Received: 25 March 2022 | Revised: 2 October 2022 | Accepted: 9 October 2022

DOI: 10.1111/ajr.12938

ORIGINAL RESEARCH

AJRH National Rural Health Alliance WILEY

Co-creation of a student-implemented allied health service in a First Nations remote community of East Arnhem Land, Australia

Ruth Barker PhD[1] | **Susan Witt MBA**[2] | **Katrina Bird BScPsych**[1] | **Kylie Stothers BSW (Jawoyn)**[3] | **Emily Armstrong BSpeechPath (Hons1)**[4] | **Murphy Dhayirra Yunupingu (Yolŋu)**[5] | **Eunice Djerrkŋu Marika (Yolŋu)**[6] | **Louise Brown MEd**[1] | **Renae Moore MAppSc**[7] | **Narelle Campbell PhD**[2]

[1]James Cook University, Cairns, Queensland, Australia

[2]Flinders NT, Darwin, Northern Territory, Australia

[3]Indigenous Allied Health Australia, Katherine, Northern Territory, Australia

[4]Northern Institute, Charles Darwin University, Darwin, Northern Territory, Australia

[5]Dhupuma Foundational Education Centre, East Arnhem Land, Northern Territory, Australia

[6]Elder of the Gumatj People from Yirrkala, East Arnhem Land, Northern Territory, Australia

[7]Top End Health Service, Darwin, Northern Territory, Australia

Correspondence
Ruth Barker, James Cook University, 14 – 88 McGregor Road, Smithfield, Qld 4878, Australia.
Email: ruth.barker@jcu.edu.au

Funding information
Hot North Pilot Project, Grant/Award Number: Round 5

Abstract

Objectives: To co-create a culturally responsive student-implemented allied health service in a First Nations remote community and to determine the feasibility and acceptability of the service.

Design: Co-creation involved a pragmatic iterative process, based on participatory action research approaches. Feasibility and acceptability were determined using a mixed-method pre/postdesign.

Setting: The service was in Nhulunbuy, Yirrkala and surrounding remote First Nations communities of East Arnhem Land, Northern Territory, Australia.

Participants: Co-creation of the service was facilitated by the Northern Australia Research Network, guided by Indigenous Allied Health Australia leadership, with East Arnhem local community organisations and community members. Co-creation of the day-to-day service model involved local cultural consultants, service users and their families, staff of community organisations, students, supervisors, placement coordinators and a site administrator.

Findings: A reciprocal learning service model was co-created in which culturally responsive practice was embedded. The service was feasible and acceptable: it was delivered as intended; resources were adequate; the service management system was workable; and the service was acceptable. Health outcome measures, however, were not appropriate to demonstrate impact, particularly through the lens of the people of East Arnhem. Recommendations for the service included: continuing the reciprocal learning service model in the long term; expanding to include all age groups; and connecting with visiting and community-based services.

Conclusion: The co-created service was feasible and acceptable. To demonstrate the impact of the service, measures of health service impact that are important

to First Nations people living in remote communities of northern Australia are required.

KEYWORDS

cultural consultants, culturally responsive, health equity, reciprocal learning

1 | INTRODUCTION

Co-creation of health services with First Nations communities in Australia is recommended to ensure services are feasible and acceptable.[1,2] Co-creation is a collaborative and iterative process of designing, delivering and evaluating services in an equal and reciprocal relationship between service professionals, users and support networks.[3] As a strength-based approach, co-creation involves sharing ideas, identifying strengths of contributing parties and symbiotically bringing those strengths together to provide services.[3] This paper describes co-creation of an allied health (AH) service in a remote First Nations community of Australia.

First Nations Peoples of Australia have the oldest continuous cultures on the planet, which are built upon ways of knowing, being and doing that are honoured, respected and valued for their contribution to health and well-being.[4] With colonisation, western ways of knowing, being and doing were imposed on First Nations Peoples.[5] Power imbalances that ensued contributed to health inequities that we see today, for First Nations Peoples compared with their fellow Australians.[5,6] Co-creation of services with First Nations communities provides the opportunity to challenge these power imbalances[6] and draw on the strengths of First Nations Peoples, to enhance their own health and well-being.[7]

In northern Australia, where First Nations Peoples make up 25% of the population,[8] there are disproportionately high rates of disease and injury, compared with Australia overall.[4,9] Paradoxically, AH services to address the disabling consequences of disease and injury are scarce, due to underinvestment, fluctuating availability of AH professionals and sparsely populated geographical areas to service.[10,11] Without adequate AH services, societal costs associated with hospital admissions prolonged length of stay and premature admission to residential care[12] are substantial, as are personal and community costs associated with dislocation from family, community and culture.[13,14] To address AH service inequity in northern Australia, AH researchers, clinicians and managers came together to form the Northern Australia Research Network (NARN).[15] Recognising the

What is already known on this subject:

- First Nations Peoples of Australia have the oldest continuous cultures on the planet, and First Nations ways of knowing, being and doing are honoured, respected and valued
- With colonisation, western ways of knowing, being and doing were imposed on First Nations Peoples, contributing to the disproportionately high rates of disease and injury for First Nations Peoples, compared with fellow Australians
- In northern Australia, allied health (AH) services to address the disabling consequences of disease and injury are scarce, contributing further to health inequity
- Co-creation of student-implemented AH services with remote First Nations communities of northern Australia provides an opportunity to address health inequity by recognising and drawing on the strengths of First Nations Peoples

What does this study add:

- A co-created, student-implemented AH service in a remote First Nations community was feasible and acceptable
- A reciprocal learning service model in which culturally responsive practice was embedded was appreciated by both the students and the First Nations service users, their families and their community
- A student-implemented service model provided the flexibility to learn about and provide a culturally safe and responsive service to address the needs of the service user, their family and community
- Measures that demonstrate the health impact of a co-created service model, through a First Nations lens, are required

importance of First Nations leadership, NARN partnered with Indigenous Allied Health Australia (IAHA)[7] the national First Nations peak body. Through IAHA's Cultural Responsiveness in Action Framework (CR Framework),[16] IAHA leadership champions First Nations ways of knowing, being and doing, to transform systems through collective action and partnership.

