Explaining students' attitudes towards a sustainable future: Evidence from SEA-PLM 2019 data

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Explaining students' attitudes towards a sustainable future: Evidence from SEA-PLM 2019 data

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Acronyms

ACER	Australian Council for Educational Research
ASEAN	Association of Southeast Asian Nations
GEM	Centre Global Education Monitoring Centre
OECD	Organisation for Economic Cooperation and Development
PISA	Programme for International Student Assessment
SDG	Sustainable Development Goal
SES	Socioeconomic status
SEAMEO	Southeast Asian Ministers for Education Organisation
SEA-PLM	Southeast Asia Primary Learning Metrics
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund

1   Overview

This report discusses how students' attitudes towards global issues are now crucial more than ever to build a sustainable world for future generations. The first section describes why students' attitudes towards school and learning are important and how they are linked to the Educational Prosperity Framework (Willms & Tramonte, 2015). The second section highlights the literature about the key factors which can influence students' attitudes towards school and learning and how they are related to students' attitudes towards sustainable development. The third section discusses the methods used for analysing the relationships between these different factors and outcomes, using data from the Southeast Asia Primary Learning Metrics (SEA-PLM) program in 2019. It also explains the rationale for the selection of the key variables. The fourth section presents the main results. The fifth section concludes with some key observations that support the goal of raising the awareness of future generations of their ecological footprints and to strive for a sustainable world.

It should be noted that SEA-PLM is the first large-scale comparative assessment in this region that measures global citizenship attitudes, values, and behaviours of children at primary level (UNICEF & SEAMEO, 2020).

Rationale

A key component of the 21st century skills concept involves learning to become global citizens, which means that students need to learn how to live in a socially dependent world and interact with different ethnic, local, and national cultures (Martono et al., 2021; Casmana et al., 2023). The SEA-PLM defines the concept of global citizenship as:

> *Global Citizens appreciate and understand the interconnectedness of all life on the planet. They act and relate to others with this understanding to make the world a more peaceful, just, safe, and sustainable place* (UNICEF & SEAMEO, 2017, p. 21).

According to Parker and colleagues (2023, p.10), the key ideas in this definition are 'the interconnectedness between all life forms (the self, others, and nature); peace; justice; safety; and sustainability'. The concept of global citizenship also includes learning about, and embracing diversity regardless of religious background, ethnicity, race, language, and skin colour (Sipayung & Dwiningrum, 2020; Raihani, 2014). Schools and other formal educational institutions can play an active role in teaching these global citizenship skills, (Fiat et al., 2017; Liefländer & Bogner, 2018; Sadiku & Sylaj, 2019) given their core function of knowledge transfer and character development (Braun et al., 2018; Bourke et al., 2012).

In addition to core competencies in literacy and numeracy, students today need to develop positive attitudes towards the environment, and embrace mutual assistance, and tolerance (Casmana et al., 2023). These are developed mostly by teaching students to care for the environment (Adler & Goggin, 2005), by encouraging teamwork (Galston, 2007), by developing a sense of togetherness (Thian, 2019) and by improving their acceptance. Tolerance is of particular importance in this era of global migration and vital

for understanding diverse cultures and habits, and faiths (Casmana et al., 2023; Bocsi et al., 2017; Mitchell, 2009; Muharib & Pennington, 2019).

A major responsibility of being a global citizen involves being active participants and uptake of pro-environmental behaviours, such as planting trees, flowering gardens and keeping the school environment green (Casmana et al., 2023). Such actions create an awareness around a sustainable future and help students realise their roles for reducing the effects of global warming (Kollmuss & Agyeman, 2010; Dewantara & Budimasyah, 2018; Prasetiyo et al., 2016; Khaedir & Wahab, 2020).

The conceptual framework

While earlier research suggests a link between reading performance and students' attitudes towards global issues (Green, 2002; Griva et al., 2012), research also points out that boys and girls significantly differ in their reading preferences (Griva et al., 2012; Clark et al., 2008). These differences are based not only on gender but several other socio-cultural influences as well, which shape the processes in which students act and attain certain outcomes for their holistic learning, health, and wellbeing.

Over the years, several frameworks and models have been developed that tie in the concepts discussed above. They include the Educational Prosperity Framework (developed by Willms & Tramonte, 2015; Willms, 2018) which is visualised as 'the prosperity tree' (see Figure 1). The Educational Prosperity Framework was selected purposely over others (e.g., Bloom, 1976; Carroll, 1963, Harnischfeger & Wiley, 1976) for this study as it was developed specifically for economically developing countries and the current analysis is based on data from six low- and middle-income countries.

The framework and its depiction of the 'prosperity tree' is well suited to conceptualize the analysis and discussion concerning a sustainable future. In this framework, the 'Foundations for Success' are the roots of the tree that form the inputs required for children and young people to thrive. The roots include five components, namely resources, family and community support, quality instruction, learning time, and inclusive environments (OECD & Willms, 2019; OECD, 2018; Willms, 2018). The inclusive environment component is well aligned to the three traits of global citizenship, i.e., pro-social environment, teamwork, and tolerance. The 'Prosperity Outcomes' are depicted as the foliage and grouped into four components, namely educational attainment, academic performance, health, well-being, as well as attitudes towards school and learning. Like a tree, the framework illustrates the need for strong roots as the basis for prosperous outcomes.

Figure 1. Visualisation of the Educational Prosperity Framework
Source: Auld et al. (2020, p.8) (adapted from original source: OECD & Willms, 2019[1])

In total, the above framework specifies nine theoretical components, seven of which were covered in the SEA-PLM assessment. These components explored some of the key sociocultural factors impacting them, such as resources (socioeconomic status), family and community support (parents' attitudes learning), quality instruction (teacher absenteeism), learning time (outside school activities, literacy lesson or reading time), inclusive environments (gender and age), attitudes towards school and learning (students' interest in school), and academic performance (reading achievement, grade repetition). The following section discusses these sociocultural factors and describes their interconnectedness.

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2 The sociocultural factors

This section discusses the key literature on the main sociocultural factors which can influence students' attitudes towards school and learning and how they are related to students' attitudes towards sustainable development.

Researchers argue that reading is 'a sociocultural process' and is based on students' prior knowledge and therefore helps to broaden their understanding and knowledge, and thus their sense of global citizenship (Green, 2002; Griva et al., 2012).

Prior research also demonstrates significant differences between boys' and girls' reading preferences (Griva et al., 2012; Clark et al., 2008). In addition to these differences, it is school and peer engagement, and the involvement in school community activities, where students work together and learn to behave appropriately in the school environment and the community, which influences their attitudes towards school as well as sustainability.

Gender

Research on students' attitudes towards reading, shows that girls hold a more positive attitude to reading, read more often (Swalander & Taube, 2007; Kirsch et al., 2002) and prefer reading a variety of genres compared to boys, who are keener on reading adventure, science fiction and sports stories (Clark et al., 2008). Moreover, girls have been found to outperform boys on reading tasks across several international large-scale assessments (Kirsch et al., 2002; Mullis et al., 2003; Brozo et al., 2007). Recent research by Denton and West (2022) further confirms that girls are more proficient in advanced reading skills. There are also gender differences in the amount of time devoted to reading where girls are likely to be more involved in leisure reading than boys (Abilock, 2002; Swalander & Taube, 2007; Gibbons et. al, 1997).

Age

Student's age is often a key factor for determining their interests and attitudes towards schooling. Also, a delay in entering school (i.e., at a later age than their peers) can have consequences for school engagement, on the other hand an early school start can improve children's cognitive skills (Suziedelyte & Zhu, 2015) that are critical for learning and later academic success. Students who start schooling later than their peers are more likely to face difficulties adjusting and thus hold more negative attitudes towards school and learning (Fertig & Kluve, 2005). The differences in school engagement are often based on the amount of time spent at kindergarten or pre-school settings from an early age that develop students' school readiness and helps with their transition to primary education (Berlinski et al., 2008). Thus, students early learning exposures are likely to have better schooling outcomes given their higher engagement with school and learning (Black et al., 2011). This is backed by data from OECD's Programme for International Student Assessment (PISA) which consistently reports that young people, particularly

those who attend preschools or kindergartens, tend to have greater academic and wellbeing outcomes (OECD, 2017; Pholphirul, 2017; OECD, 2019).

