 381) = 871.923$, $p < .001$, CFI = .860, SRMR = .065, RMSEA = .099, CI 90% [.092, .105]. The model was modified by removing from each factor those items with the weakest squared multiple correlations (i.e., Attitude 1, $r^2 = .45$; Action 5, $r^2 = .56$; and Understanding 4, $r^2 = .31$). The revised model with six items per factor had a better fit to the data but remained unacceptable: $\chi^2(132, N = 381) = 570.138$, $p < .001$, CFI = .892, SRMR =

.059, RMSEA = .093, CI 90% [.086, .101]. Inspection of modification indices revealed high coefficients for Understanding 6 and 7, Action 2 and 7, Action 6 and 7, and Attitude 2 and 3, and Attitude 6 and 7. Covarying those items produced an acceptable fit to the data: $\chi^2(127, N = 381) = 374.198$, $p < .001$, CFI = .939, SRMR = .048, RMSEA = .072, CI 90% [.063, .080]. We made no further changes and retained the six-item model.

Mean Differences

Differences between the mean scores for females and males and students in Grades 7, 8 and 9 are presented in Table 2. The differences are minimal; however, multiple analysis of variance (MANOVA) with gender (2) and grade (3) as the independent variables revealed the presence of significant differences among the dependent variables for grade, using Pillai's trace $V = .07$, $F(12, 716) = 2.20$, $p = .01$, but not for gender. There was no overall interaction effect. Follow-up analysis of variance (ANOVA) tested for between-subjects' effects and found significant differences across grades for: Understanding, $F(2, 362) = 6.31$, $p = .002$, partial eta^2 = .034; Action, $F(2, 362) = 3.28$, $p = .039$, partial eta^2 = .018; and Attitude, $F(2, 362) = 3.22$, $p = .041$, partial eta^2 = .017; but not for Figures, Time, and Esteem. Furthermore, there was a significant difference across gender for Esteem, $F(1, 362) = 8.46$, $p = .004$, partial eta^2 = .023. Bonferroni post hoc tests revealed that grade 7 students had relatively higher mean scores for Understanding, Action, and Attitude than the grade 8 and 9 students.

Correlations

Table 3 displays correlations among the measures. The Key Figures and Time Perspective sub-scales of the CCDS (Stead & Schultheiss (2010) correlated moderately to strongly with each of the three factors of the revised CEDS-Junior with the coefficients ranging from $r = .43$ to .49 for Figures and $r = .49$ to .56 for Time. The shortened version of the RSES correlated strongly

with each of the three factors of the revised CEDS-Junior with the coefficients ranging from 0.48 to 0.74. These strong correlations with the three measures provide additional evidence of validity of the CEDS-Junior.

Summary

Study 1 provided the first evidence of validity of the CEDS-Junior regarding its factor structure and convergence with measures of career-related constructs. There were no differences between the boys' and girls' scores on the CEDS's subscales; however, the younger students in grade 7 had higher scores for the three subscales.

Study 2

The purpose of Study 2 was to test a possible three-facture structure for CEDS-Primary through subjecting the data to CFA and by using other measures for validity evidence, the same as for Study 1.

Participants

Study 2 involved students from Grades 5 and 6 in three schools within a large education jurisdiction in Australia. Of the 212 students who responded 33 were deemed unsuitable mainly because of missing data, subsequently leaving a sample size of $N = 179$. Female participation was $n = 84$ (47%) while male participation was $n = 84$ (47%). Eleven students (6%) registered as neither male nor female. Participation by school grade was: grade 5, $n = 92$ (51%) and grade 6, $n = 84$ (49%). Participation was spread across three schools: School 1, $n = 37$ (21%); school 2, n = 39 (22%); and school 3, 102 (57%) participated. The ISCEA values for the respective schools are the same as listed in Study 1.

Measures

As in Study 1, the five positively-worded items of the RSES (Rosenberg, 1965) and subscales of four items and five items of the CCDS (Stead & Schultheiss, 2010) Time Perspective and Key Figures, respectively, were used as for evidence of concurrent validity.

Career Education and Development Scale-Primary (CEDS-Primary.).

CEDS-Primary was used for this study. There were seven items representing each of the three components of Understanding, Action and Attitude (21 items in total). The process for developing this Scale was the same as in Study 1. The revised version is presented in the Table 4 in the Results section together with the factor loadings for each item.

Procedure

Ethics approval and procedures mirrored the process of Study 1, as CEDS-Primary was made available for students in Grades 5 and 6 at the same time as CEDS-Junior was made available for students in Grades 7, 8 and 9.

Results

We tested the three-factor model with the original seven items per factor and its fit was unacceptable, $\chi^2(186, N = 179) = 408.047$, $p < .001$, CFI = .866, SRMR = .064, RMSEA = .082, CI 90% [.071, .093]. Like Study 1, we removed the weakest item from each factor with the lowest squatted multiple correlations (i.e., Attitude 6, $r^2 = .30$; Action 3, $r^2 = .23$; Understanding 4, $r^2 = .24$) and then tested a three-factor model with six items per factor. The amendments produced a better fitting model: $\chi^2(186, N = 179) = 271.280$, $p < .001$, CFI = .903, SRMR = .056, RMSEA = .077, CI 90% [.064, .090]. Again, similar to the process used for Study 1, we inspected modification indices for relatively high coefficients and covaried Understanding 2 and 3, and Attitude 4 and 5. The subsequent model revealed an improved fit to the data, $\chi^2(130, N = 179) =$

233.636, $p < .001$, CFI = .928, SRMR = .055, RMSEA = .067, CI 90% [.053, .081]. No further modifications were made.

Mean Differences

Differences between the mean scores for females and males in Grades 5 and 6 are presented in Table 5. The differences are minimal; however, multiple analysis of variance (MANOVA) with gender (2) and grade (2) as the independent variables revealed the presence of significant differences among the dependent variables for grade, using Pillai's trace $V = .10$, $F(6, 159) = 2.98$, $p = .009$, partial $eta^2 = .10$, and for gender, $V = .13$, $F(6, 159) = 3.80$, $p = .001$, partial $eta^2 = .125$. There was no interaction effects of gender x grade. Follow-up ANOVA tests of between-subjects effects for grade found significant differences for: Attitude, $F(1, 164) = 12.41$, $p < .001$, partial $eta^2 = .07$; and, Esteem, $F(1, 164) = 10.78$, $p = .001$, partial $eta^2 = .06$. Within gender, there were significant differences for: Attitude, $F(1, 164) = 4.62$, $p = .03$, partial $eta^2 = .03$; Figures, $F(1, 164) = 10.67$, $p = .001$, partial $eta^2 = .06$; and Esteem $F(1, 164) = 4.74$, $p = .03$, partial $eta^2 = .03$.

Correlations

The shortened version of the RSES (Rosenberg, 1965) correlated strongly with each of the three components of the CEDS-Primary with the coefficients being $r = .56$ for Understanding, $r = .60$ for Action, and $r = .67$ for Attitudes. Similarly, the Key Figures ($r = .40$, .51, and .47) and Time Perspective ($r = .56$, .60, and 0.67) sub-scales of the CCDS (Stead & Schultheiss (2009) scale also correlated very strongly with each of the components of the revised CEDS-Primary as shown in Table 6. These strong correlations with the three measures provided additional evidence of validity of the CEDS-Primary.

Summary

Study 2 provided the first evidence of validity of the CEDS-Primary regarding its factor structure and convergence with measures of career-related constructs. Unlike the CEDS-Junior, there is an evident difference between the boys' and girls' scores on the CEDS's Attitudes subscale, although the effect size is small. There is also a difference for Attitude between the two grades.

Discussion

The two studies reported here provide the first evidence of validity and reliability of the CEDS-Junior and CEDS-Primary which were specifically developed for use with junior secondary school and primary school students, respectively. For CEDS-Junior and CEDS-Primary, their three-factor structure reflects the three core components of the CEDF (AUTHORS et al., 2023a) and three factors posited in the empirically-derived model of Marciniak (2022), namely Understanding, Action, and Attitude. Affirmation of the three-factor model in all four versions of the CEDS, namely the CEDS-Primary and CEDS-Junior in present research, and the CEDS-Senior and CEDS-Tertiary in AUTHOR et al., (2023a and 2023b), provides evidence of the theoretical value of the CEDF that underpins the four CEDS. Researchers and practitioners could now trace the development of the same career constructs starting at a relatively young age and ranging across a wide age span. Additional evidence of validity is present in the CEDS-Junior and CEDS-Primary factors' correlations with the measures of self-esteem, future perspective, and the influence of significant others.

That grade 7 junior high school students had marginally higher mean scores on CEDS-Junior's Understanding, Action, and Attitude than the grade 8 and 9 students' scores, presents an interesting theoretical conundrum, as these students are—theoretically—in the same career development stage of exploration. An explanation cannot be found in the students' self-esteem,

sense of the future, and attitudes toward influential others, because these measures were not significantly different across the grades. Nonetheless, the grade 7's marginally higher scores should be treated with caution because the effect size partial eta^2 for each was small. Similarly, girls presented marginally lower mean scores for self-esteem, but the effect size was also small. The pattern of difference among the mean scores for the primary school students was somewhat different. As with the junior high, the girls in primary school had lower self-esteem than the boys, albeit a small effect size. We note that this small difference in self-esteem between males and females is commonly noted in research literature as a consistently evident phenomenon (Casale, 2020; Bleidorn et al., 2016).