Student-implemented AH services, whereby AH students on clinical placement take primary responsibility for delivery of services,[17] have been previously developed to help address service inequity in regional,[18] rural[19] and remote communities.[1] These services have connected the future health workforce to the people of the region, providing opportunities for learning about region-specific health complexities.[20] Such services have increased the likelihood that students will return to work in a rural or remote setting once they graduate.[21,22] Student-implemented services bring the added benefit of flexibility to adopt innovative practices required to be responsive to community need and direction.[1] Hence, the student-implemented service model provides an opportunity for co-creation of AH services in remote communities in northern Australia.

The East Arnhem region is a very remote region of the Northern Territory that is 800 km by air from Darwin and mostly inaccessible by road in the wet season.[23] The people of East Arnhem (population > 9000) reside in the two main towns of Nhulunbuy (population ~3000) and Yirrkala (~800) and in surrounding Homeland communities. Of the population, 85% are First Nations Peoples, most speak First Nations languages and less than 5% speak English only at home.[24] Yolŋu are the largest group of First Nations Peoples in the region. Yolŋu from different lands speak different languages and hold different and specific cultural knowledges and practices.[25] People requiring assistance through care packages, such as a Community Aged Care Package or a National Disability Insurance Scheme (NDIS) plan, receive services through community organisations. AH services required as part of care packages are available on a limited basis by an assortment of public and private providers, often on a fly-in, fly-out basis. With a Flinders University training facility situated in Nhulunbuy, an opportunity to provide student-implemented services was available, to supplement AH services and to help address service inequity.

The primary aim of this project was to co-create a student-implemented AH service to support the health and well-being of Yolŋu Peoples living in East Arnhem. The secondary aim was to determine the feasibility and acceptability of the service. This paper is focused on co-creation of the service with the people of East Arnhem. The experience for AH students has been reported elsewhere.[26]

2 | METHOD

A pragmatic co-creation process, derived from participatory action research approaches, was employed.[3,27] A NARN team, which included IAHA leadership, set out to co-create a culturally safe and responsive student-implemented service with East Arnhem community members and community organisations. The project was funded by grant and in-kind funding.

The process of co-creation was designed to connect the service with Yolŋu ways of knowing, being and doing.[28] IAHA First Nations leadership provided the NARN team with guidance on connecting, through the application of principles from the IAHA CR Framework.[16] Yolŋu cultural consultants, working alongside students and supervisors, provided Yolŋu leadership on respectfully and responsively connecting with each Yolŋu participant, while recognising Yolŋu ownership of Yolŋu knowledges and practices. As explained by one of the cultural consultants (author DY), guiding students to connect with djäma (Yolŋu ways of doing) meant guiding them in helping people; communicating respectfully; behaving appropriately when invited to buŋgul (ceremony); going out hunting and gathering; sharing knowledge and skills; and acknowledging each other's ways of working towards health and well-being. Continuous reciprocal engagement occurred: honouring Yolŋu expertise and intellectual property associated with diverse Yolŋu knowledges, practices, needs and aspirations; and honouring AH workforce expertise in managing disabling consequences of disease and injury.

Feasibility and acceptability of the co-created service was determined using a mixed-method pre-post design to answer the following questions: (a) Was the service delivered as intended? (b) Were there adequate resources? (c) Was the service management system workable? (d) Were the outcome measures adequate to demonstrate health impact (e) Was the service acceptable to those involved in the day-to-day service? and (f) What is recommended for the future? Service cost analysis is part of a subsequent project.

2.1 | Participants

The NARN team, guided by IAHA First Nations' leadership, facilitated the process of co-creation. Day-to-day co-creation of the service involved community members (service users, family and cultural consultants), community organisations based in East Arnhem, AH students, their supervisors and clinical placement coordinators and an onsite administrator, all of whom provided consent to participate. A glossary of key contributors and their role is

provided in Box 1. The naming convention was approved by the East Arnhem Yolŋu leadership.

Service users were identified and invited by the community organisation providing their care package. Family members >18 years old, considered 'family' by the service user, were recruited opportunistically, as they engaged with the service. Yolŋu cultural consultants were identified through existing links with Flinders University, on the basis of community recognition, expertise, interest and availability. They were invited by a NARN team member, to participate as paid consultants. Community organisations were represented by managers and invited to participate by a NARN team member.

Students were purposively selected via an expression of interest.[26] Student supervisors were identified on the basis of their knowledge and experience in their discipline, in student-implemented services and culturally responsive practice with First Nations people. Student placement coordinators and administrators participated as part of their usual role.

The anticipated number of service users, cultural consultants, community organisations, students and supervisors was estimated according to anticipated service demand and capacity. Service demand was estimated to be 20 of approximately 40 people on care packages in the region. Service capacity was determined by accommodation availability for students and supervisors; and an estimate

BOX 1 Glossary of key contributors and key processes involved in co-creation

Clinical placement coordinators	Two existing employees of James Cook University who participated as part of their role in coordinating student clinical placements for their disciplines.
Community organisations	Two organisations, represented by managers and care workers, that provide packages of care in East Arnhem and that hosted the students during their period of service delivery.
Cultural consultants	Two local Yolŋu people, one male and one female, who were recognised for their expertise in navigating the cultural interface between Yolŋu and non-Yolŋu service providers. Cultural consultants were paid to support connections to the Yolŋu community, provide guidance to the students and supervisors on culturally responsive service provision and support intercultural communication.
First Nations people	Aboriginal and Torres Strait Islander people of Australia.
Independent researchers	Two research assistants who were independent of NARN and the service, which were employed to conduct qualitative data collection and analysis.
IAHA	Indigenous Allied Health Australia is a collective of the AH workforce from many Aboriginal and Torres Strait Islander nations across Australia. The IAHA Cultural Responsiveness in Action Framework is a document that has been developed by IAHA to guide anyone providing services to First Nations people.
IAHA First Nations leadership	A First Nations AH professional, of the Jawoyn Nation, with recognised expertise, knowledge and respect, who provided leadership on conducting research in remote First Nations communities and on safe and culturally responsive practice according to the IAHA Culturally Responsiveness in Action Framework.
My story	A custom-designed form to guide students' learning and enable service users to identify what matters to them, what resources they have in their world to support them and what resources can be provided by the service.
NARN team	A team of four AH professionals with practice experience in remote northern Australia—two researchers, AH manager and the IAHA First Nations' Lead—who together, facilitated the process of co-creation.
Service coordinator	The Occupational Therapy supervisor who also served as the service coordinator whose role was to oversee the ongoing co-creation and delivery of the service, oversee the placement, connect and coordinate with local and visiting services and ensure student well-being and safety and support project evaluation.
Service users	Yolŋu who were in receipt of a care package through Aged Care or the NDIS and who engaged with the students on a one-to-one basis.
Site administrator	A Flinders University employee residing in Nhulunbuy who provided local logistical support.
Students	Final year, Speech Pathology and Occupational Therapy students completing a placement as a James Cook University requirement for graduation.
Supervisors	Two speech pathologists (part-time) and one occupational therapist (full-time) who provided local or distant supervision that was inter and intraprofessional, supportive, responsive and multifaceted.
'What matters'	What has meaning and is a priority in a person's life.
Yolŋu	The largest group of First Nations peoples from the East Arnhem region.

