



Primary and secondary pre-service teachers' attitudes towards inclusive education

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ABSTRACT

The practice of inclusive education in schools has led to changes in policy and pedagogy, hence teacher acceptance and attitude are important components of its success. The aim of this study is to identify the differences in attitudes of primary and secondary pre-service teachers on inclusion and the potential relationship between demographic variables such as definitions of inclusion, previous experience working in a school, completion of a module on inclusive schools, and other variables. The study included 548 Australian university students studying primary (n = 348) or secondary (n = 193) professional teaching. All participants completed the Teacher Attitudes to Inclusion Scale (TAISA). Principle components analysis was performed to transform the TAISA questionnaire into smaller set of components and two-way between-groups analysis of variance was used to analyse data. Results showed that primary pre-service teachers have more positive attitudes towards inclusion than secondary pre-service teachers. Primary pre-service teachers were also more responsive to training on inclusive education. Implications for practice and future research are discussed.

1. Introduction

The international focus on inclusion education began, in more recent times, with the “Education for All” initiative from the United Nations Convention on the Rights of Children [1], where targets were set to increase the number of children at school, with a focus on marginalised groups. Inclusive education is progressively becoming accepted as the most effective means to provide every child an equitable and high-quality education while reducing biased attitudes towards *all* students [2,3,4]. The move towards inclusive education has created a pedagogical shift in education which has helped teachers develop confidence and self-efficacy to implement an inclusive environment.

Inclusive education benefits everyone associated with the classroom [5,6,7]. A study examining the consequences of separate schooling for children with special educational needs (SEN), demonstrated that children with SEN experience little to no positive effects [8]. Additionally, children with SEN educated in mainstream schools do better academically and socially than comparable students in special non-inclusive settings [9,7]. Blackorby and colleagues [5] established that SEN students who spent more time in inclusive classrooms had fewer absences, performed closer to grade level than peers in special needs schools, and obtained higher test achievement scores. This reflects the academic benefits of inclusive schooling for all children.

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1.1. Attitudes and measurement

Since the early 20th century, attitude has been a subject of research for those seeking to understand social change, a concept prevalent in the early and current stages of social psychology [10]. Over time, the definitions of attitude across psychology, education, and numerous other fields of study have varied, but ultimately are evaluative in nature, referring to an evaluation a person may have for another person, place, concept, or thing [10]. Historically, the most popular way of and direct measure of explicit rather than implicit attitudes have included direct measures and self-report questionnaires, often utilizing a Likert scale [10,11].

Numerous social psychological theories have been developed to explain the importance of attitudes, including Jones & Davis' Attribution Theory (which states that people infer characteristics or traits about the world based on their observations; [12]) and the Domain Theory of Attitudes which divides attitudes into preference, convention, and moral imperative attitudes [10]. Broadly, the Domain Theory of attitudes posits that attitudes are shaped by a number of factors such as personal tastes, societal norms, authority of others, facts, and emotions. These theories, along with current research, provide an important basis for future research across psychology, education, and related fields to inform practice to aid those with additional support needs within educational settings.

1.2. In-service teacher attitudes

Educator attitudes are of primary importance in the implementation of inclusive programs [13,14,15]. Educators with positive attitudes towards inclusion offer their students more practice attempts, often at a higher level of success [16,17]. Teachers' positive, accepting and supportive attitudes are critical to the success of inclusion programs [18,4]. Inclusion means much more than the physical inclusion of children with SEN in a classroom; it is the complete inclusion of all students into a community. As such, teacher attitudes toward inclusion and toward individuals with SEN are crucial factors in the success of inclusion and therefore worthy of study [2,4,19,20].

There is a common inconsistency among research reports regarding teacher attitudes to inclusion according to their gender and age, amongst other demographic variables [21,19,22]. According to Hoskin et al. [19], this might be attributed in part to a common constraint of these variables, which is the imbalance of gender within a teaching population. However, providing a teacher with training in inclusive education is a technique to increase their attitudes towards inclusion. Many studies have found evidence of a positive relationship between inclusive education training and teacher attitudes [21,23,24]. Training has been shown as an important technique in raising attitudes, increasing confidence and self-efficacy and decreasing concerns about inclusive education [25,23].

Compared to inclusive training –which is actively undertaken–, teaching experience is passively accumulated. There are studies that find differences in teaching experience whereby the length of experience is correlated to negative attitudes towards inclusive education [2]. More recent research has shown that there is a significant drop in attitudes from teachers in their first year to teachers in their second, with no effect on length of experience thereafter [26]. However, a few studies still find no effect on experience, such as Memisevic and Hodzic [27]. Yet, Berry [28] performed a qualitative study that identified early career teachers being more concerned with instruction strategy than knowing the child, compared to very experienced teachers. This raises the possibility of compounding factors influencing attitudes towards inclusive education that are related to a teachers' experience.

1.3. Pre-service teacher attitudes

Education research on teacher attitudes towards inclusion has been trending towards research on pre-service teachers [2,29,23]. Pre-service training is the best time to increase positive attitudes and modify negative attitudes towards inclusion [30]. If pre-service teacher attitudes are increased and inclusive education is embraced, then teacher performance will improve [31,29].

