SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

MISSION 4.7

MISSION 4.7

THE STATUS OF EDUCATION FOR SUSTAINABLE DEVELOPMENT IN MALAYSIA

INTERIM REPORT
NOVEMBER 2022
(Revised version as at 15 March 2023)

Karen Chand
Subattra Kanesan
Shannon Kobran
Phui Yi Kong
Imran Rasid

[left blank]

MISSION 4.7

THE STATUS OF EDUCATION FOR SUSTAINABLE DEVELOPMENT IN MALAYSIA

A PILOT STUDY TO ASSESS GAPS, OPTIONS AND OPPORTUNITIES FOR THE ACHIEVEMENT OF SDG TARGET 4.7 IN MALAYSIA

INTERIM REPORT
NOVEMBER 2022
(Revised version as at 15 March 2023)

Karen Chand
Subattra Kanesan
Shannon Kobran
Phui Yi Kong
Imran Rasid

SUSTAINABLE DEVELOPMENT
SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

MISSION 4.7: THE STATUS OF EDUCATION FOR SUSTAINABLE DEVELOPMENT IN MALAYSIA
A Pilot Study To Assess Gaps, Options and Opportunities for The Achievement Of SDG Target 4.7 In Malaysia

November 2023, 1st Edition
March 2023, 1nd Revision

Authors
Karen Chand, Subattra Kanesan, Shannon Kobran, Phui Yi Kong, Imran Rasid

Full text can be downloaded from
https://www.mission4point7.org/news/mission-4-7-malaysia-releases-interim-report

c/o SDSN Asia HQ
Level 11, Sunway University
No 5 Jalan University
Bandar Sunway 47500
Selangor Darul Ehsan, Malaysia.

For Inquiries, contact us at sdsn-in-asia@unsdsn.org.

The Sustainable Development Solutions Network (SDSN) engages scientists, engineers, business and civil society leaders, and development practitioners for evidence-based problem solving. It promotes solutions initiatives that demonstrate the potential of technical and business innovation to support sustainable development.

This report was written by a group of independent experts acting in their personal capacities. Any views expressed in this report do not necessarily reflect the views of any organization, agency, or program of the United Nations.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

CPD	Continuous Professional Development
CSO	Civil Society Organizations
ESD	Education for Sustainable Development
ETA	English Teaching Assistant Programme
GCED	Global Citizenship Education
GSP	Global Schools Program
HOTS	Higher Order Thinking Skills
ICT	Information and Communications Technology
IPG	*Institute Pendidikan Guru* (Teacher Education Institutes)
KSBM	*Kerangka Standard Bahasa Melayu* (Standard Curriculum for Bahasa Melayu)
KSSM	*Kurikulum Standard Sekolah Menengah* (Standard Curriculum for Secondary Schools)
KSSR	*Kurikulum Standard Sekolah Rendah* (Standard Curriculum for Primary Schools)
LESTARI	Department of Environment and the Institute of Environment and Development
LNPT	*Laporan Nilaian Prestasi Tahunan* (Annual Performance Evaluation Report)
LINUS	Literacy and Numeracy Screening
MEB	Malaysian Education Blueprint
MOE	Ministry of Education
12MP	Twelfth Malaysia Plan
PADU	Education Performance and Delivery Unit
PBS	*Pentaksiran Berasaskan Sekolah* (School-based Assessment)
PISA	Programme for International Student Assessment
RBT	*Reka Bentuk dan Teknologi* (Design and Technology)
RIMUP	*Rancangan Integrasi Murid untuk Perpaduan* (Integration Plan for Student Unity)
SDG	Sustainable Development Goals
SDSN	Sustainable Development Solutions Network
SICS	School Improvement Specialist Coach
STEM	Science, Technology, Engineering and Mathematics
SLAAS	Sustainable Schools' Environment Awards
TFM	Teach for Malaysia
TIMSS	Trends in International Mathematics and Science Study
TVET	Technical and Vocational Education and Training
UI	Unified Instrument
UKM	Universiti Kebangsaan Malaysia
UN	United Nations
UNESCO	The United Nations Educational, Scientific and Cultural Organization
UNICEF	The United Nations International Children's Emergency Fund
WWF	Worldwide Fund for Nature

1

INTRODUCTION TO THE STUDY

Mission 4.7 is a global initiative of the UN Sustainable Development Solutions Network (SDSN) to advance Target 7 of Sustainable Development Goal 4 (SDG4) globally. Launched in December 2020, by His Holiness Pope Francis; former UN Secretary-General Ban Ki-moon; and UNESCO Director-General Audrey Azoulay; Mission 4.7 promotes Education for Sustainable Development and Global Citizenship. It recognizes the vital role of education in addressing growing sustainability challenges, particularly the climate crisis, that is, and will be, what UN Secretary-General António Guterres referred to as "the battle for our lives".

Shortly after the launch of Mission 4.7, in May 2021, UNESCO held a World Conference on Education for Sustainable Development (ESD) gathered world leaders and professionals from the world's education and sustainable development communities. Several first mover countries, including China, Finland, Germany, Greece, Indonesia, Italy, Japan, Kenya, and Morocco, among others, affirmed their countries' commitments, to varying degrees, to introducing new educational practices and approaches in to ensure their students to receive Education for Sustainable Development (ESD) to equip them in meeting present and future global challenges.

At the time of writing, Malaysia had yet to meaningfully participate in global discussions on ESD. However, there have been statements made by the Malaysian Ministry of Education locally that, while ESD has been incorporated to a certain degree in national primary and secondary school curricula, the Ministry needs to strengthen existing programmes and collaboration to advocate for greater ESD mainstreaming.

A team at the UN Sustainable Development Solutions Network (SDSN)'s Asia Headquarters, hosted by Sunway University in Kuala Lumpur, embarked on a pilot study to ascertain the extent to which ESD is mainstreamed in national education policy; national school curricula (starting with primary schools); and teacher professional development; in order to identify gaps and devise the best options to support the Ministry in its endeavour.

1.1. METHODOLOGICAL NOTE

The research team set out to answer two primary questions: (1) what is the current level of mainstreaming of ESD in national curricula; and (2) what are the major challenges or obstacles to achieving this target that need to be addressed?

This study was conducted via (i) a review of two major policy documents relevant to ESD, the Malaysia Education Blueprint 2013-2025 (MEB) and the Twelfth Malaysia Plan 2021-2025; (ii) review of primary school textbooks and curriculum frameworks; (iii) a series of in-depth interviews

with schoolteachers, school leaders, and experts on the Malaysian education system; and a review of existing literature on ESD in Malaysia.

Thematic analysis of qualitative data was used in the curriculum review and the analysis of interview responses. For the former, data was sourced from the textbooks in which each unit or topic within the textbook was scrutinized for codes related to sustainable development (e.g., the natural environment, health, poverty, climate change, energy, etc.) and recorded. The 169 targets of the 17 Sustainable Development Goals (SDGs) were used as the criteria for the codes. The codes were then categorized into existing and potential ESD topics. These codes were then rearranged and mapped against the SDGs. This methodology allowed us to determine emphasis has been placed on ESD in the Malaysian curriculum. The curriculum mapping was also useful as reference during stakeholder interviews particularly to understand the implementation aspect of ESD.

The richness of the research project's findings emerged mainly from the interviews with 23 education stakeholders, comprising: primary school teachers; primary school leaders; academics in the ESD sphere; UNICEF Malaysia education specialists; Teach for Malaysia; external ESD education providers; and a former Ministry of Education senior official, among others. Again, thematic analysis was used, where responses were coded and classified according to common themes.

Although the number of interviewees is relatively small, i) the interviewees made up a well-represented sample of respondents required for this study; and ii) the responses received achieved a satisfactory level of saturation. Triangulation was achieved by comparing interview responses to challenges identified in the MEB and 12MP; other available literature on comparable themes; curriculum mapping of primary Science English and Malay; as well as through meetings to feedback findings to education experts/ academics.

This report is the outcome of this pilot study. Its findings are confined to national primary schools as an illustration of the national education system, with the acknowledgement that extending the study to secondary schools and a larger number of respondents would enhance its validity.

2

BACKGROUND

2.1 THE SUSTAINABLE DEVELOPMENT GOALS

The world is at a pivotal point, with industrialization and growth on various fronts being achieved at rates never seen before. This rapid growth, however, has come at the expense of other environmental, social, and economic areas of development. Sustainable development calls on us to take a different approach, one that is balanced to "meet the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987). Without sustainable development, already harsh realities such as climate change, biodiversity loss, social inequality, and conflict, will be exacerbated beyond control.

To spearhead this change, in 2015, the world adopted Agenda 2030 and its 17 Sustainable Development Goals (SDGs). Each SDG aims to achieve an aspect of the three pillars of sustainable development: economic, social, and environmental. And yet the 17 SDGs are interconnected and indivisible, recognizing that poverty cannot be eradicated without economic reform, that the economy cannot develop without risk to the environment, and so on.

Malaysia, along with the other 192 Member States of the United Nations, has signed onto these Goals and pledged to meet them by 2030. The SDGs are ambitious and comprehensive, and their achievement requires new ways of thinking and acting, and the participation of not only governments, but of all sectors of society. Sustainable development must occur if we are to have a fair and just society for everyone—including future generations who will inherit the earth we leave behind.

The SDGs enshrine Quality Education as Goal 4, defining it through a series of targets that call for equitable access, accessible infrastructure, relevant skills and teacher training, among others. SDG 4 looks beyond providing access to basic literacy and numeracy and educational infrastructure; to making education the enabler of a better future—a platform to empower learners to become society's changemakers that can play a part in addressing humanity's greatest challenges, including humanity's greatest existential crisis, the climate crisis.

2.2. SDG4 AND TARGET 4.7

Target 4.7. of SDG4 is of special importance because it highlights that quality education is not just a goal but a means through which all the other SDGs can be achieved:

> *"By 2030, ensure all learners acquire knowledge and skills needed to promote sustainable development, including among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of culture's contribution to sustainable development."*

Target 4.7 calls not just for the improvement of education, but for its transformation—a transformation of what, how, and why we learn.

As defined by UNESCO, ESD empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity. It is about lifelong learning and is an integral part of quality education. ESD is holistic and transformational education which addresses learning content and outcomes, pedagogy and the learning environment. It achieves its purpose by transforming society (UNESCO, 2014).

According to UNESCO, Global Citizenship Education (GCED) works by empowering learners of all ages to understand that human rights violations, inequality and poverty that still threaten peace and sustainability, are global, not local issues and to become active promoters of more peaceful, tolerant, inclusive, secure and sustainable societies.

In this report, we use the term Education for Sustainable Development (ESD) in its broadest sense, and to also encompass GCED—the type of education that is relevant and responsive to the changing climate and other human impacts on the environment; competition for land and natural resources; technological advances; trends in urbanization and migration; disease, pandemics and public health issues; persistent poverty and widening inequality; political instability and threats to peace and security; issues of cultural diversity, gender equality, inclusion and human rights; imperatives for sustainable economic development; and the need for 21st century skills. These are all encapsulated within the targets of the SDGs.

Therefore, ESD is concerned with much more than technical knowledge and skills, but also the values, ethics, attitudes and sense of ownership to take responsible action to preserve environmental integrity, ensure economic viability, and uphold a just and peaceful society. And for this to happen, sustainable development themes need to be incorporated across curricula, in all disciplines and at all levels; learning should be student-centered and project-based, to develop critical thinking and problem-solving skills; and schools should model sustainability by adopting a whole-of-school approach, embedding sustainable development not only in the classroom, but in the culture and operations of the school itself.

Realizing the ESD as an imperative is not new. As early as the 1987 Brundtland Report for the United Nations World Commission on Environment and Development (Brundtland, 1987) sustainable development has been linked to education. Since then, there have been numerous other global calls for the incorporation of ESD. See **TABLE 1.**

1987 World Commission on Environment and Development (WCED)	Our Common Future (Brundtland Report) http://www.un-documents.net/our-common-future.pdf	Establishing the definition of Sustainable Development and the role of education within it.
1992 The UN conference on Environment and Development (Rio Earth Summit)	Agenda 21 http://www.un-documents.net/a21-36.htm	Discussed the critical role of education, training and public awareness in achieving sustainable development.
2002 The World Summit on Sustainable Development (Johannesburg Summit)	The UN Decade of ESD http://en.unesco.org/themes/education-sustainable-development/what-is-esd/un-decade-of-esd	The adoption of a resolution to start the UN Decade of Education for Sustainable Development (DESD)
2012 UN Conference on Sustainable Development (Rio+20)	The Future We Want http://www.un.org/en/sustainablefuture/	Promoting ESD and to integrate SD more actively into education beyond the UN DESD. (The end of the Decade)
2014 Global Action Programme on ESD	Aichi-Nagoya Declaration https://sustainabledevelopment.un.org/content/documents/5859Aichi-Nagoya_Declaration_EN.pdf	Follow-up to the DESD, reaffirms ESD as a vital means for the implementation of sustainable development
2014 Global Education for All Meeting (GEM)	Muscat Agreement http://www.uis.unesco.org/Education/Documents/muscat-agreement-2014.pdf	A lead up to the 2015 *World Education Forum*, all governments were called on to support the global goal and targets for the post-2015 education agenda.
2015 The World Education Forum	The Incheon Declaration https://en.unesco.org/world-education-forum-2015/incheon-declaration	Upheld the role of education as a main driver of development and in achieving all the SDGs by a vision of education that transforms lives, communities and societies, leaving no one behind.
2021 UNESCO World Conference on ESD 2030	The Berlin Declaration https://en.unesco.org/sites/default/files/esdfor2030-berlin-declaration-en.pdf	Intensification of support for the ESD 2030 Roadmap of a fundamental transformation on the path of sustainable development.

TABLE 1: Timeline of the development of ESD as an educational imperative

Source: SDSN Compilation

After years of advocacy, however, most countries around the world (including Malaysia, as this report will show) have yet to make the breakthrough to creating a world in which all learners are empowered with ESD and engaged in issues surrounding sustainable development. A recent UNESCO study shows how ESD is largely absent from the K-12 education landscape in most countries around the world (UNESCO, 2021).

The roadblocks preventing such a breakthrough are seemingly universal: curricula that are exceedingly assessment-based instead of experiential; delivery of education that is all too often top-down and mechanical, thus ignoring the need to adapt to special requirements and circumstances; and teachers who are deprived of the much needed-training in sustainable development resulting in a situation where they cannot effectively impart knowledge without first having sufficient knowledge.

2.3 MISSION 4.7—A MISSION TO TRANSFORM EDUCATION

His Holiness Pope Francis, UNESCO Director-General Audrey Azoulay and former UN Secretary-General Ban Ki-Moon launched Mission 4.7 at the Vatican Youth Symposium on 16 December 2020. "At the heart of the SDGs is the recognition that SDG 4 - Quality Education for all – is a necessary foundation for protecting our common home and fostering human fraternity," said His Holiness Pope Francis in his address at the launch.

Mission 4.7 was founded by Global Schools and the SDG Academy, both flagship programs of the UN Sustainable Development Solutions Network (SDSN), in partnership with the Ban Ki-Moon Centre for Global Citizens, UNESCO, and the Center for Sustainable Development at Columbia University.

It is co-chaired by Tan Sri Dr. Jeffrey Cheah, Founder & Chairman of the Sunway Group; Professor Jeffrey Sachs, President of SDSN; Monsignor Marcelo Sánchez Sorondo, Chancellor, Pontifical Academy of Sciences and Pontifical Academy of Social Sciences, representing His Holiness Pope Francis; and Stefania Giannini, Assistant Director-General for Education, UNESCO.

Its objective is to accelerate the implementation of SDG Target 4.7, which calls upon governments to ensure that learners acquire the knowledge, skills, values and attributes needed to achieve the Sustainable Development Goals (SDGs), by:

- Curating, creating, amplifying, and disseminating resources for teaching, learning and enabling sustainable development;
- Identifying and/or developing pedagogical innovations and content that can be incorporated in national education systems;
- Identifying best practices, entry strategies and opportunities to be shared with educators, policymakers and experts around the world.

Research shows that ESD not only empowers students to shape a better world, but also to perform better in school. Students who encounter ESD have better attendance, higher test scores, and are overall more engaged in their learning. Teachers, too, enjoy delivering lessons that touch on core content while engaging their students in understanding the world around them and their role in improving it. ESD is therefore a win-win: better for learning, better for development, and the key to a more sustainable future for countries.

ESD helps to break away from subject-area silos and approach learning through inquiry-based, collaborative, action-oriented methodologies that leverage knowledge and skills across subject areas to tackle real-life sustainable development challenges in learners' communities and globally.

This, however, is not easily done. Each country has learning standards which are often subject- and grade- specific. Aligning national and state standards to lessons in textbooks and curricula is often where most teachers start when they need to develop lesson plans. National and state curriculum standards help to provide standardized learning goals, but simultaneously make lesson planning and adaptation a very inflexible process. There are many who debate the learning standards themselves.

Yet, there are common principles that the education world agrees to that relate to the transformation agenda in terms of curricular content and pedagogy, such as knowledge about earth and climate systems, knowledge that is attained using inquiry-based, experiential methods, and equipping learners with skills and confidence to translate such knowledge into needed action. These common principles are reflected in ESD.

When we consider transforming education, we must start with what, where and how we learn, so that it can reflect the society that we want. ESD provides this basis for transformation.

[left blank]

3

REVIEW OF MALAYSIA'S COMMITMENTS ON EDUCATION FOR SUSTAINABLE DEVELOPMENT

This section will review two major policy documents: the Malaysia Education Blueprint 2013–2025 (MEB) and the Twelfth Malaysia Plan 2021–2025 (12MP); the former charts the educational trajectory for Malaysia, and the latter is the latest 5-year development plan. In analyzing these documents, particular focus was given to sections that are related to ESD or can be accelerated through ESD.

3.1 THE MALAYSIA EDUCATION BLUEPRINT 2013-2025

The MEB was developed in response to increased public scrutiny of the Malaysian education system, and the rising expectations of parents and employers for revamped system - one that can adequately prepare young Malaysians for the challenges of the 21st century. The MEB is therefore a plan to transform the education system to be on par with the best in the world, to develop young Malaysians who can think critically and creatively; have leadership and communication skills; have the values and sound judgement to uphold peace, respect diversity and care for the betterment of their communities. These are articulated in 11 shifts that are collectively to be implemented to transform the education system (MOE, 2013).

The MEB makes no explicit reference to ESD or sustainability, presumably because its release predates the adoption of the SDGs. Nevertheless, 8 out of 11 of the MEB shifts comprise concepts and principles consistent with ESD, and this section will examine the synergies between the relevant shifts proposed in the MEB and outcomes espoused through ESD.

