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Confidence and motivation to teach primary physical education: A survey of specialist primary physical education pre-service teachers in Australia

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Introduction: This study explored confidence and motivation to teach physical education of pre-service teachers specialising in primary school physical education.

Methods: Participants were 277 pre-service teachers with a mean age of 21.37 years (*SD* = 3.09) enrolled in a Bachelor of Education (P-12) who were specialising in primary physical education (P-6). Pre-service teachers completed the Confidence and Motivation to Teach Primary Physical Education Questionnaire (CMTPPEQ), which measures confidence (management and planning and implementation) and intrinsic, extrinsic, and amotivated types of motivation (knowledge, performance, practice, professional expectations, student outcomes, and disengagement) toward teaching primary school physical education.

Results: Pre-service teachers reported higher confidence in implementation and higher motivation in practice and performance, with very low disengagement. Pre-service teachers in first-year were significantly less confident in both management and planning and implementation than other year levels ($p < 0.05$). Pre-service teachers with less training and experience (completed no units in physical education or who had taught less than one hour of physical education on teaching rounds) were significantly less confident in both management and planning and implementation ($p < 0.05$). Pre-service teachers reported higher intrinsic motivation for practice and extrinsic motivation for performance, with males reporting significantly higher extrinsic motivation in professional expectations than females ($p < 0.05$).

Discussion: The study has highlighted the confidence of pre-service primary physical education specialist teachers in implementing physical education, but lower confidence in management and planning. A practical implication from the findings is the importance of training and experience in developing confidence and motivation, even for those specialising in physical education.

KEYWORDS

physical edcation, primary school, teacher education, confidence, motivation, elementary school

Introduction

Primary school physical education have the potential to contribute to the development of movement skills and competencies, as well as social, cognitive, and affective skills (Graber et al., 2008; Pangrazi and Beighle, 2019; Rink, 2020; Rink and Hall, 2008. It is, thus, imperative that primary school teachers provide quality physical education programs for children to engage with during development (Lloyd et al., 2014; Lopes et al., 2017) and that pre-service teachers feel equipped to deliver physical education. Despite the perceived importance of primary physical education, research on teacher education in physical education remains an under researched area (Carse et al., 2018). Several studies have highlighted challenges in design and delivery of physical education (Freak and Miller, 2017; Randall and Fleet, 2021), as well limited training and exposure for pre-service teachers in primary physical education (Lynch, 2017) that may influence teacher confidence (Brennan et al., 2021) and, potentially, motivation in physical education.

In many countries, including in Australia, primary school physical education is most often delivered by generalist primary teachers (O'Sullivan and Oslin, 2012; Freak and Miller, 2017), who typically do not engage in specialist training in physical education as part of their pre-service teacher education (Lynch and Soukup, 2017; Randall and Griggs, 2021). This presents a challenge to teacher education programs to equip generalist teachers to feel prepared, confident, and motivated in physical education (Freak and Miller, 2017). This has led to some debate as to whether generalist primary school teachers or specialist physical education teachers are best placed to deliver physical education (Freak and Miller, 2017; Jones and Green, 2017; Truelove et al., 2021). There are not many not many specialist programs for primary physical education (Lynch, 2013, 2015). Specialists generally complete a major area of study in a discipline area, typically in Australia this is a 6 unit/subject sequence (Spittle et al., 2022). Developing primary physical education specialists (as is common in secondary physical education) may contribute to quality physical education programs (Lynch, 2015, 2017) and could support primary generalists in delivering physical education in primary school settings.

Previous research has consistently demonstrated that generalists have lower levels of confidence to teach primary physical education (Morgan and Bourke, 2005, 2008; Callea et al., 2008; Morgan and Hansen, 2008; Randall and Fleet, 2021), which may be a barrier to the motivation of teachers and the delivery of quality physical education programs. Confidence can be considered to be an individual's belief toward their capabilities (Duda and Treasure, 2010). A closely related concept is perceived self-efficacy, which is an individual's belief about their capability to complete a task (Bandura, 1977), that is, it is specific to a particular skill and situation (Duda and Treasure, 2010; Weinberg and Gould, 2019).