Pre-service teachers that complete a module on inclusive education have significantly more positive attitudes towards inclusion than those who do not [30,23]. However, it has come to light that there are other relevant variables to this relationship, such as quality and structure of inclusive education courses [30,19]. The findings surrounding pre-service teachers who have had contact with individuals with disabilities are debated. Some studies have found that contact with students with disabilities during their studies is associated with less support towards inclusion [20]. On the other hand, some studies have found that frequent contact and site-based placements with children with SEN increases attitudes and improves degrees of comfort with children with SEN [29,32,33,34]. The participation of individuals with disabilities in university tutorials and as teaching assistants has worked to increase attitudes and break down myths about intellectual disabilities that are held by pre-service teachers [35].

1.4. Within teacher differences

It has been found that there are differences between high school teachers and primary school teachers in attitudes towards inclusion [36]. Primary school teachers have been found to be more positive towards inclusion than secondary school teachers. The consensus towards this difference is that it results from a focus of high school teachers towards subject matter that is less compatible with inclusion, compared to a focus on student development by primary school teachers. This theory has also been supported by research that found early grade primary school teachers to have more favourable attitudes towards inclusion than later grade primary school teachers [36,27]. This research also suggested that the difference may be due to an achievement gap, where the higher the grade, the greater the difference in achievement for children with SEN and their peers; this achievement gap may cause teachers stress out when achievement grows in importance.

Studies on pre-service teacher attitudes have yet to cover the same ground as in-service research has, in the areas of comparisons

between teacher populations [19,37]. The majority of studies are typical in the way that they include only one school level, or stream, such as primary or secondary pre-service teachers [e.g.,[30,36,38]]. While this type of sample allows for conclusions of a single stream, it leaves opportunities open that may further contribute towards understanding the manner in which pre-service teacher attitudes change. These opportunities may include comparing primary and secondary pre-service teachers on not only their inclusion attitudes but also their response to different events such as completing a module on inclusive education to identify what makes one stream higher than the other.

Theoretically, primary pre-service teachers and secondary pre-service teachers should be evaluated and treated separately in research on attitudes towards inclusion. If it is already acknowledged that there are different attitudes between primary and secondary teachers, which results in different total attitude scores, then, probably, the difference in ethos and focus will result in primary and secondary pre-service teachers responding to contact or experience teaching children with disabilities, module on inclusion and other characteristics differently. If this is the case, conflicting findings may be clarified by only focussing on a specific school level.

1.5. The present study

This aim of the present study is to identify differences between attitudes towards inclusion education for primary and secondary pre-service teachers and to examine the validity of the TAISA as a measure of pre-service teacher attitudes. Understanding attitude differences between primary and secondary pre-service teachers, may help clarify a currently clouded picture where conflicting and contrasting findings of pre-service teachers have been found. Even though no previous studies examine the underlying patterns of primary and secondary pre-service teacher responses to diverse factors have been found, it is possible that primary and secondary pre-service teachers will react to some factors differently. Additionally, further validation of the TAISA is vital to capturing and determining accurate measurements related to pre-service teacher attitudes.

As there is no precise form to predict where the differences will lie, the optimal approach is one that covers all factors. For instance, the changes in response to completing a module on inclusive education may be different for primary compared to secondary pre-service teachers. If there are differences between primary and secondary pre-service teachers, then there will be implications for school policy and pre-service educators.

Based on the relevant literature, the current study was guided by the following research questions:

- 1) What subscales, if any, exist within the TAISA as a measure of pre-service teacher attitudes?
- 2) What differences exist between primary and secondary pre-services teachers' attitudes on inclusive education?

2. Materials and methods

2.1. Participants

541 university undergraduate and graduate students (126 males and 415 females) studying for professional teaching qualifications in either primary (N = 348) or secondary (N = 193) participated in the present research. The participants were mainly from three campuses, and they participated in this study through the answering of the paper survey. 348 participants were in the primary stream group and 193 participants were in the secondary stream group. The mean age of participants in the study was 22.99 years (Min. = 17, Max. = 58.). 406 participants had previous experience of working in a school teaching role. 117 participants had a close friend or relative with additional support needs and 235 participants had previously studied a module on inclusive education. The details of the participants' profile are reported in [Table 1](#).

2.2. Survey instrument

An adapted version of the Teacher Attitudes to Inclusion Scale (TAISA) was used in the current research. The TAISA is a measure of pre-service teacher attitudes developed by Boyle [38] as an adapted version of the Teacher's Attitudes Toward Inclusion Scale [38]. Questions on the TAISA were modified from the original scale in order to be applicable for pre-service teachers and was first normed with a sample of Australian elementary and pre-school pre-service teachers. For example, questions were modified from the original form to include pre-tensive language rather than current-tense language to reflect pre-service teachers' lack of experience. This scale was based on research performed by Boyle et al. [38], adapted to suit this study's application, and included a mix of demographic questions (e.g., age, contact with people with disabilities) in the first section and questions and attitudes toward inclusive education in the second section. The final question of the questionnaire required participants to write their own definition of inclusion and was a short-answer question. The questionnaire is detailed in [Appendix 1](#).