A special unit was established under the Ministry of Education, the Education Performance and Delivery Unit (PADU) to facilitate, support, and deliver the MEB vision. PADU has been tasked to develop strategies and drive the execution of MEB initiatives, monitor its implementation, as well as communicate its progress with the public and gather ongoing feedback. Progress is reported through PADU's Annual Report. PADU also works to provide on-the-ground problem solving and acts as the first point of contact to escalate issues for the Ministry's attention. While PADU supports the implementation and communication of the MEB; the accountability for its results remains under the Ministry of Education.

ESD Attributes in the MEB

The MEB provides the six key attributes for quality education, in line with the National Education Philosophy's (1988) vision of balanced education: knowledge, thinking skills; leadership skills; bilingual proficiency; ethics and spirituality; and national identity.

We find the above attributes (and the elements contained therein) correspond with UNESCO's ESD key competencies: systems thinking; anticipatory competency; normative competency; strategic competency; critical thinking; self-awareness; and integrated problem-solving (UNESCO, 2017).

TABLE 2 provides a summary of how relevant shifts within the MEB can be reinforced by ESD mainstreaming in the public-school system.

The MEB is a very comprehensive policy document to guide the transformation of the K-12 education landscape in Malaysia. While ESD is not explicitly discussed or addressed, the shifts contained within the MEB coincide with and can be further supported by greater ESD transition within the schooling system. The extent to which the MEB outcomes have been realized in the 9 years since its adoption is reported each year via the PADU annual report. The ESD-relevant feedback on the achievement of planned MEB shifts is discussed in Chapter 4 on the findings of this study.

Malaysian Education Blueprint		ESD Value Proposition*
Shifts in MEB	**Details**	
1 Provide equal access to quality education of an international standard.	**Challenges identified:** • Student cognitive performance against international standards is poor, with an emphasis on content knowledge versus higher-order thinking skills (Malaysia is at the bottom third among participating countries in PISA and TIMSS assessments). • Uneven student outcomes in assessment results between children from high and low-income families; between rural and urban schools; and between Tamil schools and Chinese and National schools. • National examinations and international assessments suggest variance in how standards are set and defined. **Intervention proposed:** • Benchmark the learning of languages, Mathematics and Science to international standards. • Revamp assessments to focus on higher-order thinking skills (HOTS). • Intensify support systems for teachers to improve delivery of the curriculum. • Strengthen the quality of Science, Technology, Engineering and Mathematics (STEM) education. • Raise quality and ensure universal enrolment in preschools • Increase resources for students with special needs.	The Malaysian education system continuously strives for international benchmarking of student outcomes. To achieve this, widespread and meaningful ESD implementation accelerates student cognitive abilities to apply learning in different scenarios. This is because within ESD is the recognition that the world is changing and will continue to change. Building this into pedagogies and curricula cultivates learners' capacities for problem recognition and problem solving. Pedagogically, this means engaging students in projects and activities that require discovery and collaboration. The outcome of which is learners transcend disciplinary boundaries to find viable and imaginative solutions. Such skills are tested in international assessments such as PISA and TIMSS. In response to uneven student outcomes, ESD prescribes providing quality education in an equitable and effective manner with foundational literacy and numeracy skills as building blocks for further learning and higher-order thinking skills. A curriculum with strong ESD practice makes the entire ecosystem more resilient in addressing the educational needs of vulnerable groups, undocumented children, and indigenous communities. ESD educators and administrators localise the curriculum to uplift vulnerable students. They integrate the curriculum with skills related to their livelihood. ESD aligns with the MEB intervention to fortify STEM education because it recognises the crucial need for early STEM uptake.

TABLE 2: Summary of relevant shifts proposed in the MEB and their linkage to ESD

Malaysian Education Blueprint		ESD Value Proposition*
Shifts in MEB	**Details**	
2 Ensure every child is proficient in BM and English language and is encouraged to learn an additional language.	**Challenges identified:** • Operational proficiency in English is much lower than in BM • Poor performance in SPM English against Cambridge 1119 standards • Malaysian employers cite poor English proficiency as a key issue among fresh graduates **Intervention proposed:** • Upskill English language teachers • Provide remedial support to students who are weak in English • Provide targeted training to teachers to ensure that they are • equipped to help weaker students catch up • Provide students with greater exposure to the English language, such as through expanded literature modules	ESD prioritises the role of teachers in literacy, especially in English. An essential component of ESD is to train teachers intensively and include international cooperation for teacher training especially in developing countries. Greater international cooperation in teacher training provides a platform for teachers to broaden their exposure to best practices from around the world and disseminate them through lesson plans, especially in English, to the students. It would act as a catalyst to improve the language proficiency of teachers and students and boost their problem-solving and other relevant high-level cognitive, interpersonal and social skills. ESD supports Malaysia's context of multiple languages. Students operating in multilingual settings are better at communicating in a globalised world. ESD supports the MEB's push for greater English proficiency as more languages are enablers for active translation between social groups. Such are the foundations for learners to carry more complex perspectives about the world.

TABLE 2: Summary of relevant shifts proposed in the MEB and their linkage to ESD (continued)

Malaysian Education Blueprint		ESD Value Proposition*
Shifts in MEB	**Details**	
3 Develop Values-Driven Malaysians.	**Challenges identified:** • Students are likely to face a future of unprecedented challenges from environmental degradation to armed conflict • The need to balance global citizenship with strong national identity • Low ethnic diversity among students and teachers in public schools **Intervention proposed:** • Enhance Islamic and Moral studies with emphasis on stronger bonds between students • Holistic development through requirement to participate in one sport, one club and one uniformed body • Enhance programme to foster greater interaction among school types especially for more ethnically homogenous schools	ESD promotes a reorientation of education toward a broader sense of purpose. The ESD curriculum prepares learners to address a future of environmental fragility and social unrest because it supports increasing global perspectives using real-world issues. This cognitive understanding is reinforced by social and emotional learning. Social and emotional learning reinforce existing emphasis on cognitive, academic, and technical competencies of learners. Social-Emotional Learning (SEL) incorporates empathy for each other and for the environment and helps learners to be mindful of their own actions and help break the "myths" of modernity grounded in a utilitarian mindset (individualism, unlimited progress, competition, consumerism, the unregulated market). To further empower learners, Mission 4.7 sees a Global Citizenship Education (GCED) being a subset of Transformative Education. GCED empowers learners to assume active roles, both locally and globally, in building more peaceful, tolerant, inclusive and secure societies.

TABLE 2: Summary of relevant shifts proposed in the MEB and their linkage to ESD (continued)

Malaysian Education Blueprint		ESD Value Proposition*
Shifts in MEB	**Details**	
4 Transform teaching into the profession of choice.	**Challenges identified:** • 50% of lessons are found to be delivered in a passive lecture format • Lesson delivery focused on surface-level understanding, not higher-order thinking skills • High administrative burden takes away from core function of teaching • Teaching profession lacking culture of excellence **Intervention proposed:** • Raise the bar of teachers to be among top 30% of graduates • Review and revamp training curriculum in teacher development institutes • Intensify school-based continuous professional development and best practice dissemination • Streamlining administrative data collection and management processes • Implement competency and performance-based career progression • Implement alternative pathways for career progression to match performance, potential and interest and increase accountability • Empower more teacher autonomy utilising peer-led coaching and best practice sharing	The Incheon Declaration reaffirms the role of teachers in guaranteeing quality education. It is essential that teachers are empowered, supported, motivated and well-remunerated in a well-governed system. The declaration emphasises the role the Government should play in making the teaching profession attractive. This means looking beyond just conducive working conditions. There is a need for gender-sensitive strategies to help attract the most suitable and motivated candidates for teaching. ESD advocates a strategy of effective recruitment, training, deployment, remuneration, and working conditions. Salaries that teachers receive must be at least comparable to other professions which require similar qualifications. ESD teachers gain exposure to international teacher networks. This raises individual teachers' profile and improves public perception towards the teaching profession.

TABLE 2: Summary of relevant shifts proposed in the MEB and their linkage to ESD (continued)

Malaysian Education Blueprint		ESD Value Proposition*
Shifts in MEB	**Details**	
5 Ensure high performing school leaders in every school	**Challenges identified:** • Criteria for principal selection are still primarily driven by tenure rather than competency to lead. • Majority of school leaders do not receive training in the first three years of leadership, or sufficient and relevant training in general **Intervention proposed:** • Support and intense accountability for student outcomes • Coaching from an experienced principal or district School Improvement Partner • Continuous professional development (CPD)	The ESD view of school leaders complements the MEB's interventions. The MEB advocates for school leaders' accountability for student outcomes. The ESD whole-school-approach supports school leaders in achieving this as it solicits accountability from the entire school community to enhance student outcomes. ESD supports school leaders by broadening accountability among stakeholders, including teachers, students, parents, businesses and local community, with each playing a role. By doing this, leaders can steer their community forward as they now have greater resources to mobilise. Accountability in ESD transformation is delivered through plans on implementation for the whole institution. These plans are timebound and specific. In this model, school leaders have more support to ensure their governance and culture are aligned with sustainable development principles. To deliver this whole-institution transformation, school leaders develop skills to involve a wide base of stakeholders. School leaders use democratic bottom-up decision-making processes to involve communities, including young people and parents. Over time, the school community tackles specific sustainability challenges that need to be addressed by the institution. This strengthens the effectiveness and efficiency of school leadership.

TABLE 2: Summary of relevant shifts proposed in the MEB and their linkage to ESD (continued)

Malaysian Education Blueprint		ESD Value Proposition*
Shifts in MEB	**Details**	
7 Leverage ICT to scale up quality learning across Malaysia	**Challenges identified:** • Low level of ICT utilisation in classrooms • ICT usage mostly limited to word-processing **Intervention proposed:** • Internet access and virtual learning facilities in all schools • Repository of online content and video library of high-quality lessons in core subjects • Leveraging ICT for distance and self-paced learning to intensify access to high-quality teaching that may not be accessible in school	ESD is in line with the MEB on digital transformation, even suggesting digitisation be the first order of business. Like basic literacy and numeracy, digital literacy access for students and teachers are seen as a basic right in the twenty-first century, enabling civic and economic participation. The global pandemic showed that those with connectivity and access to digital skills were able to continue to learn remotely while schools closed (and to benefit from other vital information in real time), whereas those without such access and skills missed out on learning, augmenting gaps in educational opportunity and outcomes between and within nations. Even though the pandemic accelerated ICT usage in classrooms and pushed wider student device ownership, gaps in the digital divide exist.

TABLE 2: Summary of relevant shifts proposed in the MEB and their linkage to ESD (continued)

Malaysian Education Blueprint		ESD Value Proposition*
Shifts in MEB	**Details**	
9 Partner with parents, community and private sector at scale	**Challenges identified:** • Untapped parental and community involvement that bears significantly on learning outcomes • Untapped involvement of businesses, non-profits, and community organisations that can contribute resources and capabilities • Untapped private sector-led innovations in public schools' curriculum, teaching and learning, and overall school management **Intervention proposed:** • Parent engagement and communication plan and toolkit • Enhanced role of parent-teacher associations to advise on improvements in curriculum, teaching and learning environments and methods • Expand Trust School model (private sector-led) to more schools to accelerate school improvement	Like the MEB, ESD prescribes mobilising a wide pool of stakeholders. ESD incorporates the following into the school ecosystem: community-based local leaders, families, non-governmental and private sector actors. The MEB interventions are boosted by an ESD lens because of ESD's potential for enhancing students' abilities to apply learning across disciplines. Within ESD, the local community is a valuable setting for interdisciplinary, project-based learning and local action for sustainable development solutions. MEB shift 9 benefits from ESD's whole-of-school approach. As with the MEB, ESD sees the support and understanding of the community and parents as crucial because they provide valuable feedback to schools. A whole-of-school approach results in considering a complex input for identifying both the learners' and the community's specific needs, for the school to best position itself as a pillar of support.

TABLE 2: Summary of relevant shifts proposed in the MEB and their linkage to ESD (continued)

Malaysian Education Blueprint		ESD Value Proposition*
Shifts in MEB	**Details**	
10 Maximise student outcomes for every ringgit	**Challenges identified:** • Evidence suggests that the education system is not allocating funds towards factors that have the highest impact on student outcomes such as teacher training **Intervention proposed:** • Link every programme to student outcomes and remove low impact programmes • Reallocate funding to critical areas like teacher training	In addition to enhancing the classroom and school environment, ESD advocates for efficient education spending with particular focus on teacher development. This is consistent with the MEB emphasis on teacher training. In order to guide and empower learners, educators themselves need to be empowered and equipped with the knowledge, skills, values and behaviours that are required for this transition. This includes understanding key aspects of each of the 17 SDGs and their interlinkages, as well as understanding how transformative actions occur and which transformative pedagogical approaches can best bring them about.

TABLE 2: Summary of relevant shifts proposed in the MEB and their linkage to ESD (continued)

** Extracted from various literature on ESD, predominantly Education for Sustainable Development: A Roadmap (UNESCO, 2020); and Reimagining Our Futures Together — A New Social Contract for Education (UNESCO, 2021)*

3.2 THE 12TH MALAYSIA PLAN 2021-2025

Malaysia's current five-year development plan, the Twelfth Malaysia Plan (12MP), aspires to build talent to meet the needs of a high-skilled economy (EPU, 2021). While a whole chapter is dedicated to developing future talent, the plan, however, discusses education in limited contexts; confined mainly to the enhancement of TVET within the Malaysian education landscape; and increasing access to education, particularly for disadvantaged groups. Alongside increasing TVET uptake, the 12MP interventions related to education include improving preschool and secondary school enrolment rates; and improving Malaysia's performance on international assessments (indicated in PISA & TIMSS scores) scores.

Similarly, while a whole section of the 12MP is dedicated to Advancing Sustainability, no reference is made to ESD, apart from a small section that mentions that "environmental-related education, especially experiential learning, will be further enhanced through collaboration among educational institutions, civil society organizations (CSOs), the private sector and government agencies" in the chapter on Enhancing Energy Sustainability and Transforming the Water Sector (12MP, Chapter 9).

For the purposes of direct ESD linkage, this report will look at the 12MP initiatives related to TVET uptake, enrolment rates and international assessment performance, as shown in **TABLE 3** in the next page.

The 12MP assigns the education sector's main role as the link between the job market and labor productivity. Four main issues have been identified in relation to developing future-ready talent: low student outcomes, lack of inter-ministerial coordination and governance on education, unconducive innovation ecosystem, limited education access for both students with special education needs and Orang Asli students.

The Findings Section highlights ways in which ESD addresses each of these issues.

Relevant 12MP Commitments	Details	ESD Value Proposition*
Improving the Technical and Vocational Education and Training (TVET) ecosystem to produce future-ready talent	In the 12MP TVET is seen as an instrument to increase employee compensation, reduce dependence on foreign labor and improve student outcomes. Its enhancement is proposed though accreditation and ranking of TVET institutions based on graduate employability, industry linkages (such as the creative industry and aerospace) and creation of better job prospects and social spillover benefits in rural areas, and among less privileged groups like students from B40 families, Orang Asli and those in rural Sabah and Sarawak.	ESD views the value of TVET and STEM education as going beyond its ability to prepare students to fill job requirements, but to prepare learners to become change agents. ESD through TVET and STEM education creates opportunities for students to develop systems thinking and to translate that thinking by connecting global goals to local issues, and hence, local action. ESD calls for the transformation of TVET institutions and developing the capacities of educators on knowledge, skills, values and attitudes to achieve sustainable development, with a focus on green-related sectors and those that promote sustainable production and consumption.
Improving access and enrolment in pre-school and secondary school	Pre-school and secondary school enrolment are targeted at higher than 95%. Preschool enrolment has improved steadily to 90.2% in 2020, indicating effective MOE signaling. This was supported by a 10.2% increase in the number of preschool classes between 2015 and 2020. Secondary school enrolment is at 92.4% in 2020 (PADU, 2020), with a lower secondary completion rate of 84.6% (World Bank, 2022). The main hurdle to achieving full preschool and secondary school enrolment is access. This challenge is greatest for the following groups: Orang Asli, rural and special needs students. Subsidized preschool services will be continued and expanded to reach disadvantaged households. Where secondary school enrolment is concerned, the main driving	ESD is in line with achieving universal pre-primary enrolment. The implementation document for SDG 4, the Incheon Declaration advocates for one year of free and compulsory quality pre-primary education. Unlike government primary and secondary schools, preschools in Malaysia are not free. Both government and private Malaysian preschools charge fees. ESD complements the existing Malaysian full school enrolment objectives. While full access and enrollment is important, however, implementing ESD approaches in pedagogy at all levels of schooling serves to enhance the transformative potential of current education efforts as it stresses the socio-emotional and behavioral outcomes of learning, in addition to cognitive outcomes.

TABLE 3: Summary of relevant sections in the Twelfth Malaysia Plan and their linkage to ESD (continued).

	factor is to improve access to higher paying jobs and social upward mobility.	
Learning outcomes as evidenced in international assessment performance	Malaysia's PISA scores have increased in Science and Mathematics since 2012. The Reading category has shown inconsistent progress, with a decrease in 2015 followed by an increase in 2018 (See **Figure 1**). Like the PISA, Malaysia's TIMSS scores have been inconsistent in the past two cycles. 2019 scores were lower than 2015 but both were higher than 2011. The lowest scoring year was 2011 which marked the lowest point in a decline since 1999. Despite the historical score analysis showing inconsistent progress, the 12MP reports improvements for both assessments. For TIMSS, this is due to the use of paper-TIMSS scores for 2019. For PISA, this is due to the comparison of the latest assessment in 2018 with 2012 rather than 2015, presumably due to the 2015 sample not meeting PISA's minimum response rate. Both PISA and TIMSS scores are below the international benchmark (See **Figure 2**). Malaysia has participated in TIMSS since 1999. The assessment was conducted via paper until 2019, when Malaysia opted for eTIMSS.	PISA and TIMSS assessments aim to determine a student's ability to apply mathematical and science skills to everyday life situations. ESD supports students to perform better in the PISA and TIMSS because ESD emphasizes the application of existing skills to contexts in everyday life. A key competency of ESD is integrated problem solving, where learners have an overarching ability to apply different problem-solving frameworks to different contexts. Meaningful ESD implementation supports holistic inculcation of curiosity, socio-emotional connection, and behavioral responses. ESD allows deeper, long-lasting learning of curricular elements. ESD enables learners to develop themselves as collaborators and communicators who encourage others to apply knowledge. Such skills are emphasized in ESD through self-reflection skills, values, attitudes, and motivations acquired via learning activities. With these skills, Malaysian students will be better positioned to overcome test anxiety and apply learning to unfamiliar scenarios.

TABLE 3: Summary of relevant sections in the Twelfth Malaysia Plan and their linkage to ESD (continued).