Confidence to teach physical education then could be defined as a perceived belief about the ability to complete a range of specific tasks and handle situations in physical education (Spittle et al., 2022). This confidence is important because it can influence performance, decisions, engagement in tasks as well as self-regulation and motivation (Choi et al., 2021). Teachers' sense of efficacy has also been related to student outcomes and teacher behaviour, including teacher effort and willingness to utilise new delivery approaches (Jimenez-Silva et al., 2012). Bandura's (1977, 1997) conceptual model of self-efficacy brings together concepts of confidence and expectations and outlines the main sources of information and experiences on which individuals base their elf-efficacy. For pre-service teachers, sources of information and experiences might include the units studied in physical education as part of teacher education and the experience teaching physical education on teaching rounds.

Motivation refers to an intention to act (Gredler et al., 2004) and is a multi-faceted construct that consists of beliefs, perceptions, values, interests and actions that drive behaviour (Deci and Ryan, 1985). Thus, the motivation of pre-service teachers will influence whether and how they deliver physical education in primary schools. Motivation of students in physical education has been the subject of research (Teraoka et al., 2021) and despite several studies of teacher motivation (Spittle et al., 2009; Hein et al., 2012; Spittle and Spittle, 2014), there is much less research on the motivation in the teaching of physical education.

Self-determination theory (SDT) is a wide-reaching theory of motivation (Deci and Ryan, 1985) that can be applied to physical education teaching. SDT (Deci and Ryan, 1985, 2000) describes different types of motivation based how much the behaviour is self-determined and how it is regulated (Ryan and Deci, 2000b). An individual feels self-determined when they perceive that they are the cause of their behaviour, and the higher this feeling of self-determination, the better the motivational outcomes (Ryan and Deci, 2000a,b). According to SDT the type, rather than the amount, of motivation is more important to behavioural outcomes (Baumeister and Vohs, 2007). The types of motivation are amotivation (the absence of intrinsic and extrinsic motivation), extrinsic (undertaking activities for reasons other than inherent interest in the activity), and intrinsic (the most self-determined form of motivation, involving undertaking an activity out of interest, enjoyment, or inherent satisfaction) motivation. Like confidence, motivation is influenced by experience (Visser-Wijnveen et al., 2014), so examining experiences in physical education may be important in understanding the motivation of pre-service teachers.

Primary school teachers may have differing levels of motivation toward teaching subject areas, including physical education, based on their personal characteristics and experience. This is highly applicable in a primary school setting, as generalist teachers teach across a range of subject areas, so may have different motives in relation to different

curriculum areas. Generalist teachers who lack confidence may also have different motivation for teaching physical education than those who have chosen to specialise in primary physical education and have completed more training in physical education. The confidence and motivation of pre-service teachers who have specialised in primary physical education have not been explored, but their confidence and motivation are potentially key drivers in the delivery of quality physical education programs in primary schools.

Spittle et al. (2022) developed the Confidence and Motivation to Teach Primary Physical Education Questionnaire (CMTPPEQ) which measures two components of confidence to teach physical education: management and planning and implementation and six components of motivation to teach physical education representing intrinsic, extrinsic, and amotivation. Management and planning comprises confidence in performing common roles or duties when teaching physical education (e.g., planning a physical education program, establishing learning goals, communicating student achievements, maintaining records, and self-evaluating learning activities). Implementation represents delivering content specific to physical education (e.g., teaching motor skills and complex movements, dance, team games and sports, athletics, and fitness). Motivation is assessed in relation to six subscales: practice, knowledge, student outcomes, performance, professional expectations, and disengagement. Intrinsic motivation comprises two of those subscales: knowledge (motivation for teaching physical education as an activity that is undertaken for pleasure and satisfaction of learning new things) and practice (experiencing stimulating sensations of fun and excitement as motives for teaching physical education). Extrinsic motivation comprises three subscales: student outcomes, performance, and professional expectations. Student outcomes describes teaching physical education because it is identified as worthwhile and beneficial for students and is integrated into teacher behaviour. Performance, is governed by rewards and restrictions implemented by the teacher themselves (e.g., teaching physical education to avoid feelings of guilt or anxiety or to build up their ego and feelings of self-importance). Professional expectations is the least autonomous form of extrinsic motivation, where teacher behaviour is controlled by external sources (e.g., teaching physical education because it is required by the curriculum). Amotivation is represented by disengagement, which describes a lack of motivation toward teaching physical education (e.g., not valuing physical education, not feeling competent to teach it, or not believing it will result in a desired outcome).