of services required (e.g., one-to-one, group, community, frequency, and duration).

2.2 | Data collection and analysis

To determine feasibility and acceptability of the co-created service, daily service data and workforce data were recorded by students and supervisors (Table 1). Outcome measurement was conducted with service users pre- and post-service delivery by students, supervisors and cultural consultants (Table 1). Outcome measures were purposefully selected for suitability with First Nations Peoples[18] and contexts.[29] Qualitative data were collected via semi-structured interviews, with a subset of those involved in service delivery (seven service users, four families, one cultural consultant, one community organisation manager, four students, four supervisors, one site administrator and two placement coordinators) within 3 months of service completion. Interview questions related to each contributor's role: how the service was implemented, challenges and enablers, and recommendations for the future. Yolŋu service users were interviewed by one Yolŋu cultural consultant, face-to-face in their preferred language, together with an independent researcher. Using meaning-based interpreting,[30] the cultural consultant and independent researcher worked together to transcribe the interviews into English to be accessible to all researchers. All other participants were interviewed in English by a second independent researcher, via Zoom videoconferencing.[31] Rapid descriptive analysis[32] of interview data was conducted by the independent researcher to provide timely feedback to the East Arnhem community. Data for each contributing group were analysed and reported separately (Table 2) and reviewed by the IAHA lead to identify evidence of cultural responsiveness in action according to the six capabilities of the IAHA Framework: centrality of cultures; self-awareness; proactivity; inclusive engagement; leadership; and responsibility and accountability (Table 1). Finally, data were integrated to answer the predetermined questions. This process of integration occurred iteratively between the NARN team, including the IAHA lead, with cultural consultants, supervisors and students, during preparation of reports, presentations and publications. Descriptive statistical analysis was conducted using SPSS Statistics version 27.[33] Qualitative data analysis was managed using Nvivo software version 12.[34]

3 | RESULTS

Co-creation of the service occurred over a 12-month period between August 2018 and 2019. Service implementation occurred from February to April 2019 over an 8-week period: 1-week orientation; 6-week service delivery; and a final week for reporting and feedback. The service was interrupted by threat of a tropical cyclone in week 4 with the evacuation of students to Darwin for 4 days. Co-creation continued until recommendations were confirmed by East Arnhem community members and organisations.

3.1 | The co-created service model

The service model is illustrated in Figure 1. In short, Yolŋu community members who were in receipt of a care package (service users) were provided a service by AH students who typically worked in interprofessional pairs, within two community organisations. Cultural consultants worked directly and simultaneously with service users and students. Supervisors provided clinical guidance, support with planning, reflection and pastoral care. The model was flexible in time, mode and location, to fit around service users and community organisations. The Occupational Therapy supervisor co-ordinated the service with support from all contributors. The process of co-creation was underpinned by regular meetings with the NARN team.

3.2 | The process of co-creation

Co-creation began with engagement by Flinders University with IAHA and East Arnhem community organisations, in-person, via email and Zoom videoconferencing, to identify need, co-design a strategy to address need and prepare a funding application. Once a grant was awarded, engagement, negotiation (e.g., dates, accommodation, facilities and transport) and preparation (e.g., recruiting students, supervisors and arranging orientation) occurred.

The next phase of co-creation was signalled by the arrival of students and supervisors into the community and their inclusion in orientation programmes and organised events. Community members were becoming aware of the presence of students and supervisors were learning about local Yolŋu culture and lifestyles, community organisations and the logistics of living and working in the community (layout, shops, services, safety procedures and routines).

Within the first week, the two participating community organisations each welcomed two students (one Occupational Therapy and one Speech Pathology student) into their service. The next 2 weeks were focused on relationship building and mutual understanding.

TABLE 1 Was the service feasible and acceptable?