The findings from these two studies reinforce the findings by Marciniak et al. (2022) where their extensive research on career maturity, career readiness, career adaptability and career preparedness revealed three groupings of constructs like the three components of the CEDF. The research by Stead and Schultheiss (2003) and Schultheiss and Stead (2004) with primary school students, found that their eight factors proved to be stable with no or minimal differences in gender and grade, much like the findings in Study 1 and 2 here. Nazli (2007) also found that primary school students were aware of their own self-concepts, their career planning concepts were well developed, and they could link their current experiences to future professions. Similarly, our studies found that younger students were able to identify with the three core components of the CEDF.

CEDS-Junior and CEDS-Primary provide career practitioners and researchers with two relatively short psychometric measures to use with younger students. Their three subscales Understanding, Action, and Attitudes are related to the comprehensive set of eight subscales

measured in later years using the CEDS-Senior. Thus, these two measures for younger students can become baselines for subsequent assessments using CEDS-Senior in later years of schooling.

Practical Implications

Teachers and career practitioners now have access to two self-assessment measures based on the already validated CEDF, that can be used with confidence by their students. The CEDS-Primary can be used with students aged from 10 to12 years and CEDS-Junior with students aged from 12 to15 years. Because the measures are developmental in nature and use the same theoretical framework, teachers can scaffold similar activities and processes with students in the early years to those in subsequent years. Their work will then dovetail into and around the use of the CEDS-Senior which has been validated in a previous study (AUTHOR et al., 2023a) and is suitable for students aged from 15 to18 years.

Given the importance of formal career-related learning at these early stages of student development to broaden horizons, challenge stereotypes, link learning to the world of work and promote a sense of self (Porfeli et al.,2008; & DMH Associates, 2021), the CEDS-Primary and CEDS-Junior will facilitate the development and implementation of activities and programs to address these issues through promoting and supporting the awareness and importance of CED in primary and junior secondary schools, celebrating areas of competence, identifying and focusing on developing activities in areas that need strengthening (e.g., career planning) and providing information to guide lesson planning and program development. The economical and holistic nature of the scales (Marciniak et al., 2021) mean that they can be implemented for different purposes. For example, with individual students, as pre- and post-measures of an intervention, embedded in the curriculum to progress students' career thinking and evaluate strengths and weaknesses of a program, and as a way of determining the general level of career development of

students in an institution or educational system. Their outcomes could be used as a basis for learning and/or discussion with parents and teachers as well as to facilitate policy development and the development and allocation of valuable career resources where they are most needed. Nonetheless, we cannot assume at this stage of the CEDS' development that it has measurement stability over time (e.g., test-retest reliability).

Limitations and Future Research

These two studies were conducted in a large, mainly provincial, educational jurisdiction in Australia and the sample used for the CEDS-Primary was relatively small. Although simulation studies suggest small samples may yield outcomes in factor analytic studies (de Winter, et al., 2009), further research needs to be undertaken to include larger numbers of students and students from a more diverse range of geographical locations and ethnic backgrounds. No socio-economic data other than the ISCEA was collected for each school. Future research could focus on target populations in different types of institutions in varying locations and provide evidence of the impact of SES and/or ethnicity on student responses (Choi et al., 2012). Possible links could be explored between the CEDS and academic performance and dispositional traits that are associated with career decidedness and exploration. It would also be important to do comparative studies between students who have been involved in an explicit career education and development program and those who have not.

The differences in girls' mean scores for Attitude and Esteem girls across Grade 5 and 6 warrants further investigation (Casale, 2020; Bleidorn et al., 2016). Is this difference associated with the transition from the Fantasy sub-stage to dealing with the Capacities and Crystallization sub-stages (Super, 1990) or the transition from the second to third stages in Gottfredson's (2005) theory where she postulates that students can now array occupations two-dimensionally, by

prestige and sex type, whereas before this, they aspired to occupations along one dimension, low or high alike (Gottfredson, 2005, p. 79)? Are the differences associated with pre-pubescence for girls or increased maturity around this age range? Targeted research is required to address the validity of these findings.

The data were collected on-line voluntarily, and several students chose not to complete the survey or adopt a response-biased approach. CEDS-Primary and CEDS-Junior are based on self-reporting and thus susceptible to self-reporting bias (e.g., where participants over- or under-estimate their career understandings, behaviors, and attitudes (Donaldson & Grant-Vallon, 2002). Dyadic or 360-degree data collection methodology, which compares the self-reports with other relevant data and personal observations, would address this concern. Future research could also investigate whether the CEDS' measurement properties are invariant across time and successive administrations.

Conclusion

The present study brings to completion a program of research into the CEDF which developed separate CEDS measures for students in tertiary colleges and senior high school (i.e., grades 10, 11, and 12; AUTHORS et al., 2023a, 2023b) and now, junior high school grades 7, 8, and 9, and primary school grades 5 and 6. Thus the research program has developed resources spanning grades 5 to 12 and college years. These measures provide researchers and educational practitioners a valuable resource for longitudinally tracking students' CDL as they progress through their schooling.

Declarations

The authors did not receive funding from any organization to conduct this research. The research was approved by the Human Research Ethics Committee of the University of [MASKED FOR REVIEW]. One of the authors is a member of the advisory board of the International Journal for Educational and Vocational Guidance. The authors declare that there are no competing interests or conflicts of interest pertaining to the content of the article.

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Figure 1

CEDF's Conceptual Model based on Marciniak et al. (2022).

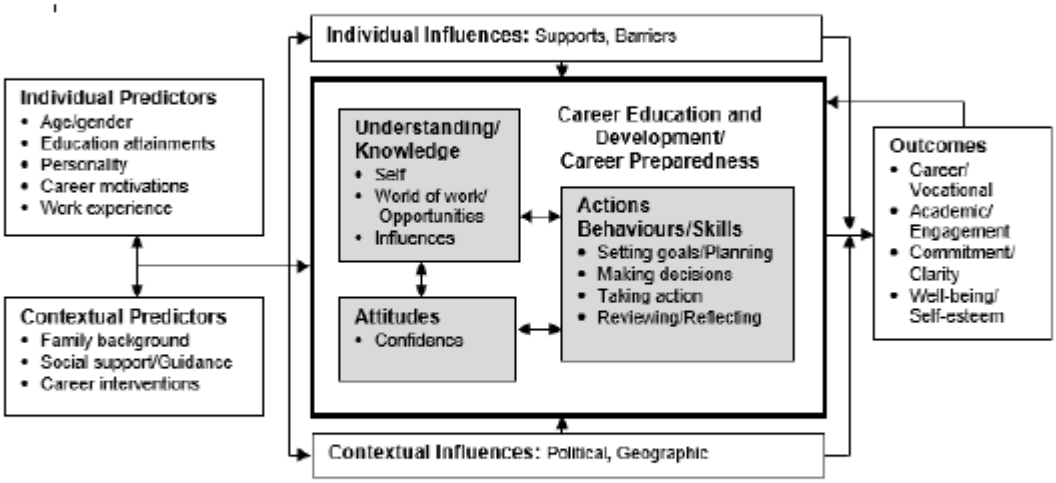

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Table 1

Confirmatory Factor Analysis Standardized Loadings for CEDS Junior

	Items	
Und 1	I have a good understanding of my strengths and interests and how they might relate to future courses or careers	.74
Und 2	I am aware of the subject(s) which I like or do well in and how it/they might relate to future courses and/or careers	.75
Und 3	I understand the importance of making course/career decisions which are mine and not influenced by my friends or social media	.60
Und 4	I understand the importance of making course/career decisions which are mine but are done with help from teachers and parents	--
Und 5	I have a good understanding of the world of work and a range of occupations within it	.65
Und 6	I have a good understanding of the range of subjects and/or courses which are available for me and where they might lead in terms of careers	.70
Und 7	I have a good understanding of career opportunities open to me	.70
Act 1	I have set myself clear and achievable subject and/or course goals	.75
Act 2	I have developed a career plan for myself.	.70
Act 3	I make good subject/course decisions based on a great deal of research	.79
Act 4	I usually consider my subject/course options carefully before making decision.	.70
Act 5	I am able to locate appropriate information on possible jobs and/or courses of further study	--
Act 6	I have researched what subject choices I need to make in the next few years.	.72
Act 7	I often review my subject/course/career plans	.72
Att 1	I am confident that I have a good idea of what career/course direction(s) or pathways I want to take	--
Att 2	I am confident I will be successful in my chosen occupation or career	.75
Att 3	I am confident that my talents and skills will be used in my future career/occupation	.73
Att 4	I am confident I can succeed at almost any endeavour to which I set my mind	.83
Att 5	When facing difficult tasks, I am certain that I will accomplish them	.83
Att 6	Compared to most people I can do most tasks quite well	.74
Att 7	Even when things are tough, I can perform quite well	.75

Note. Note. Und = Understanding; Act = Action; Att = Attitude. Und4, Act5, and Att1 were not included in the final model.