Participants responded to 21 questions assessing their attitudes towards inclusion. A six-point Likert scale was used as the measure of response, with the extreme points being 'Strongly Agree', scored as six, to 'Strongly Disagree', which was scored as one. A six-point Likert scale was chosen purposefully so that participants were unable to select a neutral score. Negatively phrased questions (Question 2, 7, 9, 11, 14, 20, 21) were reverse coded. Reliability of the TAISA was calculated, with a Cronbach alpha of .81. After reverse questions are adjusted, items are summed and averaged for a Total Inclusion Score (TIS). Broadly, higher Total Inclusion Scores on the TAISA are representative of more positive attitudes toward inclusive education.

Table 1
The Demographic profiles of Primary and Secondary Streams on the TAISA.

Demographic Factor	Respondent Subgroups	School Level			
		Primary ^a		Secondary ^b	
		N	%	N	%
Gender	Male	65	18.68	61	3.73
	Female	283	81.32	132	3.91
Age	≤19	106	30.46	66	3.89
	20–21	94	27.01	63	3.81
	22–24	55	15.81	33	3.81
	25+	93	26.72	28	3.96
	Family or friend with additional support needs	Yes	85	24.43	32
	No	263	75.57	161	3.85
Specialisation	No Specialisation	146	41.95	3	1.55
	Mathematics	4	1.15	10	5.18
	Social sciences (Psychology)	43	12.36	19	9.84
	Science (Biology, Chemistry, Physics)	5	5.75	24	12.44
	Art	20	5.75	15	7.77
	SOSE (Geography, History, Sociology, Economics)	2	21.84	9	4.66
	Business	76	0.86	56	29.02
	Physical Education	3	1.44	10	5.18
	LOTE ¹	5	6.90	6	3.11
	Music	24		8	4.15
	Other				
	Studied a module on inclusive education	Yes	152	43.68	83
No		196	56.32	110	56.99
Experience working in a school in a form of teaching support role	Yes	277	79.60	129	3.88
	No	71	20.40	64	3.79
Year of study	Post-graduate	66	18.97	19	9.84
	1st year	140	40.23	58	30.05
	2nd Year	26	7.47	39	20.21
	3rd Year	75	21.55	68	35.23
	4th Year	41	11.78	9	4.66
Definition of inclusion	No answer	93	26.72	54	27.98
	Did not define inclusion or integration	37	10.63	13	6.74
	Defined integration	14	4.02	18	9.33
	Basic definition of inclusion	164	47.13	99	51.30
	Advanced definition of inclusion	40	11.49	9	4.66

Notes: ^aN = 348, ^bN = 193.

2.3. Procedure

This study was approved by the Human Research Ethics Committee of Monash University, Australia (CF11/0746 - 2011000359). Informed consent was obtained from all the participants. Students who elected to participate were given plain language statements and made aware that their participation was voluntary. Recruitment classes were chosen by identifying subjects that each year level of pre-service primary and secondary teachers completed. The lecturers of these classes were contacted via email, inviting their students to participate in the research.

Data was collected by introducing the researcher and the project at the beginning of the lecture and participants were provided paper copies of the questionnaire to fill out within the classroom setting. The researcher was not present in the classroom while participants completed the questionnaire.

2.4. Analysis

In order to obtain a variable representation of attitudes towards inclusion, principal component analysis (PCA) was performed to transform the 21 questions from the TAISA into a smaller set of components. Two-way between-groups analysis of variance (ANOVA) provided the most suitable technique to examine the interaction of the teaching stream with other variables on attitudes to inclusion. Total inclusion scores (TIS) were used as the dependent variable while one independent variable was stream, and the other changed between assorted demographic variables such as: gender, years of study, specialisation, campus on which they trained, definitions of inclusion, previous experience working in a school, completion of a module on inclusive schools, and having a friend or family member with additional support needs. Examination of interaction effects revealed underlying patterns of primary and secondary pre-service teachers' attitudes. Independent-samples *t*-tests were also conducted to examine differences between the primary and secondary

¹ Languages Other Than English (LOTE).

stream on inclusion scores. Prior to the data analysis, the univariate normality of the data was assessed by checking skewness and kurtosis values. According to Gravetter et al. [39], having an absolute value of skewness and kurtosis less than 2 is considered as evidence that distribution does not deviate from normal.

TIS is the only factor from the PCA used as a dependent variable in the analyses, because the TAISA has not been used in literature previously, giving the subscales little comparative value. Effect sizes have been calculated for significant results in order to determine the true degree to which the two variables are associated with one another. The technique used to determine effect size is the partial eta squared. Values range from 0 to 1 can be interpreted with Cohen's [40] guidelines; 0.01 is small, 0.06 is moderate and 0.138 is large. All data was analysed using the Statistical Package for Social Scientists (SPSS), version 26, in this study.

3. Results

3.1. Factorisation

To answer the first research question, a PCA was conducted to identify potential subcomponents of the TAISA. The results of descriptive statistics showed that skewness and kurtosis values for all items were within the range between -2 and 2 , which conclude the normality of the data. Next, in order to obtain the best result for the PCA, the whole data set was utilised for this procedure [41]. Suitability of the data for PCA was assessed prior to performing the analysis, with the correlation matrix describing many coefficients of 0.40 and above, denoting high correlations between those items. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.85, exceeding the recommended value of 0.60 [42]. Bartlett's Test of Sphericity [43] was significant ($p < .001$), which supported the factorability of the correlation matrix.