Exploring confidence and motivation for teaching primary school physical education seems warranted given the influence of confidence on motivation and the influence of this on quality physical education programs. As primary school physical education is most often delivered by generalist teachers and most research exploring confidence in teaching primary physical education has centred on generalist teachers and their lack of confidence, research exploring confidence and motivation with those who are training in primary physical education seems warranted. In Australia, there are very few universities that offer specialisations in primary school physical education (as opposed to secondary physical education), but this may be important for preparing teachers to deliver and support others in delivering physical education programs (Lynch, 2013, 2015).

The aim of this study was to explore the confidence and motivation of pre-service primary teachers who had chosen a specialisation in physical education to teach physical education. To do this we compared how characteristics of confidence (management and planning and implementation) and intrinsic, extrinsic, and amotivated types of motivation (knowledge, performance, practice, professional expectations, student outcomes, and disengagement) differed for personal characteristics and experience of pre-service teachers specialising in primary physical education that may influence confidence and motivation. The characteristics compared included gender, year-level, units of physical education completed in the course, and hours of physical education taught on teaching rounds. A further aim was to discover whether confidence factors were associated with different types of motivation to teach primary physical education.

Materials and methods

Participants

Pre-service teachers must choose two teaching methods to specialise in. All participants had elected to specialise in primary physical education (P-6), which involves undertaking a six-unit major in physical education so that they can register to teach primary school physical education. The method does not enable them to register to teach secondary school physical education. A total of 277 pre-service teachers with a mean age of 21.37 years (SD = 3.09) completed the questionnaires, comprising 131 (47.3%) male and 146 (52.7%) female participants. As indicated in **Table 1**, there were 93 (33.6%) first-year, 105 (37.9%) second-year, and 79 (28.5%) third-year students. Many of the pre-service teachers had not yet completed any units of physical education as part of their course (n = 92, 33.2%), 15 students had completed one unit (5.4%), 80 had competed two units (28.9%), 18 had completed three units (6.5%), 36 had completed four units (13%), and 36 had competed more than four units (13%). Most pre-service teachers had taught less than 1 h of physical education on their teaching rounds (n = 139, 50.2%), 90 had taught between 1 and 5 h (32.5%), 20 had taught between 5 and 10 h (7.2%), 10 between 10 and 15 h (3.6%), and 18 had taught more than 15 h of physical education on their teaching rounds (6.5%).

TABLE 1 Frequency and percentage of sample characteristics.

Year level	1st year	2nd year	3rd year			
	93 (33.6%)	**105 (37.9%)**	**79 (28.5%)**			
Units of physical education completed	0	1 unit	2 units	3 units	4 units	>4 units
	92 (33.2%),	15 (5.4%),	80 (28.9%)	18 (6.5%),	36 (13%)	36 (13%)
Hours of physical education taught on teaching rounds	<1 h	1–5 h	5–10 h	10–15 h	>15 h	
	139 (50.2%),	90 (32.5%),	20 (7.2%),	10 (3.6%),	18 (6.5%).	

Measures

A questionnaire was used to measure demographic information and confidence and motivation of pre-service education students to teach physical education. The demographics form contained five questions which asked participants to indicate their gender, age, current year level, number of units of physical education completed, and number of hours of physical education taught on teaching rounds. The Confidence and Motivation to Teach Primary Physical Education Questionnaire (CMTPPEQ) (Spittle et al., 2022) consists of two sections: one section addressing confidence (24 items) and one section addressing motivation (28 items) toward teaching primary school physical education. The CMTPPEQ uses a 6-point Likert Scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*), with the item stem 'I am confident in my ability to' for confidence and "Why you would teach physical education" for motivation. Confidence comprises two subscales; management and planning (15 items) and implementation (9 items). Motivation is assessed in six subscales: practice, knowledge, student outcomes, performance, professional expectations, and disengagement. Intrinsic motivation comprises two subscales in the CMTPPEQ: knowledge and practice. Extrinsic motivation comprises three CMTPPEQ subscales: student outcomes, performance, and professional expectations. Amotivation is represented in the CMTPPEQ by disengagement

