Article

How Sustainable Are Claims about Evidence-Based Content in Australian Courses for Preparing Special Educators?

Jennifer Stephenson [1,2,*], Rahul Ganguly [3], Coral Kemp [1,2] and Catherine Salisbury [2]

1   School of Education, Macquarie University, Sydney 2109, Australia
2   InSpEd, Balmain 20141, Australia
3   School of Education, Charles Sturt University, Bathurst 2795, Australia
*   Correspondence: Jennifer.stephenson@mq.edu.au

Abstract: We reviewed the content of units in master's-level special and/or inclusive education courses in Australia to determine whether the content relating to instructional practices and behaviour support and intervention included evidence-based practices (practices drawn from sound research). We identified claims about evidence-based practices made in publicly available materials describing unit content and determined whether these claims were supported by the actual content described. Of the 28 courses examined, six made no claims about evidence-based practices, 19 courses included supported claims and 15 courses included unsupported claims. Interpretation of the results should be cautious given the limited material available for some courses, but overall, the results are cause for concern. We believe there is a need for formal standards for special/inclusive education courses and certification for qualified special educators in Australia.

Keywords: evidence-based practices; teacher education; university courses

1. Introduction

There has been increasing recognition and promotion of evidence and research-based practices in education in Australia. There is an emerging commitment to providing regular teachers with an evidence base as a strategy to ensure excellence in teaching [1]. The Alice Springs Declaration [2], which sets out a road map for the ongoing development and improvement of Australian education, notes the importance of providing teachers with "high-quality evidence" (p. 7) and the role of governments in developing an evidence base for teaching.

In the field of special education, more specifically, there has been an increasing focus on bridging the research-to-practice gap by promoting the use of evidence-based practices (EBPs) [3]. This has been driven, in part, by legislation in the United States mandating evidence-based practices [4] but is also of increasing interest in Australia. The first goal of the Alice Springs Declaration [2] is to "promote excellence and equity" (p. 4). Although it includes only one mention of students with a disability, there is a commitment to an education that meets their individual needs and provides "equality of opportunity and educational outcomes" (p. 11). The use of evidence-based practices is intended to improve outcomes for students with a disability when the strategy is matched to the student's need and to promote accountability for educational outcomes [5,6]. In a recent review of reviews of inclusion for students with a disability, Van Mieghem et al. [7] noted that evidence-informed practice was a necessity for successful inclusive education.

The terms evidence-based practice and research-based practice can be interpreted in several ways, relating to both identification of pedagogical practices and to decision making processes regarding which practices to use with a particular student [3,8]. Within special education, Cook and Cook [3] described evidence-based practices as practices that have support from a research base that meets the defined criteria. They described four elements in the identification of evidence-based practices: support from research that is designed

to demonstrate cause/effect (group experimental, group quasi-experimental and single-subject); quality research studies; multiple quality studies with consistent findings and robust effects on student outcomes. They noted that the term research-based practice is not interchangeable with evidence-based practice. A research-based practice may have support from research studies but not from several high-quality studies, as described in the criteria for an evidence-based practice. Certainly, the specific criteria of the number of studies required and the quality of those studies varies among those who review interventions and identify evidence-based practices [6,9]. Cook and Cook [3] suggested that if the term research-based is used, the criteria for the level of research support for the practice should be provided. Other authors have conceived of evidence-based practice as having a wider meaning, and although evidence from research is one source of evidence, other sources of evidence such as evidence from practice and professional wisdom may also be called upon [6,9]. A term also encountered is evidence-informed practice, in which knowledge about evidence-based practices is integrated with professional judgement, knowledge of contextual evidence and other evidence to determine practices to be used [1]. Clearly, both evidence-based practice and evidence-informed practice require a sound knowledge of the quantity and quality of the research supporting practices, of individual needs and of the context.

Cook and Cook [8] further described a broader meaning of evidence-based practice as the process of decision making that brings together research evidence, professional judgement of practitioners and the values and goals of learners and caregivers. Scheeler et al. [10] characterized this as EBP being "both a noun and a verb" (p. 172). Once decisions have been made and practices implemented with fidelity, data are collected on the student's performance, and if this performance is not as expected, the practice is changed or modified.