The PCA revealed the presence of five components with eigenvalues exceeding 1, explaining 24.12 %, 8.72 %, 8.24 %, 5.40 % and 4.84 % of the variance, respectively. The scree plot demonstrated a clear break after the third component. Using Cattell's (1966) scree test [44], it was decided to retain three components for further investigation. Watkins' [45] software for calculating Parallel Analysis supported this decision, showing only three components with eigenvalues exceeded the corresponding criterion values in a randomly generated data matrix of 21 variables and 680 respondents.

The three-component solution explained a total of 41.10 % of the variance, with component 1 contributing 24.13 %, component 2 contributing 8.72 % and component 3 contributing 8.24 %. Varimax rotation was chosen as it is the most commonly used orthogonal rotation [46] and is the rotation of choice for the empirical study of data when simplification of a number of variables is desired [47]. The rotated solution did not completely conform to Thurstone's simple structure [48] with two questions that loaded on components 2 and 3 also loading on component 1. There was no cross component loading between components 2 and 3, suggesting that these components are simpler and clearly defined, with component one a little more unclear. Table 2 shows the results of the principal components analysis by item loadings.

Questions that loaded on component 1 suggested a theme of attitudes towards the training and preparation received, and how competent participants perceived themselves. This component was labelled Training and Perceived Competence (TAPC) and was calculated to be reliable, with a Cronbach's alpha of .70. Questions that loaded on component 2 suggested a positive attitude towards inclusive education, and this component was labelled Positive Affect (PA). The Positive Affect scale was calculated to be reliable, with a Cronbach's alpha of .79. The final component was loaded by questions that suggested a negative attitude towards inclusive education, and was labelled Negative Affect (NA). The Negative Affect scale had a Cronbach's alpha of .67. The lower reliability of the Negative Affect scale is also represented by the lower percentage of variance accounted for in the three-component model. Each of the components was calculated by averaging the sum of all factors to maintain the scale consistency of scores from 1 to 6. Reliability of the TIS was also calculated, with a Cronbach alpha of .81.

3.2. Demographic analysis

Table 3 includes a list of all the two-way ANOVAs that were performed together with their effect values and significance. Results were used to address research question two and to identify the potential relationship between various the demographic variables and TIS scores. It has been noted where some variables have broken the equal group size assumption of parametric tests, and caution was used to interpret those results.

To address the second research question, regarding potential differences among secondary and primary pre-service teachers, an independent-samples *t*-test was conducted to compare TIS for primary pre-service teachers and secondary pre-service teachers. Primary pre-service teachers ($M = 4.01$, $SD = .47$) had significantly higher TIS than secondary pre-service teachers ($M = 3.86$, $SD = .49$; $t(519) = 3.43$, $p < .001$). The magnitude of the differences in the means (means difference = .15, 95 % CI: 0.06 to 0.24) was small (eta squared = .02).

3.3. Variation according to stream and gender

A two-way between-groups analysis of variance was conducted to explore the impact of stream and gender on inclusion attitudes, as measured by TIS. The interaction effect was not significant, $F(1, 515) = 1.91$, $p = .17$. There was a significant effect for stream, $F(1, 515) = 11.41$, $p = .001$ and the effect size was somewhat small (eta squared = .02). There was also a significant main effect for gender, $F(1, 515) = 4.59$, $p = .03$, however, the effect size was smaller than stream (eta squared = .009). There was unequal *n* within the two gender groups which creates difficulty and ambiguity in the interpretation of results [47]. As the imbalance is representative of the

Table 2
The results of the principal components analysis by item loadings.

Component	Item	Item Loading	Eigenvalues	% Variance	Cronbach's Alpha
Training and Perceived Competence (TAPC)	Item 1	.344	5.068	24.13	.70
	Item 3	.725			
	Item 4	.709			
	Item 5	.503			
	Item 6	.521			
	Item 8	.394			
	Item 10	.544			
Positive Affect (PA).	Item 13	.485	1.731	8.24	.79
	Item 15	.627			
	Item 16	.588			
	Item 17	.715			
	Item 18	.655			
	Item 19	.639			
Negative Affect (NA)	Item 2	.623	1.831	8.72	.67
	Item 7	.651			
	Item 9	.504			
	Item 11	.427			
	Item 12	.459			
	Item 14	.572			
	Item 20	.490			
	Item 21	.441			

Table 3
Two-way between-groups analysis of variance on TIS.

Factors	Main Effect A ^b	Main Effect B ^c	Interaction Effect
Year of Study ^a	17.36*	8.92*	7.13*
Specialisation	5.21*	1.17	1.15
Campus	3.56	.5	.47
Contact	10.44*	1.9	1.1
Gender	11.41*	4.59*	1.91
Inclusive 'Module' ^a	14.92*	8.72*	11.78*
Experience	10.22*	1.51	.49
Definition of Inclusion	1.52	10.55*	3.16
Age Groups ^a	8.08*	2.65	.72

^b The effect of the factor on TIS.

* $p < .05$.

^a An analysis of simple effects were performed for these variables.

^b The effect of stream on TIS.

natural population, interpretation must take notice of the increased Type I error rate.

