ŌTAUTAHI CHRISTCHURCH AOTEAROA NEW ZEALAND
35TH AUSTRALASIAN ASSOCIATION FOR ENGINEERING EDUCATION ANNUAL CONFERENCE
8-11 DEC 2024
THE ENGINEER AND THE WORLD

An experiment in regional delivery of a laboratory unit to First Nations students in the Pilbara

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ABSTRACT

CONTEXT

The National Agreement on Closing the Gap (Department of Prime Minister and Cabinet, July 2020) articulates the need for the proportion of First Nations people aged 25-34 years completing a tertiary qualification to increase from 47% in 2021 to 70% by 2031. In the 2021 census, the proportion of First Nations Australians aged 20-24 who had attained a Year 12 (or equivalent) qualification was 68%, compared to 91% of non-First Nations Australians. Curtin University has partnered with Fortescue and the Pilbara Kimberley Universities Centre (PKUC) to deliver the Undergraduate Certificate in Engineering to selected First Nations employees working in the Pilbara. Despite the clear rationale and need, there are significant challenges to delivering remote education to First Nations students. Further, the need for professional practice is a key component of engineering education and delivery needs to cater to full-time employed shift workers in the Pilbara, many of them being employed in Fly-In-Fly-Out (FIFO) roles. This paper outlines the delivery of an engineering first year lab unit to First Nations students in a partially online intensive mode.

PURPOSE OR GOAL

The reskilling and upskilling of workers into industries and jobs so that they are equipped to meet the energy transition is a key outcome. This highlights the intention of the Universities Accord released in early 2024, as well as addresses the UN SDGs 4, 8 and 9 in upskilling regionally, and improving pathways to higher education for First Nations people in Australia. The purpose of this paper is to describe a pilot in regional delivery of a traditional undergraduate lab unit, key learnings and offer sustainable approaches to upskilling regional workers with non-traditional educational backgrounds.

APPROACH OR METHODOLOGY/METHODS

The unit PRRE1003 Resources, Processes & Materials Engineering is one of the four units chosen as part of the Undergraduate Certificate in Engineering for delivery in this collaboration. It is the only unit which requires basic chemistry knowledge and has a laboratory component, both of which pose particular challenges for delivery to students who may not have completed Year 12. This paper describes the adjustments made to unit delivery, mode of teaching, Chemistry upskilling and laboratory component delivery that have been adjusted to suit the mode of delivery and student cohort. The laboratory component includes bespoke experimental work at Fortescue's Port Hedland metallurgy laboratory. These have been considered appropriate for First Nations students who apply a holistic pedagogy in their learning.

ACTUAL OR ANTICIPATED OUTCOMES

Key outcomes of this paper are the learnings about the effectiveness of the pedagogy, mode of delivery and support of the First Nations student cohort regionally, to ensure that the students are supported adequately to meet the learning outcomes of the unit.

CONCLUSIONS/RECOMMENDATIONS/SUMMARY

The conclusions that will be made are regarding the effectiveness and sustainability of the model of regional delivery to First Nations students, for a lab unit in a partially online block mode.

KEYWORDS

Regional, First Nations, industry

Introduction

The energy transition from a fossil-fuel based economy to a renewable one is being implemented across most first world economies at a rapid pace, to meet net zero targets by 2030 according to the Paris Agreement. The urgency in reskilling and upskilling workers towards supplying a competent and diverse workforce in Australia prompted the federal government to commission Jobs and Skills Australia (2023) to analyse the future workforce needs, potential training and education pathways. That analysis highlighted the growing deficit in the engineering workforce required to power the required change.

There is a real need to provide new pathways of training for First Nations people in STEM fields (Department of Prime Minister and Cabinet, July 2020), which is highlighted by the recent release of the Universities Accord (Australian Government Department of Education, February 2024), as well as the UN SDGs 4, 8 and 9 (United Nations Department of Economic and Social Affairs) in upskilling regionally. It has been shown that First Nations students can have lower expectations for themselves in post-secondary or higher education and are more likely than non-First Nations students to rely on their family and friends to provide career advice (Craven et al, 2005). Programs that create pathways for education and training for First Nations Australian therefore have the potential to create returns for both First Nations Australians and their social circles (Junankar & Lui, 1995).

Several programs through the higher education providers in Australia have improved higher education participation for First Nations Australians and demonstrated that adequate support for First Nations students without a secondary education can have successful outcomes (Andersen et al, 2008). A barrier to engagement in those programs has typically been the requirement to either study in an online mode (with known issues in retention and individualised support) or to travel to urban centres away from family and/or work.