** Extracted from various literature on ESD, predominantly the Incheon Declaration and Framework for Action for the Implementation of Sustainable Development Goal 4 (UNESCO, 2016); Education for Sustainable Development: A Roadmap (UNESCO, 2020); and Reimagining Our Futures Together — A New Social Contract for Education (UNESCO, 2021)*

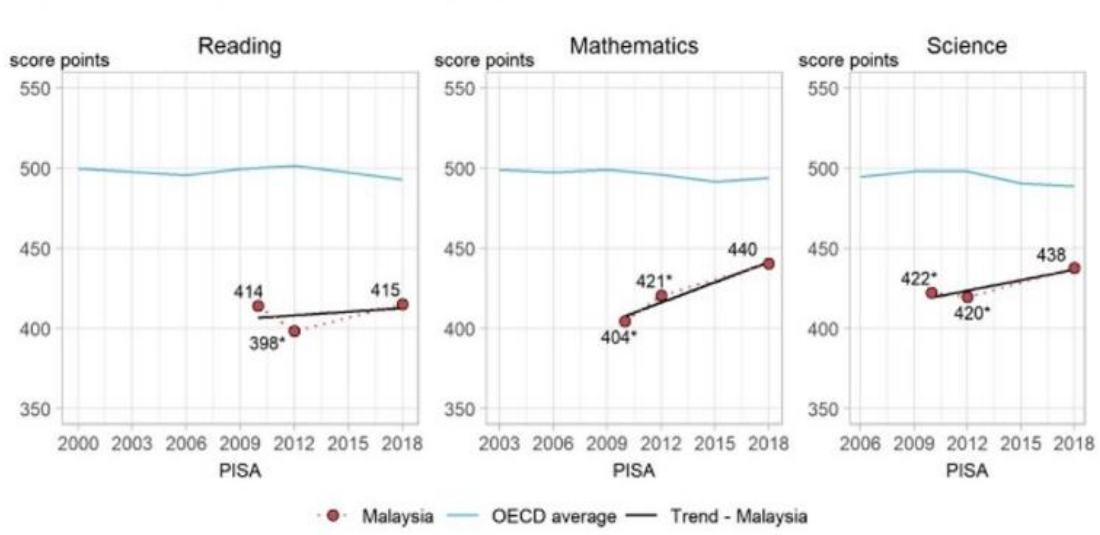


FIGURE 1. PISA Trends in Reading, Science and Math, 2009-2015.

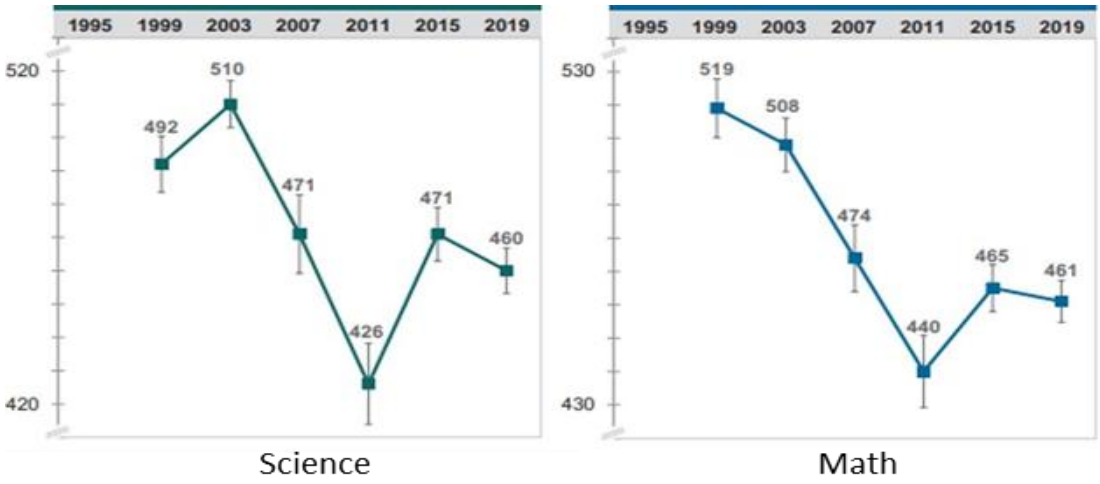


FIGURE 2. TIMMS Trends in Science and Math, 1999-2019.

3.3 REVISED CURRICULA FOR PRIMARY AND SECONDARY SCHOOLS (KSSR AND KSSM)

Since the creation of MEB the Ministry has reiterated its commitment to elevate the quality of Malaysian student outcomes to a level at par with the top third of education systems in the world. In line with the National Education Philosophy, the Ministry's approach to education is focused on developing students holistically which includes aspects of intellectual, spiritual, emotional, and physical development, alongside a strong sense of national identity. That includes the emphasis on the application of knowledge and the development of critical, creative, and innovative thinking skills, as well as providing students the opportunity to learn arts, be involved in at least one sporting activity and other co-curricular activities. Holistic assessment methods will also be used via National Examinations and school-based assessments or *Pentaksiran Berasaskan Sekolah (PBS)*.

Some of the key measures that have been introduced in MEB with regards to improving learning experiences for students are:

- Redesigning the primary and secondary school curricula (KSSR and KSSM respectively) to align with international standards;
- Upgrading assessment frameworks to increase items that test higher-order thinking skills and to move towards standard referencing in school-based assessments;
- Intensifying teacher support to ensure the written curriculum is accurately translated into classroom teaching through better teaching resources and an expanded performance improvement system known as the School Improvement Specialist Coach (SISC+) system; and
- Introducing Literacy and Numeracy Screening (LINUS) 2.0 with an expanded scope to address English literacy.

In order to initiate all these key reforms, the Ministry has enlisted the help of UNESCO and Universiti Kebangsaan Malaysia to assess different aspects of curriculum development and implementation. The curriculum is studied according to UNESCO's three dimensions of curriculum (UNESCO, 2010). Its local implementation is briefly described in **TABLE 4.**

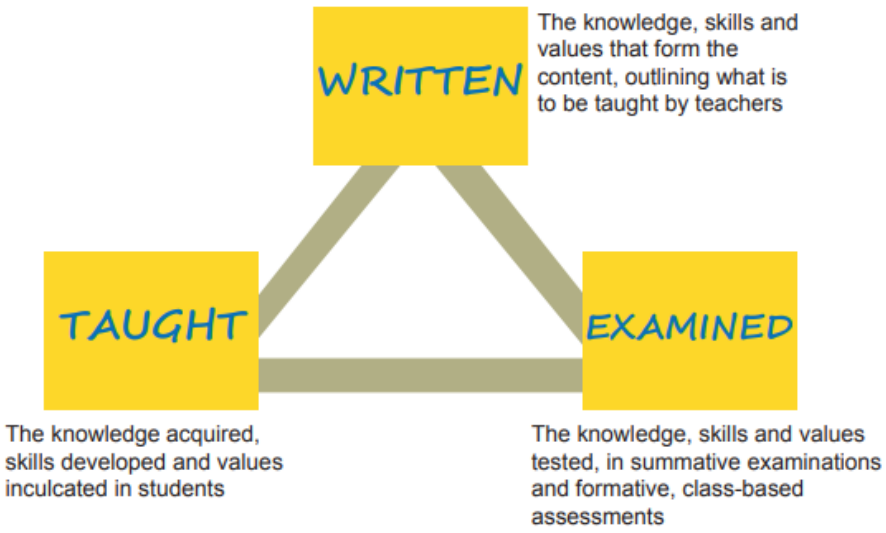


FIGURE 3. Three Dimensions of Education.
Source: UNESCO.

Written The knowledge, skills and values that form the content, or the 'written curricula', outlining what is to be taught by teachers.	The Ministry of Education has prepared a comprehensive range of languages, math, science, social science, and humanities subjects in the written curriculum.
Taught The knowledge passed on, disseminated, skills developed and the values inculcated in students.	• The new KSSR and KSSM will offer an increased focus on higher-order thinking to maximize the full potential of learning in classroom • Beyond formal classroom, the Ministry encourages active involvement in sports and co-curricular activities through the newly developed initiative, the *Rancangan Integrasi Murid untuk Perpaduan* (RIMUP) program which will allow students from different school types, public and private, to mix during sports and co-curricular activities
Examined The knowledge, skills and values tested in summative examinations and formative, class-based assessments.	• The assessment mechanism to test students' knowledge, skills, and values, either in national examinations such as the SPM, or through formative and/or class-based assessments that guide teaching • The new school-based assessment format initiated in 2011 includes four main components: School Assessment, Central Assessment, Psychometric assessment, and Physical activities, sports, and co-curricular assessment

TABLE 4: Three Dimensions of the Malaysian curriculum

In order to achieve this goal, MEB has dedicated a specific focus to re-assessing its curriculum and assessment, provisions for delivery of Science, Technology, Engineering and Mathematics (STEM), language policy, provisions for students with specific needs, and finally, its ability to translate policy into action for school improvement.

The work was organized in three waves:

Wave 1 (2013 - 2015): Improving the current curriculum and preparing for structural change	In the first wave, the Ministry has rolled out several initiatives to improve the written, taught and examined curricula individually, as well as to create tighter alignment across all three dimensions. The Report Card & the Annual Report released by PADU in 2015 highlights few key initiatives completed during this wave: • To incorporate Higher Order Thinking Skills (HOTS), the Ministry introduced i-THINK Online Course (Kursus i-THINK Dalam Talian, KiDT) for teachers from 8,893 schools using 25 self-access training modules and;

TABLE 5: Three Waves of Curriculum Enhancement in the MEB

	• Unified Instrument (UI), or *Penilaian Bersepadu Pegawai Perkhidmatan Pendidikan* was approved to replace the Annual Performance Evaluation Report (*Laporan Nilaian Prestasi Tahunan*, LNPT) to measure the performance and competencies of teachers and head teachers. • Integrating several initiatives to improve STEM and Language Proficiency: LINUS 2.0, English Teaching Assistant Programme (ETA), OPS-English, and few others.
Wave 2 (2016 - 2020): Rolling out new and revised curricula	• MOE has introduced the revised Standard Curriculum for primary schools (KSSR) and the new Standard Curriculum for secondary schools (KSSM), starting with Year 1 and Form 1 respectively in 2017. The new curriculum is to include more than 70% of higher-order thinking skills (HOTS) components • At the end of 2017, the Ministry began updating the Orang Asli and Penan Curriculum, an exercise that was to continue till 2018. • The revised curriculum added few noticeable components: Computational Thinking Skills, and the uses of ICT, • Based on the PADU's Annual report 2020, the Ministry revised and worked to improve the Standard Malay Language Framework, or *Kerangka Standard Bahasa Melayu (KSBM)*, for Malay language curriculum development within the ministry.
Waves (2021 - 2025): Rolling out new and revised curricula	At the time of writing, there was no updated information released by the ministry on the MEB vis a vis Curriculum development.

TABLE 5: Three Waves of Curriculum Enhancement in the MEB (continued)

Mapping the Primary School Curriculum against ESD

In Phase I of the pilot study, the team engaged in a Curriculum Mapping exercise of primary school Science, English and Malay language syllabi to assess how ESD components are included in the national curricula. This was followed by a preliminary review of more ESD-centric curriculum and programs (Ontario curriculum, GSP, UNESCO, WWF) to establish a comparison of approaches. Our study shows that within the revised curriculum (introduced by MOE in 2017) there are indeed lessons related to ESD (See **TABLE 6**.)

TABLE 6 summarises the extent of ESD incorporation in Science, English and Bahasa. The detailed curriculum mapping of the three subjects, as well as the criteria for curriculum mapping, is included in **Appendix 1.** No incorporation of ESD was observed in Math; and other curricula such as History, Visual Arts Education, Design and Technology, Moral and Islamic Studies were not included in the scope of this pilot study.

SDG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	GCED
SCIENCE																	
Year 1															○		
Year 2												○			○		
●○Year 3			●											○	●○		
Year 4			○				●				○	●○		○	●○		
Year 5						○			●				●	●	●		
Year 6									●			●		●	●		
MALAY																	
Year 1	○		●	○					●					●	●		○
Year 2	○	○	●						○								○
Year 3			●						○								●○
Year 4	○	○	●						○			●		●	●		○
Year 5	○	○	●						●			●		●	●		●○
Year 6			●					○	●○			●		●	●		○
ENGLISH																	
Year 1			●	○								●	○	○	○		
Year 2									●			●		●	●○		○
Year 3			●														○
Year 4														●			○
Year 5													○		○		○
Year 6	○		●	○								●					●○

● Lessons with ESD Relevance

○ Potential ESD Lessons

●○ Some relevance to ESD with potential to be enhanced

TABLE 6: Summary of ESD incorporation in Science, Malay and English

Source: SDSN Analysis

Despite the presence of ESD topics, our review of the primary school curriculum indicates the lack of clear explanations on how lessons link to sustainable development, and very limited exercises for the teachers to use as guides to maximize teaching effectiveness. A similar challenge was recognised in the MEB as well as cited the UNESCO review of Malaysia's education policy (UNESCO, 2012) that there was little evidence that teachers knew about or understood the implications for classroom practice of concepts fundamental to the philosophy and objectives of the curriculum. This finding is supported in the responses from in-depth interviews elaborated in **Chapter 3.**

Many of the existing ESD elements are disproportionately focused on the environmental pillar of sustainable development across all three subjects. Instead, and as mentioned by Crowther & Seifi (2022), the three pillars need equal treatment to ensure sustainable development, which also applies to education. It is crucial to ensure that the three pillars are equally represented in the curriculum without having any one pillar overshadowing the other. This would ensure that the students can understand sustainable development holistically, relate it to their daily lives, and not narrow their understanding to assume that global issues primarily revolve around environmental issues.

The curriculum mapping exercise helped the team identify the disproportion within the syllabus and created a platform to recognize the potential ESD and GCED topics within the curriculum that need mainstreaming. These topics (**Appendix 1**) would be able to bridge the gap in creating a well-balanced holistic curriculum. A holistic curriculum is a much-needed approach that looks beyond core academics and the environmental aspect but also integrates students' emotional, social, economic and ethical needs. This is also the essence of the Malaysian Education Blueprint, which focuses on educating students holistically by developing their worldviews and instilling the right set of attitudes, values, and behaviors.

The research team also studied the Ontario curriculum as a point of comparison with the Malaysian curriculum, for two main reasons: first, Canada places among the top-tier countries in international education assessments, such as PISA; the Sunway International School, which uses the Ontario curriculum, was accessible to the research team to use as a case study. The case study is provided in **Appendix 2.**

[left blank]

4

SALIENT FINDINGS FROM STAKEHOLDER INTERVIEWS

The richness of the research project's findings emerged mainly from a series of in-depth semi-structured interviews with schoolteachers and experts on the Malaysian education system. At the time of writing, 22 schoolteachers and other education stakeholders, comprising: school leaders; academics in the ESD sphere; teacher trainers; UNICEF Malaysia education specialists; Teach for Malaysia Fellows and leaders; external ESD education providers; and a former Ministry of Education senior official.

Despite the number of interviewees being relatively small, i) the interviewees made up a well-represented sample of respondents required; and ii) the responses received achieved a satisfactory level of saturation. Triangulation was achieved by comparing interview responses to challenges identified in the MEB and 12MP, available literature on comparable themes, the curriculum mapping of primary Science English and Malay; as well as through meetings to feedback findings to education experts/ academics.

Interview responses were recorded, transcribed, coded and thematically analysed. This multimethod, multidisciplinary collaborative research was insightful. It permitted cross-validation, and facilitated exploration, of issues that influence the decision making of teachers, school leaders and policymakers, as well as their lived experiences and concerns.

Our findings can be categorised according to the three following themes, each of these will be expanded upon in the following sections:

- Teacher professional development;
- Curriculum;
- Whole-of-school approaches.

Quotes have been selected to provide elaboration. Only quotes that reflect common views among interviewees have been selected.

4.1. TEACHER PROFESSIONAL DEVELOPMENT

Teachers have been and remain the foremost actors in any educational system and are vital in preparing students adequately for the futures they face. In the case of ESD, teachers play an extremely important role in facilitating learners to think differently, to transition to sustainable ways of life, and problem solving in myriad areas related to sustainable development. In an age of immense

and boundless information and technological advancement, teachers' roles too are changing in significant ways. The ways teachers are recruited, trained and empowered, in turn determines their ability to empower their students. They must first be equipped with the knowledge, skills, values, attitudes and behaviors that correspond with sustainable development to be able to likewise equip those in their care.

The teacher training machinery in Malaysia is comprehensive, delivered through Teacher Education Institutes (Institute Pendidikan Guru, IPG); or alternatively, education-related programs offered by local universities. The former has high entry requirements introduced in response to the MEB (a minimum of 5As in the SPM examinations, the centralized high school completion examination). If candidates do not qualify for IPG, however, they have the option to apply to education-related programs offered by local universities with lower entry requirements. Graduates in other fields from any accredited local or overseas university can also enter the teaching profession by obtaining an additional teaching diploma.

In-service professional development occurs most often when there are changes in the curriculum that need to be explained to teachers but targeted at teacher representatives rather than the entire teaching body. Other training is conducted on a piecemeal basis and for limited numbers.

According to our stakeholder interviews and literature review, ESD is found to be lacking in both initial teacher training as well as continuous professional development in Malaysia. Teachers feel ill-equipped to impart skills, in which they themselves are not adequately equipped (Kamis et al., 2017). Aside from ESD, what was further revealed is that teacher professional development, in general, has limited reach and effectiveness.

I. *TEACHER PROFESSIONAL DEVELOPMENT IN SUSTAINABLE DEVELOPMENT IS LACKING*

Teachers do not get sufficient in-service training in ESD to be able to effectively incorporate its elements into existing subjects. According to respondents, they have not heard of courses or training offered by Teacher Education Institutes that explicitly relate to sustainability, whether at the pre-service or in-service stages. With limited knowledge and exposure to sustainable development concepts, it is difficult for teachers to deliver ESD beyond a superficial level in the classroom even when elements of ESD are present in the syllabus. For teachers that have the interest and the motivation, they would take the initiative to seek out such courses in ESD externally.

"Sustainable Development Goals or sustainability-type of training is not really done for teachers. It's all under our own initiative".

- School teacher, Teluk Intan

On one hand, independent teachers can upskill themselves to deliver ESD. On the other hand, teachers are left to carry out their own professional development to bridge the knowledge and skills gap. When ESD training is perceived as scarcely available, teachers are more likely to feel dejected in their pursuit of ESD delivery as upskilling effort is squarely put on the individual. The effort to upskill additionally requires independently identifying training providers, assessing their suitability and attending training.

