| **Institution:** University of Bath |
| --- |

| **Unit of Assessment:** C23 Education |
| --- |

| **Title of case study:** The application of International Large-Scale Assessments to assess and monitor, globally, education policy in relation to sustainable development and social justice. |
| --- |

| **Period when the underpinning research was undertaken:** 2017-2020 |
| --- |

| **Details of staff conducting the underpinning research from the submitting unit:** |
| --- |

| **Name(s):** | **Role(s) (e.g. job title):** | **Period(s) employed by submitting HEI:** |
| --- | --- | --- |
| Andres Sandoval-Hernandez | Reader, previously Lecturer | September 2015 – present |

| **Period when the claimed impact occurred**: 2019-2020 |
| --- |

| **Is this case study continued from a case study submitted in 2014?** N |
| --- |

## 1. Summary of the impact

International Large-Scale Assessments (ILSAs) collect comparable data on education to enable policy analysis in over 100 countries. However, the validity and relevance of the data they produce has been questioned. Since 2017, Research at University of Bath has:

a) Improved the validity and relevance of results for two major international large-scale assessments in education through improved technical procedures: the UNESCO's Regional Comparative and Explanatory Study across 19 Latin American Countries; and UNICEF's Southeast Asia Primary Learning Metrics across 6 countries.

b) Developed the measuring and monitoring strategy for the Sustainable Development Goals (SDGs) on sustainability and social justice in Education (SDG 4.7). This has been adopted and used across all UN member states as a result of improved confidence in the validity and comparability of that data.

## 2. Underpinning research

When UN member states adopted 17 Sustainable Development Goals (SDGs), for 2030, there was little discussion about how to measure progress toward these goals. Deciding on a measurement strategy for all SDGs has become a pressing issue. International Large-Scale Assessments (ILSAs) in Education were considered the most suitable source of information to measure and monitor progress. ILSAs offer information from more than 100 education systems, provide high coverage of the indicators included in the SDGs framework, and have unrivalled data quality assurance mechanisms. The scale of ILSAs is a strength and weakness. As national participation in ILSAs has grown, it has become more difficult to produce information that is strictly comparable across countries. For example, constructs like socioeconomic status are traditionally estimated using items such as parental education, parental occupational status or household items. But it is not clear to what extent such constructs can be validly compared across countries.

Research into the application of ILSAs to support measurement of SDGs began in 2018 when the Director of the Global Education Monitoring Report (GEMR) approached Dr Sandoval-Hernandez to write one of the Background Papers for the GEMR 2019 [S1] on this issue. The main objective of the paper [R1] was to evaluate whether any ILSA could be used to monitor specific aspects of SDG Target 4.7 which relates to sustainability, citizenship and social justice. The GEMR 2019 report concluded that there is evidence of a good fit between concepts evaluated in the International Civic and Citizenship Study and those included in SDG 4.7 [R1]. However, the main limitation listed in the background paper was the lack of evidence to evaluate the cross-cultural comparability of the scales used to operationalise these indicators. From these initial results two research strands were developed:

**A technical strand** focusing on the cross-cultural comparability of ILSAs background scales. Research under this strand had two main objectives:

  a) Establishing the extent to which constructs reported by ILSAs are validly comparable across countries;
  b) Developing a statistical method to evaluate cross-cultural comparability in ILSAs.

Dr Sandoval-Hernandez began publishing on cross-cultural comparability in 2017, in relation to the development and operationalisation of a theoretical model of young citizen participation, using nationally representative data from 38 countries that participated in an International Civic and Citizenship Study (ICCS).The paper used multigroup confirmatory factor analysis to establish the comparability of the resulting scales at different levels and discussed how this procedure improves the validity of this type of analysis [R2]. This was followed in 2019 and 2020 by [R3] and [R4], where the procedure to evaluate cross-cultural comparability within ILSAs was further refined and expanded. Initial research focused on socioeconomic background scales in three additional ILSAs: the Programme for International Student Assessment (PISA), the Trends in International Mathematics and Science Study (TIMSS) and the Regional Comparative and Explanatory Study (ERCE), and outlined a step-by-step procedure to evaluate the comparability of scales considering the complex assessment and complex sampling design characteristic of ILSA data [R3]. Building on the statistical method proposed in R2 and R3 the research was expanded to evaluate cross-cultural comparability within geographical regions or culturally relevant groups of countries [R4].