Socioeconomic status

Students' family background and resources can positively influence their attitudes through the availability of educational resources and exposure to home literacy environments, and these are known to support cognitive and academic engagement from a very young age (Isaacs, 2012; Chatterji, 2006). Nevertheless, the analysis of PISA data show that students from the lowest socioeconomic status (SES) who are highly engaged readers can perform as well on the reading tasks as highly engaged students from the middle SES group (OECD, 2019; Kirsch et al., 2002).

Yet, it is possible for teachers to be biased towards students from a lower SES background and therefore have varying levels expectations of students, in turn influencing the students' interest in school and their academic performance (Olsen & Huang, 2022; Eccles & Wigfield, 2020; Janssen et al., 2012; Schofield, 1980).

Parents' attitudes towards learning

It is widely regarded that children's development is impacted by both home and school environments, and a strong collaboration between parents and teachers tend to be highly beneficial (El Nokali et al., 2010). Thus, parental involvement as observed through parents' attitudes towards their children's learning and commitment to their education (Borgonovi & Montt, 2012; Bakker & Denessen, 2007) is crucial. It can positively influence children's attitudes towards school and their learning outcomes (Harris & Goodall, 2008; Fan & Chen, 2001).

Evidence from the Philippines, for example, demonstrate that parents who highly value their children's education persevere to earn enough to pay for fees, uniforms, and school supplies, regardless of their family's SES (Alampay & Garcia, 2019; Garcia et al., 2018). However, in some cases having a higher family SES is beneficial as higher parental education can act as influencing factor in parents being able to pay more attention to the quality of their children's learning at school and to engage more frequently with their children's teachers (Hanushek et al., 2019; Egalite, 2016). Also, parents who value learning are more likely to involve their children in high-quality early learning and educational activities, for example through enrolment at private preschools and kindergartens (Dahari & Ya, 2011), most of which requires monetary resources that are more likely to be available to parents from higher SES backgrounds (Isaacs, 2012).

Outside school activities

Students' interest and participation in activities outside of school such as working at home or outside the home (such as 'child labour') also influence their attitudes and achievement in reading and math (Emerson et al., 2017; Lee et al., 2021).

Some paid work activities performed outside the home, such as farm work or physical labour, have a substantial negative effect on learning capacity particularly through

exhaustion and non-attendance at schools (Heady, 2003; Gunnarsson et al., 2006; Bezerra et al., 2009; Black et al., 2013; Emerson et al. 2017). Data from a five-year panel study on school children in Viet Nam also shows that child labour has a negative effect on school attendance and participation, as well as educational attainment (Beegle et al., 2009). Research has also confirmed that these negative effects of child labour are consistent for both girls and boys (Emerson et al. 2017; Lee et al., 2021).

Grade repetition

Students who repeat a grade often lose interest in learning and hold negative attitudes about school (Goos et al., 2021; Ikeda & Garcia, 2014), which in turn impacts their achievement even more. Data from several comparative large-scale assessments suggest that students who repeat a grade are more likely to perform poorly in reading, on average, than peers who are non- repeaters (UNICEF & SEAMEO, 2020; OECD, 2019; LLECE, 2015; CONFEMEN, 2015; Ikeda & Garcia, 2014). Moreover, many children who start school later (i.e., children who are older than their peers at school-entry) are prone to higher instances of grade repetition (Verachtert et al., 2010; Pedraja et al., 2015) than children who start school at the right school-entry age (Goos et al., 2021). Moreover, as many children who start school later tend to belong to lower family SES backgrounds they are likely to suffer from higher levels of school anxiety (Fertig & Kluve, 2005), thus facing higher likelihoods of grade retentions (Goos et al., 2021; Chen et al., 2010; Kloosterman & De Graaf, 2010) which further impact their academic performance by lowering their overall school attitudes (de Mendizábal et al., 2018; Choi et. al., 2016).

Learning time at school - literacy

Although, it has long been established that the amount of time students spend on reading is positively correlated with gains in reading achievement (Brophy & Good, 1986; Fisher et al., 1981; Stallings & Kaskowitz, 1974), researchers have not established the ideal timeframe for a school 'literacy lesson'. However, even among students who are primarily good readers, increasing reading time spent at school made a difference in terms of students' reading scores (Taylor et al., 1990). There is also widespread acknowledgement that as reading requires practice, building good reading habits improve the reading skills (Anderson et al., 1988; Greaney & Hegarty, 1987; Guthrie et al., 1999; Mol & Bus, 2011; Pfost et al., 2013)

Teacher absenteeism

The issue of teachers arriving late to the class or being absent is crucial both in financial and academic terms. Given schools spend a significant amount of funding on paying teacher salaries the costs of absence are high. Alternatively, if teachers are not there in the classrooms (either because they are late or absent), students miss valuable learning time. This can therefore have negative implications for the entire system including, reduced school engagement, lower student achievement and attendance (Harris van Keuren, 2009; Benveniste et al., 2007; Banerjee et al., 2012; Black et al., 2014; Lee et al., 2015).

Students' interest in school

Students' interest in school which is related to their mindsets in terms of their subject orientation (i.e., liking a subject) and general attitude towards school – are known to be better predictors of their performance in science, than their family SES (Chen et al., 2017). A further analysis of PISA 2015 Asia-Pacific regional data shows that 'student mindsets are twice as powerful (at 31 percent of total predictive power) as home and demographic factors' for predicting students' academic performance (Chen et al., 2017, p. 29).

Another large-scale study in Chile found that low-income students with strong growth mindsets – i.e., those holding positive attitudes about one's abilities -can achieve at the same level as high-income students with fixed mindsets and therefore students' mindset is a strong predictor for academic achievement (Claro et al., 2016).

3   Methodology

Proposed path model

Based on Willms & Tramonte's (2015) conceptual framework and the prior research discussed in the preceding sections the following proposed path model was developed for this study (see Figure 2).
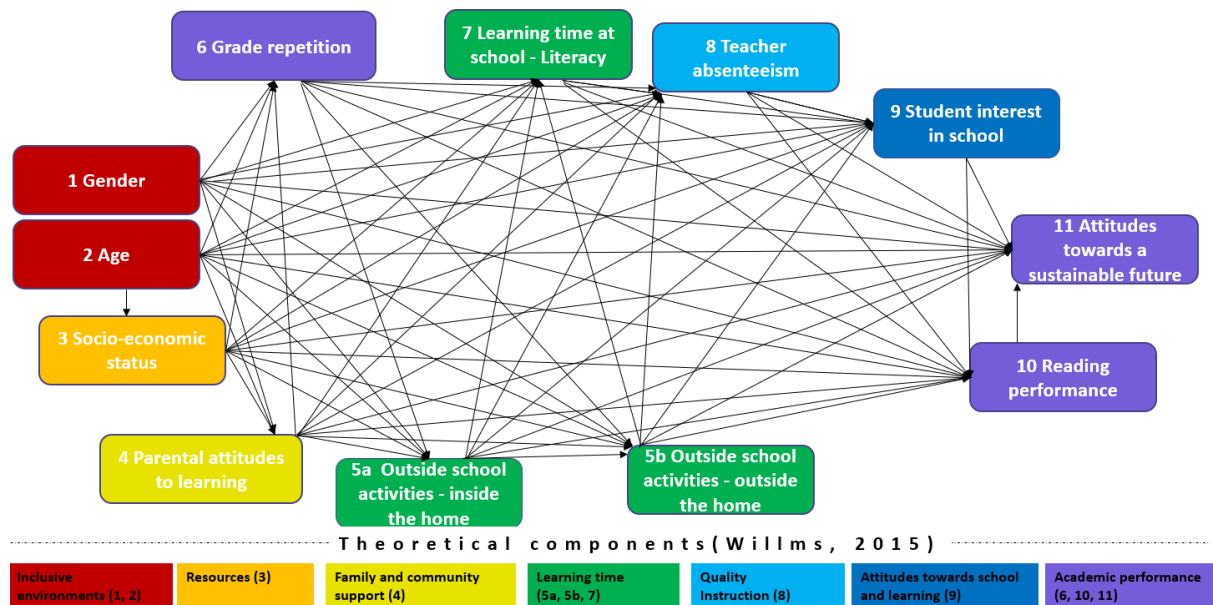
Figure 2. The proposed path model