Practices that are identified as evidence-based are important content in teacher preparation programs, as we know some practices produce better student outcomes than other practices [11,12]. It is logical then that special educators be equipped with a knowledge of effective, research-based practices if they are to implement them and improve student outcomes for students with disability and special education needs [10,13,14]. In addition, research from the US suggests well-prepared special educators are less likely to leave the field, saving resources and reducing disruption in schools [10].

Using the rigorous definition of evidence-based practices provided by Cook and Cook [3], several studies have identified systematic and explicit instruction, practices drawn from applied behaviour analysis (ABA) such as modelling, prompting, antecedent-based interventions, functional behavioural assessment and positive behaviour intervention and support as EBPs for learners with disability [15,16]. This includes students with high-incidence disabilities such as learning disabilities and mild intellectual disability [17], moderate and severe disability [13,18], autism spectrum disorders [19,20], learning difficulties [21] and difficulties in mathematics [22] and reading [23].

For students with reading and mathematical difficulties, the content of what is taught also needs to be evidence-based. Evidence-based reading instruction should include explicit and systematic instruction in phonemic awareness and phonics [23,24], decoding, as well as sight word approaches, and vocabulary [25]. For literacy, fluency and comprehension also need to be included in any instructional program [23–25]. Comprehension is the ultimate goal of any reading instruction, and explicit strategy instruction is a promising approach [25]. For numeracy, the focus of instruction should include instruction in concepts, procedural strategies and automaticity [26,27]. Since early number skills correlate highly with later mathematics achievements [28–30], evidence-based instruction in mathematics should include explicit instruction in both formal and informal early number skills. Shanley et al. [30] suggested that informal early number skills include relational phrases, counting processes, quantity comparisons and number words, while formal skills include the ability to describe, compare and combine quantities using numerals. There is thus clear research evidence that, in the area of instruction, special educators should be prepared to use explicit instruction generally and especially in the areas of reading and maths.

A recent review of initial teacher education in Australia noted that, although there are Australian Professional Standards for Teachers, some content in initial teacher education programs was not evidence-based and that teachers reported they were not equipped with EBPs in areas such as reading, classroom management and working with students with a disability [31]. There is also evidence from the US that teacher education courses may not always include established evidence-based practices or may not address them thoroughly [12,25] At the same time, Barnhill et al. [32] found that courses preparing special educators specifically to teach students on the autism spectrum were increasingly including evidence-based strategies. In the US, there are various certification standards for special educators and for specialists in applied behaviour analysis that include EBPs [32]. In contrast, there are no Australian standards for special educators, and universities are free to design their own courses in this area, with no agreed standards for content relating to EBPs in programs that prepare special educators.

For special educators, one important source of knowledge of EBPs should be those university courses that prepare qualified teachers to take on special education or support teacher roles [10]. Given that EBPs are those that have been shown to improve student outcomes, the practices already identified (explicit teaching, especially in maths and reading, applied behaviour analysis, positive behaviour support and intervention) should be included in special educator preparation courses. It is unknown to what extent university courses in Australia in special and/or inclusive education contain content on EBPs and to what extent content in courses is supported by evidence drawn from quality research. It is also unknown how universities regard EBPs in special education and whether they view research support for teaching practices as an important criterion for what is included in course content. It is also unknown if universities acknowledge the evidence required to identify a practice as an EBP using the Cook and Cook [3] criteria. If EBPs and the evidence to identify a practice as an EBP are regarded as crucial content in special/inclusive education courses, and if research evidence is an important determinant of content selection, it would be expected that this would be explicitly stated and would be evident in publicly available course descriptions, learning outcomes and other materials. We thus set out to examine the available course materials to address two research questions.

1. Does the content of units in Australian university courses in special and/or inclusive education that addresses instruction include EBPs?
2. Does the content of units addressing instruction support claims for research or evidence-based practice?

2. Materials and Methods

The data used in this article were drawn from an analysis of the content of postgraduate courses offered in Australian universities described as preparation for teachers to work with students with a disability in special or inclusive education settings. Courses were identified through an internet search for special and inclusive education courses of at least 12 months' duration and intended for Australian domestic students.

