INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN PROGRESSIVE EDUCATION & DEVELOPMENT

OPEN ACCESS JOURNAL

Vol 14, Issue 4, (2025) E-ISSN: 2226-6348

S.O.A.R.ing into Learning Analytics: Are we Prepared for the Leap?

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DOI Link: http://dx.doi.org/10.6007/IJARPED/v14-i4/26953

Published Online: 01 December 2025

Abstract

In recent years, education has experienced a shift in how schools understand learners, teachers and systems through the vast availability of educational data. The information that can be extracted from the data is valuable in reflecting a student's growth in a holistic manner i.e. academic achievements, inclinations and soft skills. Within the School-Based Assessment (SBA) currently in practice in Malaysia, large amounts of information are generated daily, yet teachers' readiness to interpret and use data for decision-making remains uncertain. Therefore, this concept paper aims to explore teachers' readiness for Learning Analytics (LA) in Data-Driven Decision Making (DDDM) in the Malaysian education environment. The methodology used for this concept paper is a thorough analysis of LA through the S.O.A.R. model that measures five elements which are Strengths (S), Opportunities (O), Aspirations (A) and Results (R). The major findings show that the S.O.A.R. model effectively demonstrates LA's potential by recognizing the strengths and opportunities that already exist in the Malaysian education context, while also outlining possible aspirations and measures of results that can be applied. By examining how the Malaysian education community (i.e. ministry, school and teachers) can leverage their existing capacities, expand future opportunities and aspire toward data-informed professionalism, the S.O.A.R. approach provides a strategic planning lens to understand how Malaysian educators can move from data collection to meaningful application. Findings from this conceptual discussion also highlight the importance of professional development, equitable digital infrastructure and a supportive data culture in realizing Malaysia's vision of an evidence-based education system aligned with the Sustainable Development Goals (SDG 4). Further research is needed to assess educators', school leaders' and ministerial authorities' readiness to apply LA in DDDM in the Malaysian education context.

Keywords: Learning Analytics, Data-Driven Decision Making, Teacher Readiness, S.O.A.R. Model, Malaysia

Introduction

The digital transformation of education has generated large quantities of learner data, reshaping how teachers assess, intervene and plan instruction. Hilmy, Hazwan, Azrifah, & Erzam (2025) observed that "a massive volume of educational data has been generated from adopting educational technologies such as online learning platforms, virtual classrooms, online information systems, and gamification". Globally, education systems have begun to rely on Learning Analytics (LA) which is the systematic measurement, collection, analysis and reporting of learning data to optimize student performance and instructional design (Long & Siemens, 2011). Leading education systems and global organizations have long integrated analytics to improve teaching, learning and governance, as in Table 1:

Table 1
LA Practice by Leading Education Systems and Global Organizations

No.	Education System/Organization	LA Practice
1	Organisation for Economic Co-operation and Development (OECD) Framework for Data Use in Education	The OECD (2019) emphasizes the integration of data-informed culture at every level of education from classroom to ministry.
2	European Commission's Learning Analytics Framework (EU Joint Research Centre)	The EU's Joint Research Centre (JRC) provides one of the most detailed Learning Analytics Policy Frameworks (Ferguson et al., 2016), designed to guide analytics adoption across European education systems.
3	U.S. Department of Education's Data Literacy for Teachers Framework	The U.S. Office of Educational Technology and the Institute of Education Sciences (IES) promote the use of LA and Data-Driven Decision Making (DDDM) through national programs like the Data Quality Campaign (DQC) (Means, Chen, Debarger, & Padilla, 2011).

In Malaysia, this shift aligns with the country's educational modernization efforts, including the implementation of the School-Based Assessment (SBA) framework, which emphasizes continuous and holistic assessment. Despite this progress, teachers' ability to translate data into pedagogical insight remains a central challenge. Malaysia's commitment to quality education, as articulated in the Malaysia Education Blueprint (2013-2025) (MoE, 2013), highlights the role of data-driven practice in promoting equity and accountability. The Ministry of Education, Malaysia (MoE) has also allocated significant budgetary resources toward digital platforms such as Sistem Pengurusan Pentaksiran Bersepadu (SPPB) or Integrated Assessment Management System to strengthen data access and analytics capacity. Yet, the effective use of LA depends not merely on technological availability but on educators' readiness, encompassing their knowledge, skills, attitudes and confidence to use data for decision-making (Mandinach & Gummer, 2016).