The SEA-PLM 2019 dataset

The data used in this analysis has been retrieved from SEA-PLM's free and public access portal: '<u>datasets and questionnaires</u>'. Information for SEA-PLM 2019 was collected from a total of 31,913 students across 1,095 schools (UNICEF & SEAMEO, 2020). The SEA-PLM global citizenship module was administered through the student questionnaire and collected information about attitudes and values of students on key issues around a sustainable future (UNICEF & SEAMEO, 2020). In the context of this analysis, the items under focus are the ones about the extent of students' concern for a range of environmental issues. Data from the participating ASEAN students confirmed that students held a higher level of concern for local issues versus global ones, and were most worried about water shortages, and least worried about pollution in countries outside their own (UNICEF & SEAMEO, 2020).

Analyses

Structural equation modelling (SEM) was used in this study as an appropriate approach to testing theoretical models such as those presented in Figure 2 and corresponding hypotheses (Sinharay, 2010) in an exploratory manner.

Various ways of estimating structural equation or path models (e.g., Golan et al., 1997; Jöreskog, 1993; McDonald, 1996; Tenenhaus et al., 2005; Wold, 1974) were developed and implemented in related software applications (e.g., Muthén & Muthén, 2017; Hair et al., 2021). For this study, the partial least squares method approach (PLS) to SEM was selected as the aim was the exploration of how various factors contributed to explaining differences in the outcome variable. Another reason was that PLS makes no distributional assumptions (Hair et al., 2021) which was imperative as the data collected in SEA-PLM were nominal and ordinal in nature. The analyses were conducted using SmartPLS 3.3.5 (Ringle & Sarstedt, 2016) with data preparation and analyses steps shown in Figure 3.

Recoded variables to ensure that higher values reflect more positive attitudes, higher educational attainment etc.

Recoded all missing values to "-99" given requirement of PLS-SEM software.

Performed frequency, correlation & factor analyses in preparation of path model analysis.

Used SmartPLS (Hair et al., 2021) to analyse path models for the six SEA-PLM countries: Cambodia, LAO PDR, Malaysia, Myanmar, The Philippines and Viet Nam

Figure 3. Data pre-processing and analyses

The analysis undertaken in this study followed these general considerations:

- The manifest variables (i.e., questions in the questionnaires) were combined into latent constructs or factors.

- Rather than bivariate relationships (e.g., outcomes by gender, region, or socio-economic background) the path models explored in this analysis enabled the structuring and analysis of complex network of factors related to student outcomes.

- As the data were cross-sectional (i.e., one point in time), the ordering of constructs was based on conceptual considerations (e.g., the Educational Prosperity Framework), logic (e.g., what happens with parents and at home precedes what happens at school), chronology (e.g., grade repetition happened in the past) and prior research.

- Rather than establishing causality, the results enabled the detection of patterns, communalities, and uniqueness of how the factors operated to affect outcomes across countries.

- While many ways can be used to evaluate various aspects of path models this analysis used the variance in the outcome explained by factors in the model as the main indicator of how well the data fit the model. For further details regarding model fit see Appendix A.

Outcomes

The SEA-PLM 2019 instruments covered the socio-emotional aspects, such as attitudes and values, relating to positive orientations including appreciation of diversity, equality, and human rights, as well as the behavioural aspects related to activities that create positive change (UNICEF & SEAMEO, 2020).

The outcome used for this analysis was students' attitudes towards a sustainable future. The following student questionnaire item (listed in Table 1), which covered the concept of attitudes about environmental sustainability was used in the analysis.

Table 1. Item description with factor loadings

	Item Code	Item label	Factor loadings
How worried are you about the following issues (GC06)? (Response scale from '1 – not at all worried' to '4 – very worried')	GC06Q01	Pollution in <country of test>	0.71
	GC06Q02	Pollution outside <country of test>	0.44
	GC06Q03	<Power> shortages	0.67
	GC06Q04	Extinction of plants	0.79
	GC06Q05	Extinction of animals	0.78
	GC06Q06	Loss of natural resources	0.76
	GC06Q07	Water shortages	0.79
	GC06Q08	<Climate change>	0.61

This question (item) was selected for this analysis as environmental issues appeared to be the most important and valued global citizenship topics and concepts learned at primary school, while other topics, such as, interpersonal issues and global and regional events were beyond the primary classroom curriculum (UNICEF & SEAMEO, 2020). The item option Pollution outside <country of test> was removed due to low factor loading on the construct (0.44; see Table 1). The example also demonstrates how a certain level of reading skills is essential to read and understand this question. Table 2 below provides details for the students' attitudes toward environmental sustainability- item-total correlations for each of the SEA-PLM participating countries.

Table 2. Total correlations for students' attitudes towards environmental sustainability

Country	Alpha	No. of items	GC 06Q01	GC 06Q02	GC 06Q03	GC 06Q04	GC 06Q05	GC 06Q06	GC 06Q07	GC 06Q08	No. of Valid	Missing %	SCALE mean	Reading performance
Cambodia (KHM)	0.832	8	0.583	0.326	0.507	0.63	0.644	0.67	0.62	0.487	4527	16.1	1.98	0.349
Lao PDR (LAO)	0.867	8	0.616	0.408	0.603	0.668	0.667	0.703	0.687	0.595	3961	15.69	1.88	0.282
Malaysia (MYS)	0.862	8	0.633	0.57	0.498	0.625	0.598	0.638	0.661	0.647	4826	15.44	1.9	0.373
Myanmar (MYR)	0.759	8	0.503	0.227	0.476	0.562	0.534	0.544	0.518	0.349	4356	2.75	2.24	0.375
Philippines (PHL)	0.751	8	0.507	0.351	0.388	0.465	0.483	0.467	0.496	0.405	5105	16.08	1.69	0.431
Vietnam (VNM)	0.842	8	0.575	0.327	0.589	0.675	0.659	0.609	0.664	0.524	4619	4.51	2.43	0.109

Note: Adapted from UNICEF & SEAMEO, 2020, p. 179

Explanatory variables

The explanatory variables or predictors used in the current analysis are presented in Table 3, and the details on the descriptive statistics of all variables are provided in Appendix A. The information on manifest variables was collected through tests and questionnaires in SEA-PLM. This information was then used to form latent variables as the components of the hypothesized theoretical path model (see Table 3).