Information about courses offered in 2020 or 2021 from each relevant university website was downloaded by the authors, with preference given to the most recent version. For some universities, additional information was located using the Google search engine. Downloaded information that was relevant to this article included handbook entries describing units, unit learning outcomes, unit guides and assessment information. Each site was revisited in 2021 by an author other than the author who completed the initial downloads, and any additional information located was downloaded.

Both core or compulsory units and elective units were included in the analysis. If a course offered multiple elective unit combinations, we coded one version. If a recommended structure was suggested, we coded the recommended version. We coded regular pathways rather than research pathways or options, as we thought more special education content was likely to be included in regular pathways. Some course structures included different named specialisations or minors, and here, we selected the versions that gave

the best coverage of special education content. Practicum units were included as core content, even if they were offered as electives. Units that did not contain content relevant to students with a disability or special needs (such as gifted education) were not included in the analysis.

The coding of content relevant to this article included whether the unit was core (this included recommended units and practicum units) or an elective. The content in each unit was coded, and the content areas of specific relevance to this article and their definitions are summarised in Table 1. Further details about the content coding can be found in [33]. For this analysis, each unit was also coded for the presence of claims made in regard to evidence-based or research-based content related to instruction or to positive behaviour support. We drew on a range of sources to identify the research-based practices that are the focus of our analysis, including the Council for Exceptional Children standards [34], InSpEd standards [35] and McLesky et al. [15].

Table 1. Definitions of content related to evidence-based instruction.

Content	Definition of Content
Principles and practice of applied behaviour analysis (ABA)	Applied behaviour analysis as underpinning of intervention strategies Mention of ABA principles (such as reinforcement) without specific mention of ABA were coded as ABA. Mention of stimulus and response prompting in teaching without specific mention of ABA were coded as ABA.
Research based-practice-explicit teacher directed instruction	Explicit teacher directed instruction A description of strategies as research-based or evidence-based was not sufficient. Some description of specific, explicit strategies was required.
Research based literacy instruction	Literacy instruction that includes explicit instruction and/or instruction in content in areas such as phonics, phonemic awareness, letter/sound correspondence, decoding, vocabulary and comprehension. As for teaching strategies some mention of specific strategies or content was required.
Research based numeracy instruction	Numeracy instruction that includes explicit instruction and/or instruction in areas such as number sense, number facts and problem-solving strategies. As for teaching strategies some mention of specific strategies or content was required.
Positive behaviour support and functional assessment/program planning	Positive behaviour support as a pro-active way to reduce problem behaviour and the use of functional assessment to identify triggers for problem behaviour and use that information to write behaviour support and intervention plans.
Claims of research or evidence-based content	Unit materials contained a claim that content was evidence-based or research-based or a claim that content was supported by or informed by research.

Coding of unit content and of the presence of claims about evidence-based and/or research-based content was completed by consensus. A claim was coded if the unit materials stated content was evidence and/or research-based or informed or supported by research. Claims about research or evidence support were first independently identified by each author and then agreed by consensus. Each unit was then examined to determine if the claims made related to instruction or to positive behaviour support. Units were coded as relating to instruction if the title or content included terms such as instruction, planning instruction, strategies to meet learning needs or programs to improve learning. For units covering positive behaviour support, mention needed to be made of positive behaviour support, functional assessment and/or program planning. Units in which practices were referred to generically (such as inclusive practices or transition practices), with no specific mention of instruction or behaviour support and intervention, were excluded, as practices might not necessarily relate to instruction but could apply to collaboration or policy. Units where claims were made in relation to other areas, such as the characteristics of learners with a disability or collaborative planning processes, were excluded from further analysis.

Each unit was coded by at least three of the four authors independently, and the final coding was the result of a consensus reached through discussion by all authors.

Once units containing claims were identified, we then evaluated the claims. This was done by checking the coding of the unit content to see if content relating to explicit teaching, applied behaviour analysis or positive behaviour support had been identified in the unit in our prior analysis [33]. We also checked to identify units containing any of this content where claims of evidence or research-based content were not made.