Table 2

CEDS Junior Means and Standard Deviations for Measured Variables Across Gender and Grade

		Grade					
		7		8		9	
		Female	Male	Female	Male	Female	Male
Understanding	*M*	3.89	3.95	3.57	3.70	3.55	3.66
	SD	0.62	0.84	0.73	0.72	0.65	0.71
Action	*M*	3.28	3.39	3.09	3.20	2.95	3.13
	SD	0.77	0.94	0.91	0.90	0.90	0.83
Attitude	*M*	3.66	3.75	3.42	3.66	3.36	3.50
	SD	0.85	0.99	0.71	0.74	0.81	0.82
Figures	*M*	3.57	3.51	3.27	3.60	3.24	3.53
	SD	0.83	1.04	0.90	0.88	0.99	0.82
Time	*M*	3.80	3.81	3.90	3.73	3.83	3.99
	SD	1.03	1.13	0.90	0.83	1.04	0.80
Esteem	*M*	3.61	3.72	3.19	3.73	3.35	3.54
	SD	0.94	1.07	0.86	0.79	0.89	0.94

Table 3

CEDS Junior Descriptive Statistics and Correlations Among Measured Variables

Variable	Understanding	Action	Attitude	Figures	Time	Esteem
Understanding	.85					
Action	.67**	.88				
Attitude	.65**	.63**	.90			
Figures	.44**	.43**	.49**	.81		
Time	.49**	.56**	.53**	.44**	.88	
Esteem	.53**	.48**	.74**	.40**	.40**	.91
M	3.68	3.14	3.51	3.43	3.84	3.47
SD	0.73	0.88	0.83	0.92	0.95	0.93
Skewness	-0.53	-0.02	-0.49	-0.30	-0.89	-0.59
Kurtosis	0.91	-0.22	0.28	-0.27	0.54	0.19

Note. ** $p < .001$. Cronbach α coefficient of internal consistent shown on the diagonal.

Table 4

Confirmatory Factor Analysis Standardized Loadings for CEDS Primary

	Items	
Und 1	I am aware of my interests and how they might relate to future careers for me	.70
Und 2	I know what I am good at and how that might relate to future careers for me	.64
Und 3	I am aware of my strengths and how they might relate to future careers for me	.67
Und 4	I Understand that my parents and teachers will help me with my future course and career choices.	--
Und 5	I Understand that my friends may wish to help me with my future course and career choices.	.52
Und 6	I have some Understanding of possible course/career options available to me	.76
Und 7	I have some Understanding of the world of work and many of the occupations in it.	.52
Act 1	I have identified some course/career options which are of interest to me or might suit me.	.61
Act 2	I have researched a range of occupations.	.54
Act 3	I have visited some workplaces.	--
Act 4	I have asked some adults about their work.	.57
Act 5	I usually consider things carefully before making decisions.	.54
Act 6	I am good at making decisions about which projects, tasks or activities to choose.	.72
Act 7	I often think about my future career plans.	.73
Att 1	I am confident I will be successful in my chosen occupation or career	.78
Att 2	I am confident my talents and skills will be used in my future career/occupation	.80
Att 3	I am confident about my future	.82
Att 4	I am confident I can succeed at almost anything to which I set my mind	.76
Att 5	I am confident I can overcome any difficulties which come my way	.66
Att 6	Compared to most people I can do most tasks quite well	--
Att 7	Even when things are tough, I can perform quite well	.61

Note. Und = Understanding; Act = Action; Att = Attitude. Und4, Act3, and Att6 were not included in the final model.

Table 5

CEDS Primary Means and Standard Deviations for Measured Variables Across Gender and Grade

		Grade			
		5		6	
		Female	Male	Female	Male
Understanding	*M*	4.03	3.97	3.67	3.97
	SD	0.76	0.51	0.81	0.64
Action	*M*	3.90	3.75	3.50	3.67
	SD	0.77	0.71	0.93	0.83
Attitude	*M*	4.06	4.03	3.36	3.90
	SD	0.64	0.69	0.92	0.80
Figures	*M*	3.64	3.84	3.34	4.16
	SD	0.98	1.07	1.11	0.85
Time	*M*	4.05	4.24	3.83	4.04
	SD	0.84	0.75	0.95	0.98
Esteem	*M*	4.04	4.15	3.54	3.92
	SD	0.73	0.57	0.82	0.78

Table 6

CEDS Primary Descriptive Statistics and Correlations Among Measured Variables

	Understanding	Action	Attitude	Figures	Time	Esteem
Understanding	.80					
Action	.70**	.79				
Attitude	.62**	.69**	.88			
Figures	.40**	.51**	.47**	.84		
Time	.56**	.60**	.52**	.42**	.84	
Esteem	.56**	.60**	.67**	.40**	.40**	.86
M	3.82	3.70	3.91	3.72	4.05	3.86
SD	0.84	.81	0.69	1.06	0.89	0.83
Skewness	-0.87	.89	-0.99	-0.59	-1.00	-0.95
Kurtosis	0.60	1.01	2.71	-0.44	0.48	0.66

Note. ** $p < .01$. Cronbach α coefficient of internal consistent shown on the diagonal.

5.2 Links and implications

The initial CEDS-Junior and CEDS-Primary model comprised the original seven items for each of the three factors. The model had an unacceptable fit but was modified by removing from each factor those items with the weakest squared multiple correlations The revised model with six items per factor had a better fit to the data but remained unacceptable. Inspection of modification indices revealed high coefficients for some items. Covarying those items produced an acceptable fit to the data and no further changes were made and the three-factor, six-item model was retained. The two studies reported here provide the first evidence of validity and reliability of the CEDS-Junior and CEDS-Primary.

Differences between the mean scores for females and males these grades are minimal; however, multiple analysis of variance (MANOVA) with gender and grade as the independent variables revealed the presence of significant differences among the dependent variables for grade (Understanding Action and Attitude). Follow-up ANOVA tests of between-subjects effects for grade found significant differences for Attitude and Esteem. There was not an interaction effects of gender x grade. Post hoc tests revealed however, that grade 7 students had relatively higher mean scores for Understanding, Action, and Attitude than the grade 8 and 9 students.

The shortened version of the RSES (Rosenberg, 1965) correlated strongly with each of the three components of the CED-Junior and CEDS Primary. Similarly, the Key Figures and Time Perspective sub-scales of the CCDS (Stead & Schultheiss (2009) scale also correlated very strongly with each of the components of the revised scales. These strong correlations with the three measures provided additional evidence of validity of the CEDS-Junior and CEDS-Primary.

Students in Grades 5, 6, 7, 8 and 9 do have career beliefs at this stage of their career development, which do reflect the three basic components of the revised CEDF but do not yet reflect the more-detailed eight elements/factors of the framework as do students in higher

grades. The revelation that the more general career beliefs at earlier stages become more specific beliefs at later stages, reinforces theories of career development (Gottfredson, 2005; Super, 1990; Ginsberg, 1984). The career beliefs, however, can be traced from the more general aspects of the revised CEDF at younger ages to the more specific aspects of the revised CEDF at later ages. This will enable teachers, career practitioners, school administrators and researchers to track the career development of students longitudinally.

Further studies involving larger samples of students would need to be undertaken to confirm or otherwise these findings.

CHAPTER 6: DISCUSSION AND CONCLUSION

6.1 Purpose of the research

The aim of this research was to investigate the psychometric properties of the four CEDS: CEDS-Tertiary; CEDS-Senior; CEDS-Junior; and CEDS-Primary (McCowan & McIlveen, 2019). The four scales measure vocational and career constructs which educators address within CED curricular frameworks. The research questions were:

1. Do the CEDS reflect the Career Education and Development Framework (CEDF) based on the empirical model by Marciniak et al. (2022) and published by McCowan et al. (2017; 2022)?
2. Do the CEDS exhibit appropriate psychometric properties such that they can be considered to be empirically valid, provide valuable data for educators and administrators, and can be used by career practitioners with confidence and assurance?
3. Do any of the CEDS have applicability in international contexts?

More Specifically, do the four versions of the CEDS demonstrate acceptable evidence of their measurement properties via:

- Testing of their hypothesized factor structures, as full-scales and sub-scales where appropriate;
- Testing across different samples (e.g., different schools and different countries); and
- Analysing whether the scales correlate with established measures of similar vocational/career constructs that are available in the literature?

6.2 Main findings

The three studies revealed that the four scales: CEDS-Tertiary; CEDS-Senior; CEDS-Junior; and CEDS-Primary, exhibited empirical and concurrent validity and the revised CEDF on which they are based, is an empirically-validated framework.

The CEDS-Senior and CEDS-Tertiary were both found to be an acceptable fit to the hypothesised eight-factor model congruent with the original design and conceptual framework

of the revised CEDF. CEDS-Senior was first tested using a sample of students from four Australian non-government high schools from three States across Australia (n = 576) and then in a sample of students (n = 272) from a large public educational jurisdiction. The Vietnamese version of CEDS-Senior was tested in a sample of high school students (n = 1283) from government and non-government schools across Vietnam. CEDS-Tertiary was tested in a sample of Vietnamese university students from government universities across Vietnam. (n = 634). Both scales consist of 24 items with three items for each of the eight factors and the resulting models emanating from the Australian and Vietnamese high school students were equivalent - that the scales had empirical and concurrent validity.

The CEDS-Junior was tested using a sample of students (n = 381) from a large public educational jurisdiction and was found to have an acceptable fit to the three-factor model consistent with the three higher order components of the revised CEDF, namely Understanding, Action and Attitude. It also demonstrated concurrent validity. The CEDS-Junior consists of 18 items, made up of 6 items for each of the three components/factors.