This pilot program was co-designed between Fortescue, Curtin University and PKUC to:

1. Enable First Nations workers in industry to obtain formal qualifications and skillsets required to transition into engineering roles or management positions in the energy/resources sector;
2. Build aspirations among the learners and their communities and demonstrate that university education is accessible and achievable;
3. Demonstrate that regional delivery of STEM by a metropolitan university, in collaboration with industry, is a potential mechanism to grow STEM professional pipelines.

The Undergraduate Certificate in Engineering is an alternative entry pathway to the traditional first year entry into engineering courses. The selection of units in this Certificate has been made with special consideration to mode of delivery and the First Nations student cohort. This pilot program is the first of its kind in Australia to provide a strong collaboration between an industry partner, university and regional training hub to delivery an engineering course to First Nations students regionally.

The purpose of this paper is to describe an experiment in regional delivery of a traditional undergraduate laboratory unit to First Nations workers, key learnings and offer sustainable approaches for similar programs. The outcomes and impacts of applying contextualised styles of

teaching, applying modified social constructivism and equitable assessment methods that are appropriate to the specific student cohort of mature-age First Nations workers will be discussed.

Approach

The unit PRRE1003 Resources, Processes & Materials Engineering is one of the four units chosen as part of the Undergraduate Certificate in Engineering for delivery for this collaboration. The unit provides content relevant to *land as the great teacher* (Graham, 2008): circular economy and sustainability in the context of the resources sector focus, adjacent to which the learners work and live. Yarning, allowing for student expression in a respectful manner**,** combined with a social constructivist pedagogy, has intentionally been chosen to move away from a transactional style of teaching.

> *Aboriginal pedagogy is about telling stories, and it's also about being listened to in a respectful way in a safe space, so it allows a different way of learning* (Leroy-Dyer, 2018).

The pilot program is broken into four intensive blocks of teaching, with an online Microsoft Teams Orientation session prior to the start of week 1. PRRE1003 was delivered in a six-week hybrid block mode a shown in Table 1.

Table 1: Structure of PRRE1003 delivery in the 2024 block delivery mode

Week	Mode	Lectures	Workshops	Labs	Group Project
1	O*	Resources x 2 Materials x 2	N/A	N/A	N/A
2	F**	N/A	Report-writing +4	Lab A (hybrid) + Lab B (online)	✓
3	O*	Processes x 3	N/A	Lab A report (formative)	N/A
4	O*	Processes x 3	N/A	Lab A report (formative)	N/A
5	F**	N/A	6	Lab C [met lab Port Hedland] + Lab B individual report	✓
6	O*	Emerging Materials x 1 Emerging Processes x1	N/A	Completion of Lab B report	Completion

***O** – *online delivery of interactive lecture material*
****F** – *face-to-face workshops and labs in Port Hedland*

This unit is traditionally taught in the first-year undergraduate course in Bachelor of Engineering (Hons) at Curtin University and across its global campuses in Malaysia, Singapore, Sri Lanka and Dubai. In the Australian context, it is designed to give students an understanding of the national and global resource industry, ensure students have a good grasp of material properties and bonding, and demonstrate understanding of how materials and energy are integral to understanding processes in a material life cycle in both a linear and circular economy. In the workshops, students problem-solve using worksheets to learn the *material* and *energy* aspects of the content. The labs provide hands on experience and demonstrate lecture content for better understanding, providing an opportunity to practice practical skills.

Student persona

Nine Fortescue First Nations employees were enrolled into the unit, which is the second of the block intensive units in the pilot program. Students did not have any of the prior chemistry knowledge that is typically required for this unit and most did not have the skills or knowledge sets that are expected of a typical student entering a first year engineering university course. The students had not done a university-enabling course to enter into the voluntary pilot program and were interviewed by Fortescue prior to enrolment. Their line managers were also contacted and informed of their requirements to take time off work to study in the block intensive periods; Fortescue is very supportive of the initiative and senior management has played an important role

in enabling this to occur. Outside of the face-to-face weeks in each block, the students were in full-time work in the other weeks with many of them in FIFO roles in the Pilbara.