Table 3. Manifest, latent, and theoretical components of the proposed path model

Manifest variables [a]	Latent variables	Theoretical components [b]
Gender (Sex of student) [c]	1 Gender	Inclusive environments
S_Age (Age of student) [c]	2 Age	Inclusive environments
SES (Social-Economic Index (Nationally standardised)) [c]	3 Socio-economic status (SES)	Resources
↑ST26Q01 (At home – do homework) ↑ST26Q02 (Parent asks what learned) ↑ST26Q03 (Schoolwork discussed with parents) ↑ST26Q04 (Parent checks homework) ↑ST26Q06 (Parent motivates to succeed)	4 Parental attitudes towards learning (PARENT)	Family and community support
↑ST06Q02 (Outside school – Farm work) ↑ST06Q04 (Outside school – Physical work)	5a Outside school activities – Outside the home (ACT-OUT)	Learning time
↑ST06Q01 (Outside school – House chores) ↑ST06Q05 (Outside school – Take care of children)	5b Outside school activities – Inside the home (ACT-IN)	Learning time
ST14Q01 (Repeat grade)	6 Grade repetition (GR)	Academic performance
ST16Q02 (Weekly lessons - <Test language>)	7 Learning time at school – literacy (LESSON)	Learning time
↑ST17Q03 (Class – teacher late) ↑ST17Q05 (Class – teacher absent)	8 Teacher absenteeism (TEACH)	Quality instruction
↑ST19Q01 (School positive – like being at school) ↑ST19Q02 (School positive – feel safe) ↑ST19Q03 (School positive – belong) ↑ST19Q04 (School positive – learn useful things) ↑ST19Q05 (School positive – make friends easily)	9 Students' interest in school (STUINT)	Attitudes towards school and learning
↑PV1_R (Plausible Values 1 for Reading) ↑PV2_R (Plausible Values 2 for Reading) ↑PV3_R (Plausible Values 3 for Reading) ↑PV4_R (Plausible Values 4 for Reading) ↑PV5_R (Plausible Values 5 for Reading)	10 Reading performance (RP)	Academic performance
↑GC06Q01 (Issue - pollution in country) ↑GC06Q03 (Issue - power shortages)	11 Attitudes towards global issues (GLOBAL)	Attitudes towards school and learning

↑GC06Q04 (Issue - plant extinction)
↑GC06Q05 (Issue - animal extinction)
↑GC06Q06 (Issue - natural resource loss)
↑GC06Q07 (Issue - water shortages)
↑GC06Q08 (Issue – climate change)

Notes:

a) As per the student context questionnaire SEA-PLM 2019

b) As per Willms & Tramonte (2015)

c) 'Gender', 'Age' and 'SES' are not considered to be influenced by any other variable in the model. All later variables can be influenced by all previous variables in the model.

4   Results
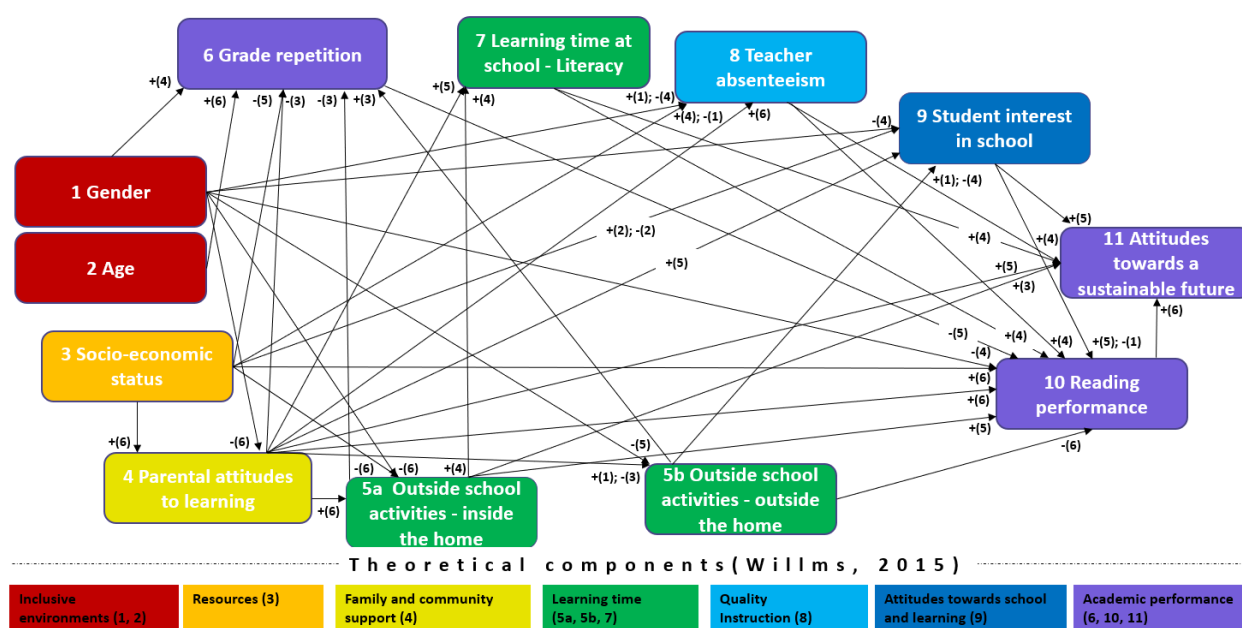
Figure 4. Summary path model

The above summary path model (Figure 4) shows the relationships between the explanatory variables and the outcome of interest across the six analyses, one path model for each country that participated in SEA-PLM. The sign next to each of the paths designates whether effect is positive or negative. The number of countries in which an effect is significantly different from zero is shown in brackets. Only effects that are significant in more than three countries are shown to emphasize the main relationships among variables in the model.

The following points highlight the main results:

- The range of explained variance (adj. R2) in outcome varies across the countries from six per cent in Vietnam to 33 per cent in the Philippines. Details of the results of the individual path model analyses for each of the SEA-PLM 2019 participating countries are provided in Appendix A.

- In Cambodia, Laos PDR, Myanmar, Malaysia, and the Philippines the factors in the model explain between one quarter and one third of the differences in students' attitudes towards a sustainable future.

- The analysis suggests that while gender has no direct effect on the outcome 'students' attitudes towards a sustainable future', the gender differences in favour of girls (see Table 4) emerge, whereby:
  - ➢ Girls perform at a higher level than boys in reading which, in turn, has a positive effect on the outcome.

➤ Girls report a greater interest in school which, in turn, has a positive effect on the outcome.

➤ Girls report more positive parental attitudes towards learning which, in turn, have a positive effect on the outcome.

➤ The effects for outside school activities are gendered, in that the boys report more activities outside the home, whereas the girls report more activities inside the home. This in turn, tend to be positively related to the outcome.

- Reading performance, students' interest in school, learning time at school and teacher absenteeism as well as parental attitudes towards learning are positively linked to students' attitudes towards a sustainable future in more than half the countries (see Table 4).

- Parental attitudes towards learning have a strong effect on most other variables in the model over and above any effect of SES.

Table 4. Summary of the effects between different factors in the analysis

	Parental attitudes towards learning	Outside school activities – Inside the home	Outside school activities – Outside the home	Grade repetition	Learning time at school – literacy	Teacher absenteeism	Students' interest in school	Reading performance	Attitudes towards global issues
1 Gender (1-Girl; 2-Boy)	-(6)	-(6)	+(5)	+(4)	-(1)	+(1), -(4)	-(4)	-(4)	
2 Age	+(1), -(1)	+(1)	+(1)	+(6)		+(1)	+(1), -(1)	+(1)	-(1)
3 Socio-economic status (SES)	+(6)	+(1), -(2)	-(6)	-(5)		+(4), -(1)	+(2), -(2)	+(6)	-(2)
4 Parental attitudes towards learning		+(6)	+(1), -(3)	-(3)	+(5)	+(6)	+(5)	+(6)	+(5)
5a Outside school activities – Inside the home				-(3)	+(4)		+(4)	+(5)	+(3)
5b Outside school activities – Outside the home				+(3)	+(1), -(1)		+(1), -(4)	-(6)	+(1), -(1)
6 Grade repetition							-(2)	-(5)	-(1)
7 Learning time at school – literacy							+(2)	+(4)	+(4)
8 Teacher absenteeism								+(4)	+(4)
9 Student interest in school								+(5), -(1)	+(5)
10 Reading performance									+(6)

Note: Sign designates whether effect is positive or negative. Brackets show number of countries in which effect is significantly different from zero. Gender, Age and SES are considered antecedents that cannot be influenced by other variables in the model.