The CEDS-Primary was tested using a sample of students (n =125) from a large public educational jurisdiction and was found to have an acceptable fit to a three-factor model, consistent with the three components of the revised CEDF – namely Understanding, Action and Attitude. The scale also demonstrated concurrent validity. The final version of CEDS-Primary consists of 18 items with 6 items for each of the three components of the revised CEDF. The final versions of the four scales are presented in Appendix C. These reflect the elements/factors and components of the CEDF in a progressive manner. CEDS-Primary and the CEDS-Junior both have 18 items and CEDS-Senior and CEDS-Tertiary each have 24 items. Table 20 shows how the items in each of the scales reflect the elements/factors and components of the revised CEDF.

Table 20

Comparison of the item structure for the four CEDSs

CEDS-Primary	CEDS-Junior Secondary	CEDS-Senior Secondary	CEDS-Tertiary
UNDERSTANDING/	**UNDERSTANDING**	**UNDERSTANDING**	**UNDERSTANDING**
Understand self x 3	Understand self x 2	Understand self x 3	Understand self x 3
Understand influe x 1	Understand influe x 2	Understand influe x 3	Understand influe x 3
Understand opport x 2	Understand opport x 2	Understand opport x 3	Understand opport x 3
ACTION	**ACTION**	**ACTION**	**ACTION**
	Goal setting x 2	Goal setting x 3	Goal setting x 3
	Making decisions x 1	Making decisions x 3	Making decisions x 3
	Taking action x 2	Taking action x 3	Taking action x 3
	Review/reflecting x 1	Review/reflecting x 3	Review/reflecting x 3
ATTITUDE	**ATTITUDE**	**ATTITUDE**	**ATTITUDE**
7. Confidence x 6	Confidence x 6	Confidence x 3	Confidence x 3
TOTAL 12	**TOTAL 18**	**TOTAL 24**	**TOTAL 24**

Understand=Understanding; influe=influences; opport=opportunities; review=reviewing

The content of the items for the same construct across the scales not only reflects the element/factor or component/factor but it also reflects the stage of development of the students. For example, the *Understanding self*, element/factor is represented by items in CEDS-Primary and CEDS-Tertiary, each of which is different from the items in CEDS-Junior and CEDS-Senior. There is a progression in thinking from more concrete to more cognitive for the same construct as outlined in Table 17.

Table 21

The four items representing the same constructs across the four scales

Example construct: *Understanding Self* CEDS-Primary: *I know what I am good at and how that might relate to future careers for me*. CES Junior & CEDS-Senior: *I have a good understanding of my interests and how they might relate to future courses or careers.* CEDS-Tertiary: *I have a good understanding of my personal strengths and attributes and how they might relate to future careers or further study options*. Example construct: *Understanding Opportunities* CEDS- Primary: *I have some understanding of possible career/course options available to me*. CEDS-Junior: *I have a good understanding of career opportunities open to me*. CEDS-Senior & CEDS-Tertiary: *I have a good understanding of the many different career pathways open to me.*

6.3 Theoretical implications

The initial framework was derived from extensive practical experience that was harnessed to identify the common steps used when assisting students with their career planning (McAlpine & McCowan 2007). These common steps were translated into the initial CEDF (McCowan &Nguyen 2014) which underpins the development of the four scales.

An examination of the career/vocational constructs in common use was needed to confirm whether these 'steps' reflect the constructs that have been derived from theoretical models and extensive research. Watkins et al. (1994) for example, surveyed career counsellors across the USA and found that career assessments at the time focussed on mainly interest, needs/values and abilities (CEDF: Understanding Self). They did acknowledge that as theories and approaches emerged, that list would grow. Swanson and D'Achiardi (2005) added attitudinal constructs and process- and outcome-orientated constructs with many overlapping. A review of these constructs (Table 4) indicates that many overlap those of the CEDF

including self-exploration (Understanding Self) career choice (Making Decision) and adjustment (Review/Reflect).

Lent and Brown (2006) took a different approach where they developed a model/framework based on Social Cognitive Career Theory (SCCT) which focusses on the factors affecting the career choice process which resembles a work-flow process similar to the Alpine and McCowan (2007) approach. Their ten constructs mapped well to the seven constructs of the CEDF as presented in Table 5.

The work by Larson et al. (2013) was most influential in confirming the constructs identified in the CEDF. Based on meta-analytic reviews they developed a comprehensive framework for placing vocational assessments within the context of a client's life experiences and around research on career interventions. Larson et al. (2013) indicated that the list was not exhaustive but acted as a reasonable overview to help practitioners and researchers know the operational definitions of the constructs they were using in their work. A comparison of the 17 representative constructs they listed as being used in career counselling, compared to the seven in the CEDF in Table 6, revealed that all seven constructs of the CEDF had at least two corresponding constructs in their list. However, the attitudinal construct around confidence and self-efficacy had no corresponding construct in the CEDF. A review of the other models revealed that attitudinal constructs were starting to emerge. For example, the Lent and Brown (2006) model included a 'self-efficacy expectations' construct. Also, a review of related measures revealed that some scales, like the Career Development Inventory, Australian, Short Form, included an attitudinal construct – Career Development Attitude. Consequently, the Attitudinal component with the construct 'Confidence' was added to the revised CEDF. All studies in this research confirmed that the Attitudinal component was not only viable but essential in the revised CEDF.

The strong correlations between the eight elements/factors in CEDS-Senior and CEDS-Tertiary, indicated that the eight constructs they represented, related to each other and to the total. That is, students perceived them to be a set of coherent constructs that made sense to them. Similarly, the three components of CEDS-Junior and the two components of CEDS-Primary, correlated strongly to each other and the totals respectively. In each case, the scales reflected the revised CEDF and the empirically and theoretically derived models on which it was based.

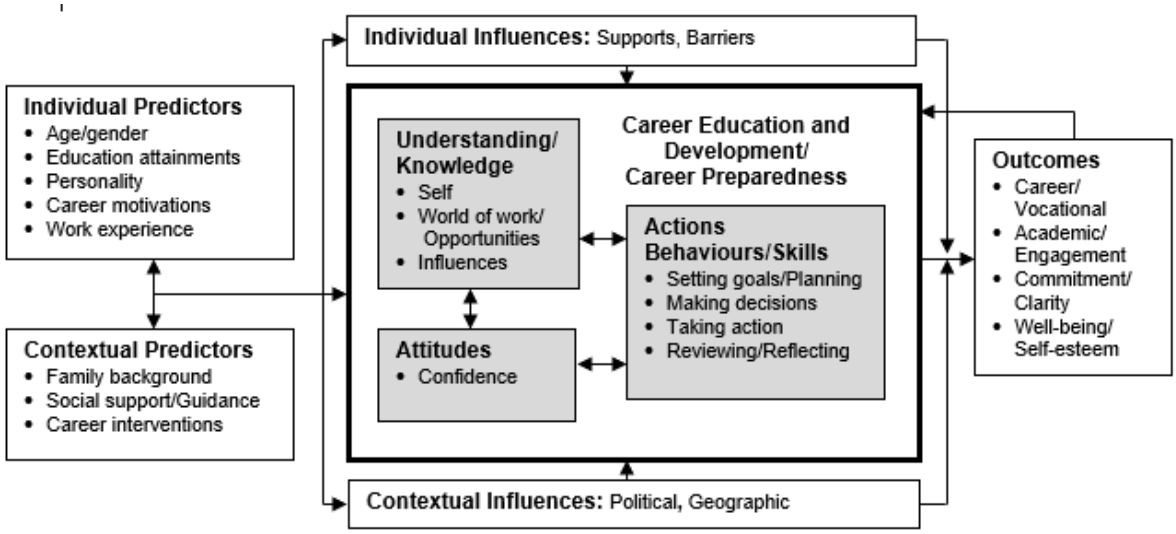
Rottinghaus and Miller (2013) took an approach based on the work of McAdams and Pals (2006), which explored the connection to the Big 5 Personality Theory. They developed an integrative model for considering cultural and contextual factors of a personality system as presented in Figure 2. Of special interest in their model is the Characteristic Adaptations (CA) component in the middle of traits, contexts and the personalised views of one's evolving life story. CA addresses how people adjust to the pivotal qualities in social-cognitive and developmental career theories and includes motivational qualities such as interests and vocational identity. It is the many qualities, strategies and processes, through which individuals operate, as represented by the CA component of their model, that can be shaped by career programs and interventions. This work by Rottinghaus and Miller (2013) placed the more operationally-focussed CEDF into the middle of a much larger personality system surrounded and influenced by career theories.

The theoretical and empirical work of Marciniak et al. (2022) had the greatest impact on this research. They undertook a detailed investigation of career preparedness defined as "the attitudes, knowledge, competencies and behaviours necessary to deal with expected and unexpected career transitions and changes" (p. 2), through an extensive examination of the use of constructs such as career maturity, career readiness and career adaptability, throughout the literature. Because their resultant framework resembled closely the initial CEDF, it was

modified and adapted to become the revised CEDF as presented in Figure 4 and repeated here in Figure 7. This has meant that the revised CEDF can be represented by an integrated model as a total system, reflecting the Systems Theory of Patton & McMahon (2014).

Figure 7

Integrated model for the revised CEDF based on the framework of career preparedness by Marciniak et al. (2022)



All studies confirmed the theoretical- and empirical-based model developed by Marciniak et al. (2022) which was adapted to form the basis of the revised CEDF. These outcomes reinforce the confluence of practice, theory and research to achieve a valid framework and four scales with empirical and concurrent validity.