3. Results

Twenty-eight courses from 21 universities met the criteria for inclusion, all at the master's level. Details of the content across courses is available in [33]. Six courses from five universities contained no claims about research/evidence-based content. It should be noted that, for three of these courses only, the unit title and description were available. For three courses from three universities, all claims were unsupported, leaving 19 courses with at least one supported claim. For four courses from four universities, all claims were supported. For those courses where claims were made, claims were made in between one to eight units, with the mean number of units containing claims being 3.3. For three courses, supported claims were only made in elective units. Table 2 presents a summary of the claims made across 17 universities and 23 courses, as well as claims made that were not supported. Table 3 presents units and courses where research/evidence-based content was included in a unit, but no claims were made anywhere in that unit or course. This table also shows where research/evidence-based content was present in a unit and where evidence/research-based claims were made in other units of the course but claims were not made in that specific unit. It is not unreasonable that, if the research/evidence base of a claim was addressed in one unit, particularly a core unit of a course, it would not be repeated in other units.

The highest number of units with supported claims within a single course was eight (across four content areas). There was only one course that contained supported claims (seven) in all content areas examined and four that contained supported claims in four content areas. The highest number of units with unsupported claims in a course was seven in two courses. There were only nine units that contained EBPs where there were no claims regarding that content in that unit or in any other units belonging to the same course.

Table 2. Number of units and courses containing supported and unsupported claims.

Content	Number of Units (Courses)	Number of Core Units (Courses)	Number of Elective Units (Courses)
Claim supported			
Applied behaviour analysis	16 (10)	13 (6)	3 (4)
Explicit teaching	20 (12)	16 (11)	4 (1)
Research-based literacy instruction	9 (8)	5 (5)	4 (3)
Research-based numeracy instruction	6 (5)	3 (3)	3 (2)
Positive behaviour support	21 (16)	14 (12)	7 (4)
Total supported claims	72 (19)	51 (16)	21 (7)
Claim not supported	53 (15)	34 (13)	19 (8)

NOTE: units could contain claims related to more than one content area, and more than one unit could contain claims about a content area.

Table 3. Number of units and courses containing EBPs where claims were not made.

Content	Number of Units (Courses)	Number of Core Units (Courses)	Number of Elective Units (Courses)
Content areas supported by research but not claimed in course at all			
Applied behaviour analysis	2 (2)	1 (1)	1 (1)
Explicit teaching			
Research-based literacy instruction			
Research-based numeracy instruction	1 (1)	1 (1)	
Positive behaviour support	6 (4)	2 (2)	4 (2)
Content areas supported by research but not claimed in a specific unit			
Applied behaviour analysis	2(2)	2(2)	
Explicit teaching	5(4)	5(4)	
Research-based literacy instruction	1(1)	1(1)	
Research-based numeracy instruction			
Positive behaviour support	4(4)	2(2)	2(2)

4. Discussion

As noted, the specific meaning of terms such as evidence-based practice, research-based practice and evidence-informed practice can vary. As we had no way of knowing the meaning intended when these terms were used in university materials, the terms research-based, evidence-based and evidence-informed (and other similarly worded expressions) were equated in the analysis as referring to claims that there is research evidence underpinning the content taught in a unit. In our identification of EBPs, we used the strict definition of Cook and Cook [3]. Thus, supported claims were those where the content contained information about instructional practices that was underpinned by several sound, high-quality scientific research studies demonstrating positive effects on student outcomes. Some of the results pertaining to unsupported claims may be due to differing interpretations by universities of what is meant by research or evidence-based practice. These practices may have limited research support, or claims may have been based on other evidence but are not EBPs in terms of the Cook and Cook [3] definition.

It would seem that, as 16 of the 21 universities delivered units that contained claims about research/evidence support, most universities generally perceive that this aspect of selection of course content is important enough to include in course descriptions and/or student outcomes. For three of the five universities where no claims were made, we could only locate short unit descriptions, which may indicate that claims of support from research evidence is almost universal in course content.

For supported claims related to instruction, generic explicit instruction was the content most commonly described as research/evidence-based (20 units across 12 courses), but this represents less than half the courses included in the analysis. The numbers were even smaller for literacy instruction (nine units in eight courses) and numeracy (six units in five courses). Explicit instruction is a teacher-centred approach and includes practices such as teacher modelling and demonstration, independent and guided practice and corrective feedback to students [22,36]. Explicit instruction also incorporates strategies drawn from applied behaviour analysis (discussed below) such as task analysis, modelling and prompting with opportunities for student responding, guided and independent practice [21]. It has a considerable research base reflecting over 40 years of work [36,37] and is one of the high-leverage practices identified by McLesky et al. [15]. It is key to response to intervention approaches [21] and has been recommended for use in both literacy and numeracy instruction for students with disabilities [37]. It is a key component of effective instruction for students with a disability and special education needs [37].