Spittle et al. (2022) reported that the CMTPPEQ has acceptable reliability with Cronbach's alpha values greater than.70 for confidence subscales (management and planning = 0.96 and implementation = 0.89) and all motivation subscales (ranging from 0.73 for professional expectations to 0.91 for practice). In the current study they were 0.75 and 0.93, respectively (**Table 2**).

Procedure

Students studying a Bachelor of Education (P-12) who had chosen primary physical education as a teaching method were invited to participate in the study. Participants were given a plain language statement and informed that their participation was voluntary and returning a completed questionnaire implied consent. The questionnaire took between 10 and 15 min to complete. A University Human Research Ethics Committee approved the study.

Data analysis

Cronbach's alpha coefficients were calculated for each of the confidence and motivation subscales to determine internal consistency. Independent samples t-tests were used to determine if there were any significant differences in the confidence and motivation subscales for gender. One-way analyses of variance (ANOVA) were used to determine if there were any significant differences in confidence and motivation subscales for year level, units of physical education completed in the course, and hours of physical education taught on teaching rounds. Where significant differences were found, *post-hoc* tests were employed to further investigate the nature of those differences. Scores (mean and standard deviations) are presented as average score per item in each subscale. Pearson correlations were calculated between the confidence and motivation subscales to discover whether confidence factors were associated with different types of motivation to teach primary physical education.

Results

Confidence and motivation

Confidence scores

The Bachelor of Education students who chose to specialise in primary physical education reported higher confidence for implementation than for management and planning (**Table 2**). Cronbach's alpha coefficients were calculated for each of the factors, displaying adequate internal consistency (**Table 2**).

TABLE 2 Descriptive statistics and internal consistency coefficients for the confidence subscales.

	Total scale score		Average score per item		
Subscale	***M***	***SD***	***M***	***SD***	**Internal consistency**
Implementation	38.51	6.04	4.28	0.57	0.750
Management and planning	68.02	10.35	4.54	0.27	0.931

Motivation scores

Participants reported higher motivation in practice and performance; and lower scores on professional expectations, and knowledge, as well as low scores on disengagement (Table 3). Cronbach's alpha coefficients were calculated for each of the factors, displaying adequate internal consistency (Table 3).

Gender

Males reported significantly higher motivation in relation to professional expectations than females (Table 4), however, no significant differences for any of the other confidence or motivation subscales.

Year level

There were significant differences for year level on the two confidence factors: implementation and management and planning (Table 5). *Post-hoc* tests revealed that first-year students had lower confidence related to management and planning than second- and third-year students and second-year students had lower confidence than third-year students. First-year students also had lower confidence in implementation than second- and third-year students. There were no significant differences for any of the motivation factors.

Units of physical education

There were significant differences on the two confidence factors between participants based on the number of units of physical education completed in the course, but no significant differences for any of the motivation factors (Table 6). For implementation, pre-service teachers who had completed no units were significantly lower in confidence than pre-service teachers who had completed 2, 4, and 4+ units. Pre-service teachers who had completed 1 unit were also significantly less confident than those who had completed 4 units. For management and planning, pre-service teachers who had completed no units of physical education were significantly less confident than pre-service teachers who had completed 2, 4, or 4+ units.

Hours of physical education taught

For hours of physical education taught on teaching rounds, there were significant differences on the two confidence factors, but no significant differences for any of the motivation factors (Table 7). Pre-service teachers who had taught less than one hour of physical education on teaching rounds were significantly less confident on implementation than pre-service teachers who had taught 1–5 or 15+ h. Similarly, for management and planning, pre-service teachers who had taught less than one hour were significantly less confident than those who had taught 1–5, 10–15, or 15+ h. No other comparisons were significantly different.