For nationwide implementation of ESD, the training material should easily guide teachers. ESD lesson plans require guiding instructions as well as an outlet (formed at school-level, district-level or state-level, according to best arrangement) where teachers can go for help. Whereever the support

set up may be set up, having easy access to auxiliary support personnel who are truly keen on seeing teachers succeed in transitioning into an ESD-oriented is integral to ensure ESD implementation is truly impactful. Support personnel are also necessary information sources for identifying and firefighting gaps in ESD roll-out.
The current upskilling on an individual basis needs a widespread inculcation strategy rather than difficult initial access to training and individually-initiated upskilling. Widely sanctioned teacher professional development will enable a larger base of teacher population to obtain an orientation into ESD. The breadth of reach will address the accessibility and availability issues highlighted above.

This links to the whole-of-school approach where school leaders can holistically manage teachers' training opportunities and support them in identifying suitable training to develop professionally.

II. *THE CURRENT SYSTEM OF IN-SERVICE TRAINING IS HIGHLY SELECTIVE AND INACCESSIBLE TO MANY*

"All the training, at district level, or even state level, even KPM level was not informed publicly to all the teachers, the access to registration or to be a participant for the relevant courses, it goes like a kind of under the table, within the circulation of people that they know".

- School teacher, Ipoh

The limited number of teachers sent per school for Ministry-organized training makes teachers feel that training opportunities are scarce. Teachers reported that any expectation to attend training is unlikely to be met and therefore adjust their expectations, accordingly, further thwarting a culture of continuous development in the teaching profession.

There is also a lack of transparency regarding available training opportunities. Ministry-organized multi-day training is only made known to certain schools, via the education department and, thereafter, to certain teachers via the school leadership, affecting accessibility to continuous professional development

This issue is not confined to ESD roll out, but with the penetration of any professional skill. Only teachers who are part of exclusive communication channels would receive access to training opportunities. ESD training available globally, organised by UNESCO or education NGOs, is also a matter of exclusive access.

Only teachers who are on the mailing list would become aware of these opportunities. In contrast, centrally-organised trainings may adopt an open dissemination approach to communicate the fair disbursement of professional development opportunities.

Establishing clear communication channels for training opportunities establishes an inclusive culture where teachers have access to centrally organised trainings. An open approach to communicating training offerings will reduce the need for social cliques and reduce resentment among disadvantaged staff members. Fair access to and awareness of training opportunities at the periphery sets the stage for a higher sense of equity among the teaching body.

"Actually, the Ministry is providing this training [on delivering updated curricular methods or elements] but this training is lacking because they are not giving to all the teachers. Sometimes if that school has 20 science teachers, they only call one. And that one teacher will have to go back to the school and deliver that. When they do that, I think it has not 100% been delivered [sic.].".

- School teacher, Kuala Lumpur

"Sometimes, because they have a shortage of time, some teachers just send a picture of themselves standing in front of a projector screen as one of the pieces of evidence that the training has been cascaded in the school, when actually it has not."

- School leader, Petaling Jaya

This approach complements ESD as its ethos is in line with the need for sustainable development to address uneven development by making opportunities available in a public way so as to reduce the need for patronage and exclusivity.

III. *CASCADING MODEL OF TRAINING NOT ACHIEVING DESIRED OUTCOMES*

A cascading approach to training is used by the ministry for efficiency of reach as is used mainly when training is required to impart updates to the curriculum, where the head of the subject for the school is usually designated to attend the training and to then pass on the learning to other teachers of that subject through a peer-to-peer learning system. However, respondents feel such a hierarchical approach reduces the information that is to be cascaded and is seen as ineffective and unrealistic. Teachers need more than attending one-off training programs in order to effectively train others. Evaluation of training outcomes is done via a 'check-box' reporting system with photographic evidence given in support of the cascaded training having been completed, but without emphasis on outcomes. Respondents reported that cascaded training is often diluted, for example a three-day training could be shared with peers in a session of just a few hours.

The cascading model was a concerted effort by the Ministry of Education to overcome "message dilution and distortion" of information upon large-scale filtering down to the teachers. It works by having trained teachers, with the help of their principals, running in-house sessions to equip other teachers. Teachers are equipped with comprehensive training packages, with guidebooks, video recordings of sample lessons and sample lesson plans. The current model was implemented during the KBSM roll out (1989 - 1993) and was a second iteration of the Ministry of Education's approach to implement large-scale curriculum changes. Overcoming this hurdle of effective change management proves crucial to ESD as it requires transformation at scale for multiplier effects to take place.

In comparison, the pre-KBSM model had selected teachers attend in-service training at the national level, who upon return to respective states and districts, would transfer their knowledge and skills. Despite the cascading approach being an improvement on the pre-KBSM model, the problems of effective training still remain. Gaps in addressing theoretical underpinnings of the syllabi or suggested pedagogy and training packages could not differentiate according to teacher

competency level or to differences in school contexts (Lee, 2006). Resolving the mechanism for large-scale in-service teacher training is integral to effective ESD implementation for transformative learning.

IV. *PROFESSIONAL DEVELOPMENT IS TARGETED AT THE BEST PERFORMERS RATHER THAN BY NEED*

Unless one has attained the 'Excellent Teacher' ('guru cemerlang') rank, teachers rarely can attend professional development courses organized by the Ministry of Education. This is particularly true in bigger schools where early career teachers have less opportunity for training. Improving and increasing teacher professional development for all teachers would establish teachers' expectations for professional development opportunities and set them on a path to pursue professional development in a continuous and periodic manner throughout their careers.

The above situation is one of favouring experienced, high-performing teachers, and resulting in early-career teachers entering the profession only to find a lack of professional development opportunities. In Malaysia, formal upskilling and new curriculum training opportunities are more likely to be centrally or externally organized. These are organized by either the Ministry of Education or affiliated training providers. Teachers may count training to their continuous professional development KPI as long as they obtain proof of attendance and completion. Early-career teachers, especially those in rural settings, may face multiple challenges in independently arranging their own professional development. Barriers need to be lowered for motivated teachers of all ranks to enter training.

Apart from restricting entry for non-*guru cemerlang*, the Ministry of Education can direct schools to developing more robust in-house collaboration between teachers. A culture of in-house knowledge exchange, sharing students' work examples, approaches to deepening learning, can help meet the need for greater focus on pedagogy and instructional design. Teachers attending external training have the difficult task of bridging new knowledge with existing practices. The in-house professional development model can prove more effective than one-off, external training only for eligible teachers.

"They do it in a very closed system, it is not open, and it is not reachable to all… If you are a normal teacher, hardly you will be called for any professional development courses. Before I became a 'guru cemerlang', because I saw many 'guru cemerlang' were the ones getting the chance [for training], so I took my own initiative, I also want to go and learn, I go and find out in internet, I collaborate with global teachers' platforms to acquire the knowledge [sic.]."

- School teacher, Ipoh

V. *TRAINING PROGRAMS LACK RELEVANCE TO THE NEEDS OF THE CLASSROOM*

Respondents reported that current training does not adequately prepare teachers to deliver the syllabus in their respective contexts whenever changes are made. Understanding of principles and concepts of new curricula remains weak and classroom practice remains traditional. Following the release of the MEB and the emphasis on higher-order thinking skills (HOTS), teachers reported that they need to be retrained in teaching approaches that support HOTS. However, more skills are needed for eventual change in classroom practice. For example, student mentoring skills - which complement delivery of HOTS are not emphasized enough in teacher professional development opportunities, especially to support weaker and more disadvantaged students. Even in HOTS courses, time constraints prevent sufficient delivery of new teaching skills, how these can be applied in classrooms and be better matched to outcomes.

"When attending training in HOTS, the main takeaway for teachers is a list of sample HOTS-type examination questions and a list of possible HOTS-type answers. So, the culture of assessment and memorization is unchanged."

- Malaysian education expert

Another example of training requiring more classroom implementation practice is Information and Communication Technologies (ICT)-related training. Pandemic-catalysed ICT training to enable online learning was limited by the respondents' lack of understanding in education pedagogy to harness technology for the best learning outcomes. Pedagogical approaches for such learning is required to complement technological skills. Teachers requested support in figuring out the pedagogical approaches to facilitate student participation using online content and delivery.

"Senior teachers are good at handling students while the new teachers are more tech-savvy and creative. Each generation of teachers have different ways to carry out their lessons. They should work closely together to share skills."

- School teacher, Subang Jaya

For teacher training to be effective it needs to be relevant to the teachers being trained. Teacher training in HOTS is expected to equip a teacher with the tools to improve student outcomes. Students are expected to arrive at better outcomes when teachers attempt to facilitate learning in HOTS. In practice, however, teachers face barriers when translating the training into their own practice. For students to benefit from HOTS, teacher-facilitated activities are channels for student participation. Only under circumstances where teachers facilitate (rather than teach) and students learn through participation can teachers be effective in nurturing students with skills. This on-the-job transitioning requires additional skills. In-house support for such skills will cement the effectiveness of training. Such is the case for any form of teacher training. Complementing the MOE-organised training with personalized on-the-job feedback, rather than attending another "one-size-fits-all" professional development training, closes the "last-mile" issue of relevance.

"For the sake of paperwork, what the teachers do is they just copy lesson plans from here and there they just put it up and file it […] Evidence has been emphasized in the paper material rather than seeing the product. We must focus more on the process, how the teachers do the teaching and learning in the classroom, and we must improve the process of delivery of the lesson in the classroom, rather than looking at the paperwork [sic.]."

- School teacher, Ipoh

VI. *THERE ARE GAPS IN MONITORING AND EVALUATING TRAINING OUTCOMES*

Respondents reported a lack of follow-up to training attended, and training is not linked to action plans or outcomes. Teachers have a desire for the Ministry to place more emphasis on actual improvements in teaching and learning, for example through spontaneous classroom observations, mentoring, and other forms of follow-up support, rather than the current emphasis on paper reporting. Allocating resources to nurturing improvements in lesson delivery is, according to respondents, more effective than resources currently spent on reporting systems.

The need for teachers who are especially trained in supervisory support for other teachers is one of the issues raised for effective training-to-classroom implementation (Lopes, 2019). A post-training support mechanism at the school-level can stand in for follow-up by trainers. Having in-house support can pave an easier path for teachers to implement training into classrooms.

Effective curriculum update implementation requires support systems at the school level. Teachers with supervisory skills form the pillars of supporting teachers to transform their classroom approach, and gradually experiment with these new approaches. Multiple instances of facilitated peer coaching sets the culture as one where teachers can speak openly about the challenges they face and feel supported in their chosen approaches to improve learning outcomes for students.

4.2 CURRICULUM

Changes to curricula make up the main component of education reform in any country, including Malaysia, and since students' learning experiences are heavily dependent on the structure of the curriculum, curriculum revision has always been Malaysia's effort to meet the demands of the times through education as best as possible. Major curriculum reforms took place, first, in 1956 with the Razak Report, where a standardization of syllabus was needed and with the Malay language made a compulsory subject (alongside English) to act as the unifier amongst the various ethnic groups. Following the 1969 ethnic riots, another major revision was made where the conversion of English medium schools to the Malay medium was hoped would enforce a more unified and equal educational experience for all. In 1991, the introduction of then Prime Minister Mahathir Mohamad's Vision 2020, with its goal of increasing competitiveness in a globalization era to eventually make Malaysia a high-income country by 2020, education policies were aimed at building human capital that will power a knowledge economy.

In response to concerns that the Malaysian education system was not adequately preparing students for the 21st century, leading to the development of the MEB in 2013, the curriculum was again to be enhanced with an increased focus on important 'soft skills' such as creativity, innovation, entrepreneurship ICT, and the incorporation of analytical and higher-order thinking (MOE, 2013). This is consistent with international trends to transition students away from memorizing information and towards the development of life and work competencies.

The most recent curriculum changes (introduced by MOE in 2017 with the KSSR and KSSM curricula) was in response to the MEB call. According to the MEB, the curriculum reformation would be: "In line with the National Philosophy of Education (NPE) [which was introduced in 1988], the Ministry's approach is focused on developing students holistically. This means, the education system addresses intellectual, spiritual, emotional, and physical development, alongside a strong sense of national identity" (MOE, 2012, p.4-2).

As Aai (2014) points out, however, the NPE has not been changed since 1988 making it less compatible with the education environment of today. As she put it, "the concerns of Malaysia's rapidly degrading environment is conveniently absent". Such hints point towards potential areas for curriculum enhancement.

This study's review of the KSSR saw the alignment of some topics with ESD in Science, English and Malay, as the previous chapter has shown, addressing themes such as renewable energy, the natural environment, and waste; and with greater use of digital education as (also observed by Yussof [2022]). However, there are limited exercises or explanations for teachers to use as guides to maximize the effectiveness of the lessons, especially those that reflect local realities. For example, the review of the primary Science textbook found that the lack of clear links between ESD elements in lessons to fundamental concepts of sustainable development. This is a challenge consistent with the observation in the UNESCO review of the Malaysian curriculum that there was little evidence that teachers knew about or understood the implications for classroom practice of concepts fundamental to the philosophy and objectives of the curriculum (UNESCO, 2012).

This is one of the gaps that has contributed to relatively low levels of knowledge on sustainable development among students, as also evidenced in an earlier study by Mumtazah and Norhafidah (2009) that found that 67.7% of 1524 Form 4 students (age 16) had no knowledge regarding sustainable consumption. Another study by Noordin and Sulaiman (2010) of 340 secondary school students also revealed that students possessed relatively low levels of knowledge, values, and participation in matters related to sustainable development.

Despite the recent abolishment of some national examinations to make way for more school-based assessments, it was observed that the classroom environment remains heavily assessment-oriented. Furthermore, the role assigned to education in the MEB is skewed towards "providing a foundation for nation building and sustainable economic growth in line with Malaysia's goal of transforming into a high-income nation" and "to produce individuals that are able to thrive and compete globally". In such an environment, the neo-liberal growth-driven mindset prevails through the education system. As Mustam and Daniel (2018) point out, therefore, the infusion of ESD is not given priority. ESD could in fact be deemed as burdensome distractions (Balakrishnan, 2021).

The findings from interviews were consistent with the observations made in the curriculum mapping and literature review.

I. *CLASSES FOCUSED ON COMPLETING THE SYLLABUS AND TEACHING TO THE TEST*

"Most of us refer closely to the official syllabus. If the ESD element is present, we teach it the way it is written. Some of us go beyond that, but most would not."

- School teacher, Trolak

With completion of the syllabus and examination scores being key performance indicators, the bulk of teaching and learning occurs in a passive lecture format towards this end and mainly to prepare students for formal assessments (national examinations or school-based assessments). Even with the abolishment of two out of three major national exams, the transition to school-based assessment has not changed the culture of teaching and learning with the purpose of scoring in assessments. Respondents reported that not much space is allocated to critical discussions or inquiry-based learning on pressing issues such as health, poverty, inequality, the economy, climate change or environmental degradation. While there are elements of the environmental aspects of sustainable development in the curriculum, socio-economic and governance aspects are very minimal.

More support and guidance is required to transition from the syllabus-for-exam vs real-world dichotomy into a syllabus-is-real-world immersion. Teachers aspire to bring real-life issues into the classroom in ways which would pave the way to student empowerment to eventually resolve them. Teachers eagerly attempt creative approaches to bridge the syllabus with current events.

Such is good news as the creative approaches teachers undertaken have greater room to develop given the abolishments of both the primary-level national examination and lower secondary national examination. Precaution needs to be taken, however, as the abolishment of examinations does not immediately lead teachers away from exam-oriented experiences. Balakrishnan (2021) notes from his experience in Malaysian schools that despite the Education Ministry's move away from examinations, "the assessments culture continues to dominate the school experience of Malaysian students" this despite shifting away from exam-centricity (p. 264).

Learning in schools can be enhanced by facilitating a link between the curriculum content standards and real-world dynamics, rather than being exam oriented. To this end, other stakeholders in students' lives can be prompted to reduce emphasis on exam results and, instead focus on content standards. Students see the need to learn when they see the relevance of their curriculum to their surroundings; parents can emphasise students' application rather than doing well in term tests. To achieve this, the ministerial thrust of education for national identity and for participation in modern economy can afford to transition into an education for application in the real-world and its complex dimensions.

"Most existing ESD lessons are environmental-related. Many issues I can say are equally important, but missing because maybe ESD is not fully understood, or some are too sensitive to talk about in the classroom, such as some social issues or governance issues [sic.]."

- School teacher, Kuala Terengganu

II. *LIMITED LOCAL CONTENT AND CONTEXT TO MEANINGFULLY SUPPORT ESD*

Respondents admitted that there is a general lack of resources within existing educational support systems (including the written curriculum) to incorporate ESD in the classroom and feel there is an urgent need to develop or curate more supporting/ supplementary materials for teachers to deliver the curriculum and incorporate ESD elements in their teaching more effectively. Some teachers, if motivated, seek out external resources to help with their lessons, but most of these resources are from western sources and for urban contexts, and it is a struggle to translate and localize these resources to suit the understanding of their students.

"The existing education structure and content are not indigenous-friendly. For example, the curriculum content is very urban-based, which decreases the students' willingness to learn as they cannot relate it to their own lives."

- Education NGO leader and former school teacher, Kuala Lumpur

"There are not enough exercises or explanations to encourage real critical thinking or problem solving on ESD. If there were real life applications, students would engage better with the curriculum. Right now, they find it a chore."

- School leader, Petaling Jaya

"I take it upon myself to look for additional material online that I can use to supplement the syllabus. But teachers do not do that."

- School teacher, Langkawi

While rural and indigenous settings provide ample opportunity to incorporate localized ESD content, even after the curriculum revision, the current is heavily urban-centric, making it difficult for rural and indigenous children to relate it to their daily lives. Respondents feel that school performance of Orang Asli children is generally poor because they do not relate to the content in the curriculum. This is supported by Errico (2017) who related the lack of recognition of the Orang Asli culture in the school curriculum to Orang Asli children's poor overall performance.

The teachers reflections support ESD literature which recommends the curricular examples be relevant to the students' local contexts. On one hand is the need for students to relate to the examples so that they immediately see the potential for knowledge application. On the other hand is the gap in curricular materials creation which leaves motivated teachers feeling isolated in their pursuit of curricular relevance.

III. *PROJECT-BASED LEARNING AND HOTS NOT YET ACHIEVING DESIRED OUTCOMES*

Revisions to the curriculum since 2013 was made after taking lessons from the experiences of Finland, Singapore, India, the Philippines and Indonesia. The most notable change was that the syllabus should be geared towards understanding, critical thinking, and application of knowledge. The new textbooks also have introduced the elements of sustainability in primary school education, and project-based learning was introduced to inculcate entrepreneurial thinking skills. However, respondents feel that these changes will take a long time to show results as they require a completely new approach teaching and learning that Malaysian teachers and students are not familiar with.

"Localization of assessment was done following the Finland assessment method, which is more project-based and less exam-oriented. This fits poorly in the Malaysian context because students are not instilled with HOTS at a younger age like they do in Finland.."

- School teacher, Ipoh

Much more than curriculum revisions, therefore, there is a need for different pedagogical and didactic approaches to be used in tandem. Respondents feel that, for now, students still generally lack analytical ability. Teachers also feel that they need to be trained in new pedagogical and didactic approaches that facilitate HOTS more effectively.