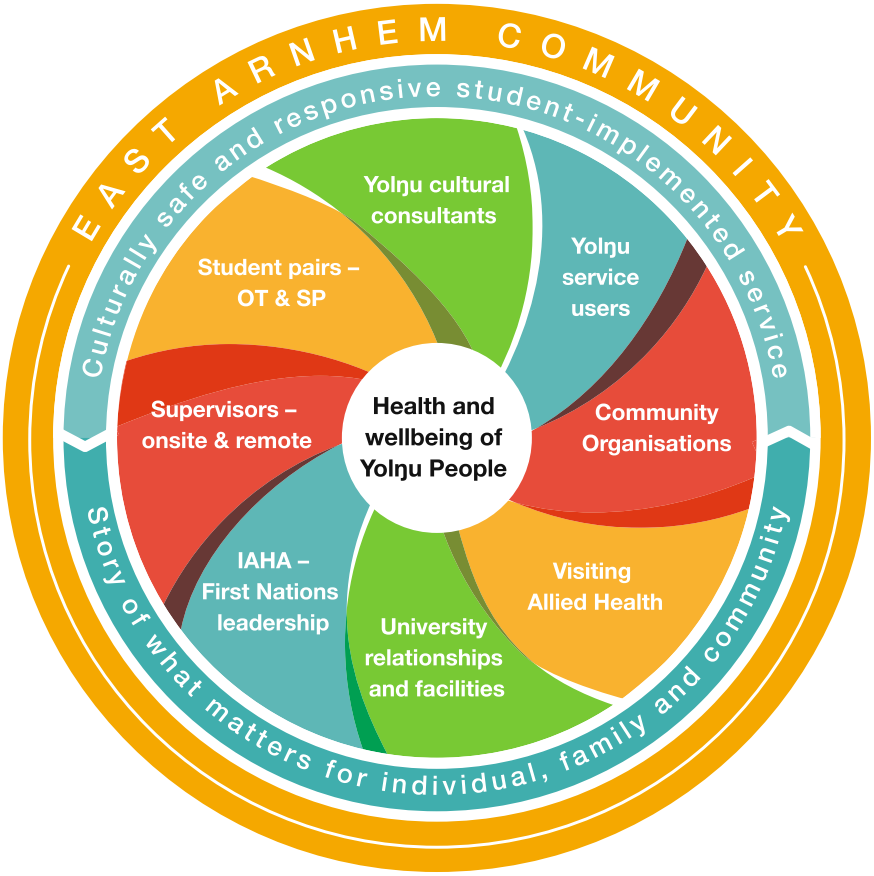
Question	Data collected		Result
Was the service delivered as intended?	Was there evidence of culturally responsive practice?	Centrality of cultures	The local cultural lens was valued and respected by all involved.
		Self-Awareness	Students learnt and practised in an environment that was self-reflective and emphasised reciprocal learning.
		Proactivity	The concept of this project was proactive and aimed to move from a transactional to transformative approach (breaking down silos, working in true partnership, and listening to learn from each other).
		Inclusive Engagement	Respectful communication and engagement strategies were evident throughout, with emphasis on ensuring the service was a cultural match to the community and needs were identified by the community.
		Leadership	The project demonstrated leadership by endeavouring to influence change and advocating for the transformation of AH service delivery in remote northern Australia.
		Responsibility and accountability	Presenting at conferences and publishing in peer review journals is a way to give voice to others about the importance of this work and honouring all those that contributed. This paper is a small part of the responsibility and accountability of those involved to give back to community.
	Did the service reach those for whom it was intended?	Referrals	n = 29; 55% > 55 years and 45% < 55 years; Males 34% Females 66%
		Retention	100% for service users, students, supervisors, cultural consultants
		Attendance	100% based on a flexible model with services in various locations
		Location	Home (21%), community organisation (31%), community (33%), hospital (12%)
		Mode	Service user + carer (83%), service user + family (9%), family only (5%), community development (2%)
		Occasions of service	Daily visits; 1 to 11 visits per person; for 1 h (range 0.25–2 h).
Were there adequate resources?	OT supervisor/coordinator		1.0 FTE for 9 weeks
	SP supervisors		1.0 FTE for 2 weeks; 0.2 FTE for 8 weeks
	Site coordinator		0.5 FTE for 8 weeks
	Yolŋu cultural consultant		0.5 FTE for 8 weeks
	Students		2 OT & 2 SP students for 8 weeks
	Office space		Full time for 8 weeks
	Orientation activities		3 days for 6 people
	Flights		4 return flights for 6 people
	Accommodation		4 students and 2 supervisors
	Ground transport		Daily use of university cars
Was the service management system workable?	Service co-ordination		6 h per day—planning, meetings, data entry
	Service user preparation		9 h a day—notes, profiles, preparation
	Student supervision		6 h a day—reflection, planning, clinical placement assessment
	Safety; adverse events		Safety procedure followed for cyclone threat; no serious adverse events One student and service coordinator completed 4WD course
Were measures adequate to demonstrate health impact?	Self-identified goals (PSFS)[30]		Not appropriate to assess prior to relationship building
	Empowerment pathway (GEMS)[27]		Difficult to assess due to intercultural communication challenges
Was the service acceptable?	Interviews with those involved in day-to-day service		Highly acceptable by all who contributed Concerns by visiting AH about supervision model and connection with visiting AH

TABLE 2 Acceptability of the student-implemented service

Interviewees	Highlights of the service model	Quote	Recommendations
Yolŋu service users, families, cultural consultants	Two-way learning—students and Yolŋu. Students took time to listen, understand their stories and learn about their culture and languages. Students filled in gaps and strengthened services by staying within the community.	'They worked well with my family within my home, and it was a good experience for them coming to community. They can learn from us, and we can learn from them'. (Service user) 'The hard thing for the students was trying to understand Yolŋu culture in such a short period of time. It was helpful having a Yolngu person present who could assist with translation in language'. (Family)	Continue the service and service model Include the whole community
Managers of community organisations	Students communicated well, always checked in, were mindful, inclusive, and professional and understood how to fit in with the community organisation. Added value to services of community organisation and visiting AH services. Service user profiles were holistic and comprehensive and a helpful tool for staff, as were the resources.	'They needed to feel like they fit within the team, and the team were very respected, and they became quite independent, they knew where people lived, they identified they needed an interpreter, they asked me what we were doing where that would fit in with our roster'. 'That whole flexibility enabled us to have a really good outcome, but if you didn't have flexibility, it would have been frustration'.	Continue service and flexible model. Always ensure service is beneficial to organisations hosting students. Ongoing communication to deal with challenges as they arise.
Students	A challenging yet unique opportunity, rewarding personal and professional experience that positioned them well for their future careers. Learnt to be responsive, to think on their feet and be flexible to the needs and circumstances of the community. Appreciated how Yolŋu shared their stories and culture with them.	'I have grown so much and developed great skills that I know will be valuable for when I start my career, such as being flexible to change and able to think quickly on my feet'. 'The Yolŋu people were so welcoming and willing to share their stories with us and seeing how appreciative they were of our presence and service provision made the experience even more worthwhile'.	Service to be ongoing and extended to all ages Orientation period essential Clear planning and communication prior to start of placement
Supervisors	Time taken in early weeks vital to learn about Yolŋu people, culture and lifestyle and to build relationships. Yolŋu cultural consultants were a crucial link in finding out 'what matters' for individuals and families and for day-to-day guidance. Flexibility meant the service could be responsive to 'what mattered'. Some concern by visiting AH around long-arm supervision model and need for integration with visiting AH services.	'The picture was that it would be flexible and, context-dependent, and I think that was what we delivered'. 'Throughout the planning process, like the thoughts of how it was actually going to look, sort of changed, and evolved as we went'. 'Because working in unison, apart from anything else, can help them understand the life of the people they were working with'.	Continue service according to the reciprocal learning model Cultural orientation vital Flexible responsive model vital Connecting with visiting AH needed as part of service model.
Placement coordinators	Challenging to find dates when OT and SP placements are aligned. Clarity is required on who is responsible for what.	'if there was a firm evacuation plan, of who's responsibilities it was and when this would occur, it would alleviate a lot of things, and there'd be a process'	Placement planning and risk management planning prior to engaging students.