5   Implications and conclusions

The analysis undertaken here supports previous reported links between reading performance and students' attitudes towards global issues. Overall, the analysis presented in this report shows that students who are better readers may be more informed and can develop greater awareness of global issues, and therefore support the previously reported link between reading performance and attitudes towards global issues (Green, 2002; Griva et al., 2012). The following points summarise further noteworthy observations from this study:

- The results imply that gender differences could be alleviated by focussing on boys' reading, improving their attitudes towards school, and raising parents' encouragement and involvement with boys' learning explicitly. However, given the beneficial impact of the above factors on girls' school engagement and reading outcomes, policies to encourage and support boys' schooling outcomes need to ensure that they are not creating a disadvantage for girls and therefore needs to focus on improving learning outcomes for both boys and girls.

- Encouraging boys to engage in reading on a variety of topics may improve their attitudes about environmental sustainability issues (Green, 2002; Griva et al., 2012). Broadening their knowledge base should therefore be given consideration, based on the research around reading performance and attitudes towards sustainability (see also Griva et al., 2012; Clark et al., 2008).

- The effect of delaying children's school entry age tends to be negative for their subsequent reading achievement (Fertig & Kluve, 2005), and older children (i.e., those who start school at a later age) are also more prone to grade repetition and fall behind further consequently (Goos et al., 2021; Chen et al., 2010; Kloosterman & De Graaf, 2010). Thus, policies which encourage early enrolment or compulsory preschools may be beneficial for getting children to start school at a younger age and improve their engagement with school and attitudes towards school and learning.

- Increasing parental support and improving their attitudes towards their children's school and learning may contribute towards raising students' awareness of global issues. It should be noted that the current analysis has found that this effect is independent of the socio-economic background of the students' homes (see also Borgonovi & Montt, 2012; Bakker & Denessen, 2007), suggesting that the influence is also significant for improving attitudes in students from low SES backgrounds.

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Appendix A

*All path coefficients shown are significantly different from zero:

Path coefficient
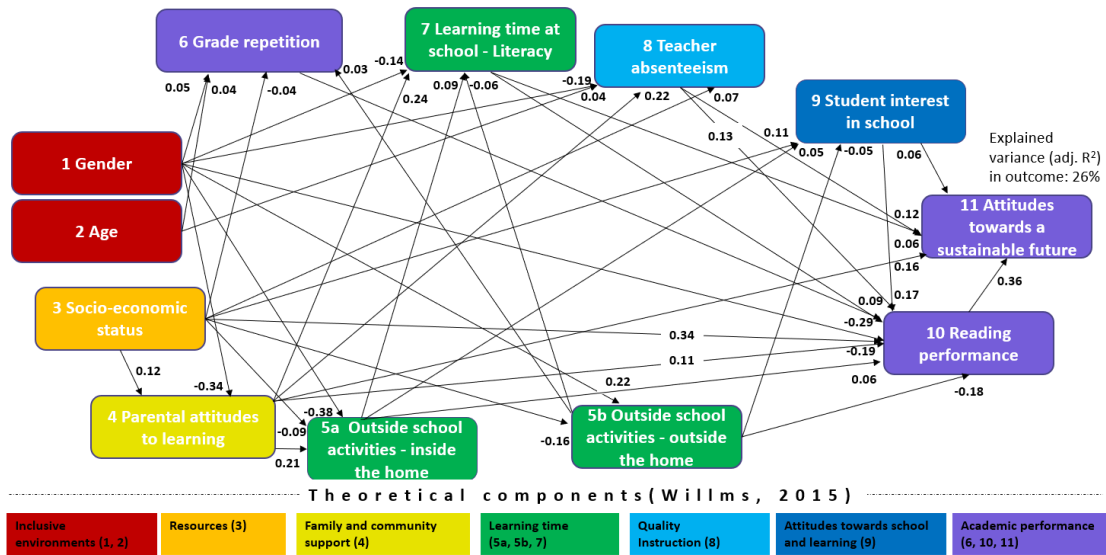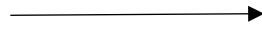
Figure A1. Path model for Cambodia
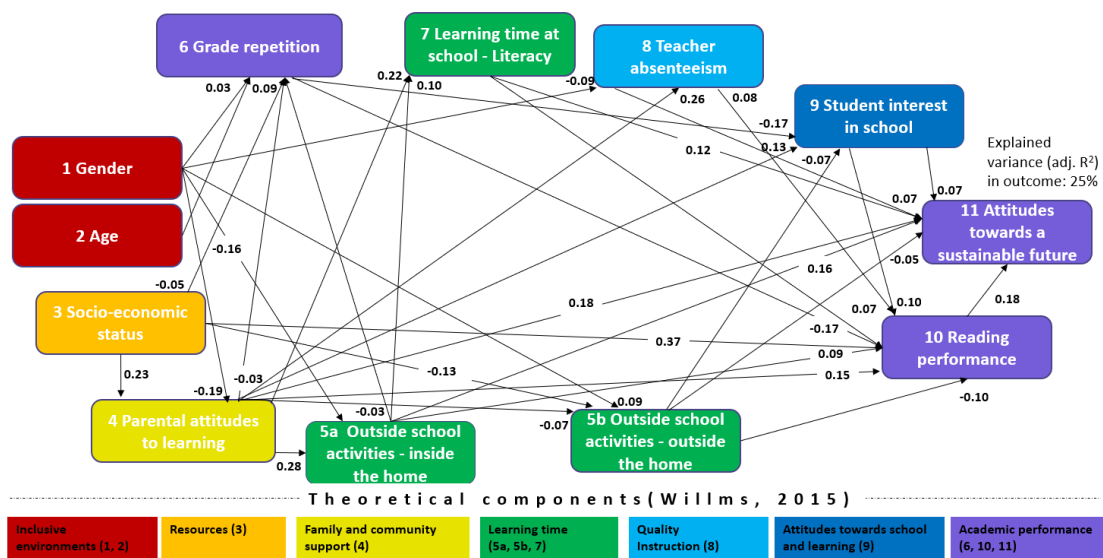
Figure A2. Path model for Laos
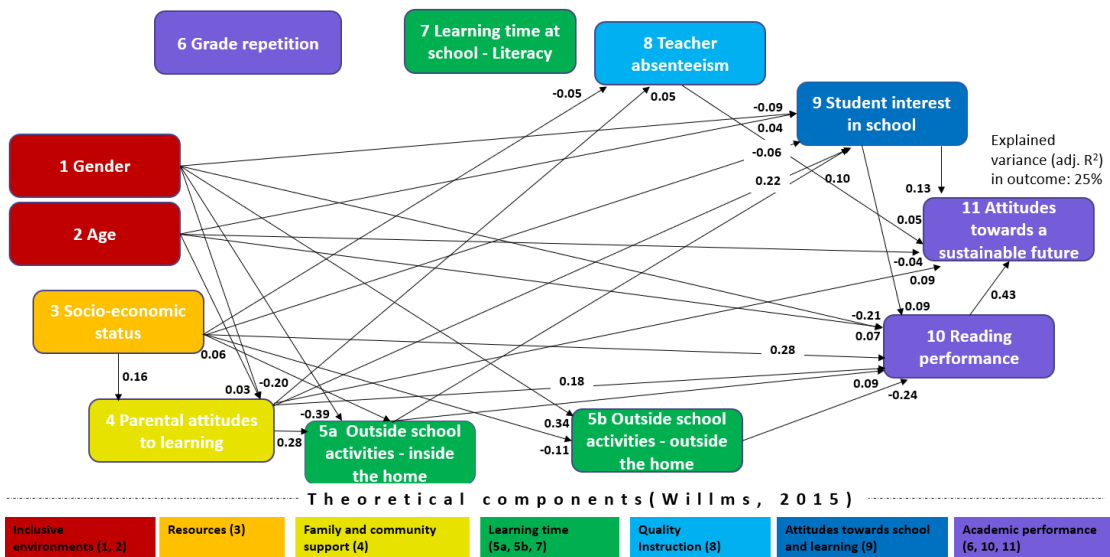
Figure A3. Path model for Malaysia
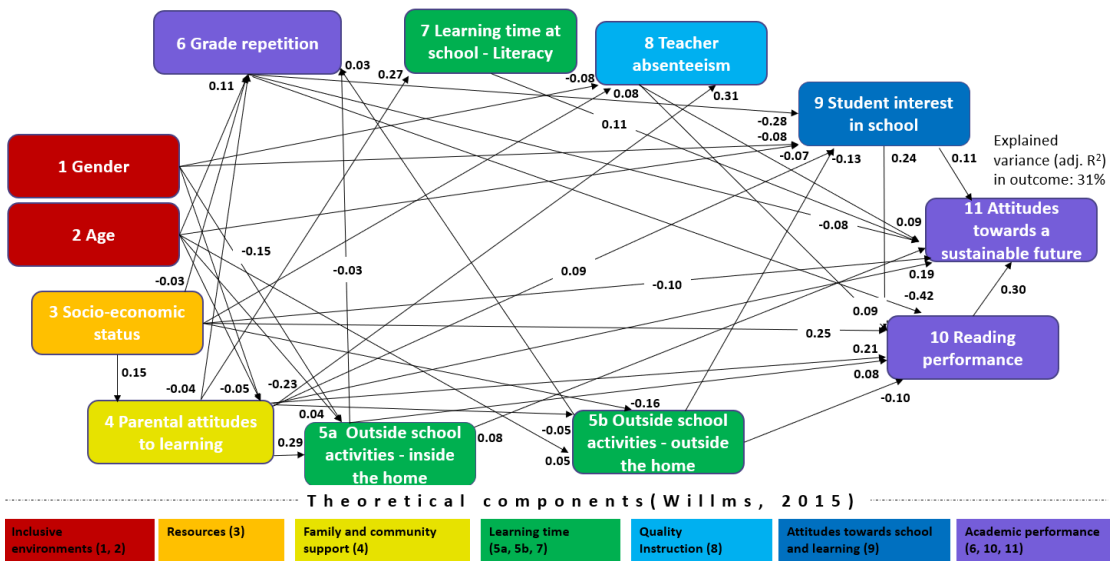
Figure A4. Path model for Myanmar
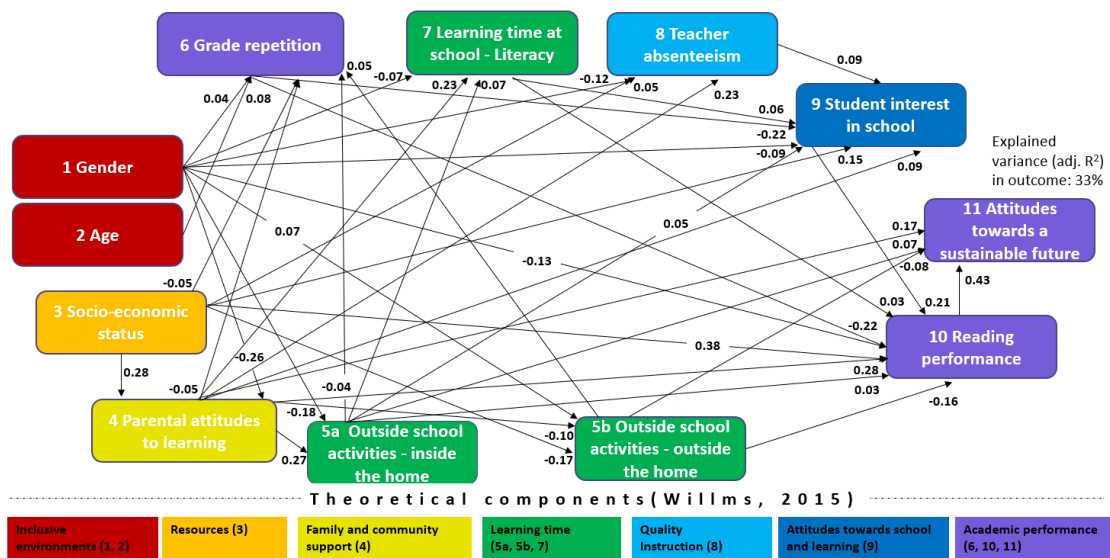
Figure A5. Path model for the Philippines
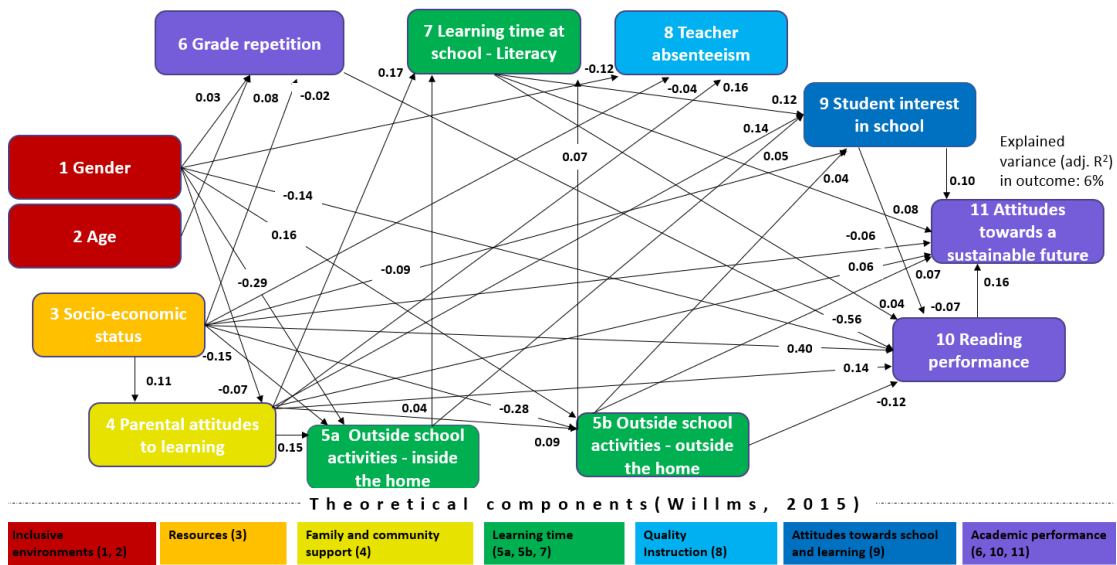
Figure A6. Path model for Vietnam

Table A1. Descriptive statistics of all variables in the analysis

Variable Name	Variable Label	Coding	KHM-mean	KHM-SD	LAO-mean	LAO-SD	MMR-mean	MMR-SD	MYS-mean	MYS-SD	PHL-mean	PHL-SD	VNM-mean	VNM-SD
Gender	Gender	1 = F 2 = M	1.49	.50	1.51	.50	1.53	.50	1.49	.50	1.50	.50	1.52	.50
S_Age	Age of students	N/A	11.62	1.26	11.19	1.17	1.63	1.01	11.19	.29	11.24	.79	11.08	.39
ST26Q01	At home – do homework	1 = Never or hardly ever 2 = Monthly (at least once a month) 3 = Weekly (at least once a week) 4 = Daily or almost daily	2.74	1.20	2.71	1.18	2.55	1.35	3.33	.97	2.55	1.20	D	D
ST26Q02	At home – parent ask what learned	As above	2.87	1.07	2.65	1.11	2.54	1.20	2.74	1.17	2.64	1.09	3.14	.90
ST26Q03	At home – schoolwork discussed with parents	As above	2.77	1.08	2.73	1.13	2.47	1.19	2.65	1.16	2.59	1.10	3.10	.93
ST26Q04	At home – parent check homework	As above	2.91	1.09	2.69	1.17	2.56	1.24	2.55	1.22	2.70	1.13	2.99	1.06
ST26Q06	At home – parent motivate to succeed	As above	3.07	1.10	2.84	1.16	2.82	1.27	3.06	1.10	2.75	1.13	3.33	.94
ST06Q02	Outside school – farm work	As above	2.02	1.20	D	D	1.82	1.08	1.56	.93	2.13	1.08	1.85	1.02
ST06Q04	Outside school – physical work	As above	1.44	.90	1.70	1.09	1.58	1.00	1.18	.59	1.83	1.08	D	D
ST06Q01	Outside school – house chores	As above	3.14	1.08	3.23	1.09	2.75	1.22	2.99	1.08	2.82	1.08	3.29	.86
ST06Q05	Outside school – take care of children	As above	2.79	1.27	2.85	1.23	2.36	1.28	D	D	2.64	1.20	2.71	1.25