Assessing teachers' preparation for Learning Analytics (LA) in Data-Driven Decision Making (DDDM) is critical in Malaysia's education environment as the country transitions to digitally enhanced teaching and learning through continuous policy reforms and technology efforts. While LA has the ability to enhance instructional practices, personalize learning, and promote evidence-based treatments, its successful application is dependent on teachers' knowledge, abilities, attitudes, and desire to incorporate data into everyday pedagogical decisions.

Identifying their preparedness is thus critical for identifying existing gaps, problems, and professional development needs, ensuring that LA tools are not only available but also meaningfully used. The study's goal is to influence strategic planning, capacity building, and policy alignment, all of which can help Malaysia's transition to a strong, data-driven educational environment.

This study adds to the Malaysian education environment by using the SOAR model—strengths, opportunities, aspirations, and results—to investigate teachers' preparation for Learning Analytics (LA) in Data-Driven Decision Making (DDDM). The study identifies teachers' existing capabilities in digital competency and instructional practice, highlighting assets that may be used to promote LA adoption. It also identifies opportunities in current educational policies, technological breakthroughs, and professional development programs to enhance data-driven practices. By investigating teachers' goals, the study captures their visions for better learning outcomes and more informed pedagogical decisions, ensuring that LA implementation is consistent with their professional beliefs. Finally, by identifying the outcomes required to achieve these goals, the study provides actionable insights for policymakers, school leaders, and training providers, ultimately promoting a more future-readier, data-enabled teaching workforce in Malaysia.

Thus, this concept paper aims to analyze Malaysian educators' readiness to integrate LA for DDDM through the strategic lens of the S.O.A.R. model. The paper employs the S.O.A.R. framework to map the Strengths, Opportunities, Aspirations and Results associated with implementing LA in Malaysia's education system.

S.O.A.R. Model Assessment – Strategic Planning Tool

S.O.A.R.: A new approach to strategic planning, published in 2003, has a potent technique for strategic planning. It stands for strengths, opportunities, aspirations and results, assisting firms in making the most of their advantages, investigating fresh prospects, establishing challenging objectives and producing measurable outcomes. The philosophy behind the S.O.A.R. framework is an appreciative inquiry, used to formulate plans that are aligned with the planned insights (Roslizawati et al., 2019).

S.O.A.R. model is also applied worldwide. For instance, the Sugiarti et al. (2023) study shows that the results of the SWOT analysis, then re-analyzed with S.O.A.R., create new co-creations for digital marketing businesses. Kamran et al. (2025) used a qualitative research method to explore the strengths, opportunities, aspirations and results (S.O.A.R.) factors that could optimize the teaching and learning process for children with special educational needs in the context of an inclusive school located in Karachi, Pakistan. Putri & Pertiwi (2025) recently analyzed and described the public information disclosure strategy through the Information and Documentation Management Officer (PPID) of East Java Province using the S.O.A.R. analysis. The S.O.A.R. Analysis Model can be illustrated as in Figure 1.0 as below:

Figure 1.0: S.O.A.R. Model Assessment Framework

In the S.O.A.R. matrix, strengths are the foundational elements that set a research apart. These are internal attributes that contribute to its competitive research advantage. Identifying and leveraging strengths are crucial for a successful S.O.A.R. action plan in research. These are the internal attributes, capabilities or resources that give an organization a competitive advantage or contribute to its success. Identifying strengths helps organizations understand what they do well and what sets them apart from others in the digital era (Elgahwash, Ahmed, & Al-Magarbi, 2023).