3.4. Variation according stream and inclusion definition

A two-way between-groups analysis of variance was conducted to explore the impact of stream and definition of inclusion on inclusion attitudes, measured by TIS. Levene's test of equality of error variances was significant, $F(9, 509) = 2.45, p = .01$, therefore a more stringent alpha level was set ($\alpha = .01$) as recommended [46]. The interaction effect was not significant, $F(4, 509) = 3.16, p = .014$. The main effect for stream was not significant, $F(1, 509) = 1.52, p = .22$. The main effect for the pre-service teacher definitions was significant, $F(4, 509) = 10.55, p < .001$, with a moderately large effect size (eta squared = .08). There are unequal n within the definition groups which creates difficulty and ambiguity in the interpretation of results [47]. As the imbalance is representative of the natural population, interpretation must take notice of the increased Type I error rate.

3.5. Variation of stream and year of study

A two-way between-groups analysis of variance was conducted to explore the impact of teaching stream and year of study on inclusion attitudes as measured by TIS. The interaction effect between stream and year of study was significant, $F(4, 507) = 7.13, p < .001$. The significance of the interaction effect means that the main effects were not able to be interpreted. A visual representation of the interaction can be seen in Fig. 1, where non-parallel lines are present.

A one-way between-groups analysis of variance was conducted to explore the impact of primary pre-service teacher's current year

of study on attitude scores as measured by TIS. There was a significant difference at the $p < .05$ level in TIS for the four year groups: $F(4, 326) = 5.41, p < .001$. There are unequal n within the five year groups which creates difficulty and ambiguity in the interpretation of results [47]. Interpretation must take notice of the increased Type I error rate. Post-hoc comparisons using the Tukey HSD test indicated that the mean score of respondents doing their post-graduate year ($M = 4.23, SD = .57$) was significantly different from respondents in their first year ($M = 3.94, SD = .43$), second year ($M = 3.88, SD = .36$), and third year ($M = 3.96, SD = .47$). There were no significant differences between respondents in their first, second or third year. Respondents in their fourth year ($M = 4.05, SD = .37$) were not different from any other year. The calculated eta squared was 0.06, showing a moderate effect size.

A one-way between-groups analysis of variance was conducted to explore the impact of secondary pre-service teacher's current year of study on attitude scores as measured by TIS. There was a significant difference at the $p < .05$ level in TIS for the four-year groups: $F(4, 181) = 9.08, p < .001$. There were unequal n within the five year groups which creates difficulty and ambiguity in the interpretation of results [47]. Interpretation must take notice of the increased Type I error rate. Post-hoc comparisons using the Tukey HSD test indicated three distinct groups. Respondents in their post-graduate year ($M = 4.12, SD = .44$), first ($M = 3.96, SD = .46$) and second ($M = 3.98, SD = .39$) year were grouped together as they were all significantly different to respondents in third ($M = 3.71, SD = .46$) and fourth ($M = 3.2, SD = .71$) year. Respondents in their third year were significantly different from all other groups; similarly, those in their fourth year were significantly different from all other years as well. The strength of the total differences was small (eta squared = .01). The size of the smallest compared to the largest group was 7.5, meaning that the assumption of equal group sizes has been broken, and consideration must be given that the power of this analysis is weak.

3.6. Variation according to completion of an inclusion module

A two-way between-groups analysis of variance was conducted to explore the impact of stream and whether participants had taken an inclusive module on inclusion attitudes, measured by TIS. The interaction effect was significant, $F(1, 514) = 11.78, p < .001$. The significance of the interaction effect means that the main effects were not able to be interpreted. Non-parallel lines can be seen in Fig. 2, demonstrating the interaction effect.

A one-way between-groups analysis of variance was conducted to explore the impact of primary pre-service teachers' completion of a module on inclusion on their attitudes towards inclusion, measured by TIS. There was a significant difference at the $p < .05$ level in TIS for the two groups: $F(1, 330) = 30.89, p < .001$. The effect size, calculated using eta squared, was 0.08 and therefore moderately strong. Pre-service primary teachers who had completed a module on inclusive education had significantly higher inclusion scores than those who had not.

A one-way between-groups analysis of variance was conducted to explore the impact of secondary pre-service teachers' completion of a module on inclusion on their attitudes towards inclusion, measured by TIS. There was no significant difference between secondary pre-service teachers who had and had not completed a module on inclusion, on their attitude scores, $F(1, 184) = .08, p = .78$.