The revised framework that has been confirmed by these studies, is an advancement on previous frameworks such as those of Lent and Brown (2006) and Rottinghaus and Miller (2013). The revised CEDF clearly delineates the 'engine room' of career work which operates inside the predictors, influencers and outcomes which are so crucial in theories like SCCT. This 'engine room' consists of the components and elements/factors/constructs which drive CED programs and interventions. Career practitioners and administrators now have access to

an easily recognisable way forward to identify, initiate and evaluate their programs and interventions with confidence.

The identification of the Attitude component at the same level as the Understanding and Action components, sends a clear message that the attitudinal component is significant. The studies resonated with the schools' personnel involved in the research because, before the current research, they perceived the Attitudinal component to be a by-product of their interventions rather than as deliberate, integral and proactive part of them. The revised CEDF attributes equal importance to all three components and eight elements/constructs.

Previous frameworks tend to label constructs in more theoretically-derived and psychologically-based terminology such as: adaptability, expectations and behaviours. The revised CEDF used terms to represent constructs which were derived initially by experienced practitioners and based around their daily work. They are action-based and focused more on tasks which are aligned with educational practices. For example, 'knowledge' equated to the educational term 'understanding' and 'behaviour' equated to the more proactive term, 'taking action'. A key inclusion in the revised CEDF is the construct of 'reviewing/reflecting'. The psychological approach tends to focus on 'review' but the educational focus is to 'reflect', as reflection is one of the most powerful learning strategies and resonates with educators.

The distillation of constructs to just three single-word components and simple, eight factors/elements, makes the revised CEDF more comprehensible than other frameworks in use such as the ABCD with its 12 complex competencies. Although the terminology is more aligned with practice, the validation of the revised CEDF will give practitioners and administrators confidence since it has been theoretically and empirically validated.

6.4 Methodological implications

Although the CEDS are based on a combination of experiential, theoretical and empirical work, it is the methodology used in this research that determines their viability and

robustness. Where appropriate, PAF and CFA were used along with an exploration of gender and grade differences.

For CEDS-Tertiary and CEDS-Senior, the hypothesised eight elements/factors of the CEDF, enabled the direct use of CFA to confirm these eight factors/elements grouped into the three components of CEDF namely UNDERSTANDING: Self, Influences, Opportunities; ACTION: Setting Goals, Making Decisions, Taking Action & Reflecting/Reviewing; and ATTITUDES: Confidence. Repeated studies in different contexts confirmed these findings.

For CEDS-Senior, the combined data, the data for boys and the data for girls all had acceptable fit to the model, with the CFI value for girls being marginally lower than for boys. Invariance testing revealed an acceptable fit for configural and metric invariance although there was a significant difference between the constrained and unconstrained models in the first study but no difference in the second study. Sources of potential invariance were explored in both studies; however, the alternative restrictive models were found not to be superior to the original model and it was concluded that the model evinced partial metric invariance. In terms of scalar invariance, the models for intercepts and covariances had acceptable fit. Because the test between the metric and scalar models was significant, further exploration was undertaken with the conclusion that the model evinced partial scalar invariance in these samples.

There were non-significant differences between gender and grades, with students in Grade 11 having slightly lower mean scores for Goals. This result might prompt further work with Grade 11 students who may not yet see the connection between school performance and future outcomes. There were trivial differences between the means score for boys and girls on Influences, Goals, Reflect, and Confidence.

The low percentage of respondents from Grade 12, means that this data must be taken with caution. Correlation studies revealed that both the NGSES and the VOE strongly correlated with each of the eight factors/elements of the revised CEDF.

For CEDS-Senior VN and CEDS-Tertiary VN the eight-factor model represented an acceptable fit to the data for both measures. All paths to the latent factors were also significant. For CEDS-Senior, modification indices indicated a high coefficient for selected items but correlating the error terms produced an even better-fitting model. Given that the two studies were the first to use the comparator measures, NGSES, VOE and CFI-9, the measurement models for these measures were also tested. For NGSES and VOE, the initial models produced an equivocal fit on some indicators. Inspection of modification indices revealed high coefficients for the same items. Correlating their error terms produced an acceptable fit and the measures were not amended. This ensured that the information on the first use of these measures in a Vietnam setting was complete, so as to provide a baseline for future studies. The NGSES and VOE correlated with each of the eight factor/elements of CEDS-Senior. NGSES and the subscales of the CFI-9 correlated strongly with all eight factor/elements of CEDS-Tertiary. However, these results need to be considered with a degree of caution because it is the first time these measures have been employed in Vietnam.

For CEDS-Senior VN, mean differences were significant for Grade and for Gender but in both instances, the effect size was small. For Grades, the differences were found in Actions and Confidence while for Gender, the differences were found in Self, Opportunities, Goals and Confidence. For CEDS-Tertiary, mean differences were not significant for different Year levels except for Confidence and there were minor differences for Gender in terms of Decisions. Univariate tests however, found no significant mean differences for all subscales in both measures. Both measures can be used across Grades, Year levels and Gender with confidence. The mean differences which did appear, warrants further research despite their non-significance.

For CEDS-Junior and CEDS Primary, PAF was employed first to explore the underlying factor structures as there was uncertainty around the nature of the structures at these

early stages of students' career development. A possible three-factor model emerged which reflected the three components of the revised CEDF. More items were written for each of these three hypothesised factors.

For CEDS-Junior, the hypothesised model was tested using CFA and it had an acceptable fit to the data. Inspection of modification indices revealed high coefficients for several items. Covarying the error terms for those items produced a more acceptable fit to the data. Minimal differences were revealed for the mean scores for Gender and Grade. Grade 7 students had relatively higher means for all three factors than students in Grade 8 and 9 This may reflect that students are still aligned with the Fantasy stage (Super, 1990) at this stage of their career development or have a minimal understanding of the upcoming complexities around future course decisions

The study involving CEDS-Primary revealed that it had an acceptable fit to a three-factor model, consistent with the three components of the revised CEDF – namely Understanding, Action and Attitude. The error terms for four items were covaried and the revised model revealed an improved fit for the data. The mean differences between boys and girls in Grades 5 and 6 were minimal but a significant difference was found for Grade. Follow up ANOVA tests for Grade found significant differences for Attitude and Esteem. This warrants further investigation. Strong correlations with the three comparator measures provided evidence of concurrent validity.

A comparison study needs to be undertaken in the future with students in Grades 5 and 6 who have and have not experienced career-related activities to determine if the absence of the Action component is valid for these Grades.

Although some minor differences in scores for gender were present in all studies, none neared significance except in the Attitudes component for CEDS-Junior. The lower scores obtained in this component for the older girls in this cohort maybe a reflection of gender

differences found in other studies (Bleidorn et al., 2016 and Casale, 2020) and requires further exploration. Differences in scores across grades/year levels in all four scales were minor which meant the scales can be used for developmental comparisons within each scale and for more longitudinal studies.

All six studies involved in this research found an acceptable fit to the hypothesised models whether they be the three factor models at junior-secondary and primary-school levels or the eight-factor models at senior-secondary and tertiary levels both in Australia and Vietnam. With a couple of exceptions invariance testing found minimal differences between girls and boys and students in different grade levels. The studies confirmed that the four English language versions and the two Vietnamese language versions of CEDS demonstrate validity, concurrent validity and reliability.

6.5 Practical implications

The revised CEDF can now be used with confidence to underpin and drive CED interventions in school, colleges, and universities with the knowledge that the basic framework behind those interventions, is coherent to students and empirically valid and reliable. The four scales emanating from the revised CEDF, provide us with a suite of measures that can be used with confidence by a range of stakeholders for different purposes.

At the student level, the CEDS can be used as a self-assessment tool providing the student with a score on their level of career thinking in relation to the relevant components and elements of the revised CEDF, at their stage of career development. Having the results from the CEDS would enable students to reflect on their level of career thinking at any stage and discuss their findings with parents, teachers/lecturers, and career practitioners. Together they could celebrate their areas of strength and plan on actions to address any areas which appear to be under strength. By using the framework of the revised CEDF, the discussions could be targeted and/or generalised as required.

At the educator/career practitioner level, the CEDS can be used as diagnostic, career readiness or quality -assurance tools. In the first instance they could be used as screening tools to identify areas of need at student, class, or grade level. For example, collated scores could help determine or advocate for increased interventions and inform the development of appropriate curricular interventions tailored to meet the needs of a particular cohort. Individual scores could be scanned to identify students at risk or in need of direct help. Pre and post scores before and after an intervention, could be used to provide evidence of the impact or not, of that intervention but also facilitate evidence-based practice. Individual scores could be the basis for reporting and discussing progress with class teachers and parents.

Teachers and lecturers have access to data to drive curriculum reform and better understand their students, while career practitioners can drive proactive career programs and interventions as well as attend to and remediate areas of high need.

At the administrator/policy level, collated scores could be used to inform policy development and the allocation of precious resources whether that be time, people, training and/or materials. Results could be used to support the advocacy of increased interventions in a very crowded curriculum. At a system level, comparison of the scores across year levels could highlight developmental issues which might need further exploration and addressing. For example, any gender difference at different stages, and lower scores from students in a particular Grade, could attract increased attention. It would also be possible to track students' career-related thinking over time and provide crucial evidence of school performance when supporting student career development.