Opportunities, in the S.O.A.R. Matrix, is used to recognize and capitalize on opportunities that are key to staying agile in research and responsive to the education market dynamics. Aspirations encompass the visionary goals and ambitions that guide a research towards future success. In the S.O.A.R. matrix, this part is about picturing what the educational organization (schools, HEI, etc) wants to achieve and deciding where it wants to go for growth. Results in S.O.A.R. analysis focus on the positives and measurable outcomes in the research topic. This involves evaluating the effectiveness of strategic initiatives and ensuring that the organization (schools, HEI, etc) achieves its objectives.

S.O.A.R. has been contrasted to the classic SWOT diagnostic analysis that diverts organizational resources away from strengths and opportunities by focusing on weaknesses and threats. Rather, S.O.A.R. is dialogue-based (Cole, Stavros, Cox, & Stavros, 2022). It has been demonstrated that S.O.A.R. is a flexible and successful strategic framework that fosters innovation, energy and organizational engagement. Strength, Opportunity, Aspiration and Result are the acronyms for S.O.A.R. It is a dynamic, contemporary and creative method for developing strategic thinking, assessing individual and group performance, developing strategies and formulating plans in S.O.A.R.'s strategic thinking and strategic planning.

S.O.A.R. is a framework that emphasizes the development and application of positive strategies through the identification of strengths, chances for constructive creativity, encouraging individuals and groups to share goals, and determining quantifiable and

significant outcomes. Thus, strategic planning is accelerated by this approach. The Strength, Opportunities, Aspirations, and Results (S.O.A.R.) analytical approach has gained popularity as a planning and analysis tool for strategic initiatives over the past ten years. By applying this technique to identify environmental correlations, a firm can engage with its surroundings and establish business strategy. For more than 20 years, S.O.A.R. has established a reputation as a framework that provides a flexible way to think strategically and develop strategies (Muhammad & Hromada, 2023).

Organizations have found success using the S.O.A.R. Model to improve student performance, motivation and engagement while facilitating change and development. The S.O.A.R. framework's goal is to accomplish the product target management aspiration by using the strategic planning approach based on the development of opportunities and strengths. In order to create plans that are in line with the planned insights, the S.O.A.R. framework is based on an appreciative inquiry. The analysis integrates the group's thoughts and promotes cooperation inside the company.

The S.O.A.R. framework also provides a flexible approach to strategic thinking, planning and leadership that invites the entire system into a strategic planning or strategy process by incorporating all who have an interest in the future success of the organization. These stakeholders can be internal workers such as employees or external participants such as suppliers, consumers, and societies. S.O.A.R. (Strengths, Opportunities, Aspirations, Results) analysis is an appreciative inquiry tool that is uniquely tailored to enable strategic planning around well-defined goals. S.O.A.R. analysis differs from the well-known SWOT (strengths, weaknesses, opportunities, and threats) analysis within two dimensions; it focuses on the future prospects and results from a subject of interest while SWOT aims at inherent weaknesses and perceived threats (Prabu et al., 2023).

The 5W + 1H of the S.O.A.R. Model in Education

What: S.O.A.R. is a strategic planning model emphasizing positive growth through reflection on strengths and future possibilities. Within the scope of LA and DDDM, S.O.A.R. functions as a reflective and diagnostic tool that helps educators and policymakers assess readiness at multiple levels. It encourages the identification of existing resources, digital competencies and institutional achievements that can serve as leverage points for advancing Malaysia's data-driven education agenda. In essence, S.O.A.R. transforms the abstract concept of "readiness" into a structured, actionable roadmap for educators navigating the transition toward analytics-based practice.

Why: It helps education systems focus on what can be leveraged such as existing teacher competencies or digital initiatives to enhance innovation and sustainability. The integration of S.O.A.R. into the discussion of LA and DDDM is vital for Malaysia because it reframes the national discourse on teacher readiness from a reactive stance ("what teachers lack") to a proactive one ("what the system can build upon"). Instead of focusing on obstacles, such as inconsistent infrastructure or limited data literacy, S.O.A.R. highlights growth through professional development, collaborative data culture and policy alignment. This approach complements Malaysia's SBA framework and the Malaysia Education Blueprint (2013–2025) (MoE, 2013), both of which emphasize evidence-based improvement and data-informed accountability.