**An operational strand** focusing on the use of ILSAs to measure and monitor the achievement of SDG Target 4.7. The 2018 Background Paper [R1] for the GEMR 2019 report led the UNESCO Institute for Statistics (UIS) to commission Dr Sandoval-Hernandez to conduct additional research in 2018 that led to two additional reports. The first, developed a proposal for a Measurement Strategy for Thematic Indicators using ILSA data [R5], which was accepted by the *Global Alliance to Monitor Learning* (GAML) in November 2019 [S2]; the second [R6], produced a set of scores that refer to knowledge about global citizenship and sustainability and attitudes/behaviours towards gender equality, multiculturality, human rights, freedom of expression, social justice (thematic indicators 4.7.4,4.7.5) available through UNESCO's official data repository [S9].

**3. References to the research**

R1 **Sandoval-Hernández, A** & Miranda, D 2018, *Exploring ICCS 2016 to measure progress toward target 4.7: Background paper for the Global Education Monitoring Report 2019*. UNESCO, Paris. http://unesdoc.unesco.org/images/0026/002660/266073e.pdf

The GEMR is an editorially independent, authoritative and evidence-based annual report published by UNESCO. Background papers are written by invitation only. Chapter 14 of the GEMR 2019 is based on this paper (see https://unesdoc.unesco.org/ark:/48223/pf0000265866, pp. 189-196).

R2 Miranda, D, Castillo, JC & **Sandoval-Hernández, A** 2020, 'Young Citizens Participation: Empirical Testing of a Conceptual Model', *Youth & Society*, vol. 52, no. 2, pp. 251-271. https://doi.org/10.1177/0044118X17741024

R3 **Sandoval-Hernández, A**, David, R, Matta, T & Miranda, D 2019, 'Back to the drawing board: Can we compare socioeconomic background scales?', *Revista de Educacion*, vol. 2018, no. 383, pp. 37-61. https://doi.org/10.4438/1988-592X-RE-2019-383-400

R4 Treviño, E, **Sandoval-Hernández, A**, Miranda, D & David, R 2019, Invarianza de las escalas de nivel socioeconómico en estudios internacionales. in J Manzi, S Taut & MR

Garcia (eds), *Validez de los Sistemas de Evaluación en Chile y Latinoamérica.* Pontificia Universidad Catolica de Chile, pp. 301-238.

R5 **Sandoval-Hernández, A**, Isac, MM & Miranda, D 2019, *Measurement Strategy for SDG Global Indicator 4.7.1 and Thematic Indicators 4.7.4 and 4.7.5 using International Large-Scale Assessments in Education: Proposal.* Information papers, no. GAML6/REF/9, UNESCO Institute for Statistics, Montreal. http://gaml.uis.unesco.org/wp-content/uploads/sites/2/2019/08/GAML6-REF-9-measurement-strategy-for-4.7.1-4.7.4-4.7.5.pdf

R6 **Sandoval-Hernández, A** & Carrasco, D 2020, *A Measurement Strategy for SDG Thematic Indicators 4.7.4 and 4.7.5 Using International Large Scale Assessments in Education.* UNESCO Institute for Statistics, Montreal.http://tcg.uis.unesco.org/wp-content/uploads/sites/4/2020/06/Measurement-Strategy-for-474-and-475-using-ILSA_20200625.pdf

## 4. Details of the impact

Dr Sandoval-Hernandez's research at University of Bath has had a significant impact on two main areas:

a) it has improved the technical procedures to process data and report results from two major international large-scale assessments (ILSAs) in education, UNESCO's Regional Comparative and Explanatory Study and UNICEF's Southeast Asia Primary Learning Metrics. These improvements are crucial for assessing and trusting country claims, for example, in relation to progress on equality and social justice in education (Sustainable and Development Goal 4). In turn this enables countries to learn from each other's policies.

b) it has informed and shaped the understanding and the decision-making process of those responsible for measuring and monitoring the Sustainable Development Goals in Education in UN member states.