There is evidence that initial teacher education (ITE) in Australia does not address explicit teaching models, which means that it is even more important that special educators are familiar with and can implement and coach explicit instruction and are familiar with

the evidence base behind it. Fahey et al. [38], who analysed mathematics units from initial primary teacher education programs, found that 27 out of 31 universities took a constructivist approach to mathematics instruction that placed an emphasis on student-led enquiry. They noted the ongoing bias to constructivist approaches in initial teacher education. An analysis of 90 mathematics units showed "virtually no evidence of ITE where explicit instruction is clearly emphasised" (p. 5). When explicit teacher-directed instruction did appear, it received only cursory treatment. There is similar evidence for literacy instruction. Meeks and Stephenson [39], who analysed the content related to early reading instruction in literacy units in primary and early childhood teacher education courses, found that between 20 and 40 percent of these courses did not cover foundational reading skills such as the alphabetic principle and phonics. Meeks and Kemp [40] reported from a small survey of preservice teachers that few of their respondents had adequate explicit knowledge to effectively teach early literacy skills.

Applied behaviour analysis (ABA) was even less frequently mentioned as a research/evidence-based practice. As for explicit instruction, there are numerous research studies demonstrating the effectiveness of instructional strategies based on the principles of ABA, and many of these methods are endorsed as EBPs [16]. It is very surprising that content in ABA, described as research/evidence-based practice, was absent from most courses, with only ten courses containing supported claims. Given that supported claims for positive behaviour support (including functional assessment and intervention) were made in over half the courses and that positive behaviour support is firmly grounded in the principles of ABA [41,42], it may be that universities are reluctant to include mention of ABA in publicly available course materials.

ABA-based interventions are particularly important for learners with severe or profound intellectual disabilities and those with complex needs, including those on the autism spectrum. Teaching strategies such as massed trial teaching, systematic prompting, antecedent-based interventions, extinction, modelling (live and video), pivotal response training, reinforcement, use of task analysis and chaining, all based on the principles of ABA, are effective for learners with severe disabilities [13]. Similarly for students with ASD, ABA-based interventions, including antecedent-based intervention, behavioural momentum, differential reinforcement, modelling (live and video), prompting, use of task analysis and time delay, have been shown to be effective in numerous research studies [20].

ABA has not been without critics, especially recently from the autistic community [43]. Some of this criticism is based on views of historical events such as the early work of Ivar Lovaas and colleagues, but similar to any field, ABA is evolving, and much more emphasis is now placed on more positive and naturalistic approaches, such as pivotal response training [43]. Some may also be based on a misunderstanding of ABA terminology such as punishment [43]. Other criticisms revolve around the goals selected for ABA intervention and the lack of collaboration with individuals receiving intervention. Criticisms (often voiced on social media) may make universities wary of being seen to promote ABA, even though it is important content. It may also be that ABA has become too strongly associated with interventions for students with ASD and is not seen as applicable to students with other disabilities and, indeed, to typically developing students [42].

Positive behaviour support comprises a set of evidence-based practices, many derived from ABA. The aim is to enhance an individual's quality of life through adapting the environment, teaching new prosocial skills and reducing problem behaviour [41]. In our definition, we have included functional behaviour assessment, an EBP for determining the function of a behaviour to enable intervention planning [19] and function-based interventions to reduce behaviours that impair an individual's ability to learn. Positive behaviour support was the content most frequently associated with supported claims of a research/evidence base with claims made in 21 units in 16 courses. Given its roots in ABA, it is surprising that claims about its research/evidence base appear to be unconnected to ABA. Again, the limited evidence available suggests that initial teacher education programs do not provide regular classroom teachers with skills and knowledge of EBPs in behaviour

management in order to deal with general classroom behaviour, let alone more challenging behaviours of individual students [44,45].