Pre-learning modules

Basic chemistry knowledge was offered to the students by offering a pre-intensive supplement two weeks before the unit began. This was compiled by the lead instructor using quality available online resources such as Khan Academy, their own notes and a worked examples from different sources. Short duration videos were chosen and keywords or concepts that were essential to understanding the unit were highlighted. Five such modules were created spanning less than 2 hours in total duration of videos (11-24 minutes per module). Microsoft Forms Quizzes were used to collect answers anonymously. These modules were not part of the unit's assessment.

Laboratory skills

The unit comprised of 3 laboratory components in the block: Labs A, B and C. The aim of the labs was to inculcate safety practices, understand the concept of uncertainty by hands-on experimentation, be skilled at writing a technical report, and effect a practical side to the theory that was discussed in lectures and workshops. The laboratory components of this unit were highly modified to be delivered away from the teaching laboratories on the main campus, to take advantage of Fortescue's industrial testing facilities, and to provide immediate contextual relevance to the learners.

The first lab was run in the first face-to-face week in Port Hedland as it was a low-risk activity to create models of crystalline structures and measure parameters to calculate their bulk density. The aim of Lab A was to understand the relationship between structure and properties of crystalline solids. The equipment for the lab (3 Vernier callipers, 40 Styrofoam balls, 3 packets of toothpicks) was flown up with the instructor:

Part of the Lab A was also done using video modules, and a formative assessment was offered to students to writeup a short lab report. The second Lab B was also worked through by watching pre-recorded videos of the experiment and working through the lab worksheets.

The third Lab C was organised by using Fortescue's metallurgical lab, Intertek, onsite in Port Hedland. A safety induction was offered by Intertek prior to students entering the lab and this formed part of the lab assessment profile (2%). The lab results (5%) formed another part of the assessment profile and the Lab C technical report was an individual assessment comprising of 22% of the final mark for the unit.

After induction, each group of students were asked to carry out metallurgical work, under the guidance and supervision of Fortescue's lab technician, to correctly weight their samples using a sensitive balance, prepare a borate flux and mix it with the sample to create fused glass discs for subsequent X-ray fluorescence (XRF) analysis, and prepare a third sample for moisture analysis in a thermogravimetric analyser (TGA). Duplicates were used for each student, who prepared two samples each. The techniques, protocols and quality control measurements were discussed with each group as they were performing the lab work. Students wore full PPE: long pants, long sleeves, hi-vis, safety boots, safety glasses and gloves when required.

Pedagogy

The instructor used social constructivism as a teaching philosophy, which was first proposed by Vygotsky (1978) and emphasises the collaborative learning process which incorporates both peer learning and interactions between instructor and students. It was necessary to understand the *zone of proximal development,* which is the knowledge gap that an instructor can best work with students based on their current knowledge and skillset to achieve the learning outcomes. For example, the lack of mathematical ability was adjusted for in more equitable assessments that did not compromise the achievements of the learning outcomes. This involved using partially filled Excel templates for students to explore concepts without the mathematical skill expected of a direct entry university level engineering student.

The approach to teaching was student-driven and the instructor sought to learn about First Nations ways of learning from the students in a two-way learning process. Icebreakers, yarning (Leroy-Dyer, 2018) and humour were used in a respectful manner, to build trust and rapport. The room space was also optimised to build peer connection and to facilitate an environment in which students could collaborate and make meaning out of the content. The first face-to-face week's teaching occurred in a boardroom style space, whilst the second week's teaching in the same space was optimised by engaging the students to trial a different space and moving around tables and locations to enable better peer discussion.

Feedback to students was delivered in multiple ways. Marks, rubrics and written comments on assessment were formal feedback mechanisms. Informal feedback took place when students asked questions during the weeks in Port Hedland, or online. Informal chats and discussion were avenues in which feedback was delivered. Peer feedback was also important for this cohort of learners.

The instructor received continuous informal feedback on teaching methods during the face to face weeks in Port Hedland, through verbal and non-verbal expression. The agreement with students was clear that questions and comments about their learning journey needed to be expressed in order to provide feedback on the effectiveness of teaching methods. Formal feedback was collected by Curtin University via Insight surveys at the end of the teaching period.

Equitable learning activities and assessment

Due to the nature of the students' full-time work outside of the face-to-face weeks, it was decided that all group work, workshop activities and lab activities should be scheduled in the two face to face intensive weeks in Port Hedland (Table 1).

All lecture material was delivered online via the Blackboard learning management system (LMS) via the creation of 1–2-hour H5P interactive modules (H5P Group, 2024). The H5P interactions in each lecture were designed to assist and engage students in their learning of the content by using self-assessment techniques in a fun, interactive format. Bookmarks were also inserted in each H5P lecture to enable students to skip to another section easily.

