

Perceptions of literacy and numeracy support from engineering apprentices

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Research provocation

- 1. Literacy concerns:** Work-ready literacy and numeracy skills has been flagged by industry (Bernards, 2014; Griffin, 2020; Macklin, 2020). Joyce (2019) stressed “there remains an urgent need to address the language, literacy and numeracy needs of the Australian workforce” (Joyce, 2019, p.103).
- 2. Industry workforce concerns:** Projected shortages in skilled workforces, training in skill-sets, pathways to employment that support a diversity of students (Griffin, 2020; Mackenzie, 2020; Yasukawa et al., 2020).
- 3. Community:** Literacy and numeracy skills are crucial for active and responsible citizenship, social capital, and ultimately self-esteem and self-efficacy (Yasukawa et al.,2020; Mayer, 2016).
- 4. Workforce demands:** Employees need to transfer key skills in a dynamic literacy and numeracy environment (Deloitte Access Economics, 2014 & 2016; Griffin, 2020; Macklin, 2020).
- 5. Current provision concerns:** Literacy practices are invisible or hidden (Mayer, 2016 and Edwards et al., 2013). Literacy and numeracy skills development needs to be fit for purpose, contextualised and relevant to the students’ immediate educational needs (Balatti et al, 2006; Black & Bee, 2018; McHugh, 2011; Rose, 2012).
- 6. Apprenticeship retention:** “inflexible delivery options, poor feedback ... and literacy and numeracy difficulties” (Bernarz, 2014, p. 5).

Research aims

How engineering apprentices acquire and navigate literacy and numeracy skills from the students' perspective

Demands, strategies, challenges, and effective supports

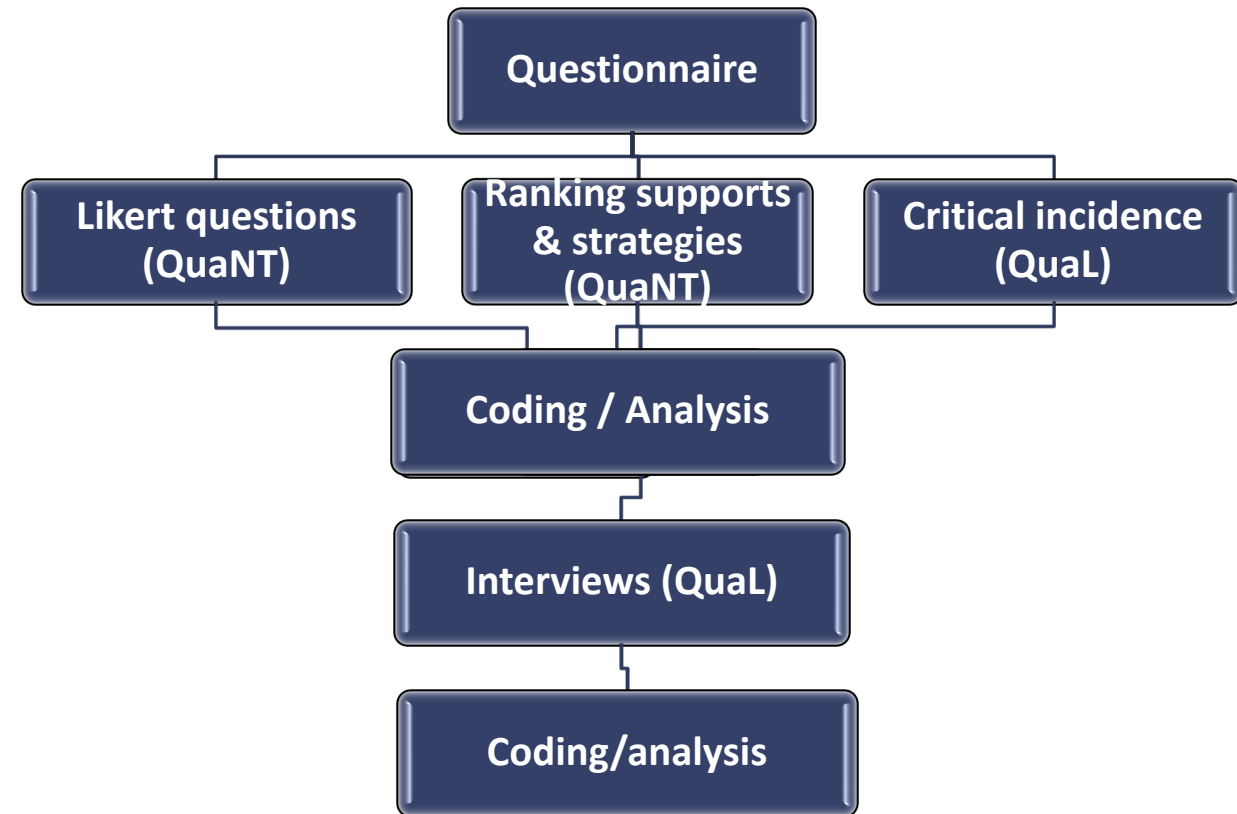
- ability levels in reading, writing and numeracy
- learning strategies employed
- literacy and numeracy support they found most helpful
- possible supports that could help