It is concerning that across the courses where claims were made in regard to instruction or positive behaviour support, many of those claims (53) were unsupported by evidence that the content did, in fact, describe research-based practices as defined by Cook and Cook [3] and as described in the literature reviewed in the introduction. Some of these units may have addressed research/evidence-based explicit instruction or strategies based on the principles of ABA, but this content was not explicitly described. We note, however, that there were only nine units that contained research/evidence-based practices where research support was not claimed at all, and 12 units where research/evidence based practices were described, but no claim was made within that specific unit but rather the evidence/research base claim about that content had been made in another unit. As courses preparing special educators are specialist courses, it should be expected that specialist practices would be explicitly described in course materials. It would also be expected, given the considerable research support for the EBPs we have examined, that the research and evidence base for these practices would be explicitly addressed.

Overall, these findings are somewhat concerning in that there appears to be no universal agreement across universities on what are evidence/research based practices in special education. Some universities do not acknowledge research at all in the units analysed, and only four courses contained only supported claims. Only one university course contained supported claims across all content areas. It should be acknowledged that for some universities, the limited material available may have affected the results. At the same time, if EBPs are regarded as core to effective special education practice, it would be expected that they would appear in course materials.

The findings may have implications for the preparation of special educators. There is a relationship between teacher knowledge and use of a practice [46,47]. Teachers who know more about EBPs are more likely to use those practices [47]. We believe special educators should learn that instruction in special education can be based on scientific principles. This means special educators develop not only a sound knowledge of research and how to use it, but also of existing EBPs and the research that supports them. Course content should explicitly cover EBPs and the research that supports them. Further, they should be coached and supported to use these practices during professional experiences, and to monitor their impact [17].

As students with disability are frequently educated in inclusive settings, support from a qualified special educator conversant with EBPs may be crucial. One of the tenets of inclusion is that adaptations or accommodations are made to meet students individual learning needs. This means that the teaching and assessment strategies used must be effective for individual students. As Jones [17] stated, students with disabilities are "those who can least afford exposure to practices, teachers and schools that ignore research findings" (p.102). Students with high incidence, less severe disability may only be identified after they fail to learn from strategies most commonly employed in classrooms. If students with disability do not receive effective instruction, there are many poor outcomes such as increased likelihood of school drop-out, reduced independence, and reduced chances of employment [17].

When these findings are considered in tandem with findings from our earlier study [33] that professional experience was only included in 15 courses, and was mostly 25 days or fewer, it appears that many courses may not adequately prepare special educators to implement EBPs in a range of settings. Having sound information about evidence-based practices is only the beginning. Special educators must be able to implement these practices with fidelity [10,13]. The generalisation and use of EBPs is crucial if student outcomes are to be improved [10,46] and implementation of EBPs in different classrooms during professional experience is one way to achieve this. This may mean that universities do not leave supervision and monitoring of professional experience to teachers, but that suitably qualified university personnel play an active role in observation, coaching and feedback,

as well as planning courses that have a coherent sequence of theory and opportunities for practice [10,48]. Ongoing professional support and coaching for beginning special educators is also likely to be needed [10]. Observational tools such as the special education teacher rubric described in Johnson et al. [49] that are being developed in the US could be used within professional experience to guide coaching and feedback to support teachers in mastering and implementing effective practices.

It should also be noted that EBPs as defined above are unavailable for some learning areas and for some groups of learners and that EBPs cannot be guaranteed to be effective for all learners within a target group. It may be that relevant research and research reviews have not been conducted, or it may be that there is little or no research [50]. This should be taken into account in course content and units on evaluating and using research.

We would argue that these findings suggest that there is a need for formal standards and certification for special educators in the same way there are standards for regular teachers [51]. In the US, Mclesky et al. [14] made the case for a core curriculum for the preparation of special educators that covers high-leverage and EBPs, including practices for collaboration, assessment, social/emotional and behavioural learning and support and instruction. In this paper we have identified EBPs that are highly relevant to instruction in special education and demonstrated that the evidence suggests a lack of consistency across universities and courses regarding EBPs and the research that supports them. The staff who teach in special education courses have an important role to play in that they need to be aware of EBPs as they are established and to ensure that they are included in course content and that unproven practices are removed. A requirement for course content and professional experiences that adequately prepare special educators to work in both segregated and regular settings, using EBPs with fidelity, would go some way to improving outcomes for students with disability.

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