3.7. Variation according to stream and age

A two-way between-groups analysis of variance was conducted to explore the impact of stream and age on inclusion attitudes, measured by TIS. Respondents were divided into four groups according to their age (Group 1: 19 years and below; Group 2: 20–21 years; Group 3: 22–24 years; Group 4: 25 years and above). Levene's test of equality of error variances was significant, $F(7, 508) =$

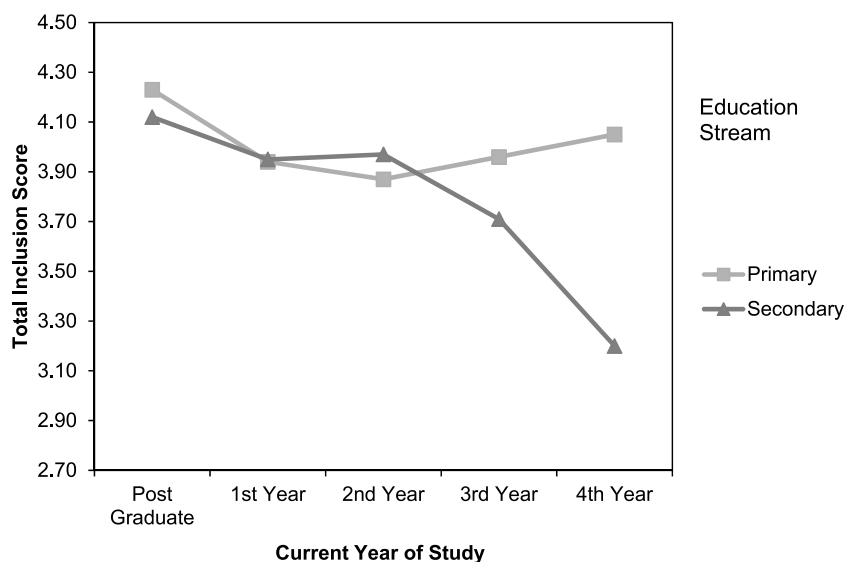


Fig. 1. Results of two-way ANOVA between stream and year of study.

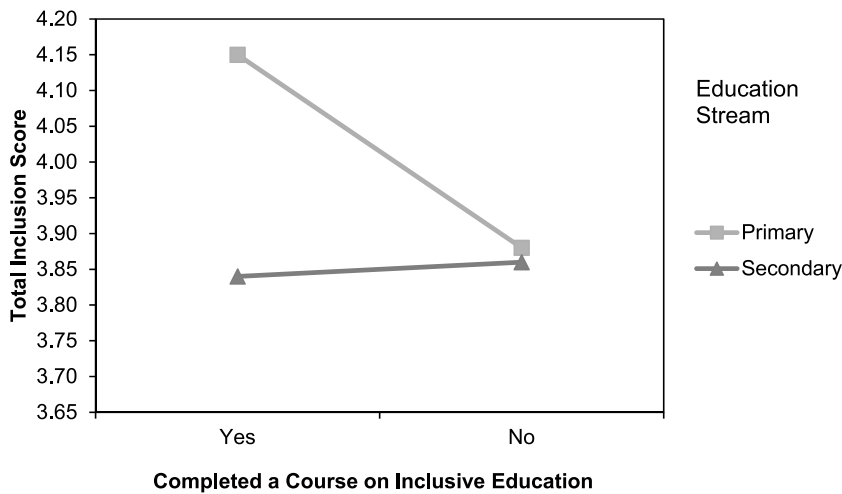


Fig. 2. Result of two-way analysis of variance between stream and module of inclusive education.

3.29, $p = .002$, therefore a more stringent alpha level was set ($\alpha = .01$) as recommended (Pallant, 2020). The interaction effect between stream and age group was not significant, $F(3, 508) = .72, p = .542$. The main effect for age group was not significant, $F(3, 508) = 2.65, p = .05$. However, the main effect for stream was significant, $F(1, 508) = 8.08, p = .005$, although the effect size was small (eta squared = .01). A visual representation of the relationship can be seen in Fig. 3.

4. Discussion

Differences between primary and secondary streams on inclusion attitudes have been found of in-service teacher populations but not yet on pre-service teacher populations. The differences between primary and secondary teachers are due to their teaching focus, inherent at their school level. Secondary teachers are thought to focus on subject content and achievement, while primary school teachers are thought to use a more holistic/inclusive ethos where they focus on child development [2]. Even within a sample of primary school teachers, it was found that the later grade level teachers held more negative attitudes than teachers of early grade levels [27].

This preliminary study attempted to replicate similar findings within populations of pre-service primary and secondary teachers, by demonstrating that differences exist between the two school streams. Significant differences were found between primary and secondary pre-service teachers on their attitudes towards inclusion. Primary pre-service teachers held more positive attitudes than secondary pre-service teachers. The effect size was small, suggesting that the difference was not large. This finding complements research of in-service teacher populations that find primary teachers more positive than secondary teachers [17].

Following similar lines of inquiry as in-service teacher differences [2], the difference between pre-service streams may be attributed to what they are being taught during their courses, as well as how they are being taught to teach, pedagogical techniques. It can be assumed that as primary teachers are known to focus on child development, primary pre-service teachers are taught about child development during their training and the pedagogical techniques that satisfy this objective. Similarly, as secondary teachers focus on content and achievement for students, pre-service secondary teachers are taught how best to convey content and help future students

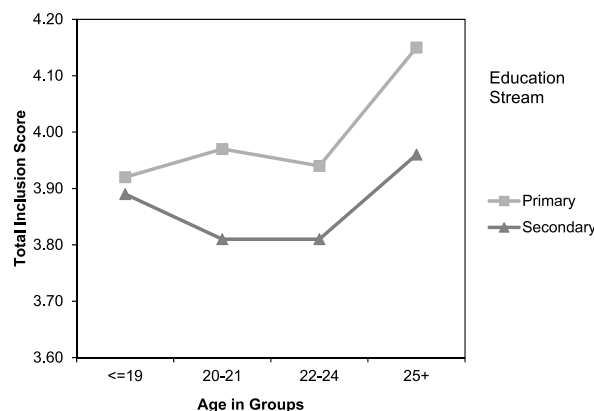


Fig. 3. Result of two-way ANOVA between stream and age in groups.