**Improving Technical procedures in ILSAs** *to enhance validity and relevance*

The Global Education Monitoring Report in 2018 [R1], in which Dr Sandoval-Hernandez points to the importance of testing and reporting cross-cultural comparability of hypothetical constructs, generated widespread interest among the ILSA research and policy community. This, along with Dr Sandoval-Hernandez's previous work in this area [R2, R3], led to his appointment on the Technical Advisory Boards of two major large-scale assessments in education; UNESCO's Regional Comparative and Explanatory Study (ERCE) and UNICEF's Southeast Asia Primary Learning Metrics (SEA-PLM). These assessments help to measure learning outcomes to inform policy making and accelerate progress towards Sustainable Development Goal 4. The two international assessments have adopted the concepts and procedures that Dr Sandoval-Hernandez developed concerning the evaluation of measurement invariance [R2, R3, R4]:

*UNESCO's Regional Comparative and Explanatory Study*

In 2018, Dr Sandoval-Hernandez was appointed as Senior Adviser of the UNESCO's Regional Comparative and Explanatory Study (ERCE) [S3]. The ERCE study was carried out across 19 Latin American countries including Argentina, Brazil, Chile, Mexico, Uruguay [S3] starting in 2018 and results will be published in July 2021. The Technical Report presented to the ERCE Steering Committee [S5] in 2018 to kick off the study, widely cited Sandoval-Hernandez's research [R3], stating "*Sandoval and colleagues' invariance proposal (2018) was implemented to evaluate the comparability of the measurement models across the participant countries [...]*" (S5, page 4 paragraph 7). UNESCO's Specialist in

Measurement and Evaluation of Education stated that "*Sandoval's academic expertise, underpinned by his research (see above [R2,R3]), played a crucial role in shaping and improving the procedures that we currently implement to evaluate and report cross-cultural comparability which, in turn, increased the trust of the different stakeholders in the validity of ERCE's results*"[S3]. "*The main benefit is the improvement of the validity of the data provided by ERCE […] policymakers are secure in their cross-country comparisons, for example, when it is claimed that a country has more or less effective policies in terms of educational inequalities"* [S3].

*UNICEF's Southeast Asia Primary Learning Metrics*

In 2019, Dr Sandoval-Hernandez was appointed as Co-Chair of the Technical Advisory Group to UNICEF's Southeast Asia Primary Learning Metrics (SEA-PLM) to provide independent advice on methodology and technical oversight to ensure high-quality reliable data [S4]. SEA-PLM was developed to "*better measure and understand the status of children's learning achievement by applying culturally appropriate metrics to learning outcomes associated with reading, writing, mathematics, and global citizenship*" [S6]. SEA-PLM 10th Regional Steering Committee Meeting Report held in 2019 [S6] notes the input of the Technical Advisory Group, specifically around the preparation and use of regional and national results. UNICEF's Educational Specialist specifically acknowledges the co-chair's contributions "*[..] and Dr. Andres Sandoval for the substantial role they played during the meeting and they will continue to play during the next steps*" [p13, S6]. SEA-PLM was implemented across 6 countries [S4] Cambodia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, and Vietnam and this equates to approximately 5,500,000 pupils and 1,000 educational officials and teachers benefitting from SEA-PLM [p3,S8].