Participants and methods

Engineering apprentices
(18+) (1st – 3rd year)

Mixed methods;

- Questionnaires (56)
- Critical incidences (17)
- Interviews (9)



Initial survey findings

The most widely utilised supports (88% and over) were:

- Ask the teacher (referring to the trade teacher/trainer);
- Have the teacher show me how to do it;
- Ask a teacher alternative ways to solve the problem; and
- Try a few times to figure it out myself, then ask the teacher.

The least utilised supports were:

- Have the LNS teacher show me how to do it (43%);
- Ask the LNS teacher (45%).

Subsequent interview findings

1. Skills as stable and fixed (continuation)
2. Confident in meeting literacy and numeracy demands (contradictions emerged)
3. Many struggled to explain learning strategies
4. Similar dependent learning strategies (continuation)
 - navigation of coursework, and disciplinary jargon
5. LNS teachers as helpful for 'others'
6. Clear distinction between the roles of the trade teachers and the LNS staff

Dependant strategies

Finding the answer and dependence on the teacher –
lack of curiosity

- Remy: “...everything’s in the book so as soon as you read over it ... if you don’t understand it, just keep reading over it and eventually you’ll get it”
- Logan: “[s]ometimes you’ve got big words and you don’t know what it means [sic] ... first identify the words, okay I really don’t know what that means, okay let’s go ask the teacher.”



Disciplinary language/workbooks



Challenging / reading demands

- Jean: “...there was a lot of big words that I did not know about...the books could be simpler”
- Hank: “there’s heaps of writing for no apparent reason.”
- Scott: “reduce some of the books. I reckon you could almost get rid of 50 percent of what we do.”

Fixed ability vs learning strategies

Many students were fixed in their mindset – not in a learning capacity

- Ray: “Well I’m more of a mathematical type of person so I find math a little bit more easy than like literacy so...”
- Scott: “I know most of my own strengths and weaknesses (VN) umm and one of my biggest weaknesses is numeracy, always has been, always will be... ‘it’s no fault to [the school] it’s solely on me, I just won’t learn it.’ ”



Motivation and interest to learn



- Logan: “some students, if they don’t understand it, they just kind of throw in the towel.”
- Remy: “You can only do so much. Everyone’s trying to help people that don’t want to be helped... There’s not much you can really do.”

LN Support teacher

Good that they're there but I don't use them - contradiction

- Jean: "Is that the guy that comes around?"
- Bobby: "...well I don't really know what he was there for. I thought he was like an aid for someone"
- Kurt: "I just don't feel comfortable having a one-on-one person there. It's sort of like singling you out a bit. It shows you they've got a problem (sic)"



Feedback on what would help

Weren't sure – couldn't really suggest changes

- More interaction, more clips, different formats, listen to the talk
- How do we specifically help students?
 - Logan “ I understand your question but I don't know the answer!”
 - Jean: “Umm usually they're too strong headed ... umm I don't know”
 - Bobby: “I'm not quite sure in all honesty”

Recommendations

1. **Workbooks:** More inclusive and engaging format to workbooks to align education and workplace requirements (Cooper & Baynham, 2005; Caruso et al., 2016).
2. **LNS support:** Greater access, unremarkable delivery, and teacher-student talk and interactions at the time of learning (Bates 2004, Griffin, 2020).
3. **Vocational literacies:** Learning discourse alongside industry and discipline knowledge. Learning strategies, specialised language, and professional competencies that avoid learner deficit discourses (McLaughlin & Parkinson, 2018).
4. **Learning strategies:** Greater focus on how apprentices' approach and solve work related problems to develop a bank of transferable strategies that support transition into the workplace, reinforce the learning process, and minimise the desire to simply find the answer (Griffin, 2020).
5. **Industry engagement:** Remove separation between literacy, numeracy, and vocational skills creating authentic workplace literacy and numeracy expectations with increased engagement and input from industry (Griffin, 2020; Jones, 2018; Macklin, 2020).
6. **Teaching and learning culture (staff):** A culture of learning and learning relationships led by the trades teachers/trainers (Medlin, 2016). Providing professional development opportunities to equip them with pedagogies and explicit learning vocabulary and practices that may be shared with their students (Guthrie & Jones, 2018; Macklin, 2020; Smith & Yasukawa, 2017)

References (1 of 2)

Balatti, J., Black, S. & Falk, I. (2006). *Reframing adult literacy and numeracy course outcomes: A social capital perspective - support document*. National Centre for Vocational Education Research. https://www.ncver.edu.au/__data/assets/file/0016/5254/nr4l05s.pdf

Bates, S. (2004). A model for pedagogical change: The course in applied vocational study skills. *Fine Print*, 27(1), 3-7.