Code	Label	Response												
ST14Q01	Repeat grade	1 = No 2 = Yes	1.32	.47	1.32	.47	1.24	.43	1.00	.07	1.33	.47	1.06	.24
ST16Q02	Weekly lessons - <Test language>	1 = No time or less than one lesson a week 2 = One lesson a week 3 = 2-4 lessons a week 4 = 5 lessons a week	2.79	1.07	2.61	1.03	2.49	1.11	3.98	.20	2.74	1.04	3.43	.75
ST17Q03	Class - teacher late	1 = Often 2 = Sometimes 3 = Rarely 4 = Never	2.59	1.13	2.23	1.03	2.28	1.12	2.30	.75	2.52	1.11	3.37	.79
ST17Q05	Class - teacher absent	As above	2.50	1.10	2.44	1.01	2.80	1.20	2.64	.68	2.80	1.09	3.50	.69
ST19Q01	School positive - like being at school	1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly agree	3.53	.70	D	D	D	D	3.35	.72	3.34	.79	3.42	.65
ST19Q02	School positive - feel safe	As above	3.21	.72	3.29	.76	3.42	.80	3.25	.75	D	D	3.35	.70
ST19Q03	School positive – belong	As above	D	D	3.20	.84	3.53	.80	D	D	D	D	3.20	.77
ST19Q04	School positive – learn useful things	As above	3.29	.76	3.41	.81	3.51	.82	3.55	.67	3.07	1.00	D	D
ST19Q05	School positive - make friends easily	As above	D	D	D	D	3.36	.88	D	D	3.08	.94	D	D
GC06Q01	Issue - pollution in country	1 = Not at all worried 2 = Not very worried 3 = Quite worried 4 = Very worried	3.10	1.02	2.88	1.21	2.84	1.15	D	D	2.71	1.18	3.55	.76
GC06Q03	Issue - power shortages	As above	2.90	.96	2.89	1.14	D	D	3.32	.84	D	D	3.52	.79
GC06Q04	Issue - plant extinction	As above	3.09	1.00	2.94	1.16	2.95	1.12	3.48	.83	D	D	3.55	.79
GC06Q05	Issue - animal extinction	As above	3.07	.99	2.96	1.16	2.88	1.12	3.45	.84	2.77	1.11	3.55	.78

GC06Q06	Issue - natural resource loss	As above	3.15	.98	3.03	1.18	3.00	1.09	3.50	.79	2.82	1.11	3.46	.81
GC06Q07	Issue - water shortages	As above	3.14	1.01	2.98	1.17	3.01	1.12	3.52	.78	2.73	1,10	3.66	.73
GC06Q08	Issue – climate change	As above	D	D	2.98	1.13	3.09	1.11	D	D	D	D	3.38	.83

Notes:

SD = standard deviation

D = deleted

N/A = not available

Country codes used: Cambodia -KHM; Laos -LAO;   Myanmar – MMR; Malaysia- MYS; Philippines -PHL; Vietnam -VNM

Table A2. Cronbach's Alpha values for reflective measurement models per country

Latent variable	KHM	LAO	MMR	MYS	PHL	VNM
PARENT	.80	.82	.84	.71	.77	.68
ACT-OUT	.33	na	.44	.27	.29	na
ACT-IN	.40	.50	.39	na	.29	.32
TEACH	.43	.60	.53	.34	.48	.36
STUINT	.61	.56	.69	.58	.55	.61
GLOBAL	.84	.87	.85	.77	.67	.85

Notes:

na = not available

No information provided on Reading Achievement as it is formed by plausible values

Table A3. Composite reliability values for reflective measurement models per country

Latent variable	KHM	LAO	MMR	MYS	PHL	VNM
PARENT	.86	.87	.88	.80	.84	.81
ACT-OUT	.74	na	.78	.73	.74	na
ACT-IN	.74	.79	.73	na	.72	.72
TEACH	.78	.83	.81	.75	.79	.75
STUINT	.79	.74	.81	.75	.75	.79
GLOBAL	.89	.90	.89	.85	.80	.89

Note:

na = not available

Table A4. AVE for reflective measurement models per country

Latent variable	KHM	LAO	MMR	MYS	PHL	VNM
PARENT	.56	.57	.60	.45	.52	.51
ACT-OUT	.60	na	.64	.58	.59	na
ACT-IN	.61	.66	.59	na	.57	.58
TEACH	.64	.71	.68	.60	.66	.60
STUINT	.56	.50	.51	.51.	.50	.56
GLOBAL	.56	.57	.57	.52	.50	.53

Note:

na = not available

Table A5. Outer loadings of manifest variables in reflective measurement models per country

Latent variable	Manifest variable	KHM	LAO	MMR	MYS	PHL	VNM
PARENT	ST26Q01	.69	.78	.81	.70	.80	d
	ST26Q02	.80	.76	.79	.65	.73	.77
	ST26Q03	.70	.75	.73	.69	.65	.72
	ST26Q04	.74	.71	.73	.63	.68	.68
	ST26Q06	.81	.78	.82	.68	.74	.69
ACT-OUT	ST06Q02	.67	d	.78	.73	.72	1.00
	ST06Q04	.86	1.00	.82	.79	.81	d
ACT-IN	ST06Q01	.93	.90	.95	1.00	.91	.93
	ST06Q05	.58	.72	.53	d	.57	.53
	ST06Q06	.84	.89	.80	.85	.85	.88
TEACH	ST17Q03	.76	.80	.85	.70	.77	.66
	ST17Q05	.67	d	.78	.73	.72	1.00
STUINT	ST19Q01	.72	d	d	.61	.55	.77
	ST19Q02	.69	.61	.71	.61	d	.68
	ST19Q03	d	.54	.76	d	d	.79
	ST19Q04	.83	.92	.79	.89	.85	d
	ST19Q05	d	d	.59	d	.69	d
GLOBAL	GC06Q01	.73	.72	.73	d	.73	.68
	GC06Q03	.65	.71	d	.67	d	.71
	GC06Q04	.77	.78	.75	.76	d	.78
	GC06Q05	.79	.77	.74	.74	.69	.77
	GC06Q06	.80	.8	.75	.75	.73	.73
	GC06Q07	.76	.79	.77	.70	.69	.77
	GC06Q08	d	.69	.77	d	d	.64

Note:

d = deleted

Table A6. HTMT values for all latent variables in the Cambodia dataset

	Age	GLOBAL	Gender	GR	LESSON	ACT-IN	ACT-OUT	PARENT	RP	SES	STUINT
GLOBAL	.05										
Gender	.12	.14									
GR	.12	.09	.08								
LESSON	.03	.22	.14	.04							
ACT-IN	.06	.20	.31	.05	.24						
ACT-OUT	.08	.23	.20	.16	.13	.33					
PARENT	.05	.37	.19	.05	.31	.39	.16				
RP	.13	.50	.20	.23	.22	.20	.52	.29			
SES	.17	.20	.00	.11	.04	.07	.30	.12	.44		
STUINT	.06	.20	.04	.03	.06	.09	.16	.07	.30	.15	
TEACH	.01	.41	.19	.12	.29	.13	.23	.40	.38	.14	.08