Relationships between confidence and motivation

Pearson's correlations to explore the relationships between the confidence and motivation subscales indicated that both confidence in implementation and planning and management were significantly related to motivation related to knowledge, practice, and performance (Table 8). The significant relationships were generally small, ranging between 0.26 and 0.41.

Discussion

This study explored the confidence and motivation of pre-service primary teachers specialising in physical education to teach physical education. To do this we compared how characteristics of confidence (management and planning and implementation) and types of motivation (knowledge, practice, performance, professional expectations, student outcomes, and disengagement) differed for personal characteristics and experience. We found that the pre-service teachers specialising in primary physical education reported higher confidence for implementation than for management and planning and higher motivation in practice and performance; and lower motivation for professional expectations and knowledge, with very low disengagement. Males reported significantly higher extrinsic motivation in relation to professional expectations than females. Pre-service teachers in first-year were significantly less confident

TABLE 3 Descriptive statistics and internal consistency coefficients for the motivation subscales.

		Total scale score		Average score per item		
	Subscale	***M***	***SD***	***M***	***SD***	**Internal consistency**
Intrinsic Motivation						
	Knowledge	14.03	2.56	4.68	0.23	0.624
	Performance	29.01	4.80	4.84	0.22	0.827
Extrinsic Motivation						
	Practice	25.68	3.43	5.09	0.20	0.793
	Professional expectations	11.46	3.74	3.82	0.55	0.692
	Student outcomes	21.61	2.57	5.40	0.25	0.793
Amotivation						
	Disengagement	6.78	3.85	1.70	0.21	0.799

TABLE 4 Descriptive statistics and *t*-test results for confidence and motivation subscales by gender.

		Gender							
		Male (n = 131)		Female (n = 146)					
Subscales		***M***	***SD***	***M***	***SD***	***t***	***df***	***p***	***d***
Confidence									
	Implementation	4.29	0.73	4.27	0.48	0.30	275	0.77	0.04
	Management and planning	4.59	2.24	4.49	0.30	1.28	275	0.20	0.15
Motivation									
Intrinsic motivation									
	Knowledge	4.63	0.12	4.72	0.33	−0.90	275	0.37	−0.10
	Practice	5.18	0.25	5.09	0.14	1.04	275	0.30	0.13
Extrinsic motivation									
	Performance	4.92	0.13	4.76	0.30	1.61	275	0.11	0.19
	Professional Expectations	4.00	0.57	3.67	0.54	2.15	275	0.05*	0.26
	Student Outcomes	5.39	0.26	5.41	0.25	−0.23	275	0.82	−0.03
Amotivation									
	Disengagement	1.80	0.23	1.60	0.19	1.69	275	0.10	0.20

*$p < 0.05$.

in management and planning and implementation than other year levels, similarly those who had completed no units in physical education and those who had taught less than 1 h of physical education on teaching rounds were less confident in both management and planning and implementation than pre-service teachers who had completed units in physical education or had taught more than one hour of physical education on teaching rounds. For motivation, the pre-service teachers reported higher motivation in practice and performance; and lower motivation based on professional expectations and knowledge, and even lower scores on disengagement.

In terms of confidence, the pre-service teachers reported being generally confident, with mean item scores of 4.28 and 4.54 out of 5 for the two confidence subscales. Primary physical education is commonly delivered by generalist primary teachers (Freak and Miller, 2017) who typically do have significant pre-service teacher education training in physical education (Lynch and Soukup, 2017; Randall and Griggs, 2021), which can make it difficult to equip generalist teachers to be confident and motivated to teach physical education (Freak and Miller, 2017), with previous research indicating lower confidence in generalist teachers (Morgan and Bourke, 2005, 2008; Callea et al., 2008; Morgan and Hansen, 2008; Randall and Fleet, 2021). The current study indicates there may be some benefits in terms of confidence to teach in having specialists deliver physical education in primary schools, whether this translates to higher quality physical education programs is an area for further research. Irrespective of the debate around whether generalist primary school teachers or specialist physical education teachers are best placed to deliver physical education (Freak and Miller, 2017; Jones and Green, 2017; Truelove et al., 2021), the higher confidence of the specialists in the current study indicates

TABLE 5 Descriptive statistics and ANOVA results confidence and motivation by year level.

