The benefits of a literacy and numeracy service-learning program for pre-service teachers: A partnership approach

Julie Boston and Nicola F. Johnson
Edith Cowan University, Australia

The Partners in Literacy and Numeracy Western Australia (PLaN WA) program was implemented within a School of Education to complement initial teacher education offerings. In forming a mutually beneficial service-learning program, schools received support from pre-service teachers to assist both primary and secondary students with their literacy and or numeracy. This paper presents findings from two focus group interviews and pre- (n = 130) and post-surveys (n =54) continuously since the program's instigation in 2019. The pre-service teachers benefited from the low stakes, voluntary, non-assessed experiences. They claimed they moved towards being more confident in achieving the graduate career stage of the Australian Professional Standards for Teachers. While we anticipated pre-service teachers would gain more confidence in their own literacy and/or numeracy and in teaching aspects of these, instead, pre-service teachers gained overall confidence to teach from program participation.

Introduction

Literacy and numeracy and the teaching thereof have long been a focus for improvement, and many initiatives have occurred in pre-service teacher education to address these concerns. Future teachers' literacy and numeracy preparedness have concerned various Australian governments and society for decades. The *Action now: Classroom ready teachers* (2015) ministerial review of Australian initial teacher education (ITE) provided clear and imperative recommendations on how to strengthen course program design to improve teacher quality and classroom readiness. One significant action from this review was implementing compulsory national literacy and numeracy testing for all pre-service teachers (PSTs) throughout Australia. Since 2016, PSTs have been required to demonstrate their competency for the literacy and numeracy demands of the teaching profession as measured through an online assessment tool known as the *National Literacy and Numeracy Test* or LANTITE (Hall & Zmood, 2019). Failure to pass the LANTITE before graduation prevents registration to the profession in Australia. To this end, various ITE programs alongside ongoing reforms such as *Action Now* (Department of Education, 2015) and *Strong beginnings* (Department of Education, 2023) have been implemented to address the issue of personal literacy and numeracy skills, along with the pedagogical skills required to teach these foundational skills to children and young people effectively. For example, Sellings et al. (2018) focused on the development of literacy and numeracy skills in PSTs in regional Victoria by implementing a social constructivist approach of a *Developing, Embedding Extending and Reflecting* (DEER) framework to ensure PST literacy and numeracy capabilities.

This article reports on a service-learning initiative, known as *Partners in Literacy and Numeracy Western Australia* (PLaN WA). It is designed to augment our institution's aspiring teachers with the tools and strategies they need both for themselves and to effectively

teach these vital skills to their students. The aim of this article is to report on the design, implementation, and impact of the PLaN WA program to date. It was influenced in part by the University of Southern Queensland PLaN program (Fanshawe et al., 2023) and is similar in that PLaN WA is not assessed or mandated as part of the ITE programs. Unlike Fanshawe's et al. study (2023), we did not focus on the construction of emerging pre-service teacher identities. We were interested in identifying how the service-learning approach of this initiative contributed to pre-service teachers' (PSTs) own personal literacy and numeracy, as well as their self-efficacy or confidence in teaching children and young people about literacy and numeracy. The article reviews relevant literature and then proceeds to explain the design of the PLaN WA program. After the research methodology is described, the findings related to the research question are presented and discussed.

Literature review

Service-learning was initially based on individual development in settings of public need as a two-way relationship for mutual benefit (Anderson et al., 2001; Bandy, 2016; Hubbard & Levy, 2006; Koch et al., 2002; Lavery & Sandri, 2021; Leytham et al., 2018; Marttinen et al., 2020). It is the community partner being served rather than the individual who has control of the service provided, while those who serve control their learning in the situation with the aim of both parties learning and being empowered (Carrington et al., 2015; Sigmon, 1979). Service-learning is a pedagogical approach (D'Rozario et al., 2012; Salam et al., 2019; Shumer et al., 2012; Tan & Soo, 2020) that combines learning with community service that meets a societal need from which all partners gain benefits. Various iterations of service-learning have occurred over time, and it has an established history of research (Anderson et al., 2001; Crews, 1995). While service-learning has similarities to work integrated learning (WIL) in that a university-community partnership is advocated, it is not the same (see Nguyên, 2022). WIL is typically part of a program requirement rather than a voluntary 'extra'. There is a plethora of literature across many education disciplines exploring various aspects of the role of service-learning in the professional development and identity for PSTs including inclusivity, diversity, and cultural competency. The recognition and inclusion of diversity and developing cultural competency are often goals of service-learning. A recent systematic literature review involving 133 studies revealed 34 of the 133 studies focused on reporting the benefits of service-learning (Salam et al., 2019). Research conducted between 2011 to 2017 formed the comprehensive review and specified sixteen potential benefits of service-learning initiatives. Hence, service-learning is not new, and the benefits have been well documented over many years (Lavery & Sandri, 2021).