reach high achievement levels with pedagogical techniques to match. In the same way that secondary teachers' focus on subject content is incompatible with inclusive education, the same must be true for secondary pre-service teachers; learning to teach subject content and how to focus on achievement is difficult to achieve with inclusive education, as it results in lower attitudes. Memisevic and Hodzic [27] proposed that differences in grade levels were due to achievement gaps between children with SEN and peers which consequently puts pressure on teachers and lowers their attitudes. This hypothesis cannot be applied to pre-service teachers because it requires interaction and teaching experience which is not part of the pre-service teacher education that has been examined.

In this regard, it seems that primary and secondary pre-service teachers share similar views and teaching ideologies with their in-service peers. This foresight into the origin of lower secondary teacher attitudes towards inclusion can be put to practical benefit, by evaluating the specific situations in which the training of pre-service secondary teachers lowers their attitudes. It may also be beneficial for secondary pre-service teachers to receive the same level of training about child development that primary pre-service teachers do.

There are many age-related findings on attitudes towards inclusion such as experience and education, especially where older pre-service teachers are more likely to be people who have decided to change careers and retrain as a teacher by completing a post-graduate diploma of education [32]. The current study found that the analysis between stream and age on attitude scores showed no significant effects. However, it must be noted that the ability to compare age groups between primary and secondary streams is difficult as they are of differing age profiles.

This study supports previous findings that show gender affects pre-service teacher attitudes [49]. The findings show a significant effect for gender with a small effect size and no differences between primary or secondary stream gender differences. Therefore, within all pre-service teachers in our sample, females had more positive attitude scores than males. However, Forlin et al. [32] have shown gender differences in inclusion attitudes change after completing an inclusive education module. Hence, it is without merit to consider gender effects without identifying if the pre-service teachers had completed an inclusive module or not, because the higher female attitudes are overtaken by the male pre-service teacher attitudes after completing a module in inclusive education [32].

Using the ratings of the definitions that participants provided of inclusion, it was found that the higher the quality of the definition given by respondents, the higher their attitudes were towards inclusion. The effect size reflects a moderately strong relationship. As there was no interaction effect, this means that both primary and secondary streams equally follow this relationship. As would logically be, the better they understand inclusive education, the more positive their attitudes will become.

Completing a module on inclusive education is known to increase individuals' attitudes towards inclusive education [30], and the same effects have been replicated in this study though only for the primary stream. Completing a module on inclusion did not increase attitudes towards inclusion for participants in the secondary stream. An analysis of simple effects revealed that secondary attitude scores do not differ whether a pre-service teacher has completed an inclusive module, whereas if a primary pre-service teacher had completed a module, their attitudes were higher than other primary pre-service teachers who had not. The effect size was moderately strong suggesting that completing a course is a straightforward technique that can be used to raise pre-service primary teacher attitudes. These results complement Boyle et al. [38] study, as they found that completing a module on inclusion raised attitudes within their primary pre-service teacher sample. Forlin and Chambers [30] were led to the same conclusion with a sample consisting of early childhood and primary pre-service teachers. In de Boer et al. [21] literature review of primary school teachers' attitudes towards inclusion consistent evidence was found for inclusive training increasing attitudes. This finding is also in contrast to Forlin et al. [32] finding that younger pre-service teachers' attitudes changed more than older peers' following an inclusive module. Our sample of secondary pre-service teachers was younger than the primary cohort, and therefore should have had more flexible attitudes but did not.

The structure of inclusion courses may be an important factor not assessed in this study. While it was found that secondary stream participants did not alter their attitude scores by completing a module on inclusion, it may be the case that if multiple types of inclusion courses were examined, secondary pre-service teachers may have shown significant changes to one of them. Yet, comparisons between inclusion courses have shown that different courses still increase attitudes the same amount [29,34].

Research has shown that differences exist between year levels of primary pre-service teachers; specifically, that pre-service teachers in their first year held more positive attitudes than respondents in their fourth year [50]. The current study did not support the same findings. It was found that primary and secondary pre-service teachers had different patterns of difference between years of study and attitudes. Primary stream participants in their post-graduate year held significantly higher attitudes than participants in their first, second or third years of study, while participants in their fourth year showed no difference to any other year level. Unlike findings seen in Tok [50] and Memisevic and Hodzic [27], the current study showed no differences between first year and fourth year primary pre-service teachers. The secondary stream replicates previous findings of decreasing attitudes as students become nearer the completion of their degree; however, given that the fourth-year group of secondary pre-service teachers consisted of only 9 participants, these results must be cautiously interpreted.

This study found that primary pre-service teachers who had already completed an undergraduate degree possessed more positive attitudes than those without. The same effect was not seen in the secondary stream, where post-graduate teachers were grouped with pre-service teachers in their first and second years. This is in direct contrast to research by Forlin et al. [32]; however, it agrees with previous research by Sharma et al. [51,52] and Dignath et al. [29]. More support for these findings is found in in-service teacher research [38,53].