"The previous curriculum saw students aware of theory but not the practicality of it; now even after five years of new curriculum, students are unable to use knowledge practically."

- school teacher, Kuala Lumpur

The teachers in this study have repeatedly showcased a desire to achieve educational delivery on par with international best practices. They do this despite the uphill task of translating the latest professional development into effective classroom delivery. Such a drive for personal transformation has been accompanied by the general curriculum moving away from examination results towards evaluating student performance based on tiered standards.

ESD calls for basic numeracy and literacy, but it does not stop there, it envisages a world where learners can integrate knowledge from multiple disciplines for real-world problem solving (Incheon Declaration, 2016). This requires a shift from achieving single-subject content and performance standards to an application-based ability within unfamiliar scenarios. Perhaps rather than as an additional task for the school teachers and administrators, this can be seen as a reprioritization of resources and skills. As shown in Table 3, Malaysian students' performance in the PISA and TIMSS have shown inconsistent progress despite the MEB roll out since 2013. The scores in both will likely improve with better application skills as the two international assessments aim to evaluate students abilities to apply mathematics and science knowledge to everyday contexts.

To develop students' application skills, teachers themselves need to acquire those abilities. Educators need to undergo their own transformation. A peer coaching or supervisory ecosystem

which enables teachers' success in transforming teaching and learning delivery towards improved student learning is integral for teachers' own application skills to be reinforced during a their career. For this to occur, educational management needs to drive classroom delivery towards instilling an ability to apply knowledge across multiple scenarios. The shift from the past system of examination-orientation to an application-oriented use of knowledge will help teachers facilitate learning which students can use over the long-term rather than specifically for the test.

4.3 WHOLE-OF-SCHOOL APPROACHES

In addition to developing curricula and teaching and learning resources that infuse ESD the education system, students can more fully realize their capacity to unleash their problem-solving potential in their schools and communities if whole-of-school approaches to ESD were adopted. This means that all school stakeholders - including school leaders, teachers, other school staff, students, families, and community groups - are engaged in school activities and transdisciplinary learning that resonate with unique context and needs of the school and the community in which it is located. Transdisciplinary learning helps break down subject silos to equip learners with knowledge and skills to understand and address complex problems that they face and that are faced by their immediate and wider communities.

In Malaysia, the education system is found to be highly centralized and top-down, which cultivates one-size-fits-all approaches in education. While schools are given the freedom to exercise autonomy in engaging with local their local communities and applying transdisciplinary approaches to learning, there is no explicit push to empower this practice. As such most school leaders, and therefore teachers, cleave to the familiar, in the absence of empowerment to facilitate opportunities for learners to engage with local and global challenges in ways that apply transdisciplinary learning to real-life issues and phenomena.

There are, however, notable initiatives to inculcate whole-of-school approaches to ESD, for example the Sustainable Schools' Environment Awards (SLAAS) by the Ministry of Education, with the Department of Environment and the Institute of Environment and Development (LESTARI), Universiti Kebangsaan Malaysia (UKM). This voluntary program was initiated in 2005 with the aim of inculcating sustainability values through school-based projects involving resource usage, consumption habits, greening spaces, recycling and upcycling, and learning activities, to name a few. Teachers and students from participating primary and secondary schools undergo external training on how to initiate and implement school-wide projects, with outcomes of the projects documented for awards submission. Since 2005, over 1000 primary and secondary schools have participated in SLAAS across the country. Studies to evaluate the SLAAS program have found that while the effort is commendable, there are limits to its effectiveness, namely: only a limited number of schools participate; it requires time investment additional to that of day-to-day teaching and learning; only those involved in the projects are invested in them, not the entire school community (Letchumanan and Che Rose, 2021); and there are gaps in inculcating behavior change (Hanifah et al, 2015).

Another notable program is Eco-Schools, a global program initiated in Malaysia by WWF in 2011 and now run by the Green Growth Asia Foundation. Participating schools, over 300 to date, implement structured transition which requires schools to undertake seven steps of change: setting up a school environment committee; auditing existing environmental management; identifying action steps and responsible parties; activity monitoring and evaluation; communicating environmental programs with parents; covering environmental issues in the curriculum; and developing an eco-code. The eco-schools program closely adheres to the spirit of the whole-of-school approach to ESD but is not without its own set of challenges. Being a voluntary environmental initiative, the main difficulty is to advance whole-school implementation of ESD to higher levels and to achieve scale (Hanifah et al, 2015).

A whole-school approach to ESD calls for sustainable development to be integrated throughout the formal sector curriculum and school practices in a trans-disciplinary and holistic manner, rather than through standalone projects. In practice, this approach means that a school will incorporate teaching and learning for sustainable development not only through aspects of the curriculum, but also through sustainable school operations such as integrated governance, stakeholder and community involvement, long-term planning, and sustainability monitoring and evaluation. Whole-school approaches also advocate for active and participatory learning, with the entire school, including students, educators and administrators, to be actively engaged in working towards a sustainable school with ESD fully integrated into the curriculum as the driving factor (Hargreaves, 2008).

According to the stakeholder interviews, most teachers feel they are not supported by the school environment and find it out of the scope of their responsibility, to transcend their subject specialty and foster broader interdisciplinary understanding of issues related to sustainable development. As such, they do not feel that they are able to adequately equip learners with the knowledge and skills needed to help find solutions to those issues.

I. *SDG CHAMPIONS ARE IN IT ALONE*

ESD champions exist in schools throughout the country, and many of the respondents who came forward to participate in this study are of this group. They have expressed difficulty in getting the support and buy-in of school leaders and other colleagues to create a whole-of-school approach to ESD, which is understandable given that it is not an easy task without clear and specific guidelines. Even in SLAAS participating schools, respondents shared that only a few teachers and students are involved in the projects, and they often face difficulty in getting the cooperation and participation of the wider school community.

"The influence made on these school children is short-lived as only a few teachers are instilling the values of SDGs."

- School teacher, Langkawi

Like effective climate change education, implementing ESD in schools is not a single-subject, single-teacher or standalone project. ESD implementation is a multifaceted task which requires linkages be made on multiple levels, from a persistant ESD-orientation within the school administration, to students integrating knowledge from multiple subjects, to developing cohesion between teachers and administrators for school-wide ESD inculcation. At the end of ESD education, students are to develop the ability to narrate a "big picture" presentation of learning.

To arrive at the "big picture", one model involves exposure to several smaller-scope modules dedicated to multiple facets of the big picture (p. 160, Sharma, 2021). These can be delivered as a whole-school community or across multiple subjects. The end goal of which is for learners to foster multiple disciplinary perspectives to an unfamiliar scenario.

For a learner to form such an interconnected perspective, the solo SDG Champion approach will need to transition into a whole-of-school implementation. The futility of the individual SDG Champion needs to be recognized as one classroom is likely insufficient to provide the stimulation for long-lasting change. Changes to the individual learner take place over an extended period of time. It may require more than a singular experience or a single school year's worth of school-wide sustainability programs for a learner to shift in perspective. Such long-term student transformation is likely a result of a student crossing multiple thresholds over an extended period, and even so, without sufficient reinforcing, gains are lost over time (Singh, 2021). A student needs multiple years of grappling with sustainability perspectives to develop their critical analysis of new information.

The pathway to implementing ESD in schools should as much as possible incorporate institutional and administrative support. School leaders and admin staff are foundationary to the change mechanism, and they will need to embark on their own ESD education transformation, or "undergo their own epistemic shifts" (p. 183, Singh, 2021). Therefore, relying on SDG champions alone is a pathway to futile long-term learner transformation. ESD Champions can be engaged for apt roles, such as pioneering the learning of other discipline languages to support a culture of employing different disciplinary perspectives in the staff room. For an effective ESD implementation, a whole-school-approach entails transformative education for students, school leaders and administrative staff.

"In the Orang Asli school, I used to conduct classes outdoors to allow the children to learn through what they know. It really helped them learn better. My headteacher did not stop me but used to say, this is not part of my KPI, so why am I putting in the extra effort? … When I was transferred to another school, all this type of effort stopped."

- Education NGO leader and former school teacher, Kuala Lumpur

II. *KPIS ARE CENTRALLY DETERMINED*

The KPIs of schools and school leaders are centrally determined and cascaded through state and district education departments to schools. The unique needs of the student body and the situation in the school environment and community are not visible at the central level. While schools and school leaders are given autonomy to implement different ways of doing things, most adhere to the tried and tested, especially when there is little capacity building and empowerment to incorporate whole-of-school ESD, localization of learning, and community engagement in learning. These concepts are new in Malaysia and because they are not part of the KPI, they are not prioritized.

Localized approaches to school administration or teaching and learning seem like outliers within the top-down nature of the Malaysian education. The National Educational Philosophy (1988, revised 1996) is focused on values-education, whereas the Malaysian Education Blueprint (2013-2023) sees education's role as providing the skills for the future workforce. Educators and school leaders who implement ESD would likely be seen as deviating from these. Such highlights the uphill task of ESD implementation even if led by principals at the school level.

"The Ministry of Education's work is too centralized, which disconnects them from realities on the ground. Curriculum development is also very centralized."

- Education NGO leader, Kuala Lumpur

"If I see my principal being able to break free from the norm and do things that are relevant to what the students need, I will feel motivated to do something out of the box."

- School Teacher, Trolak

To support schools further in their aspirations to instill the competencies required for students to become problem-solvers of sustainable development issues, the whole-school-approach needs Ministerial support.

III. *TRANS-DISCIPLINARY LEARNING AND COMMUNITY ENGAGEMENT IS NOT SUPPORTED*

Research has shown that focusing on existential issues that are challenging people in their everyday lives, those that are present in a community and school setting that require attention presents an ideal opportunity for inter-disciplinary learning, where schools become living laboratories to problem solve, whether the issue is water, health, justice, bullying, healthy eating, access to food etc. All of these can be viewed from the lens of Math and understanding numbers and statistics; or economics and understanding distribution; or science and understanding ecology; languages and communication.

These connections and relationships are not leveraged in teaching and learning in ways that ESD promote, more than altering behavior, to focus on capacity building, problem solving and critical thinking. Engagement with the community also rarely occurs, according to respondents.

An education which encourages students to apply knowledge from multiple disciplines in a way the disciplinary boundaries begin to blur results in a transdisciplinary outcome. Sustainability issues require application of knowledge in a transdisciplinary approach.

While the Ministry of Education has allocated space in the curriculum for the cross-curricular implementation of Global Sustainability, teachers need support in making transdisciplinary application a classroom practice. Skills for the integration of knowledge, the activation of knowledge application, facilitation of multiple disciplinary perspectives support teachers in making their classrooms, and the larger school environment a living laboratory for problem solving local issues.

The Education Ministry has made allocations in the KSSR (Semakan 2017) and KSSM curriculum documents for "Global Sustainability" to be added to the existing content standards. "Global Sustainability" calls for instilling an understanding of responsible consumption and production, global citizenship, and unity. SDG Champion teachers make use of this cross-curricular allocation to deliver ESD topics in their respective subjects. This, however, does not result in transdisciplinary application of knowledge.

Dedicated support mechanisms are required for teachers to acquire and hone the skills of facilitating students to apply knowledge from multiple disciplines in a problem solving task. The freedom provided in the cross-curricular elements grant teachers autonomy to enhance the syllabus. Supporting this freedom with internal, school-level, support mechanisms to make knowledge applicable leads to greater teacher and student satisfaction.

"Our school is in a B40 community and most of our students are from B40 families. If we worked together, we could address topics like this in all subjects collectively as a school, but we have never done things this way."

- School teacher, Subang Jaya

Given the findings of the policy review, the curriculum mapping and the stakeholder interviews, the following chapter will put forward recommendations and some possible next steps to advance education transformation that would support the achievement of the MEB generally and Target 4.7 specifically.

5

KEY TAKEAWAYS AND FUTURE STEPS

From the findings elaborated in Chapter 4, the following key takeaways emerge that will guide the future steps necessary to realise SDG Target 4.7 in Malaysia.

Teacher Professional Development Key Takeaway

- The need for school-support mechanisms to develop incentives for a culture of in-house professional development by collaborating with external stakeholders.

Curriculum Key Takeaway

- Teacher and administrator competencies required to contemplate and analyze real-world issues are foremost in order to effectively deliver a curriculum incorporating sustainable development considerations, without having to revise the curriculum. Supplementary learning material, such as lesson plans and guidebooks, are valuable additional resources, but can not substitute teacher and administrator capacity-building and empowerment.

Whole-of-school Approach Key Takeaway

- ESD implementation must happen as a whole school. Singular projects, single-subject ESD implementation, single-teacher ESD adoption need to give way to concerted organizational ESD drive. Transformation is possible when ESD learning is continuously and consistently reinforced. The approach needs to be collective and widely adopted by school leaders, teachers and administrative staff.

These key takeaways are supported by examples of best practices from around the world, and subsequent area under the next steps would lay out the possibility for us to not only localize these best practices but also to scale up and ensure it fits into each school in Malaysia.

5.1. IN-HOUSE PROFESSIONAL DEVELOPMENT WITH EXTERNAL SUPPORT

The role and importance of in-house professional development among teachers are essential as it creates a platform for them to communicate and share pedagogical ideas across subjects. It also gives them a sense of having a strong support system within their school environment. However, having teachers depend solely on support (in-house professional development) within their school ecosystem would only help their growth to a certain extent. To get a broader perspective of current topics and facilitate learners to think differently, it is vital for teachers and the system to collaborate with external stakeholders who are subject matter experts. These experts would be able to inculcate new skills on topics such as Education for Sustainable Development (ESD), among other crucial topics relevant to the needs of time.

Engaging or collaborating with external stakeholders (educational NGOs, think tanks, local universities) for teacher training is a prevalent practice which has proven to be a successful method

in many countries. In the Malaysian context, although the Ministry of Education constantly seeks advice from external stakeholders, especially in policy development, their receptiveness to work with local stakeholders to provide teacher training still can be improved.

Several best practices from countries worldwide successfully instilled this approach into their teacher training. One good example would be the Finnish education system. In the Finnish education system, education services fall under the purview of local providers, municipalities or cities. However, the municipality or city has the freedom to engage universities and their further education centre to provide local and school-based training. This was evident when the LUMA Center was established at the University of Helsinki in 2003. The main goal of this center for the first decade was to establish a national ecosystem for collaboration in STEM education. Over time, the center has grown to support teachers' lifelong learning through a continuum model which includes pre-service training, an induction stage and in-service training. Besides that, the LUMA activities have been integrated into the training of elementary and subject teachers at Finnish Universities. This success was seen when Finland teachers could use the latest research information they gained through this training to produce teaching materials and ideas in STEM subjects (Niemi, 2015).

Thus, this project would emphasize the importance of collaboration with external stakeholders as it would be an ideal form of intervention that the ministry could use to its advantage to ensure most, if not all, of their internal trainers, teachers, and leaders are trained to acquire skills to help students solve real–life problems. The next steps of this report will outline how our institute, as an external stakeholder, could support the ministry in achieving this.

5.2. INCULCATING COMPETENCIES TO BETTER DELIVER EXISTING CURRICULUM

Multiple skills are required for ESD-implementation. Teachers need to be able to use pedagogical approaches which embed elements of ESD; and be able to develop ESD-oriented lessons and make them applicable to solving real-world issues, without the need for revision of the existing curriculum. However, these skills in isolation are still insufficient to achieve transformative educational outcomes. To unlock the curriculum's ESD potential, school leaders and administrators also require an ESD-orientation.

Several case studies examine how a shift in policy priorities could help include school leaders and administrators play a vital role in emphasizing ESD in the school environment. One such case study is the revision of the General Teaching Council for Scotland (GTSC) professional standards in 2013 that embedded Learning for Sustainability. This new standard requires all teachers and education professionals to comply with the criteria of Learning for Sustainability throughout their careers. According to UK National Commission for UNESCO (2017), integrating Learning for Sustainability into national educational policy led to systemic change in Scotland, with every local authority, teacher, education provider, school, and individual teacher demonstrating elements of sustainability in their relevant educational context.

Epistemic shifts for school leaders and administrative staff enable teaching staff to operate in a transdisciplinary manner. An 'educate the educators' first approach is sustainable in the long-run as it supports the entire school administration to gain ESD competencies and apprecioation themselves. This allows the school organization to stand a better chance of delivering transdisciplinary learning as they shift from disciplinary silos to understanding that "the minds of students are not compartmentalized by subjects of disciplines, but make connections across the curriculum" (p. 17, Reimers et al, 2017).

Just like in Scotland, teachers in Malaysia should be provided the skills to create their lesson plans with underpinning ESD-pedagogical approaches. Mission 4.7's next steps highlight the interventions made possible by supporting teachers to inculcate ESD approaches to lesson plan development and develop educators' ESD competencies.

5.3. SUPPORT MECHANISMS FROM ALL STAKEHOLDERS TO MAKE ESD A COLLECTIVE APPROACH

To reap the full benefit of ESD in achieving the aspirations of MEB, ESD needs to be incorporated at all levels from the curriculum, pedagogies, teachers, leaders and the overall school system. The collective support mechanism (whole-of-school approach) is a known concept. This is supported by Gough (2005), who says that the ESD whole-school approach is a holistic concept that has claimed importance at all levels and in all parts of the school organization as it can help to ensure that the curriculum, programs, practices and policies of an educational institution are engaged to contribute to building a more sustainable future.

One great way to champion the whole-of-school approach is through a cohesive educational policy. This is because a robust educational policy would help advance ESD by providing the space for developing innovative learning environments for real-world, participatory, action-oriented and holistic forms of education. A strong educational policy supporting ESD is often necessary to systematically legitimize and mandate the development of such a learning environment. There are several countries which successfully developed such learning environments with the help of their government. Another important mechanism is to detail ways to actively use the school environment for experience-based and practice-based learning opportunities in the curriculum.

Therefore, this project would pave the way to not only emphasize the importance of a strong educational policy inclined towards ESD but, in the next steps, it also details how our team could convene a multi-stakeholder team of experts to relook into the policy documents to enhance and strengthen the existing correlations.

5.4 NEXT STEPS

Our initial research has identified lack of teacher capacity as a major barrier to the successful implementation of ESD in Malaysian schools, as only the most dedicated have the time and energy to find creative ways to emphasize sustainable development in their teaching. Therefore, teachers must be central to the development of any intervention that hopes to be effective at scale. This pilot study has attempted to present evidence of the gaps, options and opportunities for ESD in Malaysia, and in doing so, it has achieved its aim of providing an interim situation analysis. However, to truly ensure effective transformation of the Malaysian education system, more detailed policy-focused research is recommended.

