

# Kemampuan Interpretasi Dan Penggunaan Data Pentaksiran Dalam Pengajaran

Zuraimi Zakaria<sup>1</sup>, & Adibah Abdul Latif<sup>2</sup>

<sup>1</sup>Fakulti Pendidikan, Universiti Teknologi MARA (UiTM)

<sup>2</sup>Fakulti Sains Sosial dan Kemanusiaan, Universiti Teknologi MARA (UTM)

zurai125@uitm.edu.my, p-adibah@utm.edu.my

## ABSTRAK

**Pengenalan-** Perbincangan di dalam artikel ini memfokuskan kepada kapasiti guru dalam penggunaan data pengajaran untuk penambahbaikan proses Pengajaran dan Pemudahcaraan (PdPc), satu kaedah yang dikenali sebagai pengajaran berasaskan bukti (Mackey & Bassendowski, 2017; Woodbury & Kuhnke, 2014).

**Objektif-** Fokus utama adalah kepada tiga aspek di dalam aktiviti pengajaran dan pentaksiran: pertama, bagaimanakah guru menjalankan proses interpretasi data (bukti); kedua, bagaimanakah data yang telah ditafsir menyokong proses guru membuat keputusan; dan ketiga, bagaimanakah guru mengasimilasikan bukti di dalam aktiviti pengajaran dan pembelajaran.

**Dapatan-** Kajian literatur mendapati perbezaan yang ketara di antara minat yang ditunjukkan oleh penyelidik luar negara terhadap pengajaran berasaskan bukti (Bruniges, 2019; Mandinach & Gummer, 2016; Masters, 2018) berbanding penyelidik di Malaysia. Pelaksanaan Pentaksiran Berasaskan Sekolah (PBS), Kurikulum Standard Sekolah Rendah (KSSR) dan Kurikulum Standard Sekolah Menengah (KSSM) telah menghasilkan ledakan tumpuan penyelidikan terhadap amalan pentaksiran (Faizah, 2011; Habibah, 2016; Mohd Aisamuddin & Rohaya, 2013). Walau bagaimanapun, fokus yang diberikan lebih tertumpu kepada aspek umum amalan pentaksiran, dengan perbincangan yang sangat minimal melibatkan literasi data dan kemampuan interpretasi bukti di kalangan guru.

**Kepentingan-** KSSR dan KSSM yang dirangka melalui rujukan kriteria menyediakan iklim dan lanskap yang menyokong secara optimal amalan berteraskan evidens atau bukti. Keberkesanan kurikulum baharu ini hanya dapat ditentukan sekiranya guru benar-benar melaksanakan amalan pengajaran dan pembelajaran yang berteraskan bukti (Cawsey, Hattie & Masters, 2019; Masters, 2018); dalam mensasarkan strategi intervensi dan peningkatan pembelajaran (Diery, Vogel, Knogler & Seidel, 2020; Griffin & Francis, 2018; Popham, 2018; Woods & Coles-Janess, 2018).

**Kata Kunci:** interpretasi bukti, keputusan berpandukan bukti, literasi data, pengajaran berasaskan bukti,

# Teachers' Ability to Interpret and Use Evidence to Inform Instruction

## ABSTRACT

**Introduction-** This conceptual paper focuses on teachers' capacity to use classroom data to improve instruction, a practice widely referred to as evidence-informed instruction (Mackey & Bassendowski, 2017; Woodbury & Kuhnke, 2014).

**Purpose-** The major focus is on three aspects within instructional and assessment activities: first, how do teachers interpret their evidence (data interpretation); second, how does the interpreted evidence used to inform teachers' instructional decisions (data-driven decision making); and third, how do teachers integrate the evidence to support teaching and learning activities (linking evidence to instruction).

**Findings-** It is interesting to note that despite the wealth of literature on data-related and evidence-based practice worldwide (Bruniges, 2019; Mandinach & Gummer, 2016; Masters, 2018); the review of literature found that similar enthusiasm had not been transpired locally. The spill-over effects of the implementation of School-based Assessment (SBA) as well as the Primary School Standard Curriculum and Secondary School Standard Curriculum had led to tremendous amount of research attention on assessment culture and practices (Faizah, 2011; Habibah, 2016; Mohd Aisamuddin & Rohaya, 2013). Nevertheless, the review of literature carried out did not showcase much evidence pertaining to data literacy and evidence interpretation, with scholarly discussions focusing more on general assessment practices.

**Significance-** The current national curricula, the KSSR and KSSM, which build upon criterion-referenced framework provides an appropriate landscape for Malaysian teachers to optimize their use of evidence. A true measure of KSSR and KSSM's effectiveness could only be ascertained if evidence of learning is used to further inform practice (Cawsey, Hattie & Masters, 2019; Masters, 2018), and brought about improvement in learning (Diery, Vogel, Knogler & Seidel, 2020; Griffin & Francis, 2018; Popham, 2018; Woods & Coles-Janess, 2018).

**Keywords:** data-driven decision making, data literacy, evidence-informed instruction, evidence interpretation, instructional decision-making,

## Introduction

A common understanding of evidence is that it is raw in nature without meaning, relevance and purpose, and needs to be interpreted into useful form of information. Evidence is rarely used in the form in which it is presented (Dyer, 2016; Mandinach & Gummer, 2013; Mandinach & Jackson, 2012). Converting evidence into useful information requires teachers to contextualize, categorize, calculate, connect and/or summarize before it can provide users with its intended meaning (Davenport and Prusak, 1998).

