Australian Government
Australian Research Council

EI 2018 ENGAGEMENT AND IMPACT

Engagement and Impact 2018

The University of Western Australia

UWA13 (SS) - Impact

Overview

Title

(Title of the impact study)

Shaping National and International Educational Measurement Approaches and Practices

Unit of Assessment

13 - Education

Additional FoR codes

(Identify up to two additional two-digit FoRs that relate to the overall content of the impact study.)

Socio-Economic Objective (SEO) Codes

(Choose from the list of two-digit SEO codes that are relevant to the impact study.)

93 - Education and Training
89 - Information and Communication Services
97 - Expanding Knowledge

Australian and New Zealand Standard Industrial Classification (ANZSIC) Codes

(Choose from the list of two-digit ANZSIC codes that are relevant to the impact study.)

59 - Internet Service Providers, Web Search Portals and Data Processing Services
70 - Computer System Design and Related Services
80 - Preschool and School Education
82 - Adult, Community and Other Education

Keywords

(List up to 10 keywords related to the impact described in Part A.)

Assessment

Measurement

Online Assessment

Reporting; Standards

Item Response Theory

Rasch Measurement Models

online

teacher

National Assessment Programme Literacy & Numeracy

Western Australian Certificate of Education

Sensitivities

Commercially sensitive

No

Culturally sensitive

No

Sensitivities description

(Please describe any sensitivities in relation to the impact study that need to be considered, including any particular instructions for ARC staff or assessors, or for the impact study to be made publicly available after EI 2018.)

Aboriginal and Torres Strait Islander research flag

(Is this impact study associated with Aboriginal and Torres Strait Islander content?
NOTE - institutions may identify impact studies where the impact, associated research and/or approach to impact relates to Aboriginal and Torres Strait Islander peoples, nations, communities, language, place, culture and knowledges and/or is undertaken with Aboriginal and Torres Strait Islander peoples, nations, and/or communities.)

No

Science and Research Priorities

(Does this impact study fall within one or more of the Science and Research Priorities?)

No

Impact

Summary of the impact

(Briefly describe the specific impact in simple, clear English. This will enable the general community to understand the impact of the research.)

UWA researchers have developed an innovative assessment method to enable schools to streamline school assessment processes across the nation. Brightpath is an online tool in which samples of students work can be compared with exemplars and used provide standardised feedback in order to positive affect educational outcomes.
Brightpath has been adopted by approximately 500 schools and used for 300,000 assessments of Australian students. In addition, the researchers have impacted Australian education communities through critical involvement with: (i) the National Assessment Programme—Literacy and Numeracy (NAPLAN) involving over 1 million student participants per year; and (ii) the high-stakes Western Australian Certificate of Education (WACE) affecting 26,000 high school students each year.

Beneficiaries

(List up to 10 beneficiaries related to the impact study)

Primary and Secondary School Students and communities

Primary and Secondary School Teachers and Leaders

School Curriculum and Standards Authority (SCASA)

Western Australian Department of Education (WADOE)

South Australian Department of Education and Child Development (DECD SA)

Australian Curriculum Assessment and Reporting Authority (ACARA)

Association of Independent Schools of Western Australia (AISWA)

Catholic Education Western Australia (CEOWA)

Western Australian Primary Principals' Association (WAPPA)

Countries in which the impact occurred

(Search the list of countries and add as many as relate to the location of the impact)

Details of the impact

(Provide a narrative that clearly outlines the research impact. The narrative should explain the relationship between the associated research and the impact. It should also identify the contribution the research has made beyond academia, including:
- who or what has benefitted from the results of the research (this should identify relevant research end-users, or beneficiaries from industry, the community, government, wider public etc.)
- the nature or type of impact and how the research made a social, economic, cultural, and/or environmental impact
- the extent of the impact (with specific references to appropriate evidence, such as cost-benefit-analysis, quantity of those affected, reported benefits etc.)
- the dates and time period in which the impact occurred.

NOTE - the narrative must describe only impact that has occurred within the reference period, and must not make aspirational claims.)

IMPACT 1: COMMERCIALISATION OF THE BRIGHTPATH SYSTEM
In 2014 the company Pairwise was established to develop a new online assessment method that could be used to streamline school assessment processes with the aim of commercialising the program. UWA licensed IP was used to develop the method and create research software for scale development (Pairwise web-application). NATURE OF IMPACT: The Brightpath application enables diagnostic assessment, measurement, and reporting in Writing (Information Reports, Essays, Narratives), Oral Language, and Science Investigations. Brightpath scales are also being developed in areas not amenable to large-scale testing, such as Visual Art and Critical Thinking. Brightpath provides information to track student learning over extended periods (i.e. longitudinally). Brightpath enables schools to meet key deficiencies of most assessment processes highlighted in the recent Gonski report "Review to Achieve Educational Excellence in Australian Schools".