With guidance from cultural consultants and supervisors, students began observing and listening to stories from Yolŋu people and care workers. Gradually, community organisations were including students into service users' care, in their homes with the carer or family. With cultural consultants leading conversations in Yolŋu Matha (Yolŋu

FIGURE 1 Co-created service model



CASE STUDY 1 The flow-on effect

The students noted that Nella (pseudonym) was sleeping all day while at the day centre and then learnt from her sister that she was staying awake and wandering at night. They needed to find some cognitive stimulation that Nella liked and could participate in despite having dementia. So, the students developed an art activity and invited Nella to join in while she was at the Day Centre. Others observed what Nella was doing with interest and so joined in. Billy, who was shy and had been reluctant to engage in the activities in the centre, saw what others were doing, and came to the table and asked to participate. The students later laminated his art for him which he loved. The following week, the grandmother of one of the Day Centre attendees was admitted to hospital and the students visited to pay her a social call. She enquired about the art activity and asked if she could have some pictures and pencils while she was in hospital.

languages) and interpreting into English, students were sitting down, watching, listening and talking. Reciprocally, through back-and-forth conversation, students were sharing their stories about their own lives and about what they could provide in their AH roles. Students were gradually learning about each individual service user, what mattered to them, what they were managing well and what help they needed. Conversations were guided through the use of a custom-designed 'My Story' template.[35,36] Daily reflective sessions were held between students and supervisors. Amid these conversations, needs of individuals, family or organisations, to which students could contribute, were emerging.

Towards the end of the second week, with guidance from cultural consultants and supervisors, the students considered how they could contribute, directly and indirectly, to 'what mattered', in service users' lives. They developed a list of potential activities to undertake that could strengthen, not duplicate, existing services. With supervisors present, students met with managers of the community organisations to discuss the list and form a prioritised action plan. Then, they began to work directly with service users, with support from cultural consultants. A flow-on effect began to occur, as other Yolŋu began receiving indirect services through incidental or opportunistic connections with the students, through group activity, workforce training (resources for care workers) or community activities (e.g., participation in outings for social engagement; swimming classes). Case study 1 provides an example of a flow-on effect.

In the fourth week, the service was disrupted by threat of a tropical cyclone and evacuation of students to Darwin. During this time, students developed resources that had been prioritised. Examples included: a

CASE STUDY 2 Integration with visiting AH services

Geoffrey (pseudonym) was a primary school boy and a new NDIS participant who had just been referred to the community organisation and to visiting AH providers for an initial assessment to develop his plan. The students contacted the AH providers to discuss Geoffrey. They talked about the information required for his assessment and discussed how they could contribute.

Over the next few weeks, the students began to build rapport with Geoffrey, and his Mum whom they had noted was very shy. They learnt about how the family managed at home and about their concerns. They attended the school to observe how Geoffrey was managing there. They learnt about what mattered to Geoffrey and his Mum and their areas of concern that would require further assessment. They compiled a report with their observations and sent it to the visiting AH providers. They also discussed it with them via videoconference.

The student's efforts were appreciated by Geoffrey and his Mum and also appreciated by the AH providers who were allocated just 3 h to complete their assessment, limiting their capacity to build a strong relationship with Geoffrey and his family, and therefore, to appreciate his abilities and needs. The information gathered by the students helped visiting AH providers to focus NDIS assessment on what mattered to Geoffrey and his family.

booklet with key signs in Yolŋu Sign Language for facilitating communication with non-Yolŋu carers; manual handling instructions for car transfers for carers; an instructional booklet for families to complete exercises; and carer information on the management of specific health conditions.

The service was most productive during weeks 5–7, when the students returned from Darwin to East Arnhem, with greater confidence and clarity of purpose. With cultural consultants, students were visiting service users in their homes, community organisations or out-and-about in the community, depending on where service users were more comfortable. Students were working with individuals, their families and care workers. Additionally, several referrals were received from local health services for Yolŋu who required support but did not have a care package. Students also began working with visiting AH services, with one example presented in Case Study 2.

By the eighth week, the service was drawing to a close. As appropriate, referrals or updates were provided for visiting AH services. Service user profiles (based on My Story) and resources were finalised for service users and community organisations. Finally, students, supervisors and cultural consultants hosted a community gathering to provide feedback and thank the community for welcoming and supporting them.

BOX 2 The way in which the service worked

Dhäkay-ŋama - when people can feel an expression of a bond and feel good inside and feel healed inside. It's a deep feeling for people who are sick or can't walk or are disabled and people who can't speak. They will listen with their ears and listen with their feelings. They will hear the words and then they will feel alive and awake again. That's why we - and they, these students - are working this way. When we give a cup of tea, when we give food and talk to them, and walk hand in hand with a Yolŋu person who has a disability, they get a deep feeling from that person - a feeling of love. And that's our Rom (Law and way of doing things). When we fill it up, we fill it right to the top – that deep feeling inside like a cup of tea. Yolŋu give until the cup is filled to the top. The Yolŋu will drink the cup of tea or water and feel full of feeling and awake. Then they will awaken and walk on their own feet and see mindfully. … We will work, make them see, wake that person.

3.3 | Evaluation of the service model

The service was feasible and acceptable; however, outcome measures were not appropriate to demonstrate impact. Findings from service and workforce data are detailed in Table 1 and interview data in Table 2. Following data integration, predetermined questions were answered.

3.3.1 | Was the service delivered as intended?