Recent studies have reported on different aspects of a long-term critically reflective service-learning project for PSTs (Bursaw et al., 2014; Carrington, 2011; Carrington et al., 2015; Carrington & Selva, 2010; Iyer et al., 2018; Mergler et al., 2016; Mergler et al., 2017; Ryan, 2015). The project combined "community based voluntary work with theoretical in-class academic knowledge" (Mergler et al., 2017, p. 69) as a transformative pedagogical strategy (Carrington et al., 2015; Mergler et al., 2017) promoting values orientation and enterprise skills (Iyer et al., 2018) and embedding teacher reflection practices (Bursaw et

al., 2014; Carrington & Selva, 2010; Lavery & Sandri, 2021). Inclusive education practices (Carrington, 2011) were introduced using critical service-learning for pre-service teachers as a means to go "beyond traditional teaching modes" (Iyer et al., 2018, p. 144) to become a transformative experience that aids the development of self-efficacy in the form of empowerment and ownership and promotes the inclusivity of diversity and critical reflective practices. Enterprise skills and values were also tested in practical ways, and an awareness of diversity issues, civic values and social justice was enhanced in practical settings (Resch & Schrittesser, 2021). Shumer et al (2012) claimed a notable link connecting service-learning, character, and civic education. Teaching and practicing critical reflection is intrinsic to service-learning because it disrupts PSTs' "unexamined assumptions and beliefs, and promote[s] their consideration of ethics, diversity, and equity" (Butin, 2010, cited in Bursaw et al., 2014, p. 153).

MacGregor (2019) suggested that service-learning for PSTs needs to be an organised activity meeting community needs "providing PSTs with real-life experiences and an opportunity to apply, reflect and connect academic theoretical perspectives" (MacGregor, 2019, p. 138). Mergler et al. (2016) stated that service-learning is most effective when there is an identity shift supported by examining assumptions and personal beliefs and an explicit social justice focus in an inclusive education framework.

Patrick et al. (2019) completed a desktop audit of published studies on Australian service-learning, and Iyer et al. (2018) reflected on the 'canon' of published material around service-learning. However, Cress et al. (2005) and Butin (2010) have written comprehensively about service-learning in US education since the 1980s noting programs began in the late 1960s (Sigmon, 1979). Power and Bennett (2015) used case studies to document reflective practices and cultural competency developed in an arts-based service-learning project with PSTs and Indigenous community participants using Margaret Somerville's "pedagogy of place" and a/r/tography (p. 156). Place-based service-learning must be reciprocal and disrupt ideas and assumptions. MacGregor (2019) used rich anecdotal and critical reflection. Carrington et al. (2015) and Iyer et al. (2018) also used rich qualitative data and talk about how PSTs may see themselves as "agents of social change in the education system" (Carrington et al., 2015, p. 70) who "develop and build on their understanding of inclusive practices" (p. 70). Iyer et al. (2018) scaffolded by an extensive literature review, built on service-learning as a form of transformative experiential learning that facilitates empowered "effective inclusive practitioners" (p. 134).

In researching whether embedded service-learning experiences prepare PSTs for teaching and promote Australian Institute for Teaching and School Leadership graduate standards (AITSL, 2017), Lavery and Coffey (2016) concluded that PSTs might develop

competencies against standards 1-4 and 7 during service-learning[1]. It was also noted that service-learning was an effective preparation for PSTs before the first practicum (Coffey & Lavery, 2015), particularly for secondary students engaging with adolescents. They also found service-learning has a positive impact on PST professional and personal skills, and this helps their development towards graduate standards (AITSL, 2017). PLaN WA is different in that it was not an intention to establish whether the program helped address the AITSL standards, but more to investigate how the service-learning approach of PLaN WA contributed to pre-service teachers' personal literacy and numeracy, and their self-efficacy or confidence in teaching children and young people.

Self-efficacy

Self-efficacy beliefs are dynamic, context specific and subjective, based on personal expectations of how one undertakes certain tasks or demands (Bandura, 1997; Woodcock & Reupert, 2016). Teacher self-efficacy is a specific professional quality defined by Mergler et al. (2017) "as a teacher's belief in their own ability to influence positive learning in students despite challenges" (p. 71). Skaalvik and Skaalvik (2014) expanded on this definition to include "abilities to plan, organise, and carry out activities required to attain given educational goals" (p. 69). Eren and Yeşilbursa (2019) studied the efficacy beliefs of 725 PSTs quantitatively and the link to their teaching-specific hopes and found efficacy is crucial in having motive to prepare for a teaching career. Teacher efficacy beliefs may be measured quantitatively, and a number of scales have been developed (Garvis & Pendergast, 2016; Morris et al., 2017; Riggs & Enochs, 1990; Shroyer et al., 2014; Skaalvik & Skaalvik, 2014). Most of these are based on the Enochs et al. (1995) *Science Teaching Efficacy Belief Instrument* (STEBI) and have been used with both PSTs and practising teachers. Self-efficacy continues to be an ongoing and popular topic to research, despite its established body of literature (e.g., Zee & Koomen, 2016; Garvis & Pendergast, 2016).

Design of PLaN WA: A service-learning program

*Partners in Literacy and Numeracy Western Australi*a (PLaN WA) is a service learning-based initiative that allows PSTs to visit local schools and support them to deliver the school's literacy and numeracy programs. This program is not a professional experience (formal placement in schools) as there is no requirement of being formally assessed nor is PLaN WA paid work. Instead, the program is designed to afford each PST, known in the program as a PLaN member, to gain extra experience and exposure to the classroom

---

[1] The AITSL standards include professional knowledge, professional practice and professional engagement with seven subsets:
1. Know students and how they learn
2. Know the content and how to teach it
3. Plan for and implement effective teaching and learning
4. Create and maintain supportive and safe learning environments
5. Access-provide feedback and report on student learning;
6. Engage in professional learning
7. Engage professionally with colleagues, parents/carers and the community (AITSL, 2017).

environment, above and beyond the requirements of professional experience. PLaN WA is therefore a co-curricular program offered alongside our institution's formal ITE courses.