For ESD efforts to be scaled widely and rapidly, it requires a supportive policy landscape. Micro-scale grassroots efforts to promote ESD in individual schools and classrooms can and have been proven to yield impressive outcomes. For instance, the work of Arus Academy in Penang, through its Global Citizenship Education (GCED) programs for early secondary school students, is a successful model that warrants upscaling.[1] Another highly successful global example is the Teacher Advocates

[1] Social enterprise Arus Academy has its successful story when it comes to Global Citizenship Education (GCED). Founded by 4 Teach for Malaysia alumni, the Arus Academy focuses on GCED and is supported by the Ministry of Education as well as UNICEF. Its collaborative in GCED projects between the Ministry of Education and UNICEF

program of Global Schools, which has been able to create impact for more than 100,000 students across more than 80 countries since 2021.[2]

To scale, however, there must be complementary national policies to develop supportive school ecosystems that can create real impact for teachers and students. Mission 4.7 advocates for ESD policies that adopt the following principles:

- Be adapted to local geographical, political, social, and cultural realities;
- Be focused on all dimensions of sustainability, including environmental, social, and economic;
- Encompass all domains of learning, including cognitive, socio-emotional, and behavioral;
- Draw on innovative pedagogies and experiential learning methods and disseminate their use widely to all.

The following is an outline of recommended next steps towards educational transformation for Malaysia. These next steps are informed by the Global Schools K-12 Education Policy Program initiative, a new joint initiative of Global Schools and the SDSN Networks program to promote sustainable development in K-12 education systems around the world. The Mission 4.7 Malaysia team is in conversation with Global Schools to pilot this methodology for Malaysia in 2023. This will be part of the Global Schools effort to scale up the K-12 Education Policy Program in other parts of the world through SDSN's global network.

I. CONVENE A MULTI-STAKEHOLDER TEAM OF EXPERT RESEARCHERS TO REVIEW ALL NATIONAL EDUCATION LAWS, POLICIES, CURRICULA, SYLLABI, AND TEXTBOOKS.

While our initial fact-finding project reviewed major policy documents such as the Malaysia Education Blueprint 2013-2025, and select curricula in language, art, and science, a more comprehensive process would entail a thorough review of all relevant policy documents, national curricula in all subjects at both the primary and secondary levels, syllabi, textbooks and official supplementary materials, and teacher training and professional development curricula, to analyze the existing correlations (and gaps) to Target 4.7 indicators.

II. ASSESS TEACHING APPROACHES AND LEARNING OUTCOMES IN A REPRESENTATIVE SAMPLE OF CLASSROOMS.

Our team's understanding of pedagogy and learning outcomes was derived mainly from interviews with current and former educators. However, a more detailed assessment would consist of classroom observations and further interviews with a range of education stakeholders by an expert team.

Malaysia, provides a unique opportunity for students to dive deeper into and solve current global issues. The impact made thus far includes over 360 teachers trained and 2,200 participants (Arus Academy, 2021).

[2] The Global Schools program is an initiative of the UN Sustainable Development Solutions Network (SDSN). It works internationally to support schools and educators with evidence-informed training and localized classroom resources in order to integrate sustainable development into school curricula, operations, and activities. Its flagship initiative, the Global Schools Advocates Program, is a 6-month training and advocacy program for educators and school leaders working in primary and secondary schools globally.

III. DRAFT AN INTERVENTION BASED ON FINDINGS FROM EARLIER PHASES OF THE STUDY.

Based on our initial fact finding, as well as the outcomes of similar studies in other countries, we hypothesize that teacher capacity-building and the creation of appropriate resources will emerge as key intervention points for improving the delivery of Target 4.7 in Malaysian classrooms. These could include a series of localized lesson plans based on latest sustainable development research and the insights gained from previous stages of investigation, as well as new activity guides, teacher guides, and/or other supplementary materials aimed at enhancing the presence of sustainable development themes within the existing curricula.

Other potential interventions may point to longer-term changes, such as curriculum revision, textbook revision, or new teacher training and professional development modules.

IV. PILOT THE INTERVENTION

For lesson plans and other materials, this will involve testing the draft resources in a representative sample of classrooms, under supervision of the expert team, to evaluate their effect on students' cognitive, socio-emotional, and behavioral learning outcomes. Further development of these resources will be based on the outcome of this pilot.

V. CONDUCT WORKSHOPS AND ROUNDTABLES WITH STAKEHOLDERS FROM THE MINISTRY OF EDUCATION AND OTHER RELEVANT ENTITIES

These workshops, led by the research team, will help educate decision-makers about the importance of education for sustainable development, how it fits within Malaysia's existing education priorities, and best practices for ensuring that ESD is effectively delivered to primary and secondary school students around the country.

VI. COMPREHENSIVE REPORT AND DISSEMINATION OF AN ESD PATHWAY FOR MALAYSIA

The research team, with the support of the Ministry, will publish a comprehensive report of its findings, including detailed recommendations for policymakers and practitioners to scale up interventions nationwide. This ESD Pathway document will be published officially, as well as globally disseminated and deliberated across the global Mission 4.7 network.

Barring any unforeseen circumstances, the targeted completion of the above steps is the end of 2023, with a work plan currently being developed and potential partners identified.

APPENDIX 1

MAPPING OF PRIMARY LEVEL SCIENCE, BAHASA AND ENGLISH CURRICULA TO ESD CRITERIA

Primary Science Curriculum

Year 1				
Unit	**Topic**	**Activity**	**Existing ESD Linkage in Lesson (SDGs Addressed)**	**Potential for ESD Lesson (SDGs Addressed)**
3	Living things and non-living things	To classify living and non-living things and learn about the basic needs in life (seed germination)		SDG 15 Life on Land
5	Animals	Learning about animals and parts of animals		SDG 15 Life on Land
6	Plants	Learning about parts of plants and their importance		SDG 15 Life on Land SDG 13 Climate Action
9	The Earth	Different types of landforms, types of soil found on the surface and its importance to life		SDG 15 Life on Land SDG 13 Climate Action
Year 2				
4	Animals	Learning about classifications of animal reproduction and the reason why some have high reproduction rates		SDG 15 Life on Land
5	Plants	The importance of plants and their basic needs		SDG 15 Life on Land SDG 13 Climate Action
9	Earth	The importance of water and air to living things		SDG 15 Life on Land SDG 12 Responsible Consumption and Production SDG 6 Clean Water and Sanitation
YEAR 3				
3	Humans	Dental Care / Classes of Food & The importance of food and a balanced diet	SDG 3 Good Health & Wellbeing	
4	Animals	Animal eating habits, dentition and changes in animal eating habits		SDG 14 Life below Water SDG 15 Life on Land
5	Plants	Plant reproduction and its importance. Brief introduction to technology in plant reproduction	SDG 15 Life on Land	
YEAR 4				
1	Scientific Skills	Scientific process skills on the right way to dispose of waste		SDG 12 Responsible Consumption and Production SDG 15 Life on Land

2	Humans	Respiratory system and situations that affect breathing (importance of a healthy environment to human health)		SDG 3 Good Health and Wellbeing SDG 15 Life on Land
3	Animals	Breathing Mechanisms and Classification		SDG 14 Life Below Water SDG 15 Life on Land
4	Plants	Photosynthesis and importance of photosynthesis to living things	SDG 15 Life on Land	
6	Sounds	A very small component on reducing sound pollution and how trees can reduce noise pollution in our environment		SDG 11 Sustainable Cities and Communities SDG 13 Climate Action
7	Energy	Types and forms of energy; renewable and non-renewable energy sources; using energy wisely	SDG 12 Responsible Consumption and Production SDG 7 Affordable and Clean Energy	
8	Materials	Plant based resources (wood, cotton, rubber)		SDG 13 Climate Action SDG 14 Life Below Water SDG 15 Life on Land
		Animal based resources (skin, fur, silk, etc)		
		Resources from rock (lead, gold, copper)/ resources from soil (clay, gravel, sand)		
		Resources from petroleum		
YEAR 5				
3	Animals	Survival of animal species, animals protect their eggs and youngs to ensure survival of their species	SDG 13 Climate Action (Impact of Climate Change to food chain and food web) SDG 14 Life Below Water SDG 15 Life on Land	
		Producer & Consumer		
		Food chain; food relationships and photosynthesis		
		Food Web		
		Effect of change in population		
		Transfer of energy that occurs continually in a food chain		
		Reasons for change in animal population		

		Extreme climate change		
		Rapid deforestation		
		Poaching and illegal wildlife trading		
		Illegal forest fires		
		Animal population change and its overall impact on the ecosystem		
4	Plants	Adapting to climate and seasonal change and the importance of plant survival for animal and plant species	SDG 15 Life on Land SDG 13 Climate Action	
8	Matter	Clouds and rain		SDG 6: Clean Water and Sanitation SDG 13 Climate Action
		Water cycle		
		Importance of natural water cycle, and natural water resources		
		The impact of disruption in water cycle to the environment and living things		
10	Machines	The importance of Inventing Tools with Sustainable Characteristics	SDG 9 Industry, Innovation and Infrastructure	
YEAR 6				
3	Microorganisms	Uses of Microorganisms	SDG 15: Life on Land	
		Decomposition of organic materials		
		Relationship between microorganisms and making fertilizers, decay of organic materials, and compost		
4	Interaction among living things	A brief section on the importance of interaction among living things to the ecosystem	SDG 14 Life below Water SDG 15 Life on Land	
		Control of organism populations		
		Survival of species		

5	Preservation and Conservation	Extinct animals (Global / Asia)	SDG 14 Life Below Water SDG 15 Life on Land	
		Animals and plants threatened with extinction (Dugongs, turtles, *tongkat ali*, panda, mangrove trees, etc)		
		Activities that threaten animal and plants (forest fires, rubbish dumping, unplanned deforestation, rubbish dumping, illegal poaching, oil spill, etc)		
		Preservation and conservation of animals and plants (educate the community, avoid buying the products made from animal body parts, gazette forest area, protected animals and plants, gazette marine parks, enforce laws, rehabilitation centre)		
9	Waste Materials	Waste Materials	SDG 12 Responsible Consumption and Production (Target 5)	
		Knowing waste materials (plastic, metal, glass, paper, food waste, excretory products and faeces, toxic waste)		
		What is biodegradable and what is not		
		Relationship between biodegradable waste, microorganism and soil		
		Examples of non-biodegradable waste		
		Consequences of non-biodegradable wastes to the environment (Toxic waste thrown into water, flash food, aedes breeding ground, contaminated food product such as seafood)		
		Appreciate our earth		
		Why do we need to use non-biodegradable wastes wisely?		
		Waste management practices		
		Using the right disposal method		

		Waste segregation		
		Proper containers to dispose chemical waste and waste oil		
		Turning food waste into compost (step-by-step guide)		
		3R's		
		Planned Management of Waste materials		
		How are waste materials disposed? Note: The syllabus only looks into incineration and not the use of landfills		
13	Technology	Technology and its importance	SDG 9 Industry, Innovation and Infrastructure	
		Development of Technology in various industries		
		Advantages and Disadvantages of technology to the environment		

Primary Bahasa Curriculum

Year 1					
Theme	**Unit**	**Topic**	**Scope**	**Existing ESD Linkage in Lesson (SDGs Addressed)**	**Potential for ESD Lesson (SDGs Addressed)**
1 Keluarga Penyayang	1	Keluargaku Sayang	Mengenali dan menghargai ahli keluarga		SDG 5 Gender Equality Global Citizenship Education
	2	Bergembira dengan keluarga	Keluarga Bahagia		
	3	Bercuti di kampung	Menghargai orang tua di rumah		
2 Masyarakat Muhibah	4	Rakan sekelas	Mengenali dan menolong rakan sekelas		SDG 4 Quality Education Global Citizenship Education
	5	Tolong Menolong	Belajar menghargai jiran		
	6	Buku Segalanya	Kebaikan membaca		
3 Pentingkan Kebersihan dan Kesihatan	7	Telitinya Rizal	Amalan yang baik	SDG 3 Good Health and Wellbeing	
	8	Menu Sihat	Makanan yang berkhasiat		

	9	Kita Cergas	Bersenam		
5 Negaraku Tercinta	13	Budaya Kita	Pakaian dan makanan tradisi		Global Citizenship Education SDG 11 Sustainable Cities and Communities
	14	Milik Kita	Bunga dan Lambang Kebanggaan Kita		
	15	Sikap yang baik	Memupuk sikap dan amalan yang sopan		
6 Sains, Teknologi dan Inovasi	16	Sains dan kita	Deria dan konsep sains	SDG 9 Industry, Innovation and Infrastructure	
	17	Teknologi dan kita	Mengenali barangan elektronik dan manfaat penggunaan (pengenalan barangan solar)		
	18	Hebatnya inovasi	Inovasi		
7 Sayangi Alam	19	Sayangi Alam	Cara penjagaan alam	SDG 14 Life Below Water SDG 15 Life on Land	
	20	Flora dan Fauna	Prihatin terhadap haiwan dan tumbuh-tumbuhan		
	21	Bersihkan Alam	Cara penjagaan alam sekitar		
8 Ekonomi, Keushawanan dan pengurusan Kewangan	22	Wang dalam Kehidupan	Menabung		SDG 1 No Poverty SDG 8 Decent Work and Economic Growth SDG 10 Reduced Inequalities
	23	Peniaga Berjaya	Sikap baik dalam berniaga		
	24	Mengurus Belanja	Beringat semasa membeli		
Year 2					
1 Keluarga Saya	1	Keluarga Guan Hong	Amalan Baik keluarga		Global Citizenship Education
	2	Kami Gembira	Melawat tempat bersama keluarga		
	3	Saudara-mara saya	Menghormati saudara-mara		
2 Rakan dan Jiran	4	Rakan dan jiran	Menghargai dan menghormati jiran		Global Citizenship Education SDG 11 Sustainable Cities and Communities
	5	Hormati Jiran			
	6	Berkerjasama			
3 Kita Bersih Kita Sihat	7	Bersih dan Ceria	Kebersihan Diri	SDG 3 Good Health and Wellbeing	
	8	Sekolah Bersih Murid Selesa	Kebersihan Sekolah		
	9	Hargailah Kesihatan	Makanan dan minuman berkhasiat		SDG 2 Zero Hunger

5 Bijak Sains Teknologi dan Inovasi	13	Bijak Sains	Makan untuk hidup (penggunaan deria)		SDG 9 Industry, Innovation and Infrastructure
	14	Hebat dan Berguna	Teknologi dan Inovasi		
	15	Bijak Mencipta	Penciptaan		
6 Budaya Bahasa	16	Sambut Perayaan	Perayaan Berbagai Kaum		Global Citizenship Education SDG 11 Sustainable Cities and Communities
	17	Hargailah Seni	Alat Muzik Tradisional / Seni Tradisional		
	18	Indahnya Budi Bahasa	Budi Pekerti dan bahasa		
7 Sayangi Malaysia	19	Cintailah Bahasa Kita	Menyemai semangat patriotik dan cinta akan negara		Global Citizenship Education SDG 11 Sustainable Cities and Communities
	20	Malaysia Indah			
	21	Negara Tercinta			
8 Wang dan Perbelanjaan	22	Urus Wang	Celik Huruf Kewangan		SDG 1 No Poverty SDG 2 Zero Hunger
	23	Rajin Berusaha			
	24	Bijak Berbelanja			
Year 3					
1 Kekeluargaan	1	Keluarga Cergas	Hubungan kekeluargaan		Global Citizenship Education SDG 3 Good Health and Wellbeing
	2	Kejayaan Keluarga			
	3	Kenangan Manis			
2 Kesihatan dan Kebersihan	4	Saya Sihat dan Bertenaga	Kebersihan diri, persekitaran dan kesihatan minda	SDG 3 Good Health and Wellbeing	
	5	Kebersihan Tanggungjawab Bersama			
	6	Minda Positif Badan Aktif			
4 Perpaduan	10	Toleransi Kukuhkan Perpaduan	Memahami dan menghormati persamaan dan perbezaan antara kaum	Global Citizenship Education	
	11	Hormat-Menghormati Budaya Kita			
	12	Kerjasama Asas Kesejahteraan			
Year 4					
1 Harmoni Sentiasa	1	Tiga Sahabat	Menghargai sahabat dan jiran. Menyemai nilai untuk mneghulurkan bantuan kepada orang lain apabila diperlukan		Global Citizenship Education
	2	Jiran Sepakat			

	3	Misi Mulia			
2 Kebersihan dan Kesihatan	4	Kesihatan Harus Dijaga	Kepentingan menjaga kesihatan diri dan kebersihan persekitaran	SDG 3 Good Health and Wellbeing	
	5	Bersihnya Kami			
	6	Amalan Bersih dan Sihat			
4 Indahnya Budaya, Halusnya Seni	10	Hidup Berbudaya	Menghormati perayaan, adat tradisi agama lain.		Global Citizenship Education SDG 11 Sustainable Cities and Commnunities
	11	Seni Penyeri Kehidupan			
	12	Cantik Menawan			
5 Alam Bersih Hidup Sejahtera	13	Prihatin akan Alam	Peranan kita dalam menjaga alam sekitar dan teknologi hijau	SDG 12 Responsible Consumption and Production SDG 14 Life Below Water SDG 15 Life on Land	
	14	Bersikap Mesra Alam			
	15	Selamatkan Alam Kita			
6 Malaysia Bumi Bertuah	16	Bangganya Kami	Menyemai semangat bangga dan cinta akan negara		Global Citizenship Education
	17	Malaysia Tercinta			
	18	Negaraku Hebat			
7 Kuasai Sains, Teknologi dan Inovasi	19	Cerdik Sains	Manfaat sains dalam kehidupan		SDG 9 Industry, Innovation and Infrastructure
	20	Mesra Teknologi			
	21	Rekaan Inovatif			
8 Bijak Belanja Celik Wang	22	Belanja Berhemat	Celik Huruf Kewangan		SDG 1 No Poverty SDG 2 Zero Hunger
	23	Maju dan Berjaya			
	24	Bijak Kewangan			
Year 5					
1 Kemasyarakatan	1	Masyarakat Penyayang	Mengenali kepentingan projek berkaitan dengan komuniti dan alam sekitar	Global Citizenship Education	SDG 11 Sustainable Cities and Commnunities
	2	Kerjasama Eratkan Hubungan			
	3	Masyarakat Celik Ilmu			
2 Kesihatan dan Kebersihan	4	Bahaya dalam Senyap		SDG 3 Good Health and Wellbeing	