At the researcher level, researchers can access scores at component/element/factor levels as well as a total score, to facilitate and progress relevant research. The research undertaken here has already begun the process by identifying areas which could be explored further such as: gender; ages; stages of career development; levels of intervention; socio-

economic difference; and links to academic performance and/or career outcomes. The spread of scales over such a wide span of student development, enables the possibility of longitudinal studies to be undertaken. The introduction of scales suitable for use in the early stages of career development, draws much-needed attention to these undervalued stages.

The dearth of quality assurance measures in use in Australian schools (Rice et al., 2022) means that all four scales can be used to address this void.

6.6 Limitations

Although this study involved the development and testing of four measures, the concentration on three published articles, means that not all scales were fully tested. For example, CEDS-Senior was tested using two different samples of students whereas CEDS-Junior and CEDS-Primary were tested using one sample of students. CEDS-Tertiary was tested in a Vietnamese setting but not in an equivalent Australian setting. Ethics approval was obtained to conduct a study using CEDS-Tertiary in a large Australian University but just when the study was about to commence, it had to be cancelled due to organisational changes.

One limitation with the current studies is the restrictions associated with the comparator measures in the Vietnam context. As research progresses in Vietnam, the information around more scales will increase. For example, the total scores and component/element/factor scores of CEDS-Tertiary VN and CEDS-Senion VN can now be used as full or partial comparator measures when investigating the properties of new measures or translated measures in Vietnam.

Another limitation is the response numbers in certain instances. For example, the response numbers from students in Grade 12 was low. Grade 12 is an exceptionally busy year for students as they culminate their formal schooling and prepare for the transition to post-school options. The results at this Grade level need to be challenged or confirmed by further research. Also, the response rate for students in Primary schools was low. At this level, class

sizes can be relatively small and seeking voluntary participation in a study in an area unfamiliar to them, proved problematic. In both instances the completion of the scales could be embedded into the curriculum, rather than added as an additional burden.

Although the earliest research involved four independent schools in three States across Australia, all the subsequent research in Australia was undertaken in only one large jurisdiction representing only public schools. Other jurisdictions, communities and independent schools need to be canvassed in future studies. The Index of Community Socio-educational Advantage (ICSEA) for each school in the selected jurisdiction indicated that all schools involved were close to the Australian average. However, further detailed SES data was not obtained so that comparisons with different SES communities or ethnic groups for example, could not be undertaken (Choi et al. 2012).

The differences in means scores between gender was evident but, in most instances, were nor significant. The work of Bleidorn et al. (2016) and Casale (2020) tells us that this needs further investigation. Bleidorn et al. (2016), found using a large cross-cultural internet sample, that, from adolescence, males consistently reported higher self-esteem and that age was also related to an increase in self-esteem. They also uncovered significant socio-economic and cultural differences. Casale (2020), found modestly large differences in self-esteem, where for adolescent boys it was higher than for adolescent girls. They proposed that the differences are driven by both socio-cultural factors and genetically-based biological processes that transcend culture and context.

The majority of the data was collected online. Issues around potential self-reporting response bias (Donaldson & Grant-Vallon, 2002) where participants over- or underestimate their career understanding, behaviours and attitudes, was not investigated. Dyadic or 360-degree data collection methodology, could compare the self-report data with other relevant data and personal observation, to address this issue.

Missing data responses were not followed up. For example, was there a pattern behind the relatively high number of students who volunteered to undertake the various scales but who withdrew from the process within a minute after starting it, despite being informed that the scales would take under ten minutes to complete?

Comparisons with students who had participated in CED programs with those who had not, were not investigated. At primary and junior secondary schools in particular, the students sampled in this research had not participated in any designated career interventions or career activities. It is acknowledged that a comparison sample of students from schools where such career interventions or activities were provided, might have elicited different responses. In terms of CEDS-Primary for example, it would be important to find out if the Action component was present from such research.

The responses from students with varying levels of academic achievements were not compared. For example, would students with high academic results differ in their career thinking from students with lower academic results because of possible differences in capacity to conceptualise and understand constructs?

No links were made between the data and student outcomes. Regression analyses could be employed to explore this further. An example of outcomes research was that by Sikora (2020) in her studies of adolescent occupational expectations, revealed that indecisive career thinking around age 15, directly correlated with diminished occupational outcomes around age 25. CEDS-Senior with its eight elements/factors, including one on decision making, could provide a valuable resource for such outcomes research.

6.7 Future directions

The future directions for the use and application of the four scales could take two general pathways – one which focusses on CEDS-Primary and CEDS-Junior and another which focuses on CEDS-Senior and CEDS-Tertiary.

6.7.1 CEDS-Primary and CEDS-Junior

The development of career-related measures for use in Junior Secondary and Primary schools in particular, has been very limited. As this is one of very few such studies, it is important that the findings be replicated and/or challenged in future research. For example, the differences in gender across grade levels, as revealed in this research, needs to be explored further, particularly in the Attitudinal domain. The sample sizes obtained for this research were relatively small, particularly when investigating CEDS-Primary. It would be important to conduct similar research across a larger number of schools and involving a larger number of participants.

Despite the AEC, ABCD and revised CEDF frameworks including material for use in junior secondary and primary schools, there is minimal activity at these educational levels across Australia (Proctor, 2005). Also, at these levels there are minimal career/course decision points which means that many schools do not implement developmental CED programs and activities. Schools tend to focus on only key decision and transition points and react by introducing activity just prior to these key points. This is despite the consistent research which identifies developing building blocks in the early years promotes career maturity and depth of career understanding, when important decisions and actions are required (Covacevich et al., 2021; Inter-Agency Working Group on Career Guidance (2021); Mann et al., 2020).

Future research could utilise the CEDS to explore the career-related beliefs of students in schools where there are explicit CED activities embedded in the school curricular compared to students in schools where there is no explicit career-related activity. Issues such as the impact of socio-economic status, ethnic background and geographical location should also be explored. Longitudinal studies could begin with students at the Primary school level and follow their changes in career thinking and career development learning through to at least Grade 12 and maybe beyond to tertiary level, using the same underlying revised CEDF.

Because of the positive findings for the use of the translated scales of CEDS-Senior and CEDS-Tertiary in Vietnam, translated versions of CEDS-Junior and CEDS-Primary could also be investigated. With the increase in the training of career practitioners, the increase in career activity in schools, the progression of career practitioners to tertiary leaders and researchers, the influx of highly qualified staff into bi-lingual schools and universities from USA, UK and Australia, comes opportunities for increased CED activity and research. Given access to the research by Mann et al. (2020) for example, policy makers, administrators and career practitioners who understand the importance of CED in Primary schools, could encourage and facilitate local studies to validate translated versions of CEDS-Primary and CEDS-Junior.

Researchers could set total scores or scores at component or element/factor level obtained from the CEDS, as the criterion variable for related studies. For example, the score for Attitude could be set as the baseline against which to explore issues such as academic attainment, performance outcomes or gender difference on related psycho-social measures.

6.7.2 CEDS-Senior and CEDS-Tertiary

The results of the examination of the statistical properties for CEDS-Senior and CEDS-Tertiary in both Australia and Vietnam were strong which indicates that the measures can be used with confidence at these levels. Career practitioners can use the scales to strengthen their implementation of evidence-based practice when introducing CED activities in school and post-school institutions.

Further research can now be undertaken which explores issues such as the impact of socio-economic status, policy changes, geographical location, ethnic background, and gender as well as links to academic performance and post-educational outcomes.

In the studies which involved the use of NGSES as a comparator measure, the school practitioners and administrators in the jurisdiction involved, found that the single score for self-efficacy provided them with valuable information, particularly with girls at different grade levels. They suggested that a self-efficacy measure be integrated in the attitudinal component

of the CEDF and the scales, so that they didn't need to administer a separate scale with the students. Larson (2013; see Table 6) also coupled self-efficacy with confidence in her listing of measures again constructs and Marciniak et al. (2022) also included self-efficacy as one of the precursors to career preparedness.

An examination of the eight-item NGSES revealed that the items correlated well with all eight factors/elements of CEDS-Senior. The three items in NGSES which had the highest factor loadings were identified and added to a pilot analysis of the CEDS-Senior. The three items identified from the NGSES for inclusion in the CEDS-Senior and CEDS-Tertiary were:

- I believe I can succeed at almost any endeavour to which I set my mind;
- I will be able to successfully overcome many challenges; and
- I am confident that I can perform effectively on many different tasks.

The resultant nine-factor model showed great promise. The addition of this second factor/element to the Attitudinal component of the revised CEDF and the CEDS-Senior and CEDS-Tertiary should be investigated further as it would strengthen the underlying framework and provide educational personnel with valuable information, particularly when tracking boys and girls through different stages of their career development.

The aim of this study was to develop a holistic, yet economical scale, which could reveal students' career beliefs in terms of a single overall score, a score for each of the three components of the revised CEDF and/or a score for each of eight elements/factors for CEDS-Senior and CEDS-Tertiary. This was achieved, enabling further research to focus at these three different levels of results where appropriate. The scales can now be included in a suite of quality assurance measures and be used as the basis for evidence-based practice.

