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The Impact of Professional Development and Indigenous Education Officers on Australian Teachers' Indigenous Teaching and Learning

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Abstract: The study investigated the impact of professional development (PD) in Indigenous teaching on teachers' psychological and behavioural aspects, and Indigenous students' learning engagement. Adopting a multiple-indicator-multiple-indicator-cause model, frequency of PD was found to have positive paths to teachers' self-concept in Indigenous teaching and all the teaching strategies, but had a non-significant path to students' learning, suggesting the more frequently teachers are involved in PD in Indigenous teaching, the higher self-concept they had in teaching Indigenous children and the more frequently they adopted Indigenous teaching strategies. The availability of Aboriginal Education Officers (AEOs), however, had a significant and negative path on learning engagement. That is, Indigenous students' were perceived to be less engaged in learning with AEOs present in the school. An interaction effect was also found between PD and AEOs, indicating that the effectiveness of AEOs in Indigenous students' learning may depend on whether teachers actively attend PD programs.

Professional development (PD) of teachers is widespread in many countries around the world with a common aim to enhance the quality of student learning. Research on PD abounds, however, there is a paucity of research on PD on the teaching of Indigenous students in Australia (referred to as Indigenous teaching hereafter). Furthermore, the extant studies, which have examined the effectiveness of PD, tend to use only a single indicator to gauge the effectiveness, either on teaching (such as teachers' psychological wellbeing and teaching practice), or on learning (such as students' learning outcomes). Research to date lacks strong investigations of the effectiveness of PD by employing multiple indicators to delineate impacts on both teaching and learning. For Indigenous education to be successful, teachers should be trained to gear their teaching towards a culturally appropriate way for Indigenous students (Chinn, 2007; Matthews, Howard, & Perry, 2004; Smith, 1999). A culturally appropriate way of teaching is characterised by incorporating Indigenous values, history, and perspectives into teaching, which can be achieved by incorporating Indigenous content into the curriculum and consulting local Indigenous community members in order to understand Indigenous ways of inculcating new ideas and concepts. In Australia, in order for teaching to be adaptive for Indigenous Australian students, there is the need for PD for non-Indigenous teachers to be equipped with culturally appropriate pedagogies. Indigenous personnel known as Aboriginal Education Officers (AEOs) are also employed in schools to help engage Indigenous students. The Department of Education and Communities in the state of New South Wales (NSW), for example, has established a program which allocates AEOs in various regions. However, there is a lack of empirical evidence of the impact of having

AEOs on Indigenous teaching and learning. This paper presents the results of a study which investigates the impact of PD in Indigenous teaching and the availability of AEOs on multiple measures of Indigenous teaching and learning, namely Indigenous teaching strategies, Indigenous teaching self-concept, and Indigenous students' learning engagement, among primary school teachers in rural and urban NSW, Australia.

The Need for PD in Indigenous Education in Australia

Cooke, Mitrou, Lawrence, Guimond, and Beaven (2007) have pointed out that Indigenous Australians are known to be one of the most disadvantaged Indigenous populations in the world. For decades, they have been marginalized not only in socio-economic status, health treatment, but also in acknowledgement of culture and values and opportunities of accessing education (Claremont, 2008; Hill, Barker, & Vos, 2007; Ring & Brown, 2003; Yeung, Craven, & Ali, 2013). Failure of Indigenous education in Australia is evidenced in the fact that Indigenous children lag behind their non-Indigenous counterparts from early stages of schooling, are frequently found to be alienated in mainstream school cultures, attain seriously low school retention rates, achieve poorly in academic work, have low school enjoyment and self-concepts, and some suffer from depression and suicide ideation (Australian Bureau of Statistics and Australian Institute of Health and Welfare, 2008; Bodkin-Andrews, Ha, Craven, & Yeung, 2010; Claremont, 2008; Craven & Tucker, 2003; Yeung et al., 2013). Apparently, partial solutions to these problems reside in how educators can adapt to meeting Indigenous students' genuine needs throughout education (National Board of Employment, Education, and Training, 1995). Through adapted teaching practice, Indigenous children can be empowered in the process of education so that their full potential can be realised (Craven & Parbury, 2013) and they can obtain desirable educational outcomes (Craven, 2005, 2011).

In reality, however, in Australia, the majority of non-Indigenous pre-service teachers may not even have encountered an Indigenous person before they start teaching, and they only find themselves meeting Indigenous children for the first time in their teaching practice (Craven, 2005). Although teacher education programs in Australia are increasingly paying attention to incorporating Indigenous values and learning characteristics as important elements in the programs, not all pre-service teacher education degrees offer a course on Indigenous Studies or Indigenous Education. As a result, many pre-service teachers are found to be ill-equipped with knowledge about teaching Indigenous students, and are not well-prepared to cater for Indigenous children's educational needs (Craven, 2005, 2011). If teachers are to be qualified and be successful in teaching Indigenous students they need to acquire the knowledge, skills, and attitudes to be effective teachers of Indigenous students. This may require in-service teachers to be constantly involved in a variety of PD training, courses, and workshops so that they can construct a useful Indigenous teaching repertoire. Such PD programs do exist today but the frequency of attending such programs varies from teacher to teacher. The present study examines the impact of the frequency of Australian primary school teachers' participation in Indigenous teaching PD on Indigenous teaching and learning.

The Impact of PD

According to Guskey's (2000) model, PD may display impacts at five different levels: (1) teachers' reaction to the PD; (2) teachers' psychological change (e.g., changes in

conceptions of teaching, motivations, and self-efficacy in teaching); (3) teachers' behavioural change (e.g., changes in applying for teaching approaches, strategies, and techniques); (4) organisational support and changes; and (5) changes in students' learning (e.g., students' learning experience, approaches, and outcomes). Most previous research on the impact of PD has predominantly employed a single indicator to measure impacts only at one level out of five. However, there is growing observed evidence that PD activities lead to positive effects on a range of the above-mentioned aspects, including positive attitudes towards development activities (e.g., Steinert et al., 2006); shifts of conceptions of teaching (e.g., Donnely, 2008; Ho, Watkins, & Kelly, 2001; Postareff, Lindblom-Ylänne, & Nevgi, 2007); enhancement in motivation in teaching (e.g., Lycke, Hoftvedt, & Holm, 1998); increased teaching self-efficacy and confidence (e.g., Donnelly, 2008; Postareff et al., 2007); higher quality of teaching practice, such as using a variety of teaching techniques, strategies, and skills (e.g., Brawner, Felder, Allen, & Brent, 2002; Godfrey, Dennick, & Welsh, 2004; Ho et al., 2001); and positive effects on students' learning, such as students' satisfaction of learning experience (e.g., Trigwell, Caballero, Rodriguez, & Han, 2012), and positive influence on students' approaches to learning (e.g., Ho et al., 2001). These various aspects are clearly important and should be assessed as distinct factors.