By adopting S.O.A.R., the Malaysian education system can strategically harness its strengths to bridge the persistent gap between data collection and instructional application.

When: S.O.A.R. is applied when institutions aim to transform culture, such as during curriculum reform or analytics adoption. S.O.A.R. is particularly relevant during periods of educational reform and digital transformation, such as Malaysia's current efforts to embed analytics within SPPB while also aligning school performance with SDG 4 (Quality Education). The framework can be applied during program evaluation cycles, teacher training initiatives or the rollout of new analytics tools to assess and strengthen readiness before large-scale implementation.

Where: It is most effective within collaborative settings such as schools, states or ministries where collective visioning and data reflection take place**.** In the Malaysian context, S.O.A.R. can be applied across multiple educational tiers, from national policymaking to individual schools and classrooms. At the ministry level, it supports strategic alignment between analytics initiatives and educational policy. At the institutional level, it aids school leaders in assessing their teachers' data use and professional capacity. In classrooms, it provides teachers with a reflective lens to analyze their practice, evaluate student data and design more responsive learning experiences.

Who: The success of S.O.A.R.-based planning relies on the collaboration of teachers, school leaders, policymakers and educational technologists to align strategy with achievable results. Teachers act as the primary interpreters of learning data, school leaders serve as facilitators who model data-driven leadership and policymakers ensure systemic coherence through national strategies and funding priorities. In Malaysia, agencies such as the Institut Aminuddin Baki and teacher education institutes play crucial roles in providing capacity-building and research support for the practical adoption of LA.

How: Implementing S.O.A.R. involves a cyclical process of appreciative inquiry to identify what is working, envision what is possible, set shared aspirations and establish measurable indicators of success. Within LA and DDDM, this translates into mapping teachers' existing competencies in data literacy, defining aspirational benchmarks for analytics integration and evaluating tangible outcomes such as improved instructional quality or enhanced student engagement. In Malaysian schools, this might involve professional learning communities (PLCs) using classroom data to co-design interventions or administrators employing analytics dashboards to inform school improvement planning.

Ultimately, by applying the S.O.A.R model to LA within the Malaysian context, one is able to administer a strategic and context-sensitive assessment of educators' readiness. Rather than treating readiness purely as a set of technical competencies, such as familiarity with dashboards, data extraction or software tools, this approach reconceptualizes readiness as a collective, evolving capacity. In doing so, it aligns individual professional growth trajectories with existing national educational objectives.

This alignment positions educators not simply as users of data, but as thoughtful actors who interpret, question, and shape the meaning of data to inform decisions, tailor pedagogy and contribute to systemic transformation. In effect, readiness becomes a sustainable, system-wide reality where educators work in concert with peers, leaders, institutions and policy frameworks to translate analytics into actionable insights and to embed data-driven decision-making into everyday educational culture. In other words, readiness permeates from the individual classroom teacher, through departmental practices, to the institutional ethos and ultimately to national educational outcomes.

Research in the Malaysian setting underscores that educator readiness for new pedagogies and technologies is multi-dimensional, involving knowledge, skills, attitudes and institutional supports. For instance, a study found that Malaysian trainee teachers' readiness in terms of ICT knowledge and skills was significantly positively correlated with their implementation of 21st-century learning practices (Idham et al., 2024). By anchoring the S.O.A.R. framework in this evidence base, the measure of educator readiness becomes more than checklist-driven. It becomes dynamic, forward-looking and integrative of individual existing strengths, potential aspirations, institutional opportunities and measurable results.

Strengths (S)

LA and DDDM already possess strong foundations within Malaysia's educational ecosystem. One key strength lies in the existing policy infrastructure supporting continuous assessment and digital learning. The SBA system has normalized ongoing data collection, giving teachers a steady stream of evidence about student learning. This familiarity with data, even if not yet analytical, represents a cultural foothold for further development. The implementation of LA in DDDM does not seem to be a distant aspiration, as long as teachers and school leaders understand that "learning analytics offers educational institutions a way to improve student success by helping teachers and learners to understand and optimize learning" (Ferguson, 2012).