Primary pre-service teachers react better to training and education than do secondary pre-service teachers. Primary pre-service teachers were the only ones to be more positive because of holding an undergraduate degree, as well as improving when completing a course on inclusive education. It is either inherent in primary pre-service teachers to be more responsive towards training, or the course that they undertook was different in quality or structure to that of the secondary pre-service teachers [54,55].

Unlike previous research, the current study did not find that having contact with people with special needs raised attitudes towards inclusive education for either primary or secondary streams. This contrasts with recent research that has found contact with children with SEN increases a pre-service teachers' attitude [20]. Teaching experience was not a significant factor either, for primary or secondary pre-service teachers in this study, whereas it has been found significant in past research [32]. These conflicting findings potentially highlight the importance of a highly structured and managed exposure experience in order to result in the increase of positive attitudes.

4.1. Limitations

As a self-report measure was utilised; this study is subject to limitations based on that form of data collection. Response bias could have caused participants to appear more open to inclusion based on the premise that inclusion is a morally good concept. However, other studies have demonstrated this type of data collection to yield statistically robust findings [e.g., [56,57]]. Another limitation to this study was the unbalanced group sizes that were present in some of the variables examined, for instance, the difference in sample size of primary and secondary sample and differences in size between male and female participants may not fully justify and fit with the findings.

Asking a participant whether they have completed a course in inclusive education does not reveal whether or not they have learnt the techniques and performed competently in the course. Therefore, a participant could have answered correctly, yet not possess any benefit from completing the course thus throwing off results.

4.2. Future directions

Future research that plans to cross reference variables' effect on attitudes of primary and secondary streams of pre-service teachers can ensure statistical power and accuracy with an even spread of participants. The current study has revealed differences, however there is still more to discover. Further examination can reveal why secondary pre-service teachers do not benefit from completing a module on inclusion. Testing their response against a variety of different course types could perhaps reveal a significant relationship. Last, since the factor structure of the TAISA was determined by conducting PCA in this study, it would be worthwhile to examine the data using exploratory factor analysis to assess the suitability of the data and how factors are grouped.

5. Conclusion

The current study has demonstrated that within the sample of Australian pre-service teachers, primary pre-service teachers held more positive attitudes than secondary pre-service teachers. Training was found to only influence primary pre-service teachers, as completing a module on inclusive education improved their attitudes, and not those of secondary pre-service teachers. More generally, this research has demonstrated differences between primary and secondary pre-service teachers in attitudes towards inclusive education, and this should be considered while drafting future policy and evaluating training courses to improve pre-service teacher attitudes.

Data availability

The dataset supporting the current study has not been deposited in a public repository but is available upon reasonable request to the lead author.

Demographic questions

1. Please indicate your gender
2. Does a member of your family or a friend with whom you have regular contact with have additional support needs?
3. Please describe the course that you are studying
4. What is your current year of study?
5. What is your specialisation/proposed specialisation?
6. Please indicate your age
7. Have you studied a module or unit on inclusive education?
8. Have you experience of working in a school in some form of teaching support role?

Attitude toward inclusion

1. Students with additional support needs should be educated in a mainstream school
2. Educating children with additional support needs in mainstream classes has a detrimental effect on the other children in the class.
3. I feel that my teacher-training programme is preparing me adequately for working with all children irrespective of disability.
4. I feel competent to work with students who have varying levels of difficulties.

5. Students with additional support needs have the social skills required to behave appropriately in the classroom.
6. The presence of students with additional support needs in my mainstream class will have only a minimal effect upon my implementation of the standard curriculum.
7. Including children with additional support needs in the classroom can adversely affect the learning environment of the class.
8. A lot of the learning strategies employed in the classroom are applicable to all students not just those with additional support needs.
9. Some children have difficulties that mean that they should not be educated in mainstream schools.
10. I will be able to make a positive educational difference to students with additional support needs in my classroom.
11. Student peers will reject students with additional support
12. Students performing at a level more than three years below their chronological age should still be educated in mainstream classes.
13. Children with Social and Emotional Behavioural Difficulties should be educated in the mainstream class only if there is sufficient support in place for the class teacher.
14. It is not beneficial for children with additional support needs to be educated in mainstream schools.
15. It is my job, as a teacher, to provide alternative materials for students who have additional support needs (e.g., printed sheets of work from the whiteboard).
16. The daily or weekly formative assignments that are given to students to assess the class should be adapted for children with additional support needs.
17. The teacher should usually attempt to ensure that all the children in the class, irrespective of levels of difficulty or ability, are able to participate in the class as much as is possible.
18. With appropriate support, I could teach all students (including additional support needs) in the same class.
19. A teacher, if given what are regarded to be appropriate resources, could teach the vast majority of children with additional support needs.
20. Children with additional support needs learn best when grouped with others with similar needs.
21. I do not support the policy of inclusion no matter how much extra support the teacher is given in the class

CRedit authorship contribution statement

Christopher Boyle: Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Chris Barrell:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis. **Kelly-Ann Allen:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis. **Long She:** Writing – review & editing, Methodology, Formal analysis.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

APPENDIX. 1

Teacher Attitudes to Inclusion Scale (Adapted, TAISA).

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