		Current year level									
		1st year (n = 93)		2nd year (n = 105)		3rd year (n = 79)					
Subscales		*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*df*	*p*	η p_2
Confidence											
	Implementation	4.00	0.80	4.35	0.51	4.51	0.53	15.04	2, 274	0.001**	0.10
	Management and planning	4.23	0.32	4.55	0.28	4.87	0.23	21.15	2, 274	0.001**	0.13
Motivation											
Intrinsic motivation											
	Knowledge	4.69	0.23	4.58	0.24	4.79	0.25	1.46	2, 274	0.23	0.01
	Practice	5.23	0.18	5.02	0.20	5.18	0.23	2.57	2, 274	0.07	0.02
Extrinsic motivation											
	Performance	4.92	0.19	4.69	0.26	4.93	0.22	2.85	2, 274	0.06	0.02
	Professional expectations	3.75	0.82	3.93	0.34	3.76	0.56	0.65	2,274	0.52	0.01
	Student outcomes	5.41	0.20	5.31	0.29	5.52	0.27	2.42	2, 274	0.91	0.02
Amotivation											
	Disengagement	1.62	0.22	1.67	0.23	1.81	0.19	0.90	2, 274	0.40	0.00

**$p < 0.01$.

the importance of at least some exposure or training in physical education as part of teacher education to develop that confidence for any pre-service teacher (Brennan et al., 2021).

The pre-service teachers reported higher confidence for implementation than for management and planning. This indicates that the pre-service teachers were confident to deliver physical education, such as teach skills and games and sports, but less confident in their ability to plan and mange physical education, such as plan a program, maintain records, and establish learning goals. Several studies have highlighted challenges in design and delivery of physical education (e.g., Freak and Miller, 2017; Randall and Fleet, 2021), with the current study emphasising that management and planning may be an area to focus on with specialist pre-service teachers. This indicates that for the generalist, implementation and delivering is a concern, whereas the specialists were very confident in delivery but somewhat less confident in management and planning.

For motivation, the pre-service teachers reported higher motivation in practice and performance; and lower scores on professional expectations and knowledge. This indicates that pre-service teachers were more intrinsically motivated by practice, involving experiencing fun and excitement for teaching physical education while also being more extrinsically motivated by performance, being governed by internal rewards and restrictions such as to avoid feelings of guilt or anxiety. The pre-service teachers were less intrinsically motivated by knowledge, that is, to learn new things, and less extrinsically motivated by professional expectations and requirements controlling their teaching behaviour in physical education. Importantly, amotivation through disengagement was very low, indicating that, as would be hoped, these pre-service teachers specialising in primary physical education were motivated to teach it. This appears to indicate that practice and performance may be important motives for specialists.

Males and females did not differ significantly in most areas of confidence or motivation, but males reported significantly higher extrinsic motivation in relation to professional expectations than females. Professional expectations is behaviour controlled by external sources (i.e., doing it because it is a requirement rather than choosing to do it) and is the least autonomous form of extrinsic motivation. Pre-service teachers did differ on confidence between year levels but not on motivation. For confidence, first-year students were significantly lower on management and planning than second- and third-year students and second-year students were significantly lower than third-year students. In addition, first-year students also had significantly lower confidence in implementation than second- and third-year students. This indicates lower confidence for first-year students, which might be expected, given that they will have less training and experience than those in later years.

Pre-service teachers who were yet to complete any physical education units were less confident in both management and planning and implementation than pre-service teachers who had completed units in physical education. Motivation did not differ based on number of units completed. Similarly for hours of physical education taught as for number of units completed, pre-service teachers who had taught less than one hour of physical education on teaching rounds were significantly less confident on implementation and management and planning than pre-service teachers who had taught more physical education on teaching rounds. Limited training and practical experience for pre-service teachers, particularly generalists, in

TABLE 6 Descriptive statistics and ANOVA results for confidence and motivation by units of physical education completed.