BENEFICIARIES, END-USERS AND EXTENT: At a classroom level, teachers use software to compare the performance of their students with other classes. At a school level, comparisons are made with all schools using the system. A large number of teachers use the system to produce end-of-semester reports for their students to complement other school-based assessments, in the same fashion that NAPLAN reports are used.

In 2016, approximately 400 schools across Australia were using Brightpath to assess and measure student performance and to produce reports, including school-level reports and individual student reports. Between 2015 and 2016, the number of assessments being made by teachers within the system increased by approximately fourfold. The usage of the system has occurred through collaboration with two main industry partners, the School Curriculum and Standards Authority (SCSA) and Department of Education and Child Development (DECD).

TRANSLATION OF RESEARCH: The translation of research outcomes into an accessible form is central to the design of the Brightpath. Once exemplars have been scaled using pairwise comparisons, empirically derived descriptions of the performances are produced by content experts. These are written in a form that is accessible to and interpretable by classroom teachers to enable them to act on the information when teaching students. Exemplars are displayed visually within the application on a scale that is derived from psychometric analysis of the pairwise comparison data. This makes the technical information from scaling using the Bradley-Terry-Luce model (logit scale) simple for teachers to engage with. Displays are used by school leaders and systems/agencies such as SCSA and DECD. An excerpt from an interview with a School Principal follows:
"Why? Because I was dealing with NAPLAN data that was sterile, not in real time, and wasn't owned by my staff … So I saw Brightpath. Brightpath had two answers for me. The two answers were this particular program is going to be owned by my staff. Why? Because the staff were going to generate samples of work from the students. They were going to then take those samples and compare it with a set of exemplars. They were then going to place these assessments on a teacher ruler. That would give them some data that they owned and could then work with, so that we generated a narrative for our school which was saying: Okay, these children are over here, you need to move them there. This is why they achieved that particular grade, and this is what you need to do to move them on." --Lynda Fisher, Principal Carmel School.

IMPACT 2: IMPACT ON STANDARDISED TESTING AND EDUCATION STANDARDS
Professor Andrich and Dr Humphry have had a substantial impact through research and applied work on the National Assessment Programme-Literacy and Numeracy (NAPLAN) and the WA Online Literacy and Numeracy Assessment (OLNA) programme. Professor Andrich is a long-standing member of the Measurement Advisory

Group for NAPLAN, which makes recommendations to the Australian Curriculum, Assessment and Reporting Authority (ACARA) about educational measurement directions and immediate decisions. Professor Andrich has been integrally involved in advising and conducting work on approaches to scaling, testing and dealing with misfit to psychometric models, and standard-setting procedures, among others.

NATURE OF SOCIAL IMPACT: Between 2011 and 2016, Dr Humphry led the Central Analysis of Data project for the NAPLAN programme (approx. $300K per annum). During this project, common NAPLAN scales were formed for the five assessment areas, vertically aligned across year levels and longitudinally aligned over time. Between 2012 and 2015, Dr Humphry also collaborated with SCSA to set up the standard-setting procedures that produced the minimal standards for OLNA and the scale equating designs to make sure students are assessed relative to the same standard over time. Each year in March and September, SCSA employs the Pairwise comparison application developed by Dr. Humphry at UWA to ensure the new Writing scale for OLNA is aligned with the original scale so that students are accurately assessed against the original standard.

EXTENT: On NAPLAN scales, results for over 1 million students are reported to systems, schools, teachers, students and parents and are intrinsic to the Department of Education's objective in conducting NAPLAN: establishing minimum standards in education and identify progress of students at key stages of their educational development. On OLNA scales, to graduate from high school approximately 26,000 year 12 students in WA must now, in addition to other criteria, pass the standards set using the method designed by Humphry. Percentages of students meeting the standards are reported in the publicly available SCSA document Year 12 Student Achievement Data 2017 (School Curriculum and Standards Authority, Year 12 Student Achievement Data 2017, available online).

Associated research

(Briefly describe the research that led to the impact presented for the UoA. The research must meet the definition of research in Section 1.9 of the EI 2018 Submission Guidelines. The description should include details of:
- what was researched
- when the research occurred
- who conducted the research and what is the association with the institution)

Drs Humphry and Heldsinger conducted seminal research that identified deficiencies associated with standard grid-like rubric structures in research that strongly determined the NAPLAN Writing marking guide used since the program's inception. They subsequently led the development of the innovative two-stage assessment method that forms the basis for the Brightpath web application. Professor Andrich and Dr Humphry have jointly published on standard-setting procedures. Dr Humphry's research has spanned from 2002 to the present and has largely been conducted within the Pearson Psychometric Laboratory (PPL) at the Graduate School of Education. The work of Professor Andrich and other researchers within the PPL substantially influenced efforts to develop and implement large-scale testing systems across Australia. Dr Humphry and Professor Andrich have directed funding toward building and maintaining a team of researchers over an extended period of time. Appointments of several staff have been made to support the work, including those of Dr Ida Marais (2007 to present), Dr Joshua McGrane (2010 to 2015), Ken Bredemeyer (PhD candidate-2015 to present), Sonia Sappl (2017 to present), and Dr Sandy Heldsinger (between 2008 and 2014 - prior to commercialisation of Brightpath). This team also works with a broader team of researchers and practitioners locally and internationally.