6.8 Conclusion

The importance of career education and development in educational settings has been well documented and can be summarised by the work of Hooley and Dodd (2015) and Patton (2019). The three studies reported here, reinforced the empirically- and theoretically-based

model by Marciniak et al. (2022) which was adapted to form the revised CEDF which underpins the development of the four scales CEDS-Primary, CEDS-Junior, CEDS-Senior and CEDS-Tertiary. This research revealed that these four measures have empirical and concurrent validity and that they can be used with confidence by career practitioners, administrators and researchers. The scales provide students with a self-report measure of their career development and provide career practitioners and educators with measures to support evidence-base practice. They also provide administrators and policy makers with data to make informed decisions on the implementation and allocation of resources to support career education and development interventions in their institutions and systems. Researchers in this field also have access to validated measures to progress their research in this important field. The developmental nature of the four scales should encourage a developmental approach to career education and development which starts at an early age and is life-long.

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APPENDIX A: Translated versions of CEDS-Tertiary and CEDS-Senior

CEDS-Tertiary-Vietnamese Translation

VỀ BẢN THÂN

1 Tôi hiểu rõ về điểm mạnh và tố chất của bản thân và biết tất cả điều này liên quan ra sao đến các nghề nghiệp tương lai hoặc các lựa chọn liên quan tới bậc học cao hơn.

2 Tôi hiểu mình cần bồi dưỡng các tố chất khi tốt nghiệp để có thể khiến mình trở nên thu hút hơn trước những người sử dụng lao động trong tương lai.

3 Tôi có thể nói rõ về các sở thích, kỹ năng và tố chất cho người sử dụng lao động trong tương lai.

VỀ CÁC ẢNH HƯỞNG

4 Tôi hiểu rõ tầm quan trọng khi chọn ngành học/chọn nghề và biết rằng đây là trách nhiệm của tôi và không bị ảnh hưởng bởi bạn bè hoặc mạng xã hội.

5 Tôi hiểu rằng việc tiếp cận tới các cơ hội nghề nghiệp có thể phụ thuộc vào một loạt các tình huống liên quan tới các chính sách của chính phủ, các địa điểm cụ thể hoặc các ngành công nghiệp đang phát triển...

6 Tôi có thể quản lý các mong đợi của những người quan trọng với mình liên quan tới các lựa chọn hoặc hướng dẫn về ngành học/nghề nghiệp.

VỀ CÁC CƠ HỘI

7 Tôi thấu hiểu thế giới nghề nghiệp và các lựa chọn nghề nghiệp trong tương lai.

8 Tôi hiểu rõ về các chủ đề/môn học/ngành học/chương trình phù hợp với tôi và định hướng nghề nghiệp liên quan đến các ngành học ấy.

9 Tôi nắm bắt các con đường phát triển sự nghiệp khác nhau mà tôi đang quan tâm.

ĐẶT MỤC TIÊU

10 Tôi đã đặt ra những mục tiêu học tập/nghề nghiệp rõ ràng và khả thi.

11 Tôi đã xây dựng kế hoạch nghề nghiệp cho bản thân.

12 Kế hoạch nghề nghiệp/học tập của tôi bao gồm cả những mục tiêu ngắn, vừa và dài hạn.

VỀ VIỆC RA QUYẾT ĐỊNH

13 Tôi biết cách ra quyết định và lựa chọn vững chắc về ngành học/nghề nghiệp .

14 Tôi có thể tìm hiểu thông tin chi tiết về các ngành học và nghề nghiệp để ra quyết định sáng suốt hơn.

15 Tôi thường cân nhắc kỹ càng về các lựa chọn ngành học/nghề trước khi ra quyết định.

VỀ HÀNH ĐỘNG

16 Tôi có thể viết hồ sơ ứng tuyển cá nhân (CV/resume) và thư giới thiệu thể hiện năng lực cạnh tranh của bản thân.

17 Tôi thành thạo trong việc chuẩn bị một bộ hồ sơ ứng tuyển tìm việc/đăng ký học.

18 Tôi tự tin mình sẽ thể hiện tốt tại các buổi phỏng vấn việc làm.

19 Tôi có thể tìm hiểu thông tin phù hợp về các yêu cầu ứng tuyển/ứng thí cho công việc và/hoặc các khóa học nâng cao và chuyên sâu hơn.

20 Tôi giỏi trong việc xây dựng mạng lưới chuyên môn.

VỀ SUY NGẪM/ĐÁNH GIÁ

21 Tôi thường xem lại kế hoạch học tập/nghề nghiệp của bản thân.

22 Tôi thường xuyên kiểm tra thông tin về ngành học/nghề nghiệp để nắm bắt kịp thời những thay đổi liên quan đến kế hoạch của mình.

23 Tôi lập kế hoạch dự phòng phù hợp để đảm bảo mọi việc vẫn ổn nếu lựa chọn ưu tiên hàng đầu có trở ngại.

TỰ TIN

24 Tôi tự tin rằng mình biết các bước cần hoàn thành để thực hiện kế hoạch nghề nghiệp/học tập của mình.

25 Tôi tự tin rằng mình biết rõ về ngành học/hướng học hoặc con đường nghề nghiệp mà mình lựa chọn.

26 Tôi tự tin rằng mình sẽ thành công trong tương lai.

TIN VÀO NĂNG LỰC BẢN THÂN

27 Tôi tin rằng mình có thể thành công ở hầu hết các nỗ lực mà tôi để tâm vào.

28 Tôi có thể vượt qua mọi thử thách để vươn tới thành công.

29 Tôi tự tin rằng mình có thể thực hiện hiệu quả những nhiệm vụ khó.

. **VỀ BẢN THÂN**

1 Tôi hiểu rõ về sở thích nghề nghiệp của bản thân và biết các sở thích này liên quan ra sao đến hướng học và nghề nghiệp tương lai.

2 Tôi biết rõ những điểm mạnh và năng lực của mình và biết chúng liên quan ra sao đến hướng học và nghề nghiệp tương lai.

3 Tôi biết mình thích hoặc giỏi môn học nào và biết chúng liên quan ra sao đến hướng học và nghề nghiệp tương lai.

VỀ CÁC ẢNH HƯỞNG

4 Tôi hiểu rõ quan điểm của cha mẹ đối với hướng học và nghề nghiệp mà tôi quan tâm.

5 Tôi hiểu rõ tầm quan trọng khi chọn ngành học/chọn nghề và biết rằng đây là trách nhiệm của tôi
vàkhông bị ảnh hưởng bởi bạn bè hoặc mạng xã hội.

6 Tôi hiểu rõ tầm quan trọng khi chọn ngành học/chọn nghề và biết rằng đây là trách nhiệm của tôi và cần giúp sức bởi thầy cô lẫn cha mẹ.

VỀ CÁC CƠ HỘI

7 Tôi thấu hiểu thế giới nghề nghiệp và các lựa chọn nghề nghiệp trong tương lai.

8 Tôi hiểu rõ về các hướng học/ngành học phù hợp với tôi và định hướng nghề nghiệp liên quan đến các ngành học ấy.

9 Tôi nắm bắt các con đường phát triển sự nghiệp khác nhau mà tôi đang quan tâm.

ĐẶT MỤC TIÊU

10 Tôi đã đặt ra những mục tiêu học tập/nghề nghiệp rõ ràng và khả thi.

11 Tôi đã xây dựng kế hoạch nghề nghiệp cho bản thân.

12 Kế hoạch nghề nghiệp/học tập của tôi bao gồm cả mục tiêu ngắn, vừa và dài hạn.

VỀ VIỆC RA QUYẾT ĐỊNH

13 Tôi ra quyết định hiệu quả khi lựa chọn ngành/nghề.

14 Tôi có thể tìm hiểu thông tin chi tiết về các ngành học và nghề nghiệp để ra quyết định sáng suốt hơn.

15 Tôi thường cân nhắc kỹ càng về các lựa chọn ngành học/nghề trước khi ra quyết định.

VỀ HÀNH ĐỘNG

16 Tôi có thể viết hồ sơ ứng tuyển cá nhân (CV/resume) và thư giới thiệu thể hiện năng lực cạnh tranh của bản thân.

17 Tôi thành thạo trong việc chuẩn bị một bộ hồ sơ ứng tuyển tìm việc/đăng ký học.

18 Tôi có thể tìm hiểu thông tin phù hợp về các yêu cầu ứng tuyển/ứng thí cho công việc và/hoặc các khóa học nâng cao và chuyên sâu hơn.

VỀ SUY NGẪM/ĐÁNH GIÁ

19 Tôi xem lại kế hoạch học tập/nghề nghiệp của bản thân mỗi 6 tháng.

20 Tôi thường xuyên kiểm tra thông tin về ngành học/nghề nghiệp để nắm bắt kịp thời những thay đổi liên quan đến kế hoạch của mình.