For each face-to-face week in Port Hedland, most of the students and the academic instructor were flown in on the Monday morning at approximately 8-9 AM for a 10 AM start. Flights back to Perth were arranged for 4 PM on the Friday. The workshops and group activities were facilitated by the academic instructor at PKUC in a manner that frequent breaks were provided, often accompanying morning or afternoon tea. Fortescue's camp accommodation was utilised for the instructor and students, providing opportunity to interact outside of formal delivery. Resident students in Port Hedland did not stay at the camp.

The first workshop was on technical report writing, with clear and comprehensive written guidelines on formatting and standards expected in a technical report. In order to ensure students could achieve the learning outcomes with some guidance from the instructor, the rubric weightings and assessment criteria were adjusted to account for the students' current level of research skills, critical evaluation and written communication relative to their counterparts in the traditionally taught first year engineering unit.

Universal Design for Learning

In the individual reflection about the students' learning and part of their group project on Engineering a Steel Fork, the instructor applied principles form the Universal Design for Learning (Center for Applied Special Technology, 2024) and allowed for multiple format submissions: either a 1 page of writing or art, OR a 2–3-minute video or audio file.

Feedback on the students' work was provided verbally during the face-to-face intensives in Port Hedland, and also via written comments on their marked work. Turnitin was used for each submission except for the individual reflections on their group project as assurance of academic integrity. Peer assessment weightings were also applied for the group project.

For the online weeks of the block, 2 x 1-hour weekly Microsoft Teams meetings were scheduled with the students and Fortescue's coordinators of the pilot program. The intention was to build relationship between instructor and students and to answer any questions related to the lecture content for the week.

Outcomes

Out of 9 students,1 student withdrew from the unit after the first face-to-face week in Port Hedland, due to prior family commitments.

Pre-learning modules

A maximum of 3 students attempted the Quizzes for the pre-learning modules for chemistry. Although feedback from the students regarding the usefulness and engagement impact of the modules was very positive, written and verbal feedback from the students indicated anxiety related to learning chemistry concepts, particularly as they were delivered online and not explicitly taught. The absence of a traditional instructor may have contributed toward the lack of engagement in these modules. This observation aligns with social constructivist pedagogy in which a more knowledgeable other and peer learning are key pathways to learning (Vygotsky, 1978).

Laboratory skills

Students were very appreciative of the hands-on nature of Lab A, which helped them to visualise concepts and enable better comprehension of lecture content. Despite the workshop on technical report writing, students found it very difficult to write a first one and a formative assessment for feedback only. However, half of the students did not submit, perhaps as it was due in the "online" weeks. The observed stark difference in student engagement between face-to-face weeks and online weeks again may be explained by the lack of proximal support.

Lab C on site at Fortescue's metallurgical lab was well received by students. They reported that it helped them to understand better the operations of Fortescue and provided contextual insight into their own roles at Fortescue. All the students were highly engaged in the lab, and no safety incidents occurred. Feedback from the students were overwhelmingly positive, as it was their first time in a lab and the hands-on nature provided them with an understanding of procedure, standards and experimental precision.

The Lab C report was individual, and a difficult assessment from the students' perspective. The formatting of the report, Figure and Table captioning, technical writing styles, referencing and critical evaluation of results created significant challenge.

Pedagogy

The students' view of the academic instructor as the sole bearer of knowledge was challenged by the introduction of social constructivist pedagogical styles. Student self-efficacy was initially low, and trust in their peers as sources of learning had to be introduced gradually before it gained traction. There was an initial resistance to transforming the room and removing the instructor as the centre of their learning. However, in the second intensive week, after a little encouragement, and better rapport, this was achieved by asking students to move their tables and positioning, creating ad-hoc spaces around which they could choose how to congregate and discuss. Discussions then progressed better and were more productive than in the first week.

The initial use of an icebreaker was successful in helping students to feel seen and heard. It gave them a voice before being 'taught' and allowed them to curate what they wanted everyone to know about them, in response to "Tell me your name, which area of Fortescue you work in, and pick something you would like others here to know about you".

Throughout the face-to-face weeks, yarning was used as a way to build relationship, trust and rapport. Short swapped stories between instructor and students enabled a better understanding of who they were, why they learnt the way they preferred to, and how to build their self-efficacy

throughout the intensive. The Microsoft Teams weekly meetings were mainly attended by students for yarning, and not for discussion of much content. The instructor's willingness to let go of preconceived ways of teaching and learn how to meet the students where they were at, was well received.