	5	Kebersihan Diri dan Persekitaran	Pengamalan gaya hidup sihat dan kepentingan persekitaran yang bersih		
	6	Minda Sihat			
4 Perpaduan	10	Memupuk Perpaduan	Mengajar untuk menghargai detik sambutan bilangan kaum		Global Citizenship Education
	11	Meraikan Penyatuan			
	12	Jalinan Perpaduan			
5 Jati Diri, Patriotisme dan Kewarganegaraan	13	Sikap Bertanggungjawab	Menerapkan nilai jati diri, patriotisme dan kewarganegaraan		Global Citizenship Education
	14	Sayangi Malaysia			
	15	Keranamu Malaysia			
6 Sains, Teknologi dan Inovasi	16	Sains dan Kehidupan	Belajar mengenai fenomena yang berlaku do persekitaran kita, menggunakan STEM	SDG 9 Industry, Innovation and Infrastructure	
	17	Mesra Teknologi			
	18	Inovasi Bertambah Mutu			
7 Kelestarian Alam	19	Ceriakan Buana Kita	Sesi Pembelajaran di luar bilik darjah tentang kelestarian alam	SDG 12 Responsible Consumption and Production SDG 14 Life Below Water SDG 15 Life on Land	
	20	Selamatkan Alam Kita	Cara - cara menjaga kelestarian alam		
	21	Teknologi Hijau	Pengenalan kepada teknologi hijau dan kebaikannya	SDG 9 Industry, Innovation and Infrastructure	SDG 8 Decent Work and Economic Growth
8 Ekonomi Keusahawanan dan Pengurusan Kewangan	22	Ekonomi Dinamik	Cara menguruskan kewangan		SDG 1 No Poverty SDG 2 Zero Hunger SDG 8 Decent Work and Economic Growth SDG 10 Reduced Inequalities
	23	Usahawan Berwawasan	Mengajar cara menggunakan hobi untuk menjana pendapatan		
	24	Pintar Kewangan	Menjadi Pengguna yang bijak / Menerapkan nilai hemah berbelanja		
9 Integriti	25	Insan Berketerampilan	Ciri-ciri pemimpin cilik / Ketokohan dalam Pimpinan		Global Citizenship Education
	26	Dahulukan yang Utama	Peribadi yang baik		
	27	Hormati Hak Sesama Kita	Menerapkan nilai-nilai murni dalam individu		
Year 6					
1 Istimewanya Keluargaku	1	Kasih Insan Istimewa	Menghargai jasa ahli keluarga		Global Citizenship Education

	2	Satu Keluarga Dua Budaya	Belajar menghormati keunikan keluarga yang terdiri daripada berbilang kaum		
	3	Jauh di mata dekat di hati	Kepentingan sentiasa berhubung dengan ahli keluarga		
2 Kesihatan Mental dan Emosi	4	Minda, Oh, Minda!	Mengajar cara pengawalan minda	SDG 3 Good Health and Wellbeing	
	5	Usahlah Stres	Memberi pengenalan kepada simptom penyakit berkaitan dengan kesihatan mental		
	6	Terima Kasih, Kaunselor	Mengajar pelajar mengenai kepentingan mendapatkan bantuan kaunseling atau pakar untuk kesihatan mental		
5 Pupuk Perpaduan	13	Formula 1 Malaysia	Mengajar pelajar tentang kepentingan hidup secara harmoni, bertoleransi terutamanya di negara yang terdiri daripada pelbagai bangsa		Global Citizenship Education
	14	Berkat Hidup Sepakat			
	15	Perpaduan Memajukan Negara			
6 Semangat Cinta akan Negara	16	Perkasakan Bahasa Kita	Menerapkan sikap bangga akan bahasa kebangsaan dan negara		Global Citizenship Education
	17	Budi yang Baik Dikenang Jua			
	18	Bersyukurlah			
7 Indahnya Warisan Kita	19	Merdunya Alunan	Bangga akan adat dan warisan Malaysia		Global Citizenship Education SDG 11 Sustainable Cities and Commnunities
	20	Warisan Berharga			
	21	Budaya dan Adat Mekar dalam Hati			
8 Damainya Bumiku	22	Bumiku Sejahtera	Menggunakan bahan alternatif yang mesra alam	SDG 12 Responsible Consumption and Production SDG 14 Life Below Water SDG 15 Life on Land SDG 9 Industry, Innovation and Infrastructure	
	23	Datukku Pencinta Alam	Menggunakan teknologi/inovasi yang mesra alam / menerapkan tanggungjawab kita untuk menjaga alam sekitar		
	24	Bersama - sama Menjaga Alam			
	25	Rahsia Keajaiban Sains	Kemajuan Teknologi di Malaysia		

9 Terokai Sains Terajui Teknologi dan Inovasi	26	Masyarakat Kreatif dan Inovatif			SDG 9 Industry, Innovation and Infrastructure SDG 8 Decent Work and Economic Growth SDG 10 Reduced Inequalities
	27	Malaysia dan Kemajuan Sains			
10 Semarakkan Pertanian Kita	28	Hargailah pokok	Penghargaan terhadap pokok. Peranan agensi pertanian dan pengenlan kepada sumber rekeri daripada pertanian	SDG 15 Life on Land	
	29	Peranan Agensi Pertanian			
	30	Pertanian Sumber Rezeki			
11 Rancakkan Ekonomi Kita	31	Bersama-same menjanakan Ekonomi	Jenis Industri / berjiwa usahawan di Malaysia dan cara menjadi celik huruf kewangan		SDG 1 No Poverty SDG 8 Decent Work and Economic Growth
	32	Berjiwa Usahawan			
	33	Kod dan Diriku			

Primary English Curriculum

Year 1				
Unit	**Topic**	**Activity**	**Existing ESD Linkage in Lesson (SDGs Addressed)**	**Potential for ESD Lesson (SDGs Addressed)**
1	Sounds Everywhere	Introduction to animals and the sounds they make		SDG 15 Life on Land
3	My Day in School	Experiential learning – visit to the school garden and introduction to living and non-living things that exist there		SDG 4 Quality Education (Sub Target 4.7 Mainstreaming ESD)
7	Be Clean	Self-hygiene, clean and healthy teeth	SDG 3 Good Health & Wellbeing	
10	My Pet	Animals that can be kept as pets and their welfare		SDG 14 Life Below Water & 15 Life on Land
11	My Beautiful Garden	Experiential learning – visit to the school garden and introduction to living and non-living things that exist there		SDG 15 Life on Land
12	The Sun and The Wind	Weather in Malaysia and around the world		SDG 13 Climate Action
19	Let us Do This Together	Responsible consumption of water, electricity and plastic bags	SDG 12 Responsible Consumption and Production	
20	Good Habits	Healthy eating habits, hygiene and personality building	SDG 3 Good Health & Wellbeing Global Citizenship Education	
Year 2				

1	Hooray! We Are Back	Speak about yourself and celebrate Friendship's Day (appreciating friends)		Global Citizenship Education
2	Do the Right Thing	Values needed to be a good citizen and to develop good habits		Global Citizenship Education
8	Growing Plants	Brief introduction on simple hydroponics system	SDG 9 Industry, Innovation and Infrastructure	SDG2 Zero Hunger
12	On the Farm	Interesting facts about farm animals	SDG 15 Life on Land	SDG 2 Zero Hunger SDG 13 Climate Action
13	Good Deeds	Natural disasters (floods), and how we can help		SDG 13 Climate Action Global Citizenship Education
14	Precious Drops	Water Conservation	SDG 12 Responsible Consumption and Production	
15	Save the Sea Creatures	Sea Creatures and how do we protect them?	SDG 14 Life Below Water	
16	Reuse, Recycle	Reuse, Recycle & How do we use this knowledge to protect marine life	SDG 12 Responsible Consumption and Production SDG 13 Climate Action	
YEAR 3				
2	Being Healthy	Balanced diet and identifying labels on food packaging (sources of food)	SDG 3 Good Health & Wellbeing	
4	People Around Me	Occupations around the world		Global Citizenship Education
YEAR 4				
1	Our Community	Community and Occupations that exist within your community		Global Citizenship Education SDG 11 Suatainable Cities and Communities
6	Care for the Sea	The importance of conserving ocean, river, beaches and environment	SDG 14 Life Below Water	
10	Unity in Diversity	Unity in celebrating Malaysian festivals		Global Citizenship Education SDG 11 Suatainable Cities and Communities
YEAR 5				
8	Fascinating Sabah and Sarawak	Flora and fauna of Sabah and Sarawak		SDG 15 Life on Land & SDG 16 Life Below Water
11	Natural Disaster	Causes of natural disasters and how can we help?		SDG 13 Climate Action Global Citizenship Education
15	Real Life Heroes	Appreciating heroes around you (doctors, lawyers, policemen, etc)		Global Citizenship Education

YEAR 6				
1	Reading: A Window to the World	Encourage students to adopt reading habits		SDG 4 Quality Education
2	Appreciating Others	Learn to appreciate yourself and others around you		Global Citizenship Education
4	Step Up	Conversation about social issues such as child abuse, smoking, animal abuse, bullying and drugs (instilling the right values)		Global Citizenship Education SDG 16 Peace Justice and Strong Institutions
6	Go Green	Water, Land and Air Pollution	SDG 12 Responsible Consumption and Protection	
7	Healthy and Wise	Healthy diet and nutrition	SDG 3 Good Health and Well Being	
9	A Heart of Gold	Values and Charity	Global Citizenship Education	Global Citizenship Education
14	A Ringgit Saved is a Ringgit Earned	Financial Literacy		SDG 1 No Poverty

APPENDIX 2

CASE STUDY: ESD ELEMENTS IN THE ONTARIO CURRICULUM

The elements of ESD are already present in the Malaysian curriculum. When comparing these elements with the Ontario Curriculum, approaches to operationalize ESD emerge.

The points of comparisons were the Ontario Social Science Curriculum, which includes the 2018 Social Studies (Grades 1 – 6), History and Geography (Grades 7 & 8) Curriculum, and the 2022 Science and Technology Curriculum (Grades 1 – 8). The competencies of ESD are found within the delivery mechanisms of the Ontario curriculum.

To identify elements of ESD in the Ontario Curriculum, we first need to identify the elements of ESD. The following ESD competencies are the hallmarks of successful teachers and students comprising a school. The competencies are the intended outcomes teaching and learning, where the result of a curriculum is the ability to apply knowledge, skills, analysis, socio-emotional awareness and behavioural abilities for themselves and their communities.

Systems thinking competency: the abilities to recognize and understand relationships; to analyse complex systems; to think of how systems are embedded within different domains and different scales; and to deal with uncertainty.

Anticipatory competency: the abilities to understand and evaluate multiple futures – possible, probable and desirable; to create one's own visions for the future; to apply the precautionary principle; to assess the consequences of actions; and to deal with risks and changes.

Normative competency: the abilities to understand and reflect on the norms and values that underlie one's actions; and to negotiate sustainability values, principles, goals, and targets, in a context of conflicts of interests and trade-offs, uncertain knowledge and contradictions.

Strategic competency: the abilities to collectively develop and implement innovative actions that further sustainability at the local level and further afield.

Collaboration competency: the abilities to learn from others; to understand and respect the needs, perspectives and actions of others (empathy); to understand, relate to and be sensitive to others (empathic leadership); to deal with conflicts in a group; and to facilitate collaborative and participatory problem solving.

Critical thinking competency: the ability to question norms, practices and opinions; to reflect on own one's values, perceptions and actions; and to take a position in the sustainability discourse.

Self-awareness competency: the ability to reflect on one's own role in the local community and (global) society; to continually evaluate and further motivate one's actions; and to deal with one's feelings and desires.

Integrated problem-solving competency: the overarching ability to apply different problem-solving frameworks to complex sustainability problems and develop viable, inclusive and equitable solution options that promote sustainable development, integrating the above-mentioned competences.

Key Competencies for Sustainability

Source: UNESCO, 2017, p.10

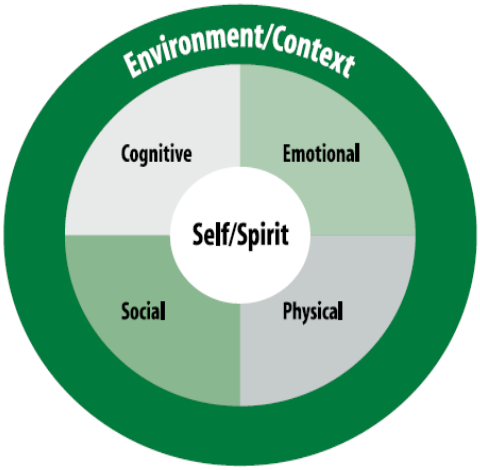
KEY FEATURES OF THE ONTARIO CURRICULUM

1. COMPLEXITY OF STUDENT AS LEARNER

Sustainable development requires an ability to recognise complex systems. In the ESD Competencies above, the Systems Thinking competency requires the ability to analyse complex systems, however, part of systems thinking is also dealing with uncertainty. The Ontario curriculum prefaces its subject

curriculum documents with an explicit recognition of the complexity of human development yet making room for the presence of uncertainty.

As a foundation, the Ontario curriculum recognises the complexity of students' circumstances in relation to their developmental stages. Such a concept is present at the start of all curriculum documents.



Educators and school environments view the complexity of human development with a positive approach. They learn the nuances of each development phase to provide stage-specific student support. The core of each student's self is seen to be both enduring yet changing. Features of complexity and uncertainty are found repeatedly in the curriculum.

Further to this is a recognition of relationships and interconnections. A person's core is interrelated and interdependent with their social, cognitive, emotional and physical self. These interrelating parts are located within multiple contexts (for example: home, ethnic, ethical, legal, economic, historical and geographic).

Supplemental frameworks are proposed to support such complexity: *Early Learning for Every Child Today: A Framework for Ontario Early Childhood Settings (2007), On My Way: A Guide to Support Middle Years Child Development (2017), and Stepping Stones: A Resource on Youth Development (2012).*

In comparison, the Malaysian national curriculum frameworks operate on a general ethos of holistic development, as articulated in the National Education Philosophy. This concept is to develop individuals along intellectual, spiritual, emotional and physical lines, and in doing so fulfil the individual's potential. Such a Philosophy focuses on the transformative outcome. The Ontario curriculum utilises the educator's competencies to evaluate the developmentally-appropriate means of engaging learners.

2. WHOLE-OF-SCHOOL APPROACH THROUGH SUPPORTING SYSTEMS

The Ontario curriculum mentions that successful curriculum implementation is supported by a whole-school approach. The paradigm being teachers operate within a larger support system to meet students' needs. These requirements are explained at the start of each curriculum document, in a section called "Front Matter". In this section, common approaches to meeting learners' needs are detailed, as well as the roles of all members of the learning community (parents, community organisations, principles, and students).

In Ontario, School Boards are tasked with implementing the curriculum whereas the Ministry of Education develops curriculum policy. In comparison, the Malaysian curriculum is focused on delivering content and skills. Without the presence of effective support systems, teachers in Malaysian schools have less resources. Support for all learners is required so that they can see themselves reflected in the curriculum. With little guidance on student support, teachers intervene in an individual capacity, which is more prone to burn out than an integrated system.

The Ontario curriculum provides direction on the approach required for schools and teachers within each of these support areas. Expectations from government priorities and policies are explicitly

mentioned in the Considerations for Programme Planning section, which is updated during every curriculum revision. Below are some examples of these areas. Information on these is present in each subject's curriculum so that teachers can practice subject-specific application while participating in the whole-of-school approach.

Student Well-Being and Mental Health	The Role of Information and Communications Technology
Planning for Students with Special Education Needs	Education and Career/Life Planning
Planning for English Language Learners	Experiential Learning
Healthy Relationships	Pathways to a Specialist High Skills Major (SHSM)
Human Rights, Equity, and Inclusive Education	Health and Safety
The Role of the School Library	Ethics

Considerations for Program Planning, as cited on the Ontario Government Website

Source: https://www.dcp.edu.gov.on.ca/en/program-planning/considerations-for-program-planning

The acknowledgement of each of these areas as contributing to the overall curriculum outcomes makes the elements required for a whole-school approach clear. Teachers can rely on existing support services for students to have a more conducive emotional and physical learning environment.

3. SYSTEMS THINKING THROUGHOUT THE CURRICULUM

The exploration of interrelationships between people, the natural environment and historical context feature heavily across the Ontario Social Studies curriculum. Below are examples of learning expectations from each grade level. Bear in mind each grade only has up to six learning expectations.

Grade 1	**A1. Application:** describe some of the ways in which people's roles, relationships, and responsibilities relate to who they are and what their situation is, and how and why changes in circumstances might affect people's roles, relationships, and responsibilities as well as their sense of self (**FOCUS ON:** *Continuity and Change*) **A2. Inquiry:** use the social studies inquiry process to investigate some aspects of the interrelationship between their identity/sense of self, their different roles, relationships, and responsibilities, and various situations in their daily lives (**FOCUS ON:** *Interrelationships*) **A3. Understanding Context:** demonstrate an understanding that they and other people have different roles, relationships, and responsibilities, and that all people should be treated with respect, regardless of their roles, relationships, and responsibilities (**FOCUS ON:** *Significance*) **B1. Application:** describe some aspects of the interrelationship between people and the natural and built features of their community, with a focus on how the features of and services in the community meet people's needs (**FOCUS ON:** *Interrelationships*) **B2. Inquiry:** use the social studies inquiry process to investigate some aspects of the interrelationship between people and different natural and built features of their local community, with a focus on significant short- and long-term effects of this interrelationship (**FOCUS ON:** *Cause and Consequence*)

Grade 2	**B2. Inquiry:** use the social studies inquiry process to investigate aspects of the interrelationship between the natural environment, including the climate, of selected communities and the ways in which people in those communities live (**FOCUS ON:** *Interrelationships; Patterns and Trends*)
Grade 3	**A3. Understanding Context:** identify some of the communities in Canada around the beginning of the nineteenth century, and describe their relationships to the land and to each other (**FOCUS ON:** *Interrelationships*) **B1. Application:** demonstrate an understanding of some key aspects of the interrelationship between the natural environment, land use, employment opportunities, and the development of municipal regions in Ontario (**FOCUS ON:** *Interrelationships; Patterns and Trends*)
Grade 4	**A2. Inquiry:** use the social studies inquiry process to investigate ways of life and relationships with the environment in a few early societies (to 1500), including at least one First Nation and one Inuit society, with an emphasis on aspects of the interrelationship between the environment and life in those societies (**FOCUS ON:** *Interrelationships*) **B1. Application:** assess some key ways in which industrial development and the natural environment affect each other in two or more political and/or physical regions of Canada (**FOCUS ON:** *Cause and Consequence; Interrelationships*)
Grade 5	**B1. Application:** assess responses of governments in Canada, including First Nations, Métis, and Inuit governments, to some significant issues, and develop plans of action for governments and citizens to address social and environmental issues (**FOCUS ON:** *Interrelationships; Cause and Consequence*)
Grade 6	**B1. Application:** explain the importance of international cooperation in addressing global issues, and evaluate the effectiveness of selected actions by Canada and Canadian citizens in the international arena (**FOCUS ON:** *Interrelationships; Perspective*)

Expectations Featuring Interrelationships in the 2018 Ontario Social Studies Curriculum
Source: Ontario Ministry of Education, 2018.