As those schools participating in this program must invest time in inducting the new PLaN member, it is a requirement that each PLaN member commits to a weekly minimum hourly amount of service-learning, be available for the duration of the entire school term and volunteer for a dedicated time slot each week. This commitment is important so an ongoing partnership, especially in relation to the formal professional placements, can be maintained. The PLaN WA program operates during school term times and is available to PSTs throughout their entire academic program affording members extra opportunities to practise and enrich their teaching skills.

A unique aspect of PLaN WA is that each school has autonomy in terms of how they deploy each PLaN member to support the various literacy and numeracy strategies operating at their school. Importantly, our institution does not promote a particular literacy or numeracy pedagogy, instead PLaN WA members are there to experience the range of school-based literacy and numeracy strategies, activities, resources, and learning programs as this will serve to enrich their future practice.

PLaN WA partner schools may be impacted by sector driven initiatives resulting in reduced engagement with our institution on occasion. We recognise this and work on an individual basis with each school and PLaN WA member to cater to all partners' needs, for example, placing membership on a 'time-out'. Furthermore, should concerns about the suitability of a PLaN WA member be brought to our attention we work sensitively to counsel the beginning teacher and offer additional supports should they be necessary.

The program was piloted from term 4 in 2019 for six months involving seven public primary schools and five public secondary schools along with 41 PSTs. The research reported on in this article commenced in 2020 after obtaining Edith Cowan University human ethics research approval. These pilot schools were selected based on the strength of the professional placement relationships, that is, these schools had consistently supported these placements with generous professional experience placement allocations. The school executives at these pilot schools co-designed the operational and administration processes that are now used to run this service-learning initiative. These principles include, each PLaN school determines how many PLaN WA members it requires, the frequency of visits, length of time for each visit and each PLaN site determines the literacy or numeracy areas for the PLaN WA members to focus on.

Following the pilot phase, the program became available to our institution's wider school partnership base where it now operates in 45 public schools (25 primary schools and 20 secondary schools) including one early learning centre. PLaN WA also operates in five regional schools. As part of the ongoing co-design and expansion of this program, feedback is regularly sought from each school partner, and its members, in other words a partnership approach has been adopted. The PLaN WA program now receives requests from schools to join by word of mouth, including a request from a school in Jamaica.

Method

Building upon (but complementing) the University of Southern Queensland PLaN initiative as reported by Fanshawe et al (2023), the research question we aimed to answer was: how does the service-learning approach of PLaN WA contribute to pre-service teachers' personal literacy and numeracy, and their self-efficacy or confidence in teaching children and young people about literacy and numeracy?

Data collection

An initial online survey provided a baseline of the participants involved, including their own literacies and numeracy levels, their teaching confidence and competence. The post survey assessed these same points upon completion of two terms of service-learning. These surveys were followed up by two semi-structured focus group interviews (one in 2020 and one in 2021) to qualitatively investigate specific findings identified from the surveys. Over the course of the project, multiple cohorts of volunteer PLaN WA participants were surveyed. Participants were invited to sign up to PLaN WA via the information provided during the public presentations at orientation day sessions, as well as introductory lectures at the beginning of semesters. As new PLaN WA members signed up to participate, they were sent emails about the research and invited to complete the pre-survey. Once they had completed two terms of service, PLaN WA members were invited to complete the post-survey. This paper reports on the pre-survey (n = 130) and the post-survey (n = 54) completions to date. A copy of the survey questions we deployed via *Qualtrics* is available in Appendix A.

In late 2020 and in mid 2021, a call asking for focus group participants was sent out to all PLaN members via email informing them of the additional phase of the research and inviting them to participate (regardless of whether they had completed the pre-survey or not). Three PSTs participated in the first focus group interview in 2020 and another three PSTs participated in the second focus group interview in 2021. A copy of the semi-structured focus group questions is available in Appendix B.

Ethical considerations

Pre-service teachers in the School of Education at Edith Cowan University, over the age of 18, who volunteered to participate in the PLaN WA service program were invited to participate in this research. Participation was voluntary. There was no obligation to participate nor was there any penalty for not participating. If participants completed the pre-survey, they were encouraged to complete the post-survey but were not obliged to do so. Participants were provided with an information statement about the aims and scope of the project in order to obtain informed consent for both the online surveys and for the focus group interviews. Participants could choose to opt out of the research at any time up until they submitted their online survey results (for both pre- and post-surveys). Ethics approval was obtained from our institution's human research ethics committee and the approval number was 2020-01239, obtained in March 2020. It should be noted our original intention was to survey PSTs after exiting the PLaN WA program upon

graduation. However, as of September 2020, no one had exited the program (nor did we have any post-survey completions), so we sought an ethics amendment for the post-survey criteria to include PLaN WA participants who had completed four terms of service learning (not just exiting members). This was approved, but because of Covid-19 and schools limiting who could walk onto school grounds, it became evident there would be few that would have had an opportunity to complete four terms of service. Therefore, our request to reduce the criterion down to the completion of just two terms of service learning was approved in March 2022.