Bednarz, A. (2014). *Understanding the non-completion of apprentices*. National Centre for Vocational Education Research, Adelaide. https://www.ncver.edu.au/__data/assets/file/0016/9520/understanding-noncompletion-2706.pdf

Black, S. & Bee, B. (2018) Adult literacy and liberal-progressive pedagogy: Australian contexts. *Research in Post-Compulsory Education*, 23(2), 181-201. <https://doi.org/10.1080/13596748.2018.1444379>

Caruso, V., Cattaneo, A. & Gurtner, J. L. (2016). Learning documentations in VET systems: An analysis of current Swiss practices. *Vocations and Learning*, 9(2), 227-256. <https://doi.org/10.1007/s12186-016-9149-4>

Cooper, B. & Baynham, M. (2005). *Rites of passage: Embedding meaningful language, literacy and numeracy skills in skilled trades courses through significant and transforming relationships*. National Research and Development Centre for Adult Literacy and Numeracy, London.

Deloitte Access Economics (2014). *Australia's STEM workforce: A survey of employers*. Canberra, ACT: Office of the Chief Scientist. <https://www2.deloitte.com/content/dam/Deloitte/au/Documents/Economics/deloitte-au-economics-australia-stem-workforce-report-010515.pdf>

Deloitte Access Economics (2016). *The future of work: How can we adapt to survive and thrive?* VOCEDplus: National Centre for Vocational Education Research, Adelaide. <https://www2.deloitte.com/au/en/pages/economics/articles/future-inc-series-caanz.html> Edwards et al., (2013).

Griffin, T. (2020). *Workforce-ready: Challenges and opportunities for VET*. National Vocational Education and Training Research Conference. National Centre for Vocational Education Research. https://www.ncver.edu.au/__data/assets/pdf_file/0030/9661008/WorkforceReady_2020-NO-FRILLS_Discussion-Paper.pdf

Guthrie, H. & Jones, A. (2018). *How can VET teacher education and development be improved?* L H Martin Institute, University of Melbourne. https://melbournecshe.unimelb.edu.au/__data/assets/pdf_file/0009/2854287/VET-teachingpaper_Guthrie_Jones.pdf

References (2 of 2)

- Jones, A. (2018). *Vocational education for the twenty first century*. Melbourne: L H Martin Institute, University of Melbourne. https://melbournecshe.unimelb.edu.au/__data/assets/pdf_file/0011/2845775/Final-Anne-Jones-paper1.pdf
- Joyce, S. (2019). *Strengthening skills: Expert review of Australia's vocational education and training system* [Joyce Review]. Department of the Prime Minister and Cabinet, Canberra. https://pmc.gov.au/sites/default/files/publications/strengthening-skills-independentreview-australia-vets_1.pdf
- Mackenzie, B. (2020). *Skills for Victoria's growing economy. Submission Part 2: Lifelong learning*. Mackenzie Research Institute. <https://holmesglen.edu.au/Holmesglen/media/PDFs/Part-2-Skills-for-Victoria-sGrowing-Economy.pdf>
- Macklin, J. (2020). *Skills for Victoria's growing economy. Issues paper*, March 2020. Department of Education. https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.vicengage.files/2215/8621/6823/Issues_Paper_Skills_for_Victorias_Growing_Economy_accessible.pdf
- Mayer, D. (2016). *Exploring perspectives on adult language, literacy and numeracy*. Adelaide: National Centre for Vocational Education Research. https://www.ncver.edu.au/__data/assets/pdf_file/0015/83121/Exploringperspectives-on-ALLN.pdf
- McHugh, M. (2011). Crossing the academic-vocational divide. *Victorian Adult Literacy and Basic Education Council*, 34(1), 12-16. https://www.valbec.org.au/fineprint/archive/2011/fp_2011-01.pdf McLaughlin & Parkinson, (2018).
- Medlin, J. (2016) *The Australian literacy and numeracy workforce: A literature review*. Adelaide: National Centre for Vocational Education Research. https://www.ncver.edu.au/__data/assets/pdf_file/0023/83570/TheAustralian-literacy-and-numeracy-workforce.pdf
- Rose, 2012
- Smith, E. & Yasukawa, K. (2017) What makes a good VET teacher? Views of Australian VET teachers and students. *International Journal of Training Research*, 15(1), 23-40. <https://doi.org/10.1080/14480220.2017.1355301>
- Yasukawa, K., Lo Bianco, J., Osmond, P. & Iles, V. (2020). *Weaving a richer narrative of adult literacy and numeracy: Policy position proposal for ACAL*. [Australian Council for Adult Literacy]. VCEplus. <http://hdl.voced.edu.au/10707/556736>