Teachers use evidence for multiple reasons. Assessment data, for example, assists teachers to improve their daily tasks in certain aspects of instructions. For instance, in designing and reviewing intervention strategies, in grouping students, and in self-evaluation of teaching effectiveness (Young, 2006; Young & Kim, 2010). Access to evidence also provides backwash effect on student learning. Teachers who strategically shared evidence of learning with their students reported an improvement in students' sense of accountability towards learning (Young, 2006; Young and Kim, 2010).

The importance of evidence has been documented in the Malaysia Education Blueprint 2013-2025 through an emphasis on strong academic performance cultivated by a focus on data (Ministry of Education, 2017). The current curricula, Primary School Standard Curriculum (or KSSR for Kurikulum Standard Sekolah Rendah) introduced in 2011 and Secondary School Standard Curriculum (or KSSM for Kurikulum Standard Sekolah Menengah) introduced in 2012 require teachers to exercise evidence use. In meeting the learning standards, teachers are expected to mine data of learning, interpret this data into useful information which can be used to inform teaching and intervention strategies (Ministry of Education Malaysia, 2017).

Teachers immerse themselves in data on a daily basis. Working within KSSR and KSSM curriculum framework, teachers have been trained to gather and organize data of learning through systematic process and procedures (Panduan Pengurusan Evidens Pentaksiran Berasaskan Sekolah, 2013). Bruniges (2019) and Masters (2018) attested that linking evidence to inform practice is the main reason for gathering evidence in the first place. Data use is vital in assisting teachers to decide where students are in their learning (Care & Griffin, 2009; Masters, 2018; Woods & Coles-Janes; 2018); determine appropriate teaching interventions and strategies (Griffin, 2009; Masters, 2018; Zakaria, Care & Griffin, 2016); and monitor student progress as well as evaluate teaching effectiveness (Care & Griffin, 2009; Griffin, 2009; Masters, 2018; Paolini, 2015). These four key aspects of data use are the embodiment of evidence-based practice within KSSR and KSSM (Sariah, 2017). In fact, the importance of data interpretation is stated explicitly in all curriculum documents known as the *Dokumen Standard Kurikulum dan Pentaksiran (DSKP)* for all subjects across the three segments of education - preschool, primary school and secondary school: gathering evidence, processing of assessment data and evidence, reporting outcome and self-reflection.

The aim of the article is to present the literature related to teachers' evidence use by comparing the practice globally and locally. The focus is on examining data use which encapsulates the following aspects: data interpretation process; data-driven decision making; and linking data to inform instruction. On global scale, there has been a tremendous amount of interest on how teachers use and should use their evidence, particularly in light of informing instruction. Analyzing Malaysian teachers' evidence use would provide an indication of the focus of current assessment practice whether a shift has

been made from collecting evidence to using evidence in a manner that would enhance instruction.

### **Literature Review**

The use of evidence has been found to empirically improve teaching engagement (Griffin & Francis, 2018; Mandinach & Jackson, 2012; Masters, 2018; Popham, 2018); boost academic performance (Blasio & Francis, 2018; Bruniges, 2019; Griffin & Francis, 2018); and influence school improvement (Bruniges, 2019; OECD, 2011).

### **Linking Evidence to Instruction**

The review of related literature has revealed, but not limited to, three prominent ways of evidence-use: data-driven feedback, differentiated instruction, and evidence use within developmental framework. The discussions of these approaches provide a detailed account of how each element investigated within evidence-based practice is integrated. Within these approaches, evidence is integrated seamlessly, yet it functions as a cyclical loop and serves a crucial foundation to teaching and learning activities.

### **Data-driven Feedback**

An extensive amount of studies has been documented on the relationship between data use and provision of feedback. Data-driven feedback has been found, directly and indirectly, to positively impact on student performance (Black & Wiliam, 2009; Leahy, Leon, Thompson & Wiliam, 2005; Popham, 2018), learner engagement (Garrison & Ehringhaus, 2009; Leahy et al., 2005), and teaching effectiveness (Black & Wiliam, 2009; Popham, 2018). Feedback quality is one of the most researched area with well documented characteristics of effective feedback (OECD, 2014).

One common theme on the quality of effective feedback is in its specificity (Black & Wiliam, 2009; Garrison & Ehringhaus, 2009). Black and Wiliam (2009) recommended that any form of feedback derived from assessment data should focus on students' specific work, accompanied with advice on what they can do to improve. On the other hand, feedback about effort should include three elements: recognition of desired goal, evidence about present position and some understanding of a way to close the gap between the two. Garrison and Ehringhaus (2009) asserted that the most significant instructional strategy is the descriptive feedback. The authors stressed that carefully formulated and descriptive feedback has the capacity to maximize student learning through better understanding of the content, specific information is given on what they need to focus on as well as the next step that they have to do in the learning progression.

Feedback is versatile enough to be garnered and formulated based on data from both formal and informal assessments. Feedback that is structured from formal assessments requires longer time to be produced given the fact that formal assessments are carried out on interval and based on specific time frame (Black & Wiliam, 2018). However, feedback based on this type of assessment data has higher credibility and is also usually shared with the

relevant stakeholders (Garrison & Ehringhaus, 2009). The most common form of feedback, however, is based on data from informal assessment type (Leahy et al., 2005). Feedback derived from informal assessment tools such as teaching observation, question and answer, homework and classroom activities (Black & Wiliam, 2018; Popham, 2019) is instantaneous but still presents teachers with the opportunities to customize feedback at individual, small group and whole group levels (Care & Griffin, 2009; Griffin, Murray, Care, Thomas & Perri, 2010), targeted (Garrison & Ehringhaus, 2009; Leahy et al., 2005), and enables feedback to be formulated based on learning from affective and psychomotor that may not be captured by formal assessments (Leahy et al., 2005). Mandinach and Jimerson (2016) stressed the significance of continuous learning as at the heart of any evidence