Findings

PLaN WA members may become members at any stage in their ITE course, therefore proficiency of the members may vary, although PLaN WA membership is currently restricted to those PSTs who are 18 years and over and have the required sector compliance requirements including a current *Working with Children Check* (WWCC, see the web address https://www.wa.gov.au/organisation/department-of-communities/working-children-check) and the *Nationally Coordinated Criminal History Check* (NCCHC, web https://www.education.wa.edu.au/ncchc). Demographically, the PLaN WA program has so far appealed mostly to first and third year ITE undergraduates with the spread almost equal across the Early Childhood Studies, Primary and Secondary cohorts. Approximately 62% of post survey completions were from undergraduate programs; the remainder from our graduate Initial Teacher Education (ITE) programs. These include the Master of Teaching (Early Childhood), Master of Teaching (Primary) and Master of Teaching (Secondary), each offered typically over two years full-time.

95% of the post survey respondents attended schools once a week with 40% of them for 2 hours per week. Almost 21% only attended for one hour a week which was the minimum. 24 of the respondents said they mainly taught 'whatever the school decided'. Another 19 PLaN members said they taught literacy in small groups. Another 19 PSTs stated they taught literacy to individuals. A lesser amount taught numeracy in small groups (n = 16) and 10 respondents said they worked with individuals on their numeracy (respondents could choose more than one option).

Table 1: PLaN PST Participation by term 2019 - 2022

Term no.	Term 4	Term 1	Term 2	Term 3	Term 4	Term 1	Term 2	Term 3	Term 4	Term 1	Term 2	Term 3	Term 4
Year	2019	2020	2020	2020	2020	2021	2021	2021	2021	2022	2022	2022	2022
PLaN school sites													
Primary	7	9	12	14	14	17	21	21	21	23	23	23	23
Second.	6	9	11	12	11	11	12	13	13	18	18	18	18
Regional										1	2	2	2
Total	13	18	23	26	26	32	36	36	36	42	42	42	42
PLaN members													
Total no.	41	99	128	143	131	138	174	193	187	166	203	215	219

Table 1 presents the participation of schools and PLaN WA members (PSTs) from 2019 to 2022. An even spread occurred across both primary and secondary schools. One early learning centre joined the PLaN WA program in terms 3 and 4 of 2022. The increase in regional school participation (as opposed to metropolitan schools) from 2022 should be noted and in 2024, we have five participating PLaN regional schools.

Data analysis and discussion

As mentioned, the research question we originally intended to answer was: how does the service-learning approach of PLaN WA contribute to pre-service teachers' personal literacy and numeracy, and their self-efficacy or confidence in teaching children and young people about literacy and numeracy? This research question informed our data analysis and the themes we present here. However, research often takes us in a different path away from our intentions. What we discovered is that the benefits to PSTs knowledge of and ability to teach literacy and numeracy was limited. We found that involvement in PLaN WA provides an informal, non-assessed setting which helps PSTs gain confidence in teaching and in being a teacher. The following focus group interview excerpt points to a resonating theme expressed by the majority of PLaN WA members:

> So, my confidence to teach has gone up. Definitely. Being in a classroom for three terms has definitely seen progression in the kids as well as forming relationships with the teacher and their kids. It helps with that and then not being graded. It helps with being relaxed and just going and doing what's needed, but definitely without the hounding of grading, it definitely relaxing (female, fourth year Bachelor of Education primary pre-service teacher).

PLaN WA members who participated in the research highlighted that having a non-assessed placement relieved them of the stress of an assessed professional experience but also gave them the opportunity to work closely with small groups of students:

> I think it's really helped with being able to … how to give individual students the help they need while still being aware and sort of managing a whole classroom. But having the pressure off because there's an actual teacher there is doing the bulk of that work. But, just one of the things I found hard on prac was when I needed to help one student and there was a whole classroom that also needed to be managed. Trying to find that balance. And I think working with the class I worked with in PLaN which was a smaller class of high needs kids really helped with some of that for me (female, Master of Teaching Secondary pre-service teacher).

A female second year Master of Teaching Early Childhood PST mentioned the benefits of being able to work with small groups of students without having to produce and plan lessons. A female Bachelor of Secondary Teaching PST majoring in music with a minor in English claimed:

> Well, I'm doing music as a major but my minor is English so being able to work in a Year Eight English class with some literacy support students has been really helpful in progressing towards my English minor units and helping me along with that and how to

teach English, because I understand that in your pracs you do a lot more of your major than your minor. So, it's been really helpful.

PSTs also mentioned how their informal experiences in PLaN WA helped them prepare for their formal professional experience placements where they were able to apply some of what they had learned during PLaN WA involvement into their placement. One example is from a female early childhood PST who stated:

I feel like I'm very confident, especially because at Barstow [pseudonym] Primary School they gave me a lot of autonomy to actually help the kids; they couldn't say 'do this' or 'do that', so I've been able to apply the things I was learning at school, and now that I'm on prac I have been able to use some of the things that I taught the little ones at Barstow Primary School in my Year One class that I've been teaching in prac these past four weeks.