		Units of physical education completed															
		0 (n = 92)		1 (n = 15)		2 (n = 80)		3 (n = 18)		4 (n = 36)		4 + (n = 36)					
Subscales		*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*df*	*p*	η p_2
Confidence																	
	Implementation	4.01	0.80	3.95	0.56	4.44	0.54	4.30	0.55	4.55	0.48	4.46	0.62	6.96	5,271	0.001**	0.11
	Management and planning	4.24	0.31	4.37	0.38	4.61	0.27	4.64	0.27	4.83	0.23	4.84	0.27	7.34	5,271	0.001**	0.12
Motivation																	
Intrinsic motivation																	
	Knowledge	4.70	0.26	4.87	0.07	4.53	0.29	4.72	0.15	4.80	0.34	4.69	0.23	0.80	5,271	0.55	0.01
	Practice	5.25	0.19	4.93	0.14	5.03	0.24	5.18	0.29	4.61	1.23	5.14	0.19	1.09	5,271	0.36	0.02
Extrinsic motivation																	
	Performance	4.93	0.21	4.77	0.14	4.65	0.25	4.90	0.28	4.84	0.28	4.98	0.20	1.42	5,271	0.22	0.03
	Professional expectations	4.45	0.47	3.73	0.81	3.92	0.34	4.04	0.53	3.75	0.71	3.81	0.32	0.33	5,271	0.89	0.01
	Student outcomes	5.41	0.24	5.12	0.27	5.36	0.26	5.50	0.25	5.48	0.24	5.45	0.32	0.89	5,271	0.49	0.02
Amotivation																	
	Disengagement	1.64	0.20	1.73	0.33	1.64	0.21	1.67	0.27	1.72	0.23	1.94	0.24	0.58	5,271	0.72	0.01

**$p < 0.01$.

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TABLE 7 Descriptive statistics and ANOVA results for confidence and motivation by hours of physical education taught on teaching rounds.

		Hours of physical education taught on teaching rounds													
		<1 (n = 139)		1–5 (n = 90)		5–10 (n = 20)		10–15 (n = 10)		15+ (n = 18)					
Subscales		***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***	***F***	***df***	***p***	**η p_2**
Confidence															
	Implementation	4.09	0.65	4.42	0.53	4.46	0.44	4.60	0.63	4.65	0.64	6.58	4, 272	0.001**	0.09
	Management and Planning	4.33	0.32	4.66	0.24	4.70	0.29	5.01	0.17	5.04	0.30	8.55	4, 272	0.001**	0.11
Motivation															
Intrinsic motivation															
	Knowledge	4.65	0.27	4.63	0.18	4.78	0.26	4.83	0.58	4.93	0.44	0.64	4, 272	0.63	0.01
	Practice	5.11	0.17	5.12	0.22	5.08	0.35	5.28	0.26	5.37	0.31	0.71	4, 272	0.59	0.01
Extrinsic motivation															
	Performance	4.82	0.19	4.75	0.29	4.88	0.16	5.27	0.27	5.06	0.32	1.33	4, 272	0.26	0.02
	Professional expectations	3.70	0.60	4.00	0.50	3.53	0.28	4.13	0.93	4.11	0.62	1.27	4, 272	0.28	0.02
	Student outcomes	5.34	0.24	5.42	0.29	5.56	0.26	5.58	0.13	5.53	0.29	0.98	4, 272	0.42	0.01
Amotivation															
	Disengagement	1.67	0.21	1.73	0.25	1.54	0.14	2.48	0.39	1.53	0.26	2.00	4, 272	0.10	0.03

**$p < 0.01$.

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primary physical education (Lynch, 2017) has been discussed as a factor that may influence teacher confidence (Morgan and Hansen, 2007). Specialists generally complete a major area of study in a discipline area, whereas generalists may only complete one or two subjects in the health and physical education area (Lynch, 2013, 2015). The current study shows that this training and experience is important not only for generalists (Ensign et al., 2020) but for specialists, with those with more units of study and/or more teaching experience on teaching rounds more confident.