Culturally safe and responsive practice was embedded in the service, with all six key capabilities of the IAHA Framework evident. Service user recruitment (n = 29) and retention (100%) exceeded the anticipated number (n = 20). Attendance was high (100%) and attributed to the flexible service model. In addition to service users, many Yolŋu benefitted indirectly from the flow-on effect of students' activities (Please refer to Case Study 1). 'What mattered' most to service users and family was whether students returned to visit and were responsive to their needs. Such needs varied widely—examples included: sleeping well at night; managing personal care; and communicating more effectively with carers. Services provided varied widely and included home assessments, equipment prescription and activities to foster social participation.

3.3.2 | Were there adequate resources?

Personnel required were available: a service coordinator; experienced supervisors; AH students and cultural

consultants. Infrastructure was also available: accommodation, transport and office space within the Flinders University facility.

3.3.3 | Was the service management system workable?

Service planning and co-ordination and student supervision were managed with the resources available. Safety considerations related to extreme weather threats were addressed appropriately according to university safety protocols. There were no serious adverse events.

3.3.4 | Were outcome measures adequate to demonstrate health impact?

Measures were not adequate to demonstrate health impact. Preservice measurement was inappropriate prior to building a relationship and learning what mattered to service users. Further, the two outcome measures, despite being purposefully selected, proved difficult to administer, due to differences in language and cultural concepts around 'what mattered'.

3.3.5 | Was the service acceptable to those involved in day-to-day service delivery?

The service was resoundingly acceptable according to each of the contributing groups (Table 2). The greatest strength was the way the service was delivered. One of the Yolŋu cultural consultants (Author DM) described the process in her own language in a videoclip. The English interpretation of a section of the videoclip is provided in Box 2 and the full videoclip with subtitles is provided as Video S1.

3.3.6 | What is recommended for the future?

There was consensus that the student-implemented service be continued, according to the flexible reciprocal learning model, and be expanded to include all age groups. First Nations Leadership, time for learning about Yolŋu people, culture, lifestyle and time for building relationships were to be prioritised within the model. The importance of connecting with visiting AH services as well as community-based services was emphasised, to strengthen the value of these services and provide integrated support to service users. In the future, the need for collaborative planning, including contingency planning, involving all contributors was requested, prior to engaging students.

4 | DISCUSSION

The purpose of this project was to co-create a student-implemented AH service to help address service inequity in East Arnhem Land. Co-creation was guided by First Nations' leadership and involved East Arnhem community organisations and two universities. AH students implemented the service with guidance from supervisors and Yolŋu cultural consultants. The service was both feasible and acceptable, although service measures did not accurately reflect the service that was delivered, nor the outcomes that were achieved. Recommendations made were to continue the service according to the reciprocal learning model, to extend the model to all age groups and to strengthen connections with visiting AH services. Measures of what matters to service users are required to demonstrate the service impact and support implementation across remote northern Australia.

Co-creation of student-implemented services offers real possibilities to address AH service inequity in remote regions of Australia.[1] In this study, which was guided by principles for successful co-creation[3] and principles of the IAHA Framework, some important caveats were apparent. Firstly, sharing of power, such as the power of the AH workforce within the Australia health system, is influenced by knowledge of possibilities. As AH services are scarce in remote First Nations communities, service users were typically unfamiliar with what AH services could provide. The focus on 'what mattered' to the individual and community enabled students to identify what expertise they could provide to assist service users to address their priorities. Secondly, the process of co-creation required time, and even though timebound, the service evolved and adapted, in a dynamic creation of symbiotic relationships between those contributing. The student-implemented model allowed the time and flexibility required, not usually available to mainstream health services. Thirdly, the service was built upon existing community foundations. Flinders University was established within the region through relationships with health services, student education, a physical workspace and accommodation, and a site administrator who could link with Yolŋu cultural consultants. While contemporary models of clinical education emphasise the importance of symbiotic relationships,[37] the important feature of the East Arnhem student-implemented service was that community need was positioned as central to all relationships and outcomes, providing the students with the opportunity to develop their capacity to provide

people-centred care[38] in a culture and community different to their own.

Evaluation of the service model highlighted a number of important elements. Feasibility of a culturally safe and responsive service was fostered by an initial period devoted to relationship building and learning about Yolŋu contexts. Feasibility of an AH service in a remote community to help address inequity was dependent on a high level of resourcing. Acceptability of the service model hinged on reciprocal learning and the central role of the Yolŋu cultural consultants. The cultural consultants made it possible to learn about 'what matters' by enabling service users to converse in their preferred language and location. Although repeatedly emphasised[14,39] and key to NDIS choice and control,[40] funding of interpreters is still often overlooked and under-resourced.[14,39,41] The importance of connecting student-implemented services, with visiting AH services as well as with community-based services to increase the value of those services to the community, was also highlighted. The challenge is to work with and support long-held mainstream models of care while remaining true to the community-guided model of care.[42]

When evaluating the co-created service, it was methodologically difficult to demonstrate the impact of the service to a health system that is not designed to include the type of service that was created. Mainstream process measures such as 'referrals' could not accurately reflect service reach, nor could 'occasions of service' accurately reflect activity at the individual, family and community level. Even purposively selected outcome measures could not capture the impact on 'what mattered' to individuals, families and community. Although co-creation of services is being increasingly championed, accurately measuring the impact of this process on health and well-being is currently out of reach. A different approach is required to ensure 'impact' is not simply measured through an imposed dominant mainstream lens, but rather through a local community lens.[43] To do otherwise, is to potentiate a structural inequity for services designed to be accessible and acceptable by those who are already at a profound disadvantage within the mainstream health system, further entrenching disadvantage.[44]

4.1 | Strengths and limitations

Success of this service can be attributed, in part, to the existing partnership between Flinders University and the East Arnhem community. Furthermore, the IAHA leadership with the NARN team formed a unique group. IAHA leadership has been central in development and application of the IAHA CR Framework. The NARN team and supervisors have experience in creation of student-implemented services and supervision of AH students in rural and remote regions, the importance of which cannot be underestimated.

This project occurred in one region and was time-limited. Lessons learnt may not be generalisable to other contexts. Instead, others seeking to co-create student-implemented services need to listen to their community and find context-appropriate processes to ensure services align with 'what matters' to community members and make a meaningful difference.