The secondary PST majoring in music thought that being involved in PLaN WA before she had completed any formal professional experience requirement for university gave her the surety to know she was on the right path:

I've wanted to be a teacher since I was five or six so I don't know if this is specific to PLaN or to being in a school for the first time, but after my very first session with PLaN, being in a school for about an hour, I knew I was on the right path. It cemented the fact that being a teacher is right for me. I went into a classroom for about an hour with about nine Year Ten boys and they were noisy and rowdy and I loved it; it was the best hour in forever and so I knew that's exactly where I wanted to be so I guess it cemented that for me.

In terms of why PSTs chose to become involved in PLaN, almost 55% of post-survey respondents strongly agreed with the statement, 'Through my involvement in PLaN, I hope to work towards achieving the overall graduate teacher standard of the Australian Professional Standards for Teachers.' As a result of involvement in PLaN WA, the most common experience was that PSTs felt better prepared for their formal professional experience placement (17.4%, n = 38). 37 of the PSTs felt they gained a better understanding of the role of a teacher (17.0%). Regarding the AITSL standards, 35 PSTs claimed they gained a better understanding of how students learn (14.2%), which was also the strongest item in the pre-survey. The other options presented received a range of responses from 3% to 13% (see Appendix A for the options). Knowing about how to teach strategies within literacy (12.8%) and numeracy (10.1%) was not strongly indicated in the results.

It is evident that while the PLaN WA service-learning program is not assessed and does not 'count' towards the required number of days of supervised professional experience in our initial teacher education courses, it has value for all involved. The research study has revealed a range of benefits so far for PSTs. Being involved in PLaN WA provides participants with a failsafe environment given it is not assessed. The return on investment is high given all partners benefit – school, students, and PSTs themselves. As it is not a top-down driven initiative where prescribed content must be taught and assessed, the

flexibility means that PSTs can assist teachers with small group initiatives and help to directly support the bespoke needs of the students within that school. While voluntary, the PLaN WA members declare its value due to their increased confidence to teach and to be a teacher, echoing the findings of Fanshawe et al (2023). Furthermore, while there is a focus on literacy and/or numeracy, it appears the skills learned during the program are transferable to other settings and learning areas. PSTs claimed they had a better sense of working towards achieving the graduate career stage of the AITSL standards (AITSL, 2017). As noted previously in this article, we did not aim to replicate Fanshawe et al.'s (2023) study, but our findings are consistent with theirs as the PLaN WA members gained insight into how schools work and gained confidence in being a teacher and their future profession.

Conclusion and implications for further research

The success of the PLaN WA program is likely to be attributed in part to the co-design process used in establishing the operational model – a partnership approach – along with the regular liaison that occurs with each partner school to coordinate PLaN service-learning placement opportunities. Importantly the PLaN WA members, as previously illustrated, speak to a range of benefits in their participation in the program. Ultimately the longer-term benefits of operating PLaN WA alongside professional experience could lead to strengthening the long-term partnerships with these schools. Furthermore, this represents further prospects for Edith Cowan University to explore research collaborations and other beneficial programs of activity. It should be noted that the PLaN WA program continues to focus particularly on partnering with schools located in low socio-economic areas to assist those children who have a lower level of educational advantage. In addition, since the PLaN WA program was launched it has been extended to five regional schools in Western Australia. The longer term aims of the PLaN WA program include evidence of enhanced meaningful impact and engagement, for partnership growth and sustainability, for use in reporting and ultimately longer-term improvement in the *Graduate Outcomes Survey* (QILT, n.d.).

The data to date indicate that PLaN WA members are receiving the benefit of enriched practice, as was intended by the establishment of this service-learning program. The school and centres that PLaN WA has partnered with have received over 7100 hours of free tuition/support. The research question we aimed to answer was: how does the service-learning approach of PLaN WA contribute to pre-service teachers' personal literacy and numeracy, and their self-efficacy or confidence in teaching children and young people about literacy and numeracy? We found the PSTs gained confidence within school settings and felt they were well on their way to achieving the graduate career stage of the professional teaching standards. The PSTs did not state their own personal literacy and numeracy improved, nor that they particularly gained strategies to teach literacy and numeracy. That said, we understand the PLaN partner schools and early learning centres are enthusiastic to participate in PLaN because of the topical and useful focus on literacy and numeracy and because of the flexibility and autonomy provided to schools.

Future research could utilise the validated self-efficacy scale to thoroughly measure the increase in self-efficacy of these PSTs pre and post involvement in PLaN WA (see Morris et al., 2017). As noted above, the literature suggests that critical self-reflection is fundamental to the success and value of service-learning and should also be considered when collecting data. Most studies are mixed methods and include an analysis of rich qualitative data, including anecdotes, journal entries, open-ended survey questions or semi-structured interviews. The formal inclusion of critical self-reflection could strengthen future research and the PLaN WA program.

References

AITSL (Australian Institute for Teaching and School Leadership) (2017). *Australian professional standards for teachers*. https://www.aitsl.edu.au/standards

Anderson, J. B., Swick, K. J. & Yff, J. (Eds) (2001). *Service-learning in teacher education: Enhancing the growth of new teachers, their students, and communities.* New York: AACTE Publications. https://eric.ed.gov/?id=ED451167

Bandura, A. (1997). *Self-efficacy: The exercise of control.* Freeman.