**Informing decision making around the measurement and monitoring of United Nations Sustainable Development Goals for Education (4.7**)

Dr Sandoval-Hernandez's paper for the Global Education Monitoring Report [R1] in 2018 demonstrated the potential of international large-scale assessments (ILSAs) to measure specific aspects of the UN's SDGs. This resulted in the UNESCO Institute for Statistics asking Dr Sandoval-Hernandez to develop a proposal for measuring elements of SDG 4.7 (4.7.1, 4.7.4 and 4.7.5) on sustainability and social justice with ILSA data [R5]. This proposal was then taken to the GAML 6th Meeting of the Technical Cooperation Group in Yerevan, in August 2019 [S2]. The attendees to this meeting, which included high profile educational policymakers from countries representing all regions, and international organisations such as the European Commission, the World Bank, UNICEF, OECD and the Global Partnership for Education [S2], voted Dr Sandoval-Hernandez's proposal as the best option to measure targets 4.7.4 and 4.7.5.

This support led to the commissioning of new research [R6] that implemented his proposal to produce data to monitor the proportion of students who achieve the targets within and across countries. The methodological strategy and findings [R6] are available on UNESCO's official data repository website [S9].

The Director of Statistical Information at the Italian Institute for the Evaluation of Education and Training stated "*the work of Dr Sandoval-Hernandez on SDGs provided a sound framework and a robust methodology that made it possible to report the progress of Italy on Targets 4.7.4 and 4.7.5.*" [S7] and "*This was not previously possible due to the lack of internationally comparable data produced using sound framework and robust methodology*" [S7].

The former Director of Educational Evaluation Projects at the Mexican Institute for the Evaluation of Education stated that "*Dr Sandoval's work saved invaluable resources to the Institute by offering a strategy to use existing data to measure the extent to which global citizenship education and education for sustainable development, including gender equality*

*and human rights, are mainstreamed in the Mexican education system in an internationally comparable fashion (SDG 4.7.4 and 4.7.5)*" [S10].

Dr Sandoval-Hernandez's measurement and monitoring strategy is now being used by all the UN member states.

## 5. Sources to corroborate the impact

[S1] Email from Director of the Global Education Monitoring Report to invite Dr Sandoval-Hernandez to write a background paper for the GEMR 2019, 6 February 2018.

[S2] Summary of the decisions made during the 6th meeting of the GAML Technical Cooperation Group in Yerevan, Armenia in November 2019. See pp 4-5 for the decision on selecting Dr Sandoval-Hernandez measurement and monitoring proposal for SDG 4.7.4 and 4.7.5. List of participants in the 6th meeting of the GALM Technical Cooperation Group in Yerevan, Armenia, 18 November 2019.

[S3] Support Letter from Specialist in Measurement and Evaluation of Education at OREALC UNESCO, and Coordinator of ERCE, 15 December 2020.

[S4] UNICEF's webpage with news about the appointment of Dr Sandoval-Hernandez as Co-Chair of the Technical Advisory Group of SEA-PLM, 10 October 2019: https://www.seaplm.org/index.php?option=com_k2&view=item&id=15:meet-the-new-technical-advisory-group-for-sea-plm

[S5] Technical Report on Measurement Models presented by the implementing partner (MIDE UC) to UNESCO ERCE's Steering Committee, 10 October 2018.

[S6] Report of the10th Regional Steering Committee Meeting from 8 – 10 July 2019, in Bangkok, Thailand.

[S7] Support Letter from Director of Statistical Information at the National Institute for the Evaluation of Education and Training in Italy, 1 December 2020.

[S8] SEA-PLM. Every Child Learns, UNICEF Education Strategy 2019-2030, December 2019. https://www.unicef.org/media/64761/file/EdStrategy-2019-2030-Southeast-Asia%20Primary-Learning-Metrics.pdf

[S9] UNESCO / UIS / official data repository (see: SDG / Goals 1 and 4 / SDG4 / Target 4.7.4 and Target 4.7.5), accessed 6 December 2020: http://data.uis.unesco.org/

[S10] Support letter from former Director of Educational Evaluation Projects at the Mexican Institute for the Evaluation of Education (INEE), 15 December 2020 and appointment letter to the INEE's Technical Advisory Board, 19 April 2017.