4.2 | Clinical implications and future research

Project recommendations were clear: that a co-created student-implemented service, based on reciprocal learning, should continue in East Arnhem and be expanded to include all age groups; and connect with existing services, both within and visiting the community. To support scalability and sustainability of these services, further research is required to determine how to measure 'what matters' to the community to demonstrate the impact of co-created student-implemented services. Subsequently, a comparative analysis of the benefits of the student-implemented service model compared with 'usual' models of health care is being developed to ensure the greatest social return on investment for northern Australia.

4.3 | Conclusion

A co-created, student-implemented service in East Arnhem Land was feasible and acceptable. A recommendation was made to continue the reciprocal learning service model and expand it to all age groups. Measures that can demonstrate the impact of the service model are required to support investment in student-implemented services across northern Australia.

AUTHOR CONTRIBUTIONS

RB: conceptualization; formal analysis; funding acquisition; investigation; methodology; writing – original draft; writing – review and editing. SW: data curation; formal analysis; investigation; supervision; validation; writing – original draft; writing – review and editing. KB: formal analysis; investigation; project administration; validation; writing – review and editing. KS: conceptualization; funding acquisition; methodology; supervision; validation; writing – review and editing.

EA: formal analysis; supervision; validation; writing – review and editing. MDY: formal analysis; investigation; validation; visualization. DM: validation; visualization. LB: conceptualization; formal analysis; methodology; supervision; writing – review and editing. RM: validation; visualization; writing – review and editing. NC: conceptualization; formal analysis; funding acquisition; methodology; writing – original draft; writing – review and editing.

ACKNOWLEDGMENTS

The authors would like to acknowledge: the Yolŋu service users and families who contributed to co-creation of the service; Yolŋu cultural consultants; staff from Anglicare NT and East Arnhem Regional Council; staff from Carpentaria, Territory Therapy Solutions and NT Health; students in Occupational Therapy and Speech Pathology at James Cook University (JCU); student supervisors from JCU, Flinders NT and Charles Darwin University; First Nations Leadership for Cultural Responsiveness—Indigenous Allied Health Australia; and Independent Researchers from JCU. The authors would like to acknowledge the author (DM) and her family for their permission to make the video available to readers of the journal. The authors would also like to acknowledge the value of the reviewer's comments, which led to extensive discussion and reflection within the intercultural authorship team. This project was funded through a HOT North Pilot Project Grant. Open access publishing facilitated by James Cook University, as part of the Wiley - James Cook University agreement via the Council of Australian University Librarians.

CONFLICT OF INTEREST

The authors report no conflict of interest. The authors alone are responsible for the content and writing of the article.

ETHICAL APPROVAL

The study was approved by the Northern Territory Department of Health and Menzies School of Health Research Ethics Committee (HREC Reference Number 2019-3304).

ORCID

Ruth Barker https://orcid.org/0000-0002-2546-2581
Katrina Bird https://orcid.org/0000-0001-7017-6683
Louise Brown https://orcid.org/0000-0002-0815-1730
Narelle Campbell https://orcid.org/0000-0003-1088-1828

REFERENCES

1. Cairns A, Geia L, Kris S, Armstrong E, O'Hara A, Rodda D, et al. Developing a community rehabilitation and lifestyle service for a remote Indigenous community. Disabil Rehabil. 2021;44:1–9.
2. Carr JJ, Lalara J, Lalara G, Lalara G, Daniels B, Clough AR, et al. Staying strong toolbox: co-design of a physical activity and lifestyle program for aboriginal families with Machado-Joseph disease in the top end of Australia. PloS ONE. 2021;16(2):e0244311.
3. WA Council of Social Service. Co-design toolkit. WACOSS. 2017:1–48. Available from https://www.wacoss.org.au/wp-content/uploads/2017/07/co-design-toolkit-combined-2-1.pdf Accessed 3 March, 2022.
4. Sherwood J. Colonisation – It's bad for your health: the context of Aboriginal health. Contemp Nurse. 2013;46(1):28–40.
5. Griffiths K, Coleman C, Lee V, Madden R. How colonisation determines social justice and Indigenous health—a review of the literature. J Popul Res. 2016;33(1):9–30.
6. Sherriff S, Miller H, Tong A, Williamson A, Muthayya S, Sally R, et al. Building trust and sharing power for co-creation in Aboriginal health research: a stakeholder interview study. Evid Policy J Res Debate Pract. 2019;15:371–92.
7. Indigenous Allied Health Australia. Indigenous allied health Australia. Canberra: ACT; 2022. https://iaha.com.au/
8. Brewer T, Dale A, Gerritsen R, Harwood S, Prideaux B, Rosenman L, et al. Leading from the north: rethinking northern Australia development. Canberra: ANU press; 2021.
9. Australian Indigenous HealthInfoNet. Overview of Aboriginal and Torres Strait Islander health status 2020. Perth: Australian Indigenous HealthInfoNet; 2021.
10. Battye KM, McTaggart K. Development of a model for sustainable delivery of outreach allied health services to remote north-West Queensland, Australia. Rural Remote Health. 2003;3(3):194.
11. National Rural Health Commissioner. Improvement of access, quality and distribution of allied health Services in Regional. Canberra: Rural and Remote Australia; 2020.
12. Henderson EJ, Caplan GA. Home sweet home? Community care for older people in Australia. J Am Med Dir Assoc. 2008;9(2):88–94.
13. LoGiudice D. The health of older Aboriginal and Torres Strait Islander. Australas J Ageing. 2016;35(2):82–5.
14. Lowell A, Maypilama E, Yikaniwuy S, Rrapa E, Williams R, Dunn S. "Hiding the story": Indigenous consumer concerns about communication related to chronic disease in one remote region of Australia. Int J Speech Lang Pathol. 2012;14(3):200–8.
15. Northern Australia Research Network. About NARN 2022. Available from https://www.crrh.jcu.edu.au/about-narn/ Accessed 2 March 2022.
16. Indigenous Allied Health Australia. Cultural responsiveness in action: an IAHA framework. Canberra: IAHA; 2019.
17. Simpson SA, Long JA. Medical student-run health clinics: important contributors to patient care and medical education. J Gen Intern Med. 2007;22(3):352–6.
18. Barker RN, Sealey CJ, Polley ML, Mervin MC, Comans T. Impact of a person-centred community rehabilitation service on outcomes for individuals with a neurological condition. Disabil Rehabil. 2017;39(11):1136–42.
19. Frakes K-A, Brownie S, Davies L, Thomas J, Miller M-E, Tyack Z. Experiences from an interprofessional student-assisted chronic disease clinic. J Interprof Care. 2014;28(6):573–5.

