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Data Literacy for Student Outcomes

Supporting principals and teachers to use data for evidence-informed decision-making

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Research Brief

What is the problem?

- Evidence shows that high performing principals are characterised by their strong focus on using data at every level of decision-making in relation to student learning and school effectiveness (Stiggins & Duke, 2008).

- Principals' leadership in data literacy influences teachers' ability to use data to make critical decisions in their classrooms (Stump, Zlatkin-Troitschanskaia, & Mater, 2016).

- Australian schools are increasingly expected to use data for planning at school and classroom levels. Australian governments have invested resources aimed at making relevant data accessible to school leaders and teachers, but student outcomes have not improved.

- Although teachers' data use has been a major focus in educational initiatives, there has been little evidence of the effective use of data in schools.

- The situation is exacerbated by lack of clarity about what is meant by data literacy.

- Research suggests that data literacy among principals and teachers may contribute to enhanced outcomes in learning, teaching, and leading.

How do we define data literacy?

There have been competing conceptualisations of data literacy and with the data that best support evidence-informed decisions at the classroom, school and systems levels, but our research uses a broader definition.

Data literacy encompasses principals' and teachers' contextualised knowledge, skills, confidence, and efficacy in gathering, prioritising, analysing, integrating, and evaluating relevant data to inform decisions about teaching and student learning in order to improve student outcomes.

In our project, we consider typical data in the school to include:

- Student achievement (from qualitative teacher records to high-stake tests)

- Socio-demographic and contextual information about schools, teachers and students

- Non-cognitive characteristics of students, teachers and school leaders

Project aims

Our research project has four specific aims:

1. Define data literacy, using both theoretical and empirical approaches, within the specific context of schools.

2. Develop a framework for teachers and school leaders that defines the knowledge, skills, and dispositions required for different school contexts.

3. Develop a set of valid and reliable assessment tools to measure the data literacy of teachers and school leaders.

4. Make recommendations about ways to improve data literacy among Australian teaching professions

Our project establishes the basis upon which the findings, including the tool and PD framework(s), can be adapted for use to enhance the data literacy of system personnel and students.

We are also exploring the extent and ways in which data literacy is generic and subject specific by considering different key learning areas and contextual factors in addition to more general data types. Our work will pursue the development of specific scales for key learning areas that could be included in the tool. There is also scope for future evaluations of the impacts on principals' and teachers' practices of using the tool, and the consequential validity of the tool for improved student outcomes.

What are we doing about it?

- We have conducted a systematic literature review to identify definitions, dimensions, and conceptualisations of principals' and teachers' data literacy.

- We will develop a theoretical framework of data literacy for principals and teachers in Australian primary and secondary schools.

- Based on the framework we will develop a set of tools to measure the data literacy skills and knowledge of principals and teachers.

- These tools will also be able to inform interventions to enhance principal and teacher data literacy.

What we found thus far?

- Types of knowledge, skills, and dimensions requiring data literacy are not well defined in the theoretical or empirical research.

- Currently, there are no valid and reliable data literacy tool that can be used for assessing and monitoring data literacy of teachers and school leaders.

- Effective learning and teaching is dependent upon a school culture with a focus on building principal and teacher data literacy, assessment literacy and decision-making. These interrelated constructs are critical for ensuring that relevant data generated, interpreted, and effectively used to inform decisions that support learning and teaching.

Data Literacy, Assessment Literacy and Decision-making

We conceptualise data literacy within a broader pedagogical model and school effectiveness. We developed an integrated pedagogical model of data literacy, assessment literacy, and decision-making for effective learning and teaching (Figure 1).

Figure 1 An integrated pedagogical model of data literacy, assessment literacy, and decision-making for effective learning and teaching

The Bottom Line

- Research on principals' and teachers' data literacy built upon a comprehensive theoretical framework is in its infancy.

- There is an urgent need for a theoretically grounded data literacy framework for principals and teachers that can inform its development.

Future Directions

- Co-design professional learning modules, with principals and teachers, to enhance data literacy (i.e., practical guides learning support materials, documents, observation and reflection tools and tasks).

- Propose an empirically-driven data literacy framework that defines the knowledge and skills required for a data literate principal/ teacher across school contexts and according to individual characteristics.

- Make system-level policy recommendations to support and improve data literacy for teachers and school leaders in Australia.

About the Authors

Kim Beswick

Kim Beswick has taught courses in quantitative literacy and developed and trialled PL on data literacy as part of the Australian Government funded Principals as STEM Leaders project. She has received ~$13M in competitive research funding for projects including many that have been large scale, national, multidisciplinary, and focussed on the knowledge of teachers of mathematics and how PL can ultimately enhance student outcomes.

Dennis Alonzo

Dennis Alonzo has an extensive track record in establishing the dimensions of various constructs. He has developed the teacher assessment for learning literacy tool, findings from which were used to develop the empirically-driven framework for defining and describing teacher assessment for learning literacy. The tool supports teachers to build strong assessment literacy and has been contextualised for EAL/D teachers and for higher education. As an ECR, he has been involved in many national and international research projects totally ~$2.5M.

Jihyun Lee

Jihyun Lee is Professor of Educational Assessment with specialisation in international and national large-scale assessment (e.g., PISA and NAPLAN), non-cognitive assessment, and survey design. She has thus far produced 85 publications and served on several prestigious international and national committees. Her recent and ongoing contributions include the development of PISA 2022 Questionnaire for the OECD and Global Crises Module survey for the OECD. She also served on the Standard Setting Advisory Group (SSAG) for the AITSL for Teacher Performance Assessment (TPA). She teaches research methods, survey design, educational assessment, and quantitative data analysis in the School of Education.

For more information

Requests for further information and/or media enquiries can be directed to the contact author for the Research Brief.

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