Another strength is the growing recognition of LA's potential among Malaysian educators. A Malaysian study observed that teachers engage in continuous learning to enhance digital competencies by using "webinars, online resources, and diverse platforms (e.g., TikTok) for professional development" (Kamilah et al., 2025). The same research found that teachers were looking forward to "gathering technical information, such as students' attendance and participation in the classroom" to guide instructional planning (Kamilah et al., 2025). Teachers are familiar with descriptive analytics (tracking student progress, attendance, and assessment results) through SPPB which serves as a gateway to more advanced analytics. Moreover, national initiatives such as the Digital Educational Learning Initiative Malaysia (DELIMa) have democratized access to digital tools, while teacher education programs are beginning to embed basic data literacy components.

Finally, there is a policy-level readiness anchored by the Malaysia Education Blueprint's (MoE, 2013) emphasis on evidence-based practice. The blueprint encourages data-informed decision-making at every level of schooling, aligning with global educational trends toward transparency, accountability and continuous improvement. These structural strengths create fertile ground for the systematic adoption of LA as part of teachers' professional toolkit.

The Strengths outlined above indicate that the Malaysian education system already has the necessary foundation for LA and DDDM in practice. The awareness among teachers and schools means that there is ample footing from which LA and DDDM can take off. The existing policies set by the MoE has continuously spurred the government's agenda in transforming the education system in Malaysia towards digitalization and data literacy.

Opportunities (O)

The rise of analytics-driven education offers Malaysia a range of opportunities to elevate teaching and learning practices. Most significantly, LA can bridge the gap between data collection and pedagogical action. Predictive and prescriptive analytics can help teachers anticipate learning difficulties and design timely interventions, allowing for personalized learning pathways (Ifenthaler & Yau, 2020). When teachers understand how to use data to guide classroom design, data collection will become a valuable task that provides them with essential information about their own students.

Furthermore, Malaysia's national digital transformation initiatives such as the Dasar Pendidikan Digital or Digital Education Policy open the door for integrating analytics into large-scale educational platforms. By aligning LA with these initiatives, the MoE can create a centralized Learning Analytics Platform (LAP) within SPPB, aggregating student data into usable dashboards that empower educators to make evidence-based decisions in real time. While SPPB is actively used by teachers to record students' progress, the isolation of each SBA component (Classroom-Based Assessment, Physical, Sports and Cocurricular Activities Assessment and Psychometric Assessment) demotivates teachers to use the data dynamically. With a centralized LAP, teacher will be able to access a more holistic report of their students' progress, which can also signal that every component of SBA is significant hence must be reported objectively and diligently.

LA also provides an opportunity to cultivate a data-informed professional culture. When teachers collaborate on analyzing student performance trends, they move from isolated decision-making to collective reflection. This shift fosters professional communities of practice (Schildkamp, Lai, & Earl, 2013) where data interpretation becomes a shared responsibility rather than an administrative burden. Such collaboration also supports school leadership development, encouraging principals to act as data mentors rather than mere supervisors. However, the effectiveness of school leader roles in data usage depends heavily on their readiness and commitment to establishing a data-driven school culture.

Lastly, the alignment with SDGs offers Malaysia a global incentive to strengthen LA adoption. By promoting equitable access to quality education and data-driven accountability, LA contributes directly to achieving SDG 4.7 (fostering inclusive and lifelong learning opportunities for all). The active usage of data provides a more holistic view of a student's abilities, academic and non-academic, therefore allowing teachers to cater to their students' varied inclinations through a more personalized and relevant lesson design. In return, students may feel more included in lessons, rather than marginalized and segregated based on one indicator (i.e. academic achievement) as previously practiced. This will create a more interactive and inclusive classroom, allowing for equal learning opportunities for all students.