Table A7. HTMT values for all latent variables in the Laos dataset

	Age	GLOBAL	Gender	GR	LESSON	ACT-IN	ACT-OUT	PARENT	RP	SES	STUINT
GLOBAL	.07										
Gender	.07	.04									
GR	.25	.16	.06								
LESSON	.04	.28	.03	.09							
ACT-IN	.06	.44	.14	.15	.24						
ACT-OUT	.06	.15	.05	.08	.06	.09					
PARENT	.10	.42	.10	.15	.29	.43	.11				
RP	.19	.39	.05	.23	.20	.31	.21	.38			
SES	.33	.20	.03	.20	.10	.14	.14	.26	.48		
STUINT	.06	.21	.04	.12	.04	.13	.11	.18	.21	.07	
TEACH	.03	.29	.03	.15	.27	.21	.09	.36	.25	.10	.09

Table A8. HTMT values for all latent variables in the Myanmar dataset

	Age	GLOBAL	Gender	GR	LESSON	ACT-IN	ACT-OUT	PARENT	RP	SES	STUINT

	Age	GLOBAL	Gender	GR	LESSON	ACT-IN	ACT-OUT	PARENT	RP	SES	STUINT
GLOBAL	.14										
Gender	.07	.12									
GR	.31	.22	.08								
LESSON	.04	.28	.05	.09							
ACT-IN	.02	.36	.14	.13	.22						
ACT-OUT	.15	.16	.04	.17	.07	.32					
PARENT	.11	.46	.12	.16	.33	.45	.13				
RP	.23	.50	.08	.35	.19	.28	.37	.39			
SES	.28	.09	.02	.17	.06	.13	.28	.16	.39		
STUINT	.17	.33	.09	.21	.12	.12	.32	.16	.42	.13	
TEACH	.07	.40	.13	.21	.29	.24	.18	.48	.38	.15	.24

Table A9. HTMT values for all latent variables in the Malaysia dataset

	Age	GLOBAL	Gender	GR	LESSON	ACT-IN	ACT-OUT	PARENT	RP	SES	STUINT
GLOBAL	.01										
Gender	.01	.12									
GR	.01	.02	.03								
LESSON	.01	.03	.01	.01							
ACT-IN	.03	.17	.23	.00	.02						
ACT-OUT	.07	.25	.33	.06	.01	.08					
PARENT	.03	.30	.12	.03	.03	.35	.18				
RP	.07	.54	.21	.04	.00	.23	.58	.29			
SES	.01	.19	.04	.02	.03	.11	.22	.17	.36		
STUINT	.06	.28	.12	.02	.03	.23	.20	.39	.21	.11	
TEACH	.03	.13	.03	.03	.21	.05	.17	.08	.05	.06	.06

Table A10. HTMT values for all latent variables in the Philippines dataset

	Age	GLOBAL	Gender	GR	LESSON	ACT-IN	ACT-OUT	PARENT	RP	SES	STUINT
GLOBAL	.05										
Gender	.11	.07									
GR	.22	.24	.10								
LESSON	.02	.20	.07	.09							
ACT-IN	.06	.43	.21	.26	.24						
ACT-OUT	.09	.41	.08	.31	.08	.36					
PARENT	.09	.57	.13	.22	.29	.54	.29				
RP	.13	.67	.13	.32	.20	.35	.64	.58			
SES	.15	.38	.04	.19	.07	.08	.38	.30	.57		
STUINT	.09	.31	.08	.23	.13	.21	.34	.25	.50	.26	
TEACH	.06	.32	.13	.19	.22	.33	.14	.39	.40	.16	.23

Table A11. HTMT values for all latent variables in the Viet Nam dataset

	Age	GLOBAL	Gender	GR	LESSON	ACT-IN	ACT-OUT	PARENT	RP	SES	STUINT
GLOBAL	.02										
Gender	.02	.05									
GR	.33	.04	.06								
LESSON	.02	.14	.03	.01							
ACT-IN	.05	.10	.26	.03	.12						
ACT-OUT	.02	.08	.08	.05	.09	.32					
PARENT	.01	.16	.05	.03	.21	.27	.09				
RP	.08	.13	.10	.19	.04	.13	.24	.22			
SES	.12	.03	.00	.12	.02	.21	.27	.12	.48		
STUINT	.04	.17	.01	.01	.19	.18	.11	.26	.11	.11	
TEACH	.01	.11	.10	.02	.24	.23	.13	.30	.09	.06	.37

Table A12. Adjusted R2 values for latent variables per country

	KHM	LAO	MMY	MYS	PHL	VNM
PARENT	.04	.06	.04	.04	.09	.01
ACT-OUT	.04	.03	.04	.04	.05	.08
ACT-IN	.10	.09	.09	.14	.08	.06
GR	.03	.09	.13	...	.12	.12
LESSON	.10	.08	.09	...	.07	.04
TEACH	.07	.07	.11	...	.07	.03
STUINT	.02	.04	.08	.08	.10	.06
RP	.38	.33	.40	.29	.58	.28
GLOBAL	.26	.25	.31	.25	.33	.06

Note:

… = not significant at .05 level

Table A13. f2 values from latent variables to Attitudes towards global issues per country

	KHM	LAO	MMY	MYS	PHL	VNM
Gender	...	...	...	...	...	...
Age	...	...	...	...	...	...
SES	...	...	.01	...	...	...
PARENT	.03	.04	.04	.01	.03	...
ACT-OUT	...	...	...	...	...	.01
ACT-IN	...	.03	.01	...	.01	...
GR	...	...	...	...	...	...
LESSON	...	.02	.02	...	...	.01
TEACH	.02	...	.01	...	...	...
STUINT	...	...	.01	.02	...	.01
RP	.11	.03	.08	.17	.11	.02

Note:

… = not significant at .05 level

Table A14. Direct effects from latent variables to Attitudes towards global issues per country

	KHM	LAO	MMY	MYS	PHL	VNM
Gender	...	...	...	...	...	...
Age	...	...	...	-.04	...	...
SES	...	...	-.10	...	...	-.06
PARENT	.16	.18	.19	.09	.17	.06
ACT-OUT	...	-.05	...	...	...	.07
ACT-IN	...	.16	.08	...	.07	...
GR	...	...	-.08	...	...	...
LESSON	.06	.12	.11	...	...	.08
TEACH	.12	.07	.09	.05	...	...
STUINT	.06	.07	.11	.13	...	.10
RP	.36	.18	.30	.43	.43	.16

Note:

… = not significant at .05 level

Table A15. Indirect effects from latent variables to Attitudes towards global issues per country

	KHM	LAO	MMY	MYS	PHL	VNM
Gender	-.25	-.11	-.13	-.20	-.20	-.04
Age	…	…	-.07	.04	-.02	…
SES	.19	.18	.16	.15	.30	.05
PARENT	.11	.16	.19	.13	.19	.06
ACT-OUT	-.08	-.03	-.06	-.11	-.08	-.01
ACT-IN	.04	.04	.05	.06	.03	…
GR	-.10	-.05	-.18	…	-.11	-.10
LESSON	.03	.01	.01	…	.02	.02
TEACH	.05	.01	.03	…	.04	…
STUINT	.06	.02	.07	.04	.09	-.01

Note:

… = not significant at .05 level

Table A16. Total effects from latent variables to Attitudes towards global issues per country

	KHM	LAO	MMY	MYS	PHL	VNM
Gender	-.26	…	-.18	-.20	-.15	-.09
Age	…	…	-.08	…	…	…
SES	.18	.19	.07	.17	.32	…
PARENT	.28	.34	.39	.22	.36	.13
ACT-OUT	-.07	-.08	-.05	-.09	-.09	.06
ACT-IN	.06	.20	.13	.06	.10	…
GR	…	-.13	-.26	…	-.15	-.17
LESSON	.09	.13	.12	…	.05	.10
TEACH	.16	.08	.11	.06	.05	…
STUINT	.12	.09	.18	.17	.09	.09
RP	.36	.18	.30	.43	.43	.16

Note:

… = not significant at .05 level