20. Campbell N, Farthing A, Lenthall S, Moore L, Anderson J, Witt S, et al. Workplace locations of allied health and nursing graduates who undertook a placement in the Northern Territory of Australia from 2016 to 2019: an observational cohort study. Aust J Rural Health. 2021;29(6):947–57.
21. Butler S, Thomas JM, Battye K, Sefton C, Smith J, Skinner I, et al. Rural placements during undergraduate training promote future rural work by nurses, midwives and allied health professionals. Aust J Rural Health. 2021;29(2):253–8.
22. Sutton K, Depczynski J, Smith T, Mitchell E, Wakely L, Brown LJ, et al. Destinations of nursing and allied health graduates from two Australian universities: a data linkage study to inform rural placement models. Aust J Rural Health. 2021;29(2):191–200.
23. Primary Health Network Northern Territory. East Arnhem region data report: overview of selected demographic and health data for the East Arnhem region of the Northern Territory. Darwin: Australian Government: Rural Workforce Agency NT; 2020.
24. Australian Bureau of Statistics. 2016 Census QuickStats Canberra. Canberra: Australian Government; 2016. [updated 30 October 2020, 10 June 2021]. Available from: https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/LGA71300
25. Dhimurru Aboriginal Corporation. Visitor's Guide Nhulunbuy, NT. Nhulunbuy, NT: Dhimurru Aboriginal Corporation; 2020. Available from. https://www.dhimurru.com.au/uploads/8/9/3/6/8936577/bj2026_dhimurru_aboriginal_corporation_updated_visitor_guide_2020.pdf Accessed 28 September 2022.
26. Bird K, Stothers K, Armstrong E, Marika ED, Yunupingu MD, Brown L, et al. Marŋgithirri guŋga'yunarawu ga guŋga'yunyarawu marŋgithinyarawu learning to connect and connecting to learn: preparing the rural and remote allied health workforce through a co-created student-implemented service in East Arnhem, Australia. Aust J Rural Health. 2021;30:75–86.
27. Greenhalgh T, Jackson C, Shaw S, Janamian T. Achieving research impact through co-creation in community-based health services: literature review and case study. Milbank Q. 2016;94(2):392–429.
28. Country B, Wright S, Suchet-Pearson S, Lloyd K, Burarrwanga L, Ganambarr R, et al. Co-becoming Bawaka: towards a relational understanding of place/space. Prog Hum Geogr. 2016;40(4):455–75.
29. Haswell MR, Kavanagh D, Tsey K, Reilly L, Cadet-James Y, Laliberte A, et al. Psychometric validation of the growth and empowerment measure (GEM) applied with Indigenous Australians. Aust N Z J Psychiatry. 2010;44(9):791–9.
30. Lyons R, Armstrong E, Atherton M, Brewer K, Lowell A, Maypilama L̲, et al. Cultural and linguistic considerations in qualitative analysis. In: Lyons R, McAllister L, Carroll LC, Hersh D, Skeat J, editors. Diving deep into qualitative data analysis in communication disorders research. Havant: J & R Press; 2022.
31. Zoom Video Communications Inc. (2019). Zoom meetings & Chat. Retrieved from https://zoom.us/meetings
32. Watkins DC. Rapid and rigorous qualitative data analysis: the "RADaR" technique for applied research. Int J Qual Methods. 2017;16(1):1609406917712131.
33. IBM Corp. IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp; 2020 Available from: https://www.ibm.com/au-en/products/spss-statistics
34. QSR International Pty Ltd. NVivo 12 2018 Available from: https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home.
35. Page J. My story cards: a therapeutic tool for Aboriginal people. 2011. [updated October 2022, 2 February 2022]. Available from https://mystorycards.com.au/
36. Taylor M. The importance of an Indigenous rehab assistant. Adelaide: Indigenous Allied Health Australia National Conference; 2013.
37. Prideaux D, Lindemann I, Cottrell A. Community and workplace expectations of graduates in the health professions. Netherlands: Educating Health Professionals: Brill Sense; Boston, 2013. p. 71–82.
38. World Health Organization. Framework on integrated, people-centred health services. Report by the Secretariat. Geneva: WHO; 2016 [16; A69]. https://apps.who.int/gb/ebwha/pdf_files/WHA69/A69_39-en.pdf
39. Brennan G. The need for interpreting and translation Services for Australian Aboriginals: with special reference to the Northern Territory: a research report: research section. Department of Aboriginal Affairs; Darwin, Australia, 1979.
40. Ferdinand A, Massey L, Cullen J, Temple J, Meiselbach K, Paradies Y, et al. Culturally competent communication in Indigenous disability assessment: a qualitative study. Int J Equity Health. 2021;20(1):1–12.
41. Cochrane F, Siyambalapitiya S, Cornwell P. Clinical profile of Aboriginal and Torres Strait Islander adults with stroke and traumatic brain injury at a regional Australian hospital: a retrospective chart audit. Brain Impairment. 2021;22(3):281–93.
42. Barton R, Dew A, Ryall L, Jensen H, Taylor K, Lincoln M, et al. Working with Aṉangu (Aboriginal people) with disabilities from remote Central Australia. Navigating multiple expectations: "sandpaper and polyfilla". Res Pract Intellect Dev Disabil. 2021;9:1–16.
43. Bourke SC. Making cultures count: transforming Indigenous health data in Australia. Oxford, UK: University of Oxford; 2020.
44. Adkins-Jackson PB, Chantarat T, Bailey ZD, Ponce NA. Measuring structural racism: a guide for epidemiologists and other health researchers. Am J Epidemiol. 2021;191:539–47.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Barker R, Witt S, Bird K, Stothers K, Armstrong E, Yunupingu MD, et al. Co-creation of a student-implemented allied health service in a First Nations remote community of East Arnhem Land, Australia. Aust J Rural Health. 2022;30:782–794. https://doi.org/10.1111/ajr.12938