Bandy, J. (2016). *What is service learning or community engagement?* Center for Teaching, Vanderbilt University. https://www.utrgv.edu/ceo/_files/documents/service-learning-and-community-engagement.pdf

Bursaw, J., Kimber, M., Mercer, L. & Carrington, S. (2014). Teaching reflection for service-learning. In M. Ryan (Ed.), *Teaching reflective learning in higher education* (pp. 153-168). Springer. https://doi.org/10.1007/978-3-319-09271-3_11

Butin, D. W. (2010). *Service-learning in theory and practice: The future of community engagement in higher education.* Palgrave Macmillan. https://doi.org/10.1057/9780230106154

Carrington, S. (2011). Service-learning within higher education: Rhizomatic interconnections between university and the real world. *Australian Journal of Teacher Education,* 36(6). https://ro.ecu.edu.au/ajte/vol36/iss6/1/

Carrington, S., Mercer, K. L., Iyer, R. & Selva, G. (2015). The impact of transformative learning in a critical service-learning program on teacher development: Building a foundation for inclusive teaching. *Reflective Practice,* 16(1), 61-72. https://doi.org/10.1080/14623943.2014.969696

Carrington, S. & Selva, G. (2010). Critical social theory and transformative learning: Evidence in pre-service teachers' service-learning reflection logs. *Higher Education Research & Development,* 29(1), 45-57. https://doi.org/10.1080/07294360903421384

Coffey, A. & Lavery, S. (2015). Service-learning: A valuable means of preparing pre-service teachers for a teaching practicum. *Australian Journal of Teacher Education,* 40(7), 86-101. https://ro.ecu.edu.au/ajte/vol40/iss7/7/

Cress, C. M., Collier, P. J. & Reitenauer, V. L. (Eds) (2005). *Learning through serving: A student guidebook for service-learning across the disciplines.* Stylus Publishing, LLC.

Crews, R. (1995). *What is service-learning? University of Colorado at Boulder service-learning handbook.* Boulder, CO: University of Colorado at Boulder.

Department of Education (2015). *Action now: Classroom ready teachers.* Report of the Teacher Education Ministerial Advisory Group. Australian Government. https://www.education.gov.au/teaching-and-school-leadership/resources/action-now-classroom-ready-teachers-report-0

Department of Education (2023). *Strong beginnings: Report of the Teacher Education Expert Panel.* Australian Government. https://www.education.gov.au/quality-initial-teacher-education-review/resources/strong-beginnings-report-teacher-education-expert-panel

D'Rozario, V., Low, E. L., Avila, A. P. & Cheung, S. (2012). Service learning using English language teaching in pre-service teacher education in Singapore. *Asia Pacific Journal of Education,* 32(4), 441-454. https://www.tandfonline.com/doi/full/10.1080/02188791.2012.741764

Enochs, L. G., Scharmann, L. C. & Riggs, I. M. (1995). The relationship of pupil control to preservice elementary science teacher self-efficacy and outcome expectancy. *Science Education,* 79(1), 63-75. https://doi.org/10.1002/sce.3730790105

Eren, A. & Yeşilbursa, A. (2019). Pre-service teachers' teaching-specific hopes and their motivational forces: The roles of efficacy beliefs and possible selves. *Teaching and Teacher Education,* 82, 140-152. https://www.sciencedirect.com/science/article/pii/S0742051X18315397

Fanshawe, M., Saltmarsh, S. & Larsen, E. (2023). Learning and exploring teacher identity: Preparing for teaching in the Partners in Literacy and Numeracy (PLaN) programme. *Asia Pacific Journal of Education,* 43(1), 1-15, https://www.tandfonline.com/doi/full/10.1080/02188791.2020.1866492

Garvis, S. & Pendergast, D. (Eds.) (2016). *Asia-Pacific perspectives on teacher self-efficacy.* Springer. https://link.springer.com/book/10.1007/978-94-6300-521-0

Hall, J. & Zmood, S. (2019). Australia's literacy and numeracy test for initial education students: Trends in numeracy for low- and high-achieving students. *Australian Journal of Teacher Education,* 44(10). https://ro.ecu.edu.au/ajte/vol44/iss10/1/

Hubbard, P. & Levy, M. (Eds.) (2006). *Teacher education in CALL.* John Benjamins Publishing. https://doi.org/10.1075/lllt.14

Iyer, R., Carrington, S., Mercer, L. & Selva, G. (2018). Critical service-learning: Promoting values orientation and enterprise skills in pre-service teacher programmes. *Asia-Pacific Journal of Teacher Education,* 46(2), 133-147. https://www.tandfonline.com/doi/full/10.1080/1359866X.2016.1210083

Koch, T., Selim, P. & Kralik, D. (2002). Enhancing lives through the development of a community-based participatory action research programme. *Journal of Clinical Nursing,* 11(1), 109-117. https://doi.org/10.1046/j.1365-2702.2002.00563.x

Lavery, S. & Coffey, A. (2016). Service-learning: Promoting the development of the graduate professional standards in pre-service secondary teachers. In *Purveyors of fine learning since 1992. Proceedings of the 25th Annual Teaching Learning Forum*, 28-29 January 2016. Perth: Curtin University. https://researchonline.nd.edu.au/cgi/viewcontent.cgi?article=1090&context=edu_conference