Aspirations (A)

The aspirations for LA in Malaysia extend beyond technical competence. They envision a culture where teachers are reflective, data-literate professionals capable of transforming raw

information into pedagogical insight. This aspiration aligns with the MoE's goal to nurture teachers as innovators who personalize instruction and evaluate learning continuously.

The future Malaysian classroom is imagined as a dynamic, analytics-enabled environment, where teachers access real-time dashboards that visualize student progress and potential learning risks. Data does not merely come as a report card, but a living narrative of growth and potential. Teachers interpret analytics to design differentiated tasks, predict learning gaps and support holistic student development, in line with the National Education Philosophy.

Beyond the classroom, this aspiration includes institutional transformation. Schools may establish internal analytics teams or data coordinators who support teachers in interpreting patterns. Pre-service teacher programs could integrate LA modules, ensuring new educators enter the field with foundational data literacy and ethical awareness (Kitto & Knight, 2019).

Ultimately, Malaysia's aspiration is to elevate education from data-rich to data-wise, creating a system that learns from itself, values reflection for improvement and adapts intelligently to its learners. Data is not only collected as part of a gruelling, routine task, merely to satisfy administrative work. It will transform into an essential part of teaching and learning design that helps teachers navigate their students towards their full potential.

Results (R)

The measurable outcomes (results) of adopting LA and DDDM through the S.O.A.R. model can be conceptualized across four interdependent domains: teacher readiness, institutional capacity, policy alignment and learner outcomes. Together, these domains represent the tangible expressions of Malaysia's aspiration to cultivate a data-literate, reflective, and future-ready teaching force.

Teachers who acquire analytical literacy demonstrate greater confidence in using evidence to guide instruction, shifting from intuition-based decision-making to evidence-informed pedagogical strategies (Mandinach & Gummer, 2016). Institutions that integrate LA systems improve transparency, collaboration and accountability. At the policy level, analytics enable smarter resource allocation, targeted interventions and continuous performance monitoring aligned with the Malaysia Education Blueprint (2013–2025) (MoE, 2013) and SDG 4 (Quality Education).

To determine whether the education system is on track to achieving these goals, several meaningful measures can be established based on the preceding S.O.A.R. dimensions. Meaningful indicators of success reflect the system's ability to translate vision into measurable action. In the Malaysian context, readiness can be tracked through increased teacher participation in data literacy training, particularly in programs organized by the MoE, teacher education institutes or other government agencies. For example, the Malaysia Digital Economic Corporation (MDEC) provides "Data Literacy Fundamentals" courses, often partnered with providers like Cybiant Asia, introducing data concepts, terminology and hands-on case studies for practical application. Teachers' participation in these types of trainings, voluntary or otherwise, can be an indicator of their readiness to commit to using LA in practice.

Othman et al. (2023) argues that the mere availability of data and technology tools does not automatically yield improved learner outcomes. Teachers need to interpret data meaningfully and then apply appropriate action in the classroom. Therefore, the demonstrated use of analytics tools in daily instructional planning, assessment feedback and student support systems can also be a measure of progress to show that LA in DDDM is successfully applied in Malaysian classrooms.

Implementation of LA in DDDM in schools needs to be a collaborative effort and not isolated to individual teachers. The student data available, especially through the SBA system, is attained through different assessment methods carried out by different teachers and cover academic and non-academic domains. Therefore, to synthesize information, the school community, including school leaders, must cooperate and actively participate in applying LA. This can be measured based on data culture scores that can be obtained through surveys assessing collaboration, reflection and trust in data.

An effective use of LA in DDDM and its application in classroom design can be seen through the reduction in learning disparities. When teachers are able to control predictive analytics, they are then able to provide timely interventions for students at risk. Rather than designing lessons based on one-size-fits-all and wasting resources (i.e. time, irrelevant teaching aids), teachers are able to use LA to correctly identify possible learning outcomes catered to specific groups of students based on their potential capabilities.

In summary, the Results dimension of the S.O.A.R. model captures not only what can be measured but also what can be meaningfully celebrated. By defining clear indicators of readiness, balancing the triple bottom line, allocating appropriate resources, and embedding thoughtful rewards, Malaysia's education system can move steadily toward the realization of a data-driven, equitable, and sustainable learning future.