One third of the 36 Social Studies Expectations across Grades 1 – 6 involve exploring interrelationships (as seen in the table). This feature is an indication that the Ontario curriculum wants its students to fully grasp Systems Thinking. The curriculum builds students' ability to think of the relationships within a system, and does this consistently throughout the curriculum. Students coming out of the Social Studies programme at Grade 6 will have the foundational skills to apply Systems Thinking to their subsequent subjects.

See one such example from the Science curriculum where students understand the inherent linkages between humans and environmental health.

Learning Strand B1 from Grade 1 Ontario Science
Source: Ontario Ministry of Education, 2022.

Repeatedly, we see the Ontario curriculum's learning objectives focusing on interrelationships.

4. TEACHERS ASKED TO PRACTICE ESD COMPETENCIES

The 2018 Ontario Social Studies Curriculum requires teachers to acquire several of the above competencies.

Teachers themselves are required to practice these competencies for effective curriculum delivery. Below are some examples where the curriculum requires teachers to practice ESD Competencies for effective curriculum delivery.

Normative Competency "Reflecting on One's Values" in History

The History subject, which is taken in Grades 7 & 8, illustrates the need for Normative Competency. One of the subject's overarching goals is for students to understand the experiences of and to empathize with people in past societies. Note that this goal is further supported via students engaging in History-subject thinking.

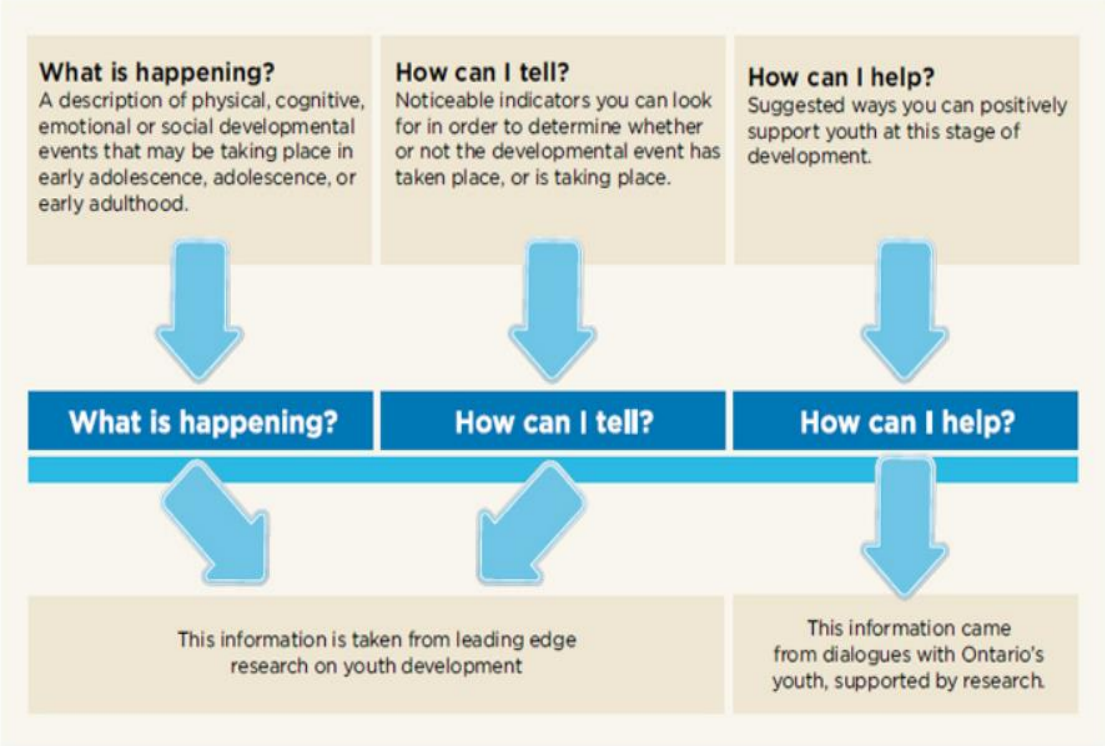
Before a teacher can effectively facilitate students' empathy for past societies, the Ontario curriculum explicitly states they require Normative Competency. Such is detailed in the Roles and Responsibilities in Social Studies, History and Geography curriculum document section. Teachers are explicitly asked to "reflect on their own attitudes, biases, and values with respect to the topics they are teaching" (p. 17, Ontario Ministry of Education, 2018). The curriculum encourages teachers to practice reflection on the norms and values which underly their own actions. This prepares teachers to be more understanding of students' conceptions of history, and better able to facilitate students' empathy with past societies.

Collaboration Competency "to understand and respect the needs, perspectives and actions of others" as Critical to the Teacher's Success

Ontario curriculum documents emphasise the role of "educator's awareness of and responsiveness to students' cognitive, emotional, social, and physical development, to their sense of self and spirit" as "critical to their [students] success" (p. 4, Ontario Ministry of Education, 2018). For teachers to successfully deliver the Ontario curriculum, teachers are required to be aware and responsive of students' needs, and to do so in line with students' development. We see the Ontario Curriculum resources supporting this. Teachers have research-informed web-based guides on early childhood, middle years and adolescent development.

These documents enable educators to know physical, emotional, cognitive, and linguistic approaches to communicating at each development stage. Educators use the documents to identify interventions according to a students' development stage. For example, the adolescent document is a website which explains Early adolescence (12–14 years); Adolescence (13–19 years), and; Early adulthood (17–25 years). The format, "What is happening?" "How can I tell?" and "How can I help?" makes it practical for the user.

Links to supplemental material (such as the above "Stepping Stones") on the development stages of students across grades K – 12 is included in curriculum documents, and thus become common references for all teachers in the Ontario district.



Format used to allow educators to incorporate this information into practical use.
Source: https://www.ontario.ca/document/stepping-stones/developmental-maps-early-adolescence

EMBEDDING ESD USING SUBJECT-SPECIFIC THINKING-SKILLS

We further see these competencies mirrored within the discipline-specific thinking skills. In a particular grade students' key learning outcomes are divided into two main strands. Each strand is further divided into three substrands. At the substrand level, the curriculum directs teachers on the discipline-specific thinking skill required.

The discipline-specific thinking skills in the Ontario curriculum is an example of ESD embedding. Teachers are explicitly asked to use a given method of inquiry to instill discipline-specific thinking skills in students. Students come out of the Ontario schooling experience with ESD competencies because the thinking skills nurtured contain ESD competencies. All substrands are marked with one or two thinking skills. Further, the curriculum provides specific example questions within the learning substrands for teachers to accurately set up students' engagement. The Social Science curriculum has six thinking skills, within one substrand one to two of these are highlighted for focus.

Having "abilities to recognise and understand relationships" is an ESD Competency seen in the Social Studies Curriculum. This is seen as a subject-specific thinking skill called "Interrelationships". Educators are told explicitly to emphasise this skill via thought-provoking questions.

In Grade 1, a student is asked "In what ways do people and the natural and built features of our community work together to help meet the needs of the community?" Students continue to practice thinking using the "Interrelationships" concept. Such concepts are not confined to the human-nature relationship. In Grade 5, a student is asked "Which level or levels of government should address the issue of the sale and export of spring water from Ontario?" Embedding ESD within subject-specific thinking and highlighting where teachers deliver them and providing sample probing questions ensures the curriculum delivers ESD.

Significance	Cause and Consequence	Continuity and Change
This concept requires students to determine the importance of something.	This concept requires students to determine the factors that affect or lead to something as well as its impact or effects.	This concept requires students to determine what has stayed the same and what has changed over a period of time.
"What role does an Elder play in your community? (Grade 1)	"Why don't farmers in Ontario grow bananas or pineapples?" (Grade 2)	"What are the main differences between your day-to-day life and the life of a child living in Upper Canada in 1800?" (Grade 3)
Patterns and Trends	**Interrelationships**	**Perspective**
This concept requires students to study characteristics that are similar and that repeat themselves in a natural or human environment and characteristics that exhibit a consistent tendency in a particular setting and/or over period of time.	This concept requires students to explore connections within and between natural and/or human systems, including how they adapt to and have an impact on one another.	This concept refers to the ways in which different individuals and/or groups view something.
"What makes a region a region?" (Grade 4)	"Why does the issue of invasive species require action at the international level?" (Grade 6)	"How does an understanding of unique individuals and groups help us appreciate the diversity in our community?" (Grade 2)

The Six Social Studies Thinking Concepts & Brief Description & Example Question

Source: Ontario Ministry of Education, 2018 (p. 60-62).

Content is delivered with the intent of understanding the relationships between past societies and their contexts. They explore the contribution of past societies to Canada's heritage. Topics include Canada's Indigenous population through Indigenous voices and narratives; students analyse the role colonialism has played in Canada and its impact to individuals and communities. In other words, the Ontario curriculum requires students to evaluate and understand relationships within the past.

5. LONG-TERM LEARNING USING "BIG IDEAS"

Primary and secondary school subjects lay the foundation for students to apply the learning throughout their lives. The long-term impact of the Ontario curriculum is clear within its instructional approach.

The long-term impact of is part of ESD where learners not only have the knowledge to address societal challenges but foundational knowledge upon which to build for the rest of their lives. The greater the impact of an education curriculum to learners, the better the quality. The greater the impact intended, the higher the chance of impact. ESD as a pathway for societal transformation is

possible when the outcomes of ESD are long-term. This means that the curriculum is designed to accommodate students' long-term application.

The Ontario Social Studies Curriculum streamlines students' long-term learning by having a component called "Big Ideas". These are "ideas students retain long after they have forgotten many of the details of the content they studied" (p. 14, Ontario Ministry of Education, 2018). The outcome is for students to learn these concepts through specific knowledge.

Overall Expectations	Related Concepts of Social Studies Thinking	Big Ideas
Strand A. Heritage and Identity: Communities in Canada, 1780–18		
A1. compare ways of life among some specific groups in Canada around the beginning of the nineteenth century, and describe some of the changes between that era and the present day	Continuity and Change; Perspective	The different communities in early-nineteenth-century Canada influence the way we live today.

Big Idea for Social Studies Grade 3 on Heritage and Identity

Source: Ontario Ministry of Education, 2018 (p. 86).

The outcome of the Ontario curriculum is not for students to retain specific knowledge. Instead, students use the thinking skills and inquiry process to have insight. Through this process, students would formulate their own analysis on the content. Therefore, the concept is retained long after the specific knowledge has been forgotten in the long run, privileging a deep engagement with subject matter to understand fundamental concepts enables students to apply them to other subjects.

References

Aai, S.Y. (2014). Education for Sustainable Development in Malaysia's National Curriculum Reformation: A Theoretical Exploration. *Journal of International and Comparative Education, 3(2).* doi:10.14425/00.73.61

Arus Academy. (2021). *Global Citizenship Education Projects.* https://arusacademy.org.my/web/global-citizenship-education-projects/

Balakrishnan, P. (2021). ESD in Malaysia. In Iyengar, R. & Kwauk, C. (2021). *Curriculum and Learning for Climate Action*. Leiden, The Netherlands: Brill. doi: https://doi.org/10.1163/9789004471818_017

Brundtland, G.H. (1987). *Our Common Future Report of the World Commission on Environment and Development*. Geneva, UN-Document A/42/427.

Crowther, D., & Seifi, S. (2022). Introduction: Managing the Pillars of Sustainable Development. *The Equal Pillars of Sustainability*. Emerald Publishing Limited.

Economic Planning Unit (EPU) (2021). *Twelfth Malaysia Plan 2021-2025.* https://rmke12.epu.gov.my/en/documents/twelfth-plan

Errico, S. (2017). *The rights of indigenous peoples in Asia.* Geneva: International Labour Organisation. https://www.ilo.org/gender/Informationresources/Publications/WCMS_545487/lang--en/index.htm

Gough, A. 2005. "Sustainable Schools: Renovating Educational Processes." *Applied Environmental Education and Communication* 4 (4): 339–351. doi:10.1080/15330150500302205.

Hanifah, M., Shaharudin, I., Mohmadisa, H., Nasir, N., & Yazid, S. (2015). Transforming sustainability development education in Malaysian schools through greening activities. *Review of International Geographical Education Online*, 5(1). http://www.rigeo.org/vol5no1/Number1Spring/RIGEO-V5-N1-5.pdf

Hargreaves, L. (2008) The whole-school approach to education for sustainable development: From pilot projects to systemic change. *Policy and Practice: A Development Education Review*, Vol. 6, Spring, pp. 69-74.

Kamis, A., Che Rus, R., Rahim, M. B., Nur Yunus, F. A., Zakaria, N., & Mohd Affandi, H. (2017). Exploring green skills: A study on the implementation of green skills among secondary school students. *International Journal of Academic Research in Business and Social Sciences*, 7(12). https://doi.org/10.6007/IJARBSS.v7-i12.3615

Lee, M. N. (2006). Centralized decentralization in Malaysian education. *Educational decentralization: Asian experiences and conceptual contributions*, 149-158.

Letchumanan, K. & Che Rose, R.A. (2021). Cabaran dan isu yang dihadapi dalam pelaksanaan Program Sekolah Lestari di Malaysia. *Malaysian Journal of Society and Space,* 17(1) (238-254) https://doi.org/10.17576/geo-2021-1701-18238

Lopes, A. (2019). Still building a better world?: research reflections on teacher education and identity. *Rethinking teacher education for the 21st century: trends, challenges and new directions.*

Ministry of Education (MOE) (2013). *The Malaysia Education Blueprint 2013-1025.* *https://www.moe.gov.my/menumedia/media-cetak/penerbitan/dasar/1207-malaysia-education-blueprint-2013-2025/file*

Ministry of Education (MOE) (2016). *Buku penerangan kurikulum standard sekolah menengah (KSSM).* https://www.academia.edu/32045741/Buku_Penerangan_KSSM_

Ministry of Education (MOE) (2017). Kurikulum standard sekolah rendah (KSSR) (Semakan 2017). *Kerangka Kurikulum Mata Pelajaran.* https://online.fliphtml5.com/axjgi/nklf/#p=1

Ministry of Education (MOE) (2022). Quick Facts. https://www.moe.gov.my/menumedia/media-cetak/penerbitan/quick-facts/5336-quick-facts-2022/file

Mumtazah, O., & Norhafidah, A. (2009). *Bagaimanakah amalan penggunaan lestari remaja sekolah?* Jurnal Pengguna Malaysia, 13, 30–45.

Mustam, B., & Daniel, E. S. (2018). Informal and formal environmental education infusion: Actions of Malaysian teachers and parents among students in a polluted area. *Malaysian Online Journal of Educational Sciences*, 4(1), 9–20. https://mojes.um.edu.my/article/view/12641

Niemi, H. (2015). Teacher professional development in Finland: Towards a more holistic approach. *Psychology, Society & Education*, *7*(3), 279-294.

Noordin, T. A., & Sulaiman, S. (2010). The status on the level of environmental awareness in the concept of sustainable development amongst secondary school students. *Procedia-Social and Behavioral Sciences*, 2(2), 1276–1280. https://doi.org/10.1016/j.sbspro.2010.03.187

Ontario Ministry of Education. (2018). Social Studies Grades 1 to 6 History and Geography Grades 7 and 8. Retrieved 15 October 2022 from https://www.edu.gov.on.ca/eng/curriculum/elementary/social-studies-history-geography-2018.pdf

Ontario Ministry of Education. (2022). Science and Technology Grades 1 to 8. Retrieved 15 October 2022 from https://assets-us-01.kc-usercontent.com/337fb634-90af-0011-64d4-f50e909cadce/a6136d61-3120-43f0-94a3-5859e0319382/The%20Ontario%20Curriculum%20Grades%201%E2%80%938%20%E2%80%93%20Science%20and%20Technology%202022.pdf

PADU. (2021) *Pelan Pembangunan Pendidikan Malaysia, 2013-2025, Laporan Tahunan 2020*. https://www.padu.edu.my/annual_report/2020/

Reimers, F. et al. (2017). Empowering students to improve the world in sixty lessons: Version 1.0. Creative Space Independent Publishing Platform.

Sharma, R. (2021). Learning to recycle isn't enough: Youth-led climate activism and climate change education in the UK. In Iyengar, R. & Kwauk, C. (2021). *Curriculum and Learning for Climate Action*. Leiden, The Netherlands: Brill. doi: https://doi.org/10.1163/9789004471818_017

Singh, V. (2021). Toward a Transdisciplinary, Justice-Centered Pedagogy of Climate Change. In Iyengar, R. & Kwauk, C. (2021). *Curriculum and Learning for Climate Action*. Leiden, The Netherlands: Brill. doi: https://doi.org/10.1163/9789004471818_017

UNESCO (2012). *The Malaysia Education Policy Review*. https://unesdoc.unesco.org/ark:/48223/pf0000221132

UNESCO (2014). *Roadmap for Implementing the Global Action Programme on Education for Sustainable Development*. https://unesdoc.unesco.org/ark:/48223/pf0000230514

UNESCO (2017). *Education for sustainable development goals: Learning objectives*. https://unesdoc.unesco.org/ark:/48223/pf0000247444

UNESCO (2020). *Education for Sustainable Development: A Roadmap* https://unesdoc.unesco.org/ark:/48223/pf0000374802

UNESCO (2021). *World Conference on Education for Sustainable Development*. Berlin.

UNESCO. (2021). Getting every school climate-ready: how countries are integrating climate change issues in education. United Nations Educational, Scientific and Cultural Organisation. Paris.

UNESCO (2021). *Reimagining Our Futures Together — A New Social Contract for Education* https://unesdoc.unesco.org/ark:/48223/pf0000379707.locale=en

Wals, A.E.J. (2011). Learning our way to sustainability. *Journal of Education for Sustainable Development*, 5(2). https://journals.sagepub.com/doi/pdf/10.1177/097340821100500208

World Bank (2022). Data as of June 2022. Lower secondary completion rate, total (% of relevant age group) – Malaysia. https://data.worldbank.org/indicator/SE.SEC.CMPT.LO.ZS?locations=MY

Yusof, T. A. (2022). School curriculum review should be done earlier, says experts. *New Straits Times, 23.6.2022*. https://www.nst.com.my/news/nation/2022/06/807642/school-curriculum-review-should-be-done-earlier-say-experts

[left blank]

Launched in December 2020, Mission 4.7 is a global initiative of the UN Sustainable Development Solutions Network (SDSN) to advance Target 7 of Sustainable Development Goal 4 globally by promoting Education for Sustainable Development (ESD) and Global Citizenship.

This report is a pilot study to ascertain the extent to which ESD is mainstreamed in Malaysian national education policy, national school curricula, and teacher professional development. We identify gaps and devise the best options to support the Malaysian Ministry of Education in its endeavour to modernize the national curriculum in line with the SDGs.

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

MISSION 4.7