A very positive outcome of the intensive weeks was that the instructor learnt more holistic ways of teaching First Nations students that are not transactional but rather took into account the connection between students' cultural background and connection to country and its association to learning. The instructor did not explicitly acknowledge country either, preferring instead to authentically share their journey with the students and demonstrate the acknowledgement instead by listening respectfully, with curiosity and care, about how each student learnt best (Bishop, 2023). Student feedback on delivery of the unit was extremely good from most of the cohort, but some feedback was non-committal (cannot judge, or neither agree nor disagree), indicating a deeper need for individual rapport within the cohort, and being clear about what questions were being asked.

Traditional social constructivism relies on peer learning and the facilitation of a "more knowledgeable other" to help construct learning in the gap that exists in which students can achieve a set of outcomes with some assistance. It was observed that as student self-efficacy grew, with strong feedback loops with the instructor, collaborative learning also improved.

Equitable learning activities and assessment

Using templated Excel sheets enabled the focus to remain on the learning outcomes of the unit rather than the hurdles presented to students mathematically. However, careful curation was necessary to ensure that the skillset adjustment did not lead to content adjustment or reduced impacts in assessment.

It is important to note that rubrics should reflect an achievable set of expected learning, rather than ones that are impossible to achieve from a given student cohort. Students were very interested in the feedback given via comments on marked work and made sure to question where they lost marks. Therefore, *the potential* to achieve the highest marks in a rubric should align with student ability and background, leading to better self-awareness for students and enhanced self-efficacy. This reinforces the need for the instructor to operate in the *zone of proximal development*, which is central to the theory of constructed learning (Page, S, 2014).

Universal Design for Learning

This assessment style was well received and there was appreciation by students that the instructor recognised that they were unique individuals and gave them an opportunity for choice in their expression. They submitted an audio file, a piece of original artwork, a hybrid art/text document and some text-only documents in response to the rubric.

An authentic expression of students' learning was demonstrated using this style of assessment as it allowed for individual preference. Many students connected their learning to their cultural history, the land and their spiritual values, despite these not being explicit learning outcomes.

The use of H5P was interactive and useful but created barriers to being able to watch lectures offline. To FIFO workers, this could be highly significant as they are often time poor and need to use time in airport lounges and planes to catch up on work. Downloadable versions of the lecture material were provided to offset any potential disadvantage.

Group work

Good group work remains a taught skill, as with non-First Nations student cohorts. However, there were no complaints, major issues or difficulties that were raised with the instructor. Students were honest about their peer assessment of other student contributions, and even rated themselves lower than peers in some sections.

Overall outcomes

Student performance was very good when equitable adjustments were made to the unit to accommodate their needs and levels of prior skills. The distribution of marks was generally within a 15% range, with a single high outlier. All students passed and met the unit learning outcomes.

The significance of these outcomes is that it demonstrates engagement and ability of the First Nations student cohort, given optimised conditions for their learning. Enhanced confidence in their own ability is crucial for continued learning, and demonstrates a pathway for progression to themselves, their families and friends and employer. Students reported on their conversations with family and colleagues about the unit, and how it has changed their way of thinking about many things. This has a flow-on impact into their communities and assists in bridging the gap between western and First Nations education systems.

Discussion about employment and education opportunities is ongoing, as part of the entire pilot program. However, it is clear that the unit alone has been impactful and no doubt the completion of the pilot program and subsequent award will open up new opportunities both within and external to Fortescue, in education and employment for these students.

Conclusions

Remote delivery of a partially online unit in an intensive mode has provided successful and impactful learning for the First Nations cohort of students in this unit. Unit learning outcomes have been met, by adjusting for the cohort skillset in the delivery mode, pedagogy and assessment rubrics.

Flexibility in format of content was important, and training for students to be able to navigate online systems and digital technology can be important to remove barriers to learning. In particular, the ability to download content and watch it in airports and on planes was important for busy FIFO workers who are time poor.

The UDL principle of allowing for multiple assessment formats has also proved to be a positive impact on students. Unique and impactful assessments were submitted that demonstrated student learning and their connection to land, culture and spiritual beliefs.

A laboratory unit with associated learning outcomes has been delivered remotely, by using hands-on activities, online materials and curating a bespoke lab in context of the students' employment and experiences. Positive feedback from students provide evidence for their learning. However, technical report writing, and critical evaluation of experimental work remains a challenge due to lack of training or experience in their educational backgrounds.