Figure 2.0 outlines the strengths of existing systems, opportunities for growth, future aspirations and the expected results to support the application of LA in DDDM in the Malaysian education context. What we can observe from this framework is that LA in DDDM already has a strong foundation but further study is needed to determine whether educators, school leaders and ministerial authorities are ready to fully commit to its application.

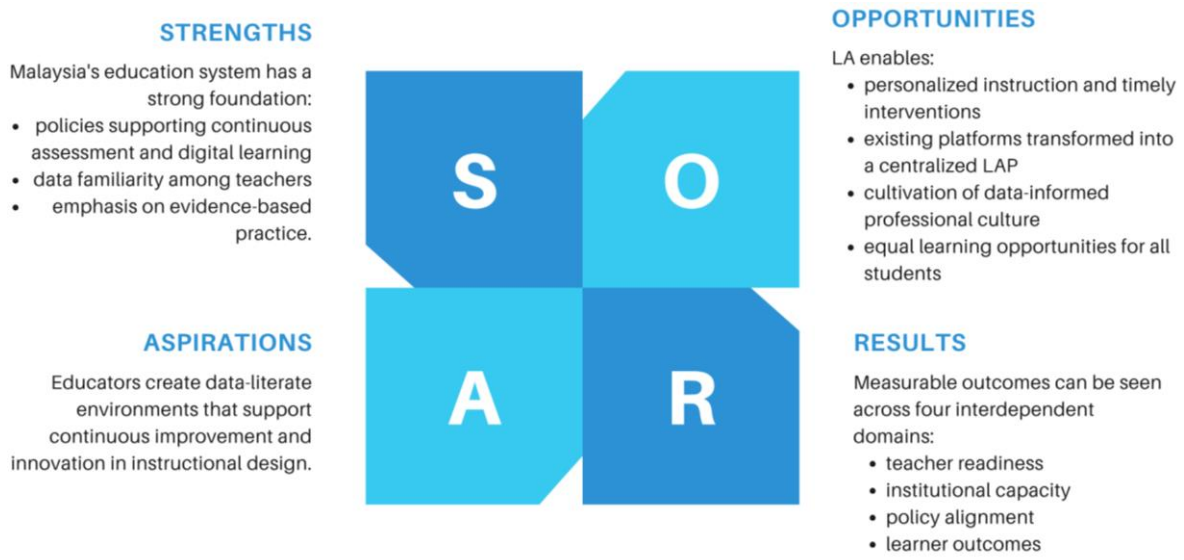

Figure 2.0: S.O.A.R. Framework Model on LA in DDDM

Summary

The application of the S.O.A.R. model to LA and DDDM offers a constructive and strategic framework for advancing Malaysia's education system toward data-informed practice. It emphasizes the need to identify what already works, expand on existing opportunities and translate aspirations into measurable results. Several strengths already exist in Malaysia, including the SBA framework, digital learning initiatives such as SPPB and growing policy emphasis on evidence-based improvement. These provide a strong foundation for integrating analytics into teaching and decision-making. However, to ensure that these initiatives lead to sustained transformation, there is a pressing need to develop a validated instrument to measure educators' readiness for LA and DDDM. This tool would assess teachers' competencies, confidence and attitudes toward data use across technical, cognitive and affective domains. Findings from this instrument would have important implications for professional development, policy formulation and educational technology integration, guiding the MoE and teacher training institutes in tailoring capacity-building efforts. These findings could also help in identifying gaps in digital equity, infrastructure and data literacy, ensuring that interventions are contextually relevant and sustainable. Through these findings, we can properly identify the levels of readiness among educators, determine which supports are most effective and prioritize initiatives that lead to genuine pedagogical improvement rather than surface-level compliance. Future studies are recommended to extend this conceptual work by empirically testing the readiness instrument across different educational settings, comparing urban and rural contexts and exploring its predictive power in improving learning outcomes. This research would contribute to a more adaptive and evidence-driven education system that continually learns from its own data.

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