In a recent study of the evaluation of impacts of a PD program in higher education, Trigwell et al. (2012) questioned the credibility of using a single indicator for PD, and argued for using multiple factors to assess the impact of PD activities. In their innovative study, Trigwell et al. (2012) adopted four different indicators, namely, students' satisfaction of learning experience at individual and faculty level, and teachers' recipient of teaching awards and grants; and they found the four indicators jointly contributed small and positive effects on a year-long certificate program in higher education. The authors discussed the advantages of using this new approach involving multiple indicators and call for the adaption of such an approach in future studies (Trigwell et al., 2012).

However, apart from PD program evaluation, there is a lack of studies that examine the impact of the frequency of PD on a number of outcomes. In particular, there is a dearth of research which has examined PD in Indigenous teaching in relation to different factors related to Indigenous teaching and learning. In Australia where Indigenous students are experiencing disadvantage in education, the research is essential and timely so as to better equip qualified teachers to help Indigenous students through more effective teaching and learning. The research reported here attempts to fill the gap.

Our study adopted two indicators of teaching and one indicator of learning. The two teaching-related indicators are teachers' self-concepts (in both general teaching and Indigenous teaching). General teaching self-concept differs from Indigenous teaching self-concept as is explained in self-concept research literature regarding the domain-specific nature of self-concepts (Craven & Yeung, 2008). If a PD program has a strong focus on Indigenous education, then we would expect domain-specific effects observable in Indigenous teaching self-concept, which may not translate to teaching self-concept in general. Hence in a sense, teaching self-concept in a general sense serves as a control variable when we examine the relations of Indigenous teaching PD to teachers' self-concepts. In other words, because of domain-specific nature of the relations between intervention and self-concept development (Craven & Yeung, 2008), frequency of PD with a focus on Indigenous education would not have noteworthy impact on self-concept in general teaching as it would on Indigenous teaching. For the learning-related variable, the indicator is Indigenous students' learning engagement as perceived by the teacher. In the following, we will review previous studies of PD on these three aspects, and discuss their importance in our study.

Psychological Change and Teachers' Self-concept

Past research has demonstrated that teaching development may exert an impact on teachers' psychological change, and the relation between the two is shown to be bidirectional. That is, whereas teaching development can lead to teachers' psychological change, the initial psychological status of teaching also affects teachers' attitudes towards teaching development (Åkerlind, 2003; Guskey, 1988; Weurlander & Stenfors-Hayes, 2008). For instance, Postareff et al. (2007) categorised 200 university lecturers into 4 groups according to the amount of pedagogical training they attended. They found that lecturers who received the most amount of training tended to conceive teaching as helping students restructure their knowledge (i.e., conceptual change/student-focused) and scored highest on self-efficacy in teaching. In contrast, those who had the least amount of training were more likely to view teaching as knowledge transmission (i.e., information transmission/teacher-focused) and were also low in self-efficacy. These results suggest that teachers' psychological change may be affected by the amount of PD they are involved in.

Teachers' conceptions of teaching are also found to have an impact on their perceptions on PD. Åkerlind (2003) reported that university lecturers who conceived teaching as knowledge transmission activities believed that teaching development programs should help teachers absorb new knowledge and teaching skills; whereas those who perceived teaching as restructuring students' existing concepts saw teaching development as a useful way to facilitate student learning. Teachers' psychological factors are also suggested to affect their perceptions towards teaching development activities. Among 120 primary and secondary school teachers, Guskey (1988) found that teachers who had high teaching efficacy, positive affect towards teaching, and positive self-concept commented favourably on a one-day teaching training on using mastery learning instructional strategies.

The above literature on teaching development points to a gap in the research of whether involvement in PD can affect teachers' self-concept or not. Considering that self-concept is an important psychological factor, which "makes things happen" (Roche & Marsh, 2000, p. 440), and enables "the realization of full human potential in a range of settings" (Marsh & Craven, 2006, p. 134), it is important and meaningful to include self-concept as one of the indicators in our study. Developing a positive and healthy teaching self-concept is of vital importance for teachers, as this may foster teachers' motivation and confidence in teaching (Roche & Marsh, 2000), which in turn may reinforce good teaching performance, because self-concept and behaviours are well regarded as reciprocal and mutually enhancing (Marsh & O'Mara, 2008).

In our study, we separated self-concept in general teaching and in Indigenous teaching. This was because of the multidimensional and domain specific nature of self-concept construct (e.g., Lau, Yeung, Jin, & Low, 1999; Marsh, Hey, Roche, & Perry, 1997). On the basis of previous studies testing the domain specificity of self-concept, we expect that PD activities focusing on Indigenous education would have a significant impact only on self-concept related to Indigenous teaching but not on self-concept in general teaching.

Behavioural Change and Teaching Strategies

Past research has demonstrated that involvement in PD has an impact on teaching behaviours, ranging from broader teaching approaches to more specific teaching techniques. There is a variation in research on how teaching behaviours are measured: including students' ratings about teaching quality, interviews with teachers, and surveys using self-reported questionnaires (Ho et al., 2001; Godfrey et al., 2004; Stes, Clement, & Van Petegem, 2007; Weurlander & Stenfors-Hayes, 2008).

Using students' rating, for example, Ho et al. (2001) examined the influence of an innovative PD program aiming at changing teachers' conceptions of teaching. The purpose was to test the program's effects on the teachers' teaching practice as judged by their students using the Course Experience Questionnaire (Wilson, Lizzio, & Ramsden, 1997). The study adopted a repeated-measures design in which the same lecturer's teaching of the same course was evaluated by students before and after the PD program. The results indicated that teachers who reported improved conceptions of teaching also displayed enhanced teaching performance as assessed from their students' point of view, whereas the non-change group did not show any improvement in teaching as rated by their students.

Using teachers' self-reporting rather than students' rating seems be a more common practice in research. Synthesizing research on PD in medical education from 1980-2002, Steinert et al. (2006) reported that teachers participating in a teaching development intervention often reported self-perceived changes in teaching performance, such as increased use of new educational initiatives and designs, assessing learners' needs, and adopting a more learner-centred approach. In addition to changes in terms of broader teaching approaches, PD was also found to change teachers' specific teaching strategies. For instance, Brawner et al. (2002) used a survey to evaluate the effectiveness of a staff development program known as SUCCEED. The respondents reported that they used active and team-based learning strategies more frequently in teaching compared to their practice prior to the program.

Although these studies suggest the positive influence of PD on general teaching, empirical studies lack evidence pointing to the influence of PD on Indigenous teaching. In Australian teaching contexts, teachers need to adapt their teaching to Indigenous students' needs so as to close the gap between Indigenous students and their non-Indigenous peers in participation in schooling and academic performance. Through education, there is hope to reduce the disadvantages of Indigenous Australians. However, Indigenous students may learn better in culture-specific ways and perceive learning quite differently (Bodkin-Andrews, Craven, Parker, Kaur, & Yeung, 2013). In our study, we examined three kinds of Indigenous teaching strategies: integrative teaching, community linking, and culture sharing. Integrative teaching incorporates Indigenous values and perspectives into teaching. Community linking actively seeks advice for teaching from local Indigenous community. Culture sharing asks Indigenous students to talk about their specific culture in class so that they can feel proud of their identity and culture. To date, no research has attempted to examine whether PD in Indigenous education would have any effect at all on these Indigenous teaching strategies.

Students Learning and Engagement in Learning

The research on the impact of PD has predominantly focused on teaching. Although educators worldwide have shifted from a focus on teaching to an increasing emphasis on students' learning, which may include learning processes and learning outcomes, there is a paucity of research on how teachers' PD may influence learning in terms of these aspects. In Ho et al.'s (2001) study, the impact of the PD program on students' approaches to learning was examined. Using the Approaches to Studying Inventory (Entwistle, 1994), the researchers found that the students of teachers who changed their conceptions of teaching through PD also shifted from adopting surface approaches to deep approaches to facilitating learning. Likewise, Trigwell et al. (2012) examined the impact of a year-long certificate program for academic development on students' learning at both individual and faculty levels. At the individual teacher level, students whose lecturers completed the program were more satisfied with their learning experience after their teachers had finished the program. At

the faculty level, in faculties where a higher proportion of lecturers completed the program, students reported higher satisfaction of their degree experience.

However, there is limited research that has examined the impact of teaching development on students' learning engagement. Learning engagement is one of the most important factors in the learning process (Hattie, 2012). How to engage Indigenous students in learning is undoubtedly a primary aim to achieve in Australian education. Getting students involved in learning is a promising way to reduce the low retention rate and to create a sense of school belonging especially for Indigenous students who have notably lower retention and higher absenteeism. Research has shown that engaged students tend to develop positive affect and achieve highly in academic performance (Apple & Beane, 1999; Klem & Connell, 2004; Marks, 2000; Shulman, 2002; Teese & Polsel, 2003; Zyngier, 2007). Through engaging them in school, Indigenous students' full potential can be empowered and their academic outcomes can be improved. While previous studies have focused on the effect of PD in teaching and learning in higher education (e.g., Ho et al., 2001; Postareff et al., 2007), whether PD has significant impacts on teaching and learning in school settings is unclear.

Indigenous Education Officers in Australia

In Australian, many Indigenous students often find themselves in a conflict between their life experiences and their Euroamerican school culture; and such conflict, by and large, leads to the fact that many Aboriginal children do not achieve their learning potential (Matthews et al., 2003). However, empirical evidence suggests that learning is more effective for Indigenous children when teaching is delivered to them in a way which incorporates their cultures, values, and ways of knowing (Matthews et al., 2003; Yunkaporta, 2009). Matthews et al. (2003) reviewed and discussed the benefits of five innovative mathematics programs, which were designed to benefit Indigenous students living in the state of NSW. In another study, Yunkaporta (2009) instructed Australian Indigenous children by using a way which was familiar to the children in that community. Through an appropriate infusion of community knowledge and academic knowledge, the students taught by Yunkaporta achieved a higher level of academic success than those taught by other teachers. Hence although we may not assume that all Indigenous students will benefit from Indigenous-relevant input, evidence did seem to point to this likelihood.

In order to facilitate an infusion of Indigenous community knowledge in schools, the NSW Department of Education and Communities has set up a special program, which allocates Indigenous education officers known as Aboriginal Education Officers (AEOs) to schools in order to "work closely with teachers to develop culturally appropriate resources and programs" so that Indigenous education can be promoted, and Indigenous children and parents can be encouraged and supported. As described in Education and Communities, NSW Government (2013), the function of the AEOs is as follows:

> AEOs work with teachers to assist Aboriginal students achieve their potential and keep the Aboriginal community informed of students' progress and achievements, and of things like parent meetings, school activities, new programs and other changes. AEOs provide role models for Aboriginal students and have a positive impact on helping them achieve their potential.

Having the AEOs work with in-service teachers is deemed to be important because the reality is that a large number of Australian in-service teachers are not well prepared for teaching Indigenous students (Craven, 2005). Cooperation with the AEOs is believed to result in enabling Indigenous students' to reach their full potential. In summary, the AEOs play

multiple roles: as facilitators for teachers in curricula development, as assistants for Indigenous students in learning, and as informants to keep parents and communities informed.

Notwithstanding the proposed functions of the AEOs, the actual impact of the availability of AEOs on teachers' perceptions of Indigenous teaching and student engagement has not been examined. In the present study, the impact of AEOs on both Indigenous teaching and learning are explored together with teachers' PD in Indigenous education using multiple indicators for more accurate assessments of effects.

In a recent review of AEOs in the state of Western Australia, both quantitative surveys and qualitative interviews with principals, teachers, and AEOs were conducted. The quantitative surveys reported that almost 80% of the principals and teachers who participated in the review believed that the AEO program was successful; whereas the remaining 20% of the principals and teachers did not consider the AEO program effective. The qualitative interviews identified different reasons for their perceived ineffectiveness from principals', teachers', and AEOs' perspectives. The teachers listed that "time constraints, cultural issues, a lack of skills and formal education" were some major concerns for the effective implementation of AEO programs, whereas principals believed that the key to success in implementing the AEO programs is through networking, mentoring, and a quality process for recruiting the AEOs (Gower et al., 2011, p. iii). Conversely, AEOs reported that some teachers may not know how to work effectively with them and there was a lack of induction programs (Gower et al., 2011). Due to the lack of a similar study in the state of NSW where our study was conducted, there is a need to observe more closely the effect of having AEOs in Indigenous teaching and learning. As the participants in the Gower et al. (2011) study showed mixed perceptions of the AEO program, it is unclear whether AEOs would have positive effects on Indigenous teaching or learning.

The Present Study

Adopting a multiple indicator approach, the present study examined the impact of frequency of PD in Indigenous teaching and availability of AEOs on six variables: teachers' teaching self-concept (Indigenous teaching and general teaching), Indigenous teaching strategies (i.e., integrative teaching, community linking, and culture sharing), and Indigenous students' learning engagement in Australian NSW rural and urban primary schools. An overarching research question is: What is the impact of frequency of PD in Indigenous teaching and the availability of AEOs on the six variables? As our aim is to use multiple indicators to examine the effect, a multiple-indicator-multiple-indicator-cause (MIMIC) approach to structural equation modelling was adopted (see Yeung, Taylor, Hui, Lam-Chiang, & Low, 2012). The advantage of this approach is to more accurately assess the effects of PD or AEO, and an interaction of both, on the six latent variables by accounting for measurement errors. From the previous literature on teaching development, we expected that higher frequency of participation in PD in Indigenous teaching would have positive effects on most variables: more positive Indigenous teaching self-concept, more frequent application of Indigenous teaching strategies, and higher level of learning engagement of Indigenous children. Based on the domain-specific nature of self-concept, we also hypothesized that frequency of PD with an Indigenous education focus would not have any effect on teachers' self-concept in general teaching. For the effect of the availability of AEOs, given no definite evidence is available from previous research, no specific hypothesis could be formulated.

Method

Participants

The study was conducted in 52 primary schools randomly selected across the urban and rural areas of NSW, Australia. Two hundred and eight teachers, whose class had various numbers of Indigenous students participated in the study. Among them 45 were males (21.63%) and 163 were females (78.37%). The teaching qualifications and teaching experiences of the participants were diverse. Among them, 33 had a Diploma in Education, 72 a Bachelor of Education, 34 had both a Bachelor of Teaching and a Diploma in Education, 17 graduated with Double Degrees, and 52 had other qualifications. Teaching experiences ranged from less than 1 year to 41 years: approximately 24% had teaching experience less than 5 years; 16.4% had been teachers for 6-10 years; 17.3% had taught between 11 to 20 years, 27.4% for 21-30 years, and 11.1% had taught more than 31 years.

Instrument

The instrument for data collection was a questionnaire, which started with a section on demographic information including sex, types of teaching qualifications, and years of teaching followed by a section on participation of Indigenous teaching PD and a Yes/No question on the availability of AEOs; a section on teaching self-concept (including self-concept in Indigenous teaching and general teaching); a section on Indigenous teaching strategies; and a section on Indigenous students' learning engagement. The items in all sections were randomised to avoid response bias. In the following, the items of each section are explained further, and sample items are listed in the Appendix.

Indigenous PD and Availability of AEOs

PD is a series of 5 items surveying the participation in Indigenous PD activities, which are designed to develop professional knowledge, skills, and understanding of how to support effective teaching and learning for Indigenous students. The PD activities may vary in terms of formality. It can be attending formal training on understanding broadly Indigenous cultures, informal workshops for learning specific Indigenous teaching strategies (e.g., accelerated literacy teaching for Indigenous students and a program known as *Count Me in Too* Indigenous for teaching numeracy to Indigenous students), or school-based professional learning such as mentoring programs and classroom observations. The items of PD asked the teachers to report how often on average in the last 2 years they participated in the above mentioned PD activities on a 4-point scale (1 = not at all, 2 = once or twice, 3 =3-4 times, and 4 = 5 or more times). The items of availability of AEOs is a dichotomous question asking whether there is an AEO available to work with teachers and their students (coded 1 = no; 2 = yes).

Self-concept in teaching

This section consists of two 5-point Likert scales (1 = false, 5 = true). One scale is about Indigenous teaching, and the other is about general teaching, and each scale consists of 5 items, which made a total of 10 items. The self-concept in Indigenous teaching asked how

teachers perceived their abilities to teach Indigenous students from different aspects: support for Indigenous students, assessments and classroom management strategies which are culturally appropriate for Indigenous students, and understanding of Indigenous teaching principles. The self-concept in general teaching scale was based on Marsh's (1992) Self-Description Questionnaire, a well-established scale through vigorously empirical testing in measuring self-concept (Byrne, 1996). It has been empirically tested to be applicable to Indigenous Australian samples (Yeung, Craven, & Ali, 2013). The teachers were asked about their perceptions of teaching abilities in general, such as fostering a positive learning environment, effectively managing a class, and being good at teaching literacy, numeracy, and other subjects.

Indigenous Teaching Strategies

Similarly, the Indigenous teaching strategies were measured using 5-point Likert scales (1 = false, 5 = true), which consisted of three scales measuring teachers' use of the three Indigenous teaching strategies of interest: integrative teaching, community linking, and culture sharing. There were nine items with three items for each scale. The integrative teaching scale asks whether teachers use Indigenous cultures and perspectives as teaching resources and implement them in teaching pedagogy and curricula on a regular basis. The community linking scale is about having Indigenous communities involved in teaching planning and actual teaching. It includes teachers' consultation with Indigenous communities about their opinions on education, discussion with Indigenous people about their ways of thinking and learning, and contact with Indigenous students' community. The culture sharing scale surveys what teachers have done to provide opportunities for their Indigenous students to share the Indigenous history and values in teaching. This strategy is important as it helps Indigenous students establish pride and confidence about their Indigenous identity and let other non-Indigenous students learn about them, so that Indigenous culture can be acknowledged and respected.

Indigenous Students' Learning Engagement

This section includes a 4-item scale on whether teachers' perceived their Indigenous students being involved and actively participate in different teaching activities in class. Although learning engagement is a multi-dimensional construct, which is often considered to encompass engagement in behaviour, cognition, and emotion (Fredricks, Blumenfeld, & Paris, 2004; Reeve, Deci, & Ryan, 2004), we focused on students' behavioural engagement, as this can be directly observed by teachers. Specifically, the items asked about teachers' observation of their Indigenous students' engaging in activities such as: question responding, classroom discussion participation, and group work attendance.

Procedure

The data collection followed requirements prescribed by the ethics committee of the researchers' university. Questionnaires were mailed to teachers in 52 primary schools in NSW, Australia. Half of the schools were located in urban areas and the other half were in rural areas. Before teachers filling out the questionnaire, a Participant Information Statement was provided and it explained to them clearly that taking part in the survey was voluntary and

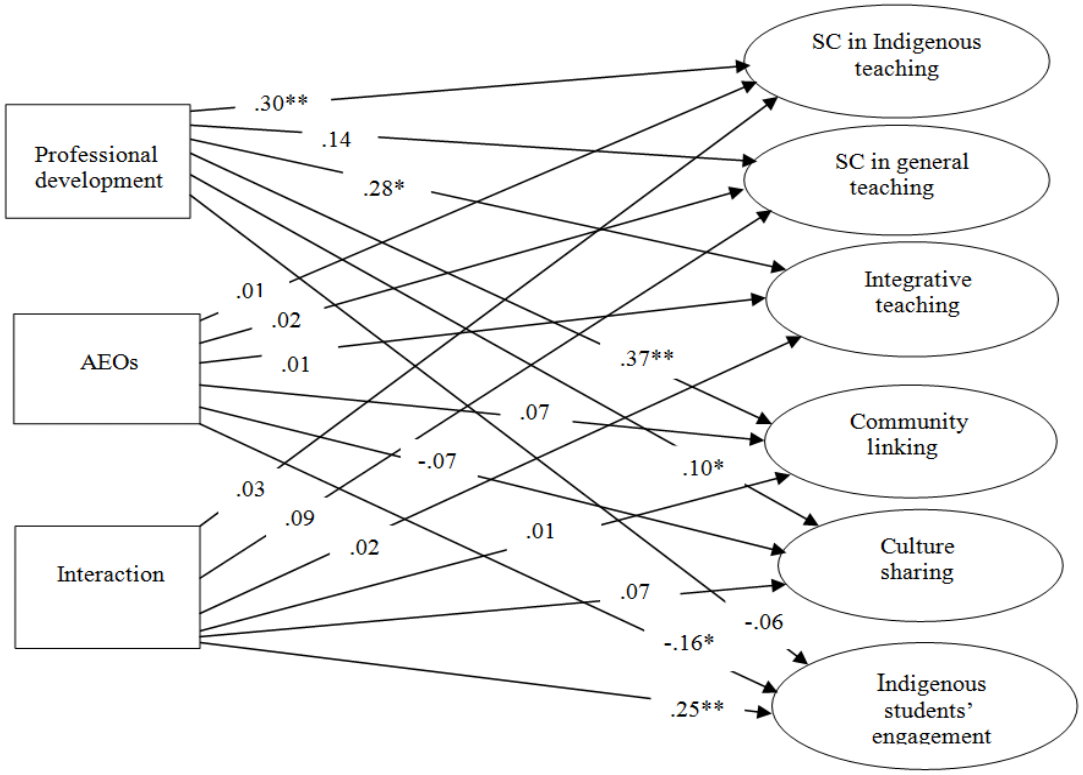
anonymous. If they were to participate, they needed to sign a consent form. Only completed questionnaires with signed consent forms were entered into the analysis.

Statistical Analysis

To start with, because the scales were newly designed, we performed exploratory factor analyses (EFA) with the items in the questionnaire to establish the scales. We followed the principal component procedure (Field, 2013; Preacher & MacCallum, 2003) by consulting both eigenvalues of the factors (greater than 1) and the scree plot. According to Preacher and MacCallum (2003), we considered the parsimony and the interpretability of the factors. We also checked the coefficients of items within a factor to make sure that each of the coefficients was above .30.

In the second step, we conducted confirmatory factor analysis (CFA) and checked the reliabilities of the scales using Mplus 6. We followed the general procedures for conducting CFA (e.g., Kline, 2005; Jöreskog & Sörbom, 2005). Due to the sensitiveness of chi-square statistics to sample size, we used goodness-of-fit indices to assist in evaluating the CFA models. Among different fit statistics, the Tucker-Lewis Index (TLI, Tucker & Lewis, 1973), the Comparative Fit Index (CFI, Bentler, 1990), and the root mean square error of approximation (RMSEA, Browne & Cudeck, 1993) are used frequently and were considered as primary goodness-of-fit statistics used in the CFA. It is generally agreed that values of TLI and CFI greater than .90, and a value of .06 for the RMSEA, are indicative of acceptable fit to data (e.g., Browne & Cudeck, 1993; Hu & Bentler, 1999). Apart from values of fit statistics, a number of criteria need also to be considered (Jöreskog & Sörbom, 2005), which include reliability (in general Cronbach's alpha coefficients at .70), factor loadings (in general, the items for each corresponding scale should have a loading of above .30); and factor correlations (which should be low enough among scales for them to be distinguished from each other).

When the scales were well established, in the final step, to statistically examine any group differences, a MIMIC model was tested. A MIMIC model is a special application of structural equation modelling (SEM) that resembles multiple regression analysis, but the advantage of a MIMIC model is that measurement error of latent variables is taken into consideration (Jöreskog & Sörbom, 2005; Marsh, Ellis, Parada, Richards, & Heubeck, 2005; Marsh, Tracey, & Craven, 2006; Yeung et al., 2012). We constructed three grouping variables: the first grouping variable was frequency of PD. This was created by using the mean scores of the PD scale as a cut-off, and the participants who were below the mean were classified as the low-frequency group and those above the mean were classified as high-frequency (1 = low, 2 = high). The second grouping variable was the availability of AEOs (1 = non-AEOs, 2 = AEOs), and the third grouping variable was an interaction terms between PD and AEO (i.e., PD x AEO, using standardised scores so as to avoid an unduly high correlation between the grouping variables). Our MIMIC model examined the paths from the 3 discrete grouping variables to the 6 latent variables (Figure 1).



Note: * ** $p < .01$, $p < .05$

Figure 1. Paths of the MIMIC

Results

Establishing the Dependent Variables

All the 23 items for the dependent variables were analysed using a series of EFA. The analyses produced 6 factors, with each item having reasonable loadings on their corresponding factors (all above .40; KMO = .82). The Cronbach's alpha scores for the six factors were all above .70 (self-concept in Indigenous teaching: .75, self-concept in general teaching: .82, integrative teaching: .71, community linking: .82, culture sharing .77, and Indigenous students' learning engagement: .86), which suggested acceptable reliability of the resulting factors (see Table 1 for values of Cronbach's alpha).

We conducted a CFA for all 23 items. It tested the six-factor model derived from the EFA, and the model resulted in a proper solution with an acceptable fit: χ^2 (215, N = 208) = 352.41, TLI = .93, CFI = .92, RMSEA = .06) (Table 1). The factor loading for each item on its corresponding scale was above .55, indicating reasonable loadings (see Table 2 for the factor loadings).

Model	χ^2	*df*	TLI	CFI	RMSEA
1. Model 1 (6-factor model)	352.41	215	.93	.92	.06
2. Model 2 (MIMIC model)	415.43	102	.93	.91	.05

***Note:* N = 208. CFI = Comparative fit index. TLI = Tucker-Lewis index. RMSEA = Root mean square error of approximation. No. of items were 23 for Model 1 and 26 for Model 2.**

Table 1: Goodness of fit summary of models

	SC-I	SC-G	Integrative	Community	Culture	Engagement	Unique
SC-I1	**.84****						**.30****
SC-I2	**.79****						**.38****
SC-I3	**.80****						**.35****
SC-I4	**.57****						**.68****
SC-I5	**.64****						**.59****
SC-G1		**.75****					**.44****
SC-G2		**.70****					**.50****
SC-G3		**.66****					**.56****
SC-G4		**.58****					**.67****
SC-G5		**.73****					**.47****
Integrative1			**.77****				**.41****
Integrative2			**.62****				**.62****
Integrative3			**.59****				**.65****
Community1				**.71****			**.50****
Community2				**.66****			**.56****
Community3				**.74****			**.45****
Culture1					**.71****		**.50****
Culture2					**.77****		**.42****
Culture3					**.71****		**.49****
Engagement1						**.66****	**.57****
Engagement2						**.83****	**.31****
Engagement3						**.88****	**.23****
Engagement4						**.75****	**.44****

***Note:* N = 208, ** $p < .01$, *$p < .05$.**

SC-I = self-concept in Indigenous teaching. SC-G = self-concept in general teaching. Integrative = integrative teaching strategy. Community = community linking strategy. Culture = culture sharing strategy. Engagement = Indigenous students' engagement in learning. Unique = Uniqueness of measurement.

Table 2: Factor loadings of model 1

The latent factor correlations were all below .60, indicating that the six scales were all distinct variables. The correlation between the two factors of self-concept in teaching was significant and positive (r = .39), the moderate correlation coefficient implies that self-concept is a hierarchical and domain-specific construct as shown in previous research (e.g., Lau et al., 1999), and hence a teacher's self-perception of their ability in Indigenous education is clearly separable from their ability perception in general teaching.

With regard to the correlations of the three factors within Indigenous teaching strategies, it was found that integrative teaching was positively correlated with both community linking (r = .46) and culture sharing (r = .16). However, the correlation between community linking and culture sharing was close to zero (r = .02). The results appear to suggest that teachers who use one Indigenous teaching strategy may not necessarily use the other two Indigenous teaching strategies. More specifically, adopting integrative teaching seems to be more related to community linking and culture sharing strategies; whereas using community linking strategies does not seem to be associated with culture sharing strategies. The weak association between community linking and culture sharing strategies may reflect a different focus by different teachers' preference. While community linking strategies may focus on seeking opinions from Indigenous communities which are beyond school and teaching contexts, culture sharing strategies clearly has a student-centred focus, as Indigenous students are invited to present their cultural values to the rest of the students in their class.

In line with our expectation, the correlations of self-concept in general teaching with integrative teaching (r = .17) and community linking strategies (r = .13) were much lower than the correlation of self-concept in Indigenous teaching with integrative teaching (r = .56) and community linking (r = .55). This once again reflects that self-concept is specific in different domains (e.g., Vispoel, 1995) such that Indigenous-focused variables are more

strongly related to Indigenous-related self-concept. However, a high correlation between self-concept in general teaching and culture sharing strategies (r = .43) was present, which seems to be higher than that between self-concept in Indigenous teaching and culture sharing (r = .21). This seems to suggest that culture sharing strategies tend to be more domain-general and less Indigenous-specific as the other variables. In this sense then, within the Australian context where many students come from different ethnic backgrounds around the world, teachers may find culture sharing strategies not only applicable to Indigenous students. Instead, this strategy may be used in general teaching with students from a variety of cultural backgrounds. Therefore, this culture sharing strategy may be useful for all students irrespective of their ethnic backgrounds.

The correlations between Indigenous students' learning engagement and other factors were all significant and positive (integrative teaching: r = .24; culture sharing: r = .26; self concept in Indigenous teaching: r = .25; and self-concept in general teaching: r = .34); except for the one between Indigenous students' learning engagement and community linking (r = .11) (see Table 3 for the factor correlations).

	SC-I	SC-G	Integrat	Community	Culture	Engage	PD	AEO	PD x AEO
SC-I	--								
SC-G	**.39****	--							
Integrative	**.56****	**.17***	--						
Community	**.55****	**.13**	**.46****	--					
Culture	**.21****	**.43****	**.16***	**.02**	--				
Engagement	**.25****	**.34****	**.24****	**.11**	**.26****	--			
PD	**.28****	**.12**	**.21****	**.31****	**-.03**	**-.04**	--		
AEO	**.01**	**.01**	**.01**	**.05**	**-.09**	**-.15***	**-.01**	--	
PD x AEO	**.03**	**.08**	**.01**	**-.00**	**-.09**	**.21****	**-.00**	**-.01**	--

***Note:* N = 208, ** $p < .01$, *$p < .05$.**

SC-I = self-concept in Indigenous teaching. SC-G = self-concept in general teaching. Integrat = integrative teaching strategy. Community = community linking strategy. Culture = culture sharing strategy. Engage = Indigenous students' engagement in learning. PD = Frequency of professional development. AEO = Availability of Aboriginal Education Officers in school. PD x AEO = interaction of professional development and availability of AEOs.

Table 3: Factor correlations of model 2

Mean Scale Scores by Groups

The scores of items in each scale were averaged to form a scale score for low-frequency and high-frequency PD in the AEO and non-AEO groups respectively. The means and standard deviations (*SD*s) are presented in Table 4. Among 208 teachers, only 59 had AEOs working with them and 149 did not have AEOs. Among the 59 having AEOs, 31 were in the low-frequency PD group, and 28 were in high-frequency PD group. Of 149 in the non-AEO group, 59 were in low-frequency PD, and 76 were in high-frequency PD group.

Indicators	Groups			
	AEOs		Non-AEOs	
	Low (31)	High (28)	Low (59)	High (76)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Self-concept in Indigenous teaching	3.51 (0.55)	3.96 (0.62)	3.54 (0.70)	3.90 (0.70)
Self-concept in general teaching	4.38 (0.48)	4.61 (0.41)	4.45 (0.47)	4.51 (0.42)

Integrative teaching	**3.92 (0.62)**	**4.25 (0.65)**	**3.92 (0.82)**	**4.21 (0.63)**
Community linking	**2.27 (0.88)**	**2.86 (0.90)**	**2.15 (0.87)**	**2.74 (0.98)**
Culture sharing	**4.24 (0.51)**	**4.08 (0.49)**	**4.25 (0.42)**	**4.26 (0.40)**
Indigenous students' learning engagement	**4.15 (0.66)**	**4.48 (0.56)**	**4.61 (0.46)**	**4.40 (0.63)**

Table 4: Descriptive statistics of the 6 variables by groups

MIMIC Model

The MIMIC model displayed a reasonable fit to the data (χ^2 (102, N = 208) = 415.43, TLI = .93, CFI = .91, RMSEA = .05) (Table 1). The factor loadings can be found in Table 2 and the factor correlations are given in Table 3.

Effect of Frequency of PD

The main effect of frequency of PD was significant for four out of six latent variables. Significantly positive paths are found from PD to self-concept in: Indigenous teaching (β = .30), integrative teaching (β = .28), community linking (β = .37), and culture sharing (β = .10). The significant and positive paths means that teachers involved in high-frequency PD had significantly higher rating on these four latent variables than teachers in low-frequency PD.

Effect of Availability of AEOs

Only one path from the availability of AEOs was statistically significant and the latent variable was Indigenous students' learning engagement (β = -.16), which was negative. Because we coded the availability of AEOs as 1 representing non-AEO and 2 representing AEO, the negative path reflected that from the perspective of the teachers surveyed in the study, Indigenous students in schools without AEOs were perceived to be more engaged in learning than those students in schools where AEOs were available. This result appeared to be contrary to the Gower et al. (2011) showing a majority of teaching staff being positive about AEOs, although it also supports the mixed finding of favourable and unfavourable perceptions co-existing.

Interaction effect

Out of the latent variables, statistically significant interaction effect was found only on Indigenous students' learning engagement (β = .25). For settings with AEOs, those in high-frequency PD had higher ratings on their Indigenous students' learning engagement (M = 4.48) than those in low-frequency PD (M = 4.15). This pattern was reversed for teachers without AEOs: the teachers in low-frequency PD group perceived that their Indigenous students were more engaged (M = 4.61) than the perceptions by teachers in high-frequency PD group (M = 4.40).

Discussion

Due to the lack of empirical studies on PD in Indigenous teaching and learning, and on the effect of having AEOs in Indigenous teaching and learning, the present study investigated the impact of frequency of PD in Indigenous teaching and availability of AEOs on multiple variables relevant to Australian teaching and learning contexts. The six latent variables of interest include teachers' self-concept related to Indigenous teaching, self-concept in general teaching, three teaching strategies related to Indigenous teaching, and perceived learning engagement of Indigenous students. Congruent to our expectation, the MIMIC approach to comparison through SEM showed that frequency of participating in Indigenous teaching development indeed exerted positive impacts on a number of variables. Relative to the positive effects of PD, the effects of the availability of AEOs seemed trivial. The analysis found that the availability of AEOs actually had negative effects on Indigenous students' learning engagement as perceived by students' teachers. Other than this, there was no significant effect found on Indigenous teaching, nor was there any effect on the teachers' self-concepts.

For PD in Indigenous teaching, the positive paths in our study suggest that teachers in high-frequency group felt more satisfied with their Indigenous teaching competence, more confident about their classroom management of Indigenous students, and in general felt they were capable of teaching Indigenous students effectively ($M = 3.91$) compared to teachers in the lower frequency group ($M = 3.53$). These empirical findings provide support for Guskey's (2000) model postulating that PD has positive impacts on teachers' teaching motivation. While past research indicates that teachers who have positive self-concept tend to have positive reaction towards PD activities compared to teachers with low self-concept (e.g., Guskey, 1988), our results showed that teachers who more frequently and actively attend professional learning also tend to rate their self-concept in teaching more highly than teachers who take part in professional learning less frequently.

However, it should be noted that the difference of self-concept between high-frequency and low-frequency groups is only restricted to self-concept in Indigenous teaching but not in self-concept in general teaching. This result is in fact logical and reasonable, as we measured frequency of PD in terms of Indigenous teaching rather than general forms of teaching. This is consistent with what has been clearly demonstrated in the literature given that self-concept is not a unidimensional construct such that the self-concept in a specific domain may not translate to the self-concept in another domain (e.g., Lau et al., 1999; Marsh, 1990; Vispoel, 1995). Consistent with the domain specificity of self-concepts and relations with other variables, our study shows that frequency of PD specifically in Indigenous teaching only yields difference in the self-concept specifically related to the domain of Indigenous teaching. This finding has some practical implications for in-service teachers and teacher development programs. From what we have found, we advise teachers to carefully select PD programs according to their own needs, and choose programs targeting the specific skills they wish to develop. For program developers, each individual PD program should have a clear purpose, distinguishing general teaching from teaching specific student populations.

In addition to the positive effects of frequency of PD on self-concept, positive effects are also found on teachers' use of Indigenous teaching strategies. We found that the teachers in the high-frequency group had higher self-reported ratings than their counterparts in low-frequency group on all of the three Indigenous teaching strategies investigated here. This finding also corroborates the PD model developed by Guskey's (2000) postulating that PD has positive impacts on teachers' behaviours. Our findings were also consistent with the synthesized findings by Steinert et al. (2006) that teachers participating in a teaching development intervention tended to increase their use of new educational initiatives and

designs. In our study, we found that teachers participating in Indigenous teaching PD tended to show increased use of Indigenous teaching strategies.

The positive impact of PD on Indigenous teaching, however, does not transform into Indigenous students' learning engagement as rated by their teachers. Previous research has shown that PD of teachers could have positive impact on students' approaches to learning in a way that learning is shifted from surface approaches towards deep approaches (e.g., Gibbs & Coffey, 2004; Ho et al., 2001), and on students' learning experience (e.g., Trigwell et al., 2012). However, no previous studies have examined the impact of PD on students' learning engagement, especially that of Indigenous students. One possible reason for the non-significant impact shown here may be that the amount of training of Indigenous teaching received by the teachers in our study is not sufficiently strong to produce observable impacts on students' engagement. As noted by Postareff et al. (2007), the length of PD matters. It is therefore possible that PD programs of longer duration and greater intensity are needed to produce significant effects on student outcome variables.

In terms of the impact of the availability of AEOs, we found a negative main effect on Indigenous students' learning engagement as perceived by students' teachers ($\beta = -.16$). While the purpose of having AEOs to work closely with teachers is to "develop culturally appropriate resources and programs" and to "assist Aboriginal students achieve their potential" (Education and Communities, NSW Government, 2013), our empirical data seem to query such claims. Given that our sample came from a randomly selected number of schools from urban and rural regions, this unfavourable perception of AEOs from the teachers' perspective may need attention.

Interestingly, the statistically significant interaction effect between the availability of AEOs and frequency of PD ($\beta = .25$) has provided us with some useful information. This is an interesting finding and the reason behind the finding is worthy of further exploration. For some school settings, there are AEOs available whereas for some other settings, AEOs are not available. In either setting, teachers are involved in a variety of Indigenous education PD frequencies. The interaction effect shows that those teachers in settings with AEOs and are involved in high-frequency PD had relatively higher ratings on their Indigenous students' learning engagement ($M = 4.48$) than those in low-frequency PD ($M = 4.15$). This may imply that teachers who are well trained in PD related to Indigenous education and who have the experience of working with AEOs tend to have more favourable views about the functions of AEOs. For those teachers who have no experience working with AEOs because no AEO is available in their settings, they may have a misconception of their Indigenous students' high engagement ($M = 4.61$), especially for those teachers who have not had sufficient PD for them to have a more realistic perception of their students' engagement. This speculation is supported by the relatively lower perceptions of teachers in the high-frequency PD group ($M = 4.40$), who did not have the support of an AEO. Nevertheless, due to the quantitative nature of the study, we are unable to provide firm answers to this question. Hence, these explanations should only be treated as tentative and need to be interpreted with caution. A qualitative approach that taps into the reasons for such perceptions to exist in teachers in various settings would be helpful in delineating the reasons for such a pattern to be observable.

A possible explanation is that the engagement scale was measured from a teacher's point of view, and the perception of student engagement might involve some misconception from teachers, especially those who were not involved, or not involved enough, in PD activities in teaching Indigenous students. In particular, teachers who did not have experience of working with AEOs and who lacked professional learning might not be able to accurately assess learning engagement. When teachers have acquired sufficient Indigenous teaching and learning knowledge, like the teachers in the non-AEO high-frequency PD group, their

conception of learning engagement might be more realistic. This might explain why the ratings of learning engagement were lower by the teachers in non-AEO and high-frequency PD group (M = 4.40), compared to those by teachers in non-AEO and low-frequency PD group (M = 4.61).

Hence the views of teachers may differ as revealed by Gower et al. (2011) in a study of the AEO program in Western Australia. They reported an issue that "many teachers are unaware of their skills and do not make effective use of them" (p. iii), and they suggested that in order to generate more positive effects of the AEO programs, induction programs for teachers are needed to make sure that teachers understand the roles of AEOs and how to work with them. This could also be true in other parts of Australia, like NSW where the current study was carried out. That is, teachers inadequate in Indigenous-related PD might not understand the functions of AEOs and how to work with them even though AEOs are present in their school. As AEOs are not always available in every NSW school, it is unclear how teachers would be effectively trained to work with AEOs, and whether it would be possible at all to provide training on how to work with AEOs for every teacher. Nevertheless, for settings with the presence of AEOs, teachers' understanding of the roles of the AEO is crucial and should be facilitated.

Limitations and Directions for Future Studies

Our study is the first to investigate the impact of PD and availability of AEOs on Indigenous teaching and learning in primary school contexts in NSW, Australia. Despite the interesting findings and the strength of the MIMIC approach we adopted taking into account measurement errors, some limitations need to be pointed out and be addressed in future studies. As has been mentioned, the research methodology used in our study is quantitative. Though it has the advantage of explicating general patterns, it does not allow us to claim detailed reasons to explain our results. For instance, without in-depth qualitative data, it is not possible to explicate why the AEOs in our sample did not seem to bring up positive effects on Indigenous students' learning as educators and policy makers have envisaged. Besides, we only surveyed the frequency of PD activities in the last two years, which may have excluded some teachers who have done PD activities for more than two years. To further explore the effects of PD and AEOs on Indigenous teaching and learning, future studies may consider adding qualitative data collection methods into the current design. Focus group interviews of teachers, AEOs, and Indigenous students, together with classroom observations would enable us to have a better understanding of the reasons behind the quantitative findings.

Secondly, to assess Indigenous students' learning engagement, we measured it from the teachers' perspective. Whereas teachers' perception is one of the most common ways to measure students' learning engagement (Fredricks et al., 2004), it may partly reflect teachers' expectations instead of actual engagement behaviours; and it may differ from their students' perspective on learning engagement. Moreover, cross-cultural differences (e.g., a teacher of non-Indigenous origin assessing Indigenous Australian students) may also have produced discrepancies between teachers' and students' perceptions. We suggest that future studies should use both students' and teachers' ratings to assess engagement in order to triangulate data. Apart from students' engagement, future research may focus on students' learning outcomes. Recent research in PD has found that building school-based professional learning communities is one of the most effective PD strategies, which not only benefit teaching, but also translate into students' learning outcomes (McLaughlin, & Talbert, 2006). Therefore, future studies may wish to explore the effect of school-based professional learning communities on learning outcomes of Indigenous students in various contexts.

Thirdly, although we have adopted a MIMIC approach, which is superior to other multivariate analyses of group differences and interaction effects on multiple indicators in a single analysis (Yeung, Barker, Tracey, & Mooney, 2013), the results obtained are by no means representative of causal relations. To claim any causal relation, future studies should adopt an experimental design in a longitudinal manner (e.g., comparison of Indigenous teaching and learning before and after PD and between experimental and control groups).

Fourthly, given the diversity of language, cultural characteristics, and beliefs among various Indigenous communities, results found in this study should not be taken as generalisable to a variety of Indigenous communities. Further research may attempt to test the generalisability of findings with various community characteristics. That is, although our findings showed that Indigenous students tended to benefit from educational input relevant to their culture, whether the positive effects would be similar across different Indigenous communities is worth exploring.

Finally, while the interpretation of the results of our study is only restricted in Australian primary Indigenous teaching, further research should attempt to conduct similar research with teachers at various levels of schooling. The research will also benefit from studying other Indigenous populations in the world. This will not only test the generalisability of the findings in our study, but will also testify the use of PD and extra personnel support such as the AEOs in our study in other populations and settings.

Implications and Conclusion

The findings of our study have practical implications for teacher education and it also offers some potential for the MIMIC approach to be adopted in future research on teacher education. Practically speaking, as our study demonstrates that PD in Indigenous teaching has positive effects on teachers' psychological well-being and teaching behaviours, in-service teachers are advised to be actively involved in different kinds of PD activities. These activities may include formal certificate studies, workshops, and mentoring programs through which they can learn more about Indigenous students' characteristics, special needs, teaching approaches, and techniques adaptive to teaching Indigenous learners so as to contribute to closing the gap between Indigenous children and their peers in academic achievement. Moreover, in-service teachers who work with AEOs may also need to try to gain a deeper understanding of the functions of AEOs. Efforts should be made to make optimal use of AEOs to enable them to effectively promote Indigenous students' engagement and learning.

Methodologically speaking, the measurement of the constructs was first validated through a series of factor analytical steps including CFA to establish the multiple latent constructs that formed the basis of our subsequent MIMIC analysis. As has been discussed previously, the advantage of taking a MIMIC approach lies in its accuracy over other multivariate comparisons because of its capability of accounting for measurement errors (Yeung et al., 2013). Therefore, data analysis procedures applied here, including the MIMIC approach to group comparisons, are recommended to be adopted in other similar situations in teacher and Indigenous education.

To sum up, our study examined the effects of PD and the availability of AEOs in Indigenous teaching and learning among primary school teachers from both urban and rural areas in NSW, Australia. The findings attest to the positive contribution of PD to teachers' motivation and teaching behaviour in a domain-specific manner. Based on the findings, we recommend that Australian in-service teachers should continually develop their Indigenous teaching via PD in their career. We also encourage more empirical research to be carried out to further investigate the effectiveness of AEO programs across different states in Australia.

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Appendix

Scales and Sample Items Used in the Study

Factors (alpha)	Sample Items
Professional development in Indigenous teaching (α = .83)	How often on average in last 2 years in professional development in teaching Aboriginal students.
Integrative teaching (α = .71)	My teaching strategies are inclusive of Aboriginal culture and perspectives.
Community linking (α = .82)	Most of my Aboriginal students enjoy sharing things about their culture in my class.
Culture sharing (α = .77)	I provide an environment where the Aboriginal children in my class are confident to share their knowledge about Aboriginal people and cultures.
Self-concept in Indigenous teaching (α = .75)	I have sufficient knowledge of Aboriginal culture to be able to effectively support Aboriginal students to understand and negotiate school ways of knowing.
Self-concept in general teaching (α = .82)	I am confident that if students misbehave I can manage the situation.
Indigenous students' engagement (α = .86)	My Aboriginal students get involved when we do group work in class.