There were significant relationships between confidence and motivation, with both confidence in implementation and planning and management significantly related to motivation related to knowledge, practice, and performance. Confidence in management and planning and implementation were not related to the least autonomous form of motivation: professional expectations, and disengagement. The findings of the current study further indicate the relationship between confidence in teaching primary physical education and motivation to teach it.

Limitations

This study provides important information on the confidence and motivation of pre-service teachers specialising in primary physical education, however, some potential limitations of the study should be acknowledged. The questionnaire utilised has been developed based on an existing theoretical framework and has established reliability and validity. The use of a questionnaire, however, with volunteer participants may limit the range of possible responses and as a form of self-report data may be potentially subject to participants providing socially desirable responses (Paulhus, 1991) and common method variance (Podsakoff et al., 2003). The sample of participants is a potential limitation and may limit the generalisability of findings. Participants volunteered to participate in the study, so the responses may be limited to those with an interest in the topic or may exclude particular groups of pre-service teachers who have chosen not to participate. In addition, participants were pre-service teachers from one university. Future research should continue to examine the role of confidence and motivation in teaching primary physical education. Investigating in-service physical education teachers would help develop further understanding of confidence and motivation of specialists in primary physical education.

Implications

The pre-service teachers were more confident and intrinsically motivated to teach physical education than generalists in previous studies (Morgan and Bourke, 2005, 2008; Callea et al., 2008; Morgan and Hansen, 2008; Randall and Fleet, 2021), indicating the importance of exposure and access to physical education in teacher education, for confidence of both generalists and specialists. Providing university courses where teachers have the opportunity to specialise in primary physical education should help prepare teachers to be confident and motivated in teaching physical education (Lynch, 2013). Currently in Australia there are a number of universities that offer specialisations in secondary physical education and generalist primary education, but few university courses that offer a specialisation in primary school physical education (Lynch, 2013, 2015).

TABLE 8 Pearson's correlations between confidence and motivation subscales.

	Confidence	
Motivation	**Implementation**	**Management and planning**
Knowledge	0.260**	0.280**
Practice	0.322**	0.356**
Performance	0.266**	0.309**
Professional expectations	−0.041	0.008
Student outcomes	0.325**	0.411**
Disengagement	−0.039	−0.061

**$p < 0.01$.

The pre-service teachers specialising in primary physical education reported higher confidence for implementation than for management and planning, this may indicate that teacher education programs may need to ensure they support pre-service teachers in planning and managing physical education, as well as in delivering a program. The pre-service teachers reported higher intrinsic motivation for fun and excitement in practice, and were extrinsically motivated and governed by their own expectations of performance. Delivering physical education was important to them for the fun and enjoyment they experience, but also because internally they feel it is important. They were less motivated by professional expectations and requirements to deliver physical education or for knowledge and learning new things. Therefore, making sure pre-service teachers experience the fun and enjoyment of teaching in physical education and not making it feel like it is a requirement to teach may be important to maximising engagement in physical education.

Conclusion

In conclusion, we found that pre-service primary teachers specialising in physical education reported higher confidence for implementation than for management and planning and higher motivation in practice and performance, with very low disengagement. Pre-service teachers in first-year were significantly less confident in both management and planning

and implementation than other year levels. Pre-service teachers who had completed no units in physical education and those who had taught less than one hour of physical education on teaching rounds were less confident in both management and planning and implementation than pre-service teachers who had completed units in physical education or had taught more than one hour of physical education on teaching round, indicating the importance of training and experience to confidence in teaching physical education, even for those specialising in physical education. Pre-service teachers reported higher intrinsic motivation for practice and extrinsic motivation performance, indicating motives for fun and excitement in teaching and internal regulation of motivation for teaching physical education. The study highlighted the importance of training and experience in developing confidence and motivation to teach physical education, even for those who have chosen to specialise in physical education in teacher education programs.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Victoria University Human Research Ethics Committee. The patients/participants provided their written informed consent to participate in this study.

Author contributions

SS and MS co-designed the study. SS, MS, and KE implemented the study and data collection. SI conducted the data management. SS, MS, SI, and KE contributed to the initial draft. MS conducted data analysis and prepared the final draft. All authors contributed to the manuscript and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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