Modified social constructivism to include a *gradual* introduction to peer learning activities and remove the instructor as the centre of their learning was a successful pedagogy to employ with First Nations cohorts. Holistic, rather than transactional, ways of teaching and rapport between student and instructor provided a good framework for learning.

Recommendations

Future programs or iterations of this program will need to further adapt to the unique needs of the student cohort regarding educational background, skillsets, group interactions and experience. There is a need to grow the reach and impact of this, and similar programs. That expansion will require careful planning and industry engagement, cohort consideration, and deep community consultation to ensure ongoing success.

An intensive mode of teaching may provide logistical solutions to teaching regional full-time workers, but may pose real educational obstacles to learning, such as time to learn concepts, practice, fail and re-learn. Consider alternatives, such as in-semester teaching in a partially online format.

Consider providing a bridging course tailored towards First Nations students, to prepare them in skill and content for first year university learning, but also to prepare staff pedagogically for First

Nations teaching. Consider the aspect of student rapport with teaching staff from a holistic perspective, and design learning activities and extracurricular activities to build this before the onset of teaching.

Tiem for instructor-student informal interactions can play a major role in student perceptions and success. Structured meetings with designated tutors may also provide better learning outcomes and opportunities for students studying regionally or online.

References

Andersen, C., Bunda, T. and Walter, M. (2008). Indigenous higher education: the role of universities in releasing the potential. *The Australian Journal of Indigenous Education. 37*, 1-8.

Bishop, M (2023). Humility. Listen. Respect: Three Indigenous values underpinning Indigenous (environmental) education sovereignty. *Progress in Environmental Geography. 2*(3), 191-201.

Center for Applied Special Technology. (2024). About Universal Design for Learning. *CAST*. Retrieved July 31, 2024, from https://www.cast.org/impact/universal-design-for-learning-udl

Craven, R. G., Tucker, A., Munns, G., Hinkley, J., Marsh, H. W., Simpson, K. (2005). Indigenous students' aspirations: Dreams, perceptions and realities. Canberra: *Department of Education, Science and Training, Commonwealth of Australia*.

Department of Education. (2024, February). *Australian Universities Accord Final Report Document.* Retrieved July 31, 2024, from https://www.closingthegap.gov.au/sites/default/files/2022-09/ctg-national-agreement_apr-21-comm-infra-targets-updated-24-august-2022_0.pdf

Department of Prime Minister and Cabinet (2020, July). *National Agreement on Closing the Gap*. Retrieved July 31, 2024, from https://www.closingthegap.gov.au/sites/default/files/2022-09/ctg-national-agreement_apr-21-comm-infra-targets-updated-24-august-2022_0.pdf

Graham, M. (2008). Some thoughts about the philosophical underpinnings of Aboriginal worldviews. *Australian Humanities Review 45*(45), 181–94.

H5P Group. (2024). Interactive Video. Retrieved October 8, 2024, from https://h5p.org/interactive-video

Jobs and Skills Australia (2023, October). *The Clean Energy Generation.* Retrieved July 31, 2024, from https://www.jobsandskills.gov.au/publications/the-clean-energy-generation

Junankar, P. N., & Lui, J. (1995). Estimating the social rate of return to education for Indigenous Australians (CAEPR Discussion Paper No. 276) *Australian National University*.

Leroy-Dyer, S. (2018). Aboriginal pedagogies and approaches in Australia: Centring and decolonising our approaches. *International Studies in Widening Participation*, *5*(2), 4-9.

Page, S. (2014). Exploring new conceptualisations of old problems: researching and reorienting teaching in indigenous studies to transform student learning. *The Australasian Journal of Indigenous Education*, *43*(1), 21-30.

United Nations Department of Economic and Social Affairs. *Sustainable Development Goals.* Retrieved July 31, 2024, from https://sdgs.un.org/goals

Vygotsky, L. (1978) *Mind in Society*. London: Harvard University Press.

Acknowledgements

The authors acknowledge the staff at Pilbara Kimberley Universities Centre for ongoing partnership in supporting regional students in the Pilbara. Special thanks to Linda Adyana (Curtin) for her role in fostering the partnership between Fortescue and Curtin. Thanks also go to Marc Stoitis (Curtin) for excellent student support, and Nicky Cordin (Fortescue) and Amy Cameron (Curtin) for the extensive planning and coordination around this pilot program.

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