FoR of associated research

(Up to three two-digit FoRs that best describe the associated research)

13 - Education
08 - Information and Computing Sciences

References (up to 10 references, 350 characters per reference)

(This section should include a list of up to 10 of the most relevant research outputs associated with the impact)

Andrich, D., Marais, I., Humphry, S. (2016). Controlling Guessing Bias in the Dichotomous Rasch Model Applied to a Large-Scale, Vertically Scaled Testing Program. Educational and Psychological Measurement, 76(3), 412-435.

Andrich, D. (2015). The Problem with the Step Metaphor for Polytomous Models for Ordinal Assessments. Educational Measurement-Issues and Practice, 34(2), 8-14.

Andrich, D. (2012). An expanded derivation of the threshold structure of the polytomous Rasch rating model which dispels any “threshold disorder controversy”. Educational and Psychological Measurement.

Andrich, D., Marais, I. & Humphry, S. (2012). Using a theorem by Andersen and the dichotomous Rasch model to assess the presence of random guessing in multiple choice items. Journal of Educational and Behavioral Statistics, 37 (9), 417 - 442.

Heldsinger, S. & Humphry, S. M. (2013). Using calibrated exemplars in the teacher-assessment of writing: an empirical study. Education Research, 55(3), 219-235.

Heldsinger, S. & Humphry, S. M. (2010). Using the Method of Pairwise Comparison to Obtain Reliable Teacher Assessments. Australian Educational Researcher, 37(2), 1-20.

Humphry, S.M., & Heldsinger, S.A. (2014). Common Structural Design Features of Rubrics May Represent a Threat to Validity, Educational Researcher, 43(5), 253-263.

Humphry, S.M., Heldsinger, S.A., & Andrich, D. (2014). Requiring a Consistent Unit of Scale Between the Responses of Students and Judges in Standard Setting, Applied Measurement in Education, 27, 1, 1-18.

Humphry, S.M., & McGrane, J.A. (2015). Equating a large-scale writing assessment using pairwise comparisons of performances, Australian Educational Researcher, 42(4), 443-460.

Additional impact indicator information

Additional impact indicator information

(Provide information about any indicators not captured above that are relevant to the impact study, for example return on investment, jobs created, improvements in quality of life years (QALYs). Additional indicators should be quantitative in nature and include:
- name of indicator (100 characters)
- data for indicator (200 characters)
- brief description of indicator and how it is calculated (300 characters).)

Name

Commercial adoption of a new process or concept technology (Brightpath system)

Indicator Data

SCSA purchased an opt-in license for Brightpath for all WA schools 2015 - 2020 for $300K per annum. SA DECD purchased a license and services for ~70 schools in 2016/2017 at a cost of ~$240K.

Indicator Description

SCSA purchased a license through a procurement (tender) process, which is a matter of public record. The SCSA website includes a page for Brightpath. The SA DECD procured a license and associated services for Brightpath in 2016/2017.

Name

Sales or take-up in use of new products (Brightpath adoption)

Indicator Data

Teachers in approximately 500 schools have made over 300,000 assessments of students in Brightpath since late 2015. The number of assessments grew sharply between 2015 and 2016 and continues to do so.

Indicator Description

Data regarding the numbers of schools and student assessments are obtained through direct export from the application by Pairwise and collaborating partners. Information about time of assessments is available in exports.

Name

Take-up in use of new products: reporting directly to school communities

Indicator Data

88 schools are using Brightpath results in their Annual Reports and Site Improvement Plans, reporting to the system and to local communities and demonstrating use to improve student outcomes.

Indicator Description

Public information shows that more than 50 schools in Western Australia refer to Brightpath in publicly available Annual Reports. In South Australia, 38 schools reference Brightpath in their publicly available Site Improvement Plans.

Name

Traditional media citations

Indicator Data

Apr '12 West Weekend Liftout Education (100 Most Influential People in Education citation); Jul '12 "Tougher uni-entry rules loom"; Nov '13 "NAPLAN ALARM"; Nov '13 "Focus on exams distorts reality"

Indicator Description

Professor David Andrich has been consulted by The West Australian newspaper on numerous occasions to seek his comments on current issues within the state related to education assessment, including NAPLAN.