21 Tôi lập kế hoạch dự phòng phù hợp để đảm bảo mọi việc vẫn ổn nếu lựa chọn ưu tiên hàng đầu có trở ngại.

TỰ TIN

22 Tôi biết các bước cần hoàn thành để thực hiện kế hoạch nghề nghiệp/học tập của mình.

23 Tôi tự tin rằng mình biết rõ về ngành học/hướng học hoặc con đường nghề nghiệp mà mình lựa chọn.

24 Tôi tự tin rằng mình sẽ thành công trong tương lai.

TIN VÀO NĂNG LỰC BẢN THÂN

25 Tôi tin rằng mình có thể thành công ở hầu hết các nỗ lực mà tôi để tâm vào.

26 Tôi có thể vượt qua mọi thử thách để vươn tới thành công.

APPENDIX B: Translated versions of the comparator scales

Vietnamese translation of the VOE

1¤	Lập kế hoạch nghề nghiệp sẽ giúp tôi có một nghề nghiệp vừa ý.¤
2¤	Tôi sẽ thành công trong công việc/nghề nghiệp mà mình lựa chọn.¤
3¤	Tôi thấy tương lai của mình thật tươi sáng.¤
4¤	Các năng khiếu và kỹ năng của tôi sẽ được vận dụng trong công việc/nghề nghiệp.¤
5¤	Tôi làm chủ các quyết định nghề nghiệp của mình.¤
6¤	Tôi có thể khiến tương lai của mình trở nên hạnh phúc.¤
7¤	Tôi sẽ có công việc mình muốn như mình đã chọn.¤
8¤	Công việc/nghề nghiệp mà tôi chọn sẽ giúp tôi có được thu nhập theo ý mình.¤
9¤	Công việc/nghề nghiệp tương lai của tôi sẽ được xã hội tôn trọng.¤
10¤	Tôi sẽ đạt được các mục tiêu công việc/nghề nghiệp của mình.¤
11¤	Gia đình sẽ chấp nhận lựa chọn công việc/nghề nghiệp của tôi.¤
12¤	Lựa chọn công việc/nghề nghiệp sẽ giúp tôi sống theo cách mình muốn.¤

Vietnamese translation of the NGSES

1¤	Tôi có thể đạt được hầu hết các mục tiêu mà mình đề ra.¤
2¤	Mỗi khi gặp nhiệm vụ khó, tôi luôn tin chắc mình sẽ hoàn thành.¤
3¤	Nhìn chung, tôi nghĩ rằng mình có thể hoàn tất những việc quan trọng với mình.→¤
4¤	Tôi tin rằng mình có thể thành công ở hầu hết các nỗ lực mà tôi để tâm vào.¤
5¤	Tôi có thể vượt qua mọi thử thách để vươn tới thành công.¤
6¤	Tôi tự tin rằng mình có thể thực hiện hiệu quả những nhiệm vụ khó.¤
7¤	Tôi có thể làm hầu hết các công việc rất tốt so với người khác.¤
8¤	Tôi vẫn có thể làm việc ổn ngay cả trong những tình huống khó khăn.¤

Vietnamese Translation of the CFI -SF

	KHẢ NĂNG THÍCH NGHI TRONG SỰ NGHIỆP
1	Tôi có thể thích nghi với sự thay đổi của thế giới nghề nghiệp
2	Tôi có thể thích nghi với những thay đổi trong kế hoạch nghề nghiệp của mình; và
3	Tôi dễ dàng điều chỉnh theo những thay đổi từ yêu cầu công việc.
	TÍNH LẠC QUAN VỀ NGHỀ NGHIỆP
4	Nghĩ về sự nghiệp làm tôi thấy hứng khởi
5	Tôi cảm thấy phấn chấn khi nghĩ về sự nghiệp của cá nhân; và
6	Tôi khao khát theo đuổi sự nghiệp mình mơ ước.
	NHẬN BIẾT VỀ KIẾN THỨC CỦA BẢN THÂN
7	Tôi có hiểu biết tốt về các xu hướng thị trường lao động.
8	Tôi chưa hiểu biết về các xu hướng của thị trường lao động.**
9	Tôi dễ dàng nhận biết các xu hướng tuyển dụng trong tương lai.

APPENDIX C: Final versions of the four scales

CEDS-Primary

UNDERSTANDING

1. I am aware of my interests and how they might relate to future careers for me
2. I know what I am good at and how that might relate to future careers for me
3. I am aware of my strengths and how they might relate to future careers for me
4. I understand that my friends may wish to help me with my future course and career choices.
5. I have some understanding of possible course/career options available to me
6. I have some understanding of the world of work and many of the occupations in it.

ACTION

7. I have identified some course/career options which are of interest to me or might suit me.
8. I have researched a range of occupations.
9. I have asked some adults about their work.
10. I usually consider things carefully before making decisions.
11. I am good at making decisions about which projects, tasks or activities to choose.
12. I often think about my future career plans

ATTITUDE

13. I am confident I will be successful in my chosen occupation or career
14. I am confident my talents and skills will be used in my future career/occupation
15. I am confident about my future
16. I am confident I can succeed at almost anything to which I set my mind
17. I am confident I can overcome any difficulties which come my way
18. Even when things are tough, I can perform quite well

CEDS-Junior

UNDERSTANDING

1. I have a good understanding of my interests and how they might relate to future courses or careers.
2. I am aware of the subject(s) which I like or do well in and how it/they might relate to future courses or careers.
3. I understand the importance of making course/career decisions which are mine and not influenced by my friends or social media.
4. I have a good understanding of the world of work and a range of occupations within it.
5. I have a good understanding of the range of subjects and/or courses which are available for me to study and where they might lead in terms of careers.
6. I have a good understanding of career opportunities open to me

ACTION

7. I have set myself clear and achievable subject and/or course goals.
8. I have developed a career plan for myself
9. I make good subject/course decisions based on a great deal of research
10. I usually consider my subject/course options carefully before making decisions.
11. I have researched what subject choices I need to make in the next few years.
12. I often review my subject/course/career plans.

ATTITUDE

13. I am confident I will be successful in my chosen occupation or career.
14. I am confident that my talents and skills will be used in my future occupation or career.
15. I am confident that I can succeed at almost any endeavour to which I set my mind.
16. When facing difficult tasks, I am certain that I will accomplish them.
17. Compared to most people, I can do most tasks very well.
18. Even when things are tough, I can perform quite well.

CEDS-Senior

UNDERSTANDING

SELF

1. I have a good understanding of my interests and how they might relate to future courses or careers.
2. I have a good understanding of my personal strengths and abilities and how they might relate to future courses or careers
3. I am aware of the subject(s) which I like or do well in and how it/they might relate to future courses or careers.

INFLUENCES

4. I have a good understanding of my parent's views regarding future courses and careers that might interest me.
5. I understand the importance of making course/career decisions which are mine and not influenced by my friends or social media.
6. I understand the importance of making course/career decisions which are mine but are done with help from teachers and parents.

OPPORTUNITIES

7. I have a good understanding of the world or work and future careers options.
8. I have a good understanding of the range of subjects/courses which are available for me to study and where they might lead in terms of careers.
9. I have a good understanding of the many different career pathways open to me.

ACTION

SETTING GOALS

10. I have set myself clear and achievable course/career goals.
11. I have developed a career plan for myself.
12. My course/career plans contain short, medium and long-term goals.

MAKING DECISIONS

13. I am good at making sound career/course choices and decisions.
14. I am able to seek detailed course and career information to assist me make good decisions.
15. I usually consider my course/career options carefully before making decisions.

TAKING ACTION

16. I am able to construct a competitive resume and cover letter.
17. I can competently complete job/course/career-related applications.
18. I am able to locate appropriate information on entry prerequisites for jobs and/or courses of further study.

REFLECTING/REVIEWING

19. I review my course/career plans approximately every six months.
20. I regularly check course/career information to see if there are any changes relevant to my course/career planning.
21. I have developed appropriate back-up plans if my first choice doesn't eventuate

ATTITUDE

CONFIDENCE

22. I know what steps I need to take to progress my course/career planning.
23. I feel confident that I have a good idea of what course/career direction(s) or pathway(s) I want to take.
24. I am confident that I will have successful future.

CEDS-Tertiary

UNDERSTANDING

SELF

1. I have a good understanding of my personal strengths and attributes and how they might relate to future careers or further study options
2. I understand that I need to develop my graduate attributes in order to make me more attractive to future employers.
3. I can communicate strong evidence of my interests, skills and attributes to future employers

INFLUENCES

4. I understand the importance of making course/career decisions which are mine and not influenced by my friends and/or social media
5. I understand that access to career opportunities could depend on a range of circumstances like government policies or specific locations or growth industries
6. I am able to manage the expectations of significant others on my career/course choices and directions.

OPPORTUNITIES

7. I have a good understanding of the world or work and future careers options within it.
8. I have a good understanding of the range of units/subjects/courses/programs which are available for me to choose and where they might lead in terms of careers.
9. I have a good understanding of many different career pathways open to me.

ACTION

SETTING GOALS

10. I have set myself clear and achievable career/course goals.
11. I have developed a career plan for myself.
12. My course/career plans contain short, medium and long-term goals.

MAKING DECISIONS

13. I am good at making sound career/course choices and decisions.
14. I am able to seek detailed course and career information to assist me make good decisions
15. I usually consider my career/course options carefully before making decisions

TAKING ACTIONS

16. I can competently complete job/course/career-related applications.
17. I am confident I will perform well at job/career related interviews
18. I am strong at professional networking

REFLECTING/REVIEWING

19. I review my course/career plans often.
20. I regularly check course/career information to see if there are any changes relevant to my course/career planning.
21. I have developed appropriate back-up plans if my first choice(s) don't eventuate.

ATTITUDE

CONFIDENCE

22. I feel confident that I have a good idea of what career/course direction(s) or pathways I want to take.
23. I am confident I will get appropriate employment/further study opportunities upon graduation.
24. I am confident I will have a successful future