Lavery, S. & Sandri, S. (2021). Pre-service primary and early childhood teachers' perceptions of a service-learning experience. *Issues in Educational Research,* 31(4), 1101-1120. https://www.iier.org.au/iier31/lavery.pdf

Leytham, P. A., Dawson, S. & Rasmussen, C. L. (2018). Changing perceptions of pre-service educators through service-learning. *Journal of the International Society for Teacher Education,* 22(2), 23-35. https://files.eric.ed.gov/fulltext/EJ1237541.pdf

MacGregor, L. J. (2019). 'Making learning valuable': Transforming my practice through a service-learning partnership in Central Gippsland. In M. Green, S. Plowright & N. F. Johnson (Eds.), *Educational researchers and the regional university: Agents of regional-global transformations.* Springer. https://link.springer.com/chapter/10.1007/978-981-13-6378-8_8

Marttinen, R., Daum, D. N., Banville D. & Fredrick, R. N. (2020). Pre-service teachers learning through service-learning in a low SES school. *Physical Education and Sport Pedagogy,* 25(1), 1-15. https://doi.org/10.1080/17408989.2019.1670153

Mergler, A., Carrington, S., Kimber, M. & Bland, D. (2016). Inclusive values: Exploring the perspectives of pre-service teachers. *Australian Journal of Teacher Education,* 41(4). https://doi.org/10.14221/ajte.2016v41n4.2

Mergler, A., Carrington, S., Boman, P., Kimber, M. & Bland, D. (2017). Exploring the value of service-learning on pre-service teachers. *Australian Journal of Teacher Education,* 42(7). https://doi.org/10.14221/ajte.2017v42n6.5

Morris, J. E., Lummis, G. W., McKinnon, D. H. & Heyworth, J. (2017). Measuring preservice teacher self-efficacy in music and visual arts: Validation of an amended science teacher efficacy belief instrument. *Teaching and Teacher Education, 64,* 1-11. https://doi.org/10.1016/j.tate.2017.01.014

Nguyên, N. (2022). University-community partnerships in language teacher education through work-integrated learning. *Issues in Educational Research,* 32(1), 292-314. https://www.iier.org.au/iier32/nguyen.pdf

Patrick, C.-J., Valencia-Forrester, F., Backhaus, B., McGregor, R., Cain, G. & Lloyd, K. (2019). The state of service-learning in Australia. *Journal of Higher Education Outreach and Engagement,* 23(3), 185-198. https://files.eric.ed.gov/fulltext/EJ1241651.pdf

Power, A. & Bennett, D. (2015). Moments of becoming: Experiences of embodied connection to place in arts-based service learning in Australia. *Asia-Pacific Journal of Teacher Education,* 43(2), 156-168. https://doi.org/10.1080/1359866X.2014.960801

QILT (Quality Indicators for Learning and Teaching) (n.d.). *Graduate Outcomes Survey.* https://www.qilt.edu.au/surveys/graduate-outcomes-survey-(gos)

Resch, K. & Schrittesser, I. (2021). Using the service-learning approach to bridge the gap between theory and practice in teacher education. *International Journal of Inclusive Education,* 27(10), 1118-1132. https://doi.org/10.1080/13603116.2021.1882053

Riggs, I. M. & Enochs, L. G. (1990). Toward the development of an elementary teacher's science teaching efficacy belief instrument. *Science Education,* 74(6), 625-637. https://doi.org/10.1002/sce.3730740605

Ryan, M. E. (Ed.) (2015). *Teaching reflective learning in higher education: A systematic approach using pedagogic patterns.* Springer. https://doi.org/10.1007/978-3-319-09271-3

Salam, M., Awang Iskandar, D. N., Ibrahim, D. H. A. & Farooq, M. S. (2019). Service learning in higher education: A systematic literature review. *Asia Pacific Education Review, 20,* 573-593. https://doi.org/10.1007/s12564-019-09580-6

Sellings, P., Felstead, K. & Goriss-Hunter, A. (2018). Developing pre-service teachers: The impact of an embedded framework in literacy and numeracy. *Australian Journal of Teacher Education,* 43(4). https://doi.org/10.14221/ajte.2018v43n4.1

Shroyer, G., Riggs, I. & Enochs, L. (2014). Measurement of science teachers' efficacy beliefs. In R. Evans, J. Luft, C. Czerniak & C. Pea (Eds.), *The role of science teachers' beliefs in international classrooms* (pp. 103-118). Springer. https://doi.org/10.1007/978-94-6209-557-1_7

Shumer, R., Lam, C. & Laabs, B. (2012). Ensuring good character and civic education: Connecting through service learning. *Asia Pacific Journal of Education,* 32(4), 430-440. https://doi.org/10.1080/02188791.2012.741768

Sigmon, R. L. (1979). Service-learning: Three principles. *Synergist,* 8(1), 9-11.

Skaalvik, E. M. & Skaalvik, S. (2014). Teacher self-efficacy and perceived autonomy: Relations with teacher engagement, job satisfaction, and emotional exhaustion. *Psychological Reports,* 114(1), 68-77. https://doi.org/10.2466/14.02.PR0.114k14w0

Tan, S. Y. & Soo, S. H. J. (2020). Service learning and the development of student teachers in Singapore. *Asia Pacific Journal of Education,* 40(2), 263-276. https://doi.org/10.1080/02188791.2019.1671809

Woodcock, S. & Reupert, A. (2016). Inclusion, classroom management and teacher self-efficacy in an Australian context. In S. Garvis & D. Pendergast (Eds.), *Asia-Pacific perspectives on teacher self-efficacy* (pp. 87-102). Springer. https://link.springer.com/chapter/10.1007/978-94-6300-521-0_6

Zee, M. & Koomen, H. M. Y. (2016). Teacher self-efficacy and its effects on classroom processes, student academic adjustment, and teacher well-being: A synthesis of 40 years of research. *Review of Educational Research,* 86(4), 981-1015. https://doi.org/10.3102/0034654315626801

Appendix A: PLaN WA post survey

Gender	Male	Female		Prefer not to say		
	☐	☐		☐		

Age	18 - 21	22 - 25	26 - 29	30 - 33	34 - 37	38 - 41	42 - above
	☐	☐	☐	☐	☐	☐	☐

Degree	Early childhood		Primary		Secondary
	☐		☐		☐

Level	Undergraduate	Graduate (MTeach)
	☐	☐

Year	1st	2nd	3rd	4th
	☐	☐	☐	☐

Mode	On campus	On-line	Mix of both
	☐	☐	☐

Type	Full-time	Part-time
	☐	☐

Instructions
Please read each of the following statements carefully, and indicate via an X in one or more boxes

1. I attend my PLaN school for the following frequency

Once a week	☐
Twice a week	☐
Three times a week	☐

2. My PLaN school is a

Early childhood centre	☐
Primary school	☐
Secondary school	☐

3. I attend my PLaN school

1 hour a week	☐
2 hrs a week	☐
3 hrs a week	☐
More than 3 hrs a week	☐

4. I work with the same students in my PLaN school

Yes	☐
No	☐
Sometimes	☐
Most of the time	☐

5. During my term of service in PLaN, I was able to collect evidence against the Australian Professional Standards for Teachers for (tick all that apply)

Lesson plans	☐
Examples of differentiation	☐
Different ways of communication	☐
Understanding how students learn	☐
Develop approaches that work with students from diverse linguistic backgrounds	☐
Develop approaches that work with students from diverse cultural backgrounds	☐
Develop approaches that work with students from diverse religious backgrounds	☐
Develop approaches that work with students from diverse socio-economic backgrounds	☐
Develop learning sequences for students	☐

Demonstrate my knowledge of a range of resources including ICT to engage students in their learning	☐
Demonstrate a range of verbal and non-verbal communication strategies to support student engagement	☐
Knowing and understanding literacy teaching strategies and their application in teaching areas	☐
Knowing and understanding numeracy teaching strategies and their application in teaching areas	☐

6. I found participating in PLaN assisted me (tick all that apply)

In understanding the role of a teacher	☐
In developing teaching strategies of numeracy	☐
In developing teaching strategies of literacy	☐
In developing my knowledge of sequencing lesson plans	☐
In developing my knowledge of a range of resources including ICT	☐
In developing my verbal and non-verbal communication strategies to support student engagement	☐
In developing a sense of teacher identity	☐
In preparing me for my professional experience placement	☐

7. I engaged in the following whilst involved in PLaN (tick all that apply):

Whatever the school decided	☐
Teaching literacy in small groups	☐
Teaching individuals literacy	☐
Teaching numeracy in small group	☐
Teaching individuals numeracy	☐
Other (please state)	☐

Appendix B: Semi-structured focus group questions for PLaN WA

You have all been involved in PLaN
1. How would you describe your current confidence regarding your ability to teach?
2. How relevant is the Partners in Literacy and Numeracy (PLaN) program relevant to your teacher education course?
3. Tell us how you have used what you have learnt in your coursework in PLaN and vice versa?
4. Tell us how your involvement in PLaN has influence your teaching approach?
5. Can you tell us how being involved with PLaN has had an impact on your preparation for becoming a teacher?
6. Can you tell us how being involved with PLaN changed the way you think about yourself as a potential teacher?
7. Has your involvement in PLaN had an impact on your confidence in teaching literacy and/or numeracy skills?
8. Have any of your values or beliefs changed as a result of being involved with PLaN in a school? Can you share an example?
9. What could be improved in the PLaN program?

Dr Julie Boston is a senior lecturer in secondary science and Director of Partnerships and Engagement in the School of Education at Edith Cowan University, Perth, Western Australia. She is responsible for identifying, establishing and managing education partnerships and enterprise-related programs that drive the School of Education's strategic priorities and relevant university performance targets.
ORCID: https://orcid.org/0000-0002-3892-6031
Email: julie.boston@ecu.edu.au

Dr Nicola F. Johnson (corresponding author) is an associate professor of digital technologies in education in the School of Education at Edith Cowan University. She researches the intersections between technology and education within society.
Twitter (X): @nfjnic
ORCID: https://orcid.org/0000-0001-7875-3027
Email: nf.johnson@ecu.edu.au

Please cite as: Boston, J. & Johnson, N. F. (2024). The benefits of a literacy and numeracy service-learning program for pre-service teachers: A partnership approach. *Issues in Educational Research*, 34(2), 419-435. http://www.iier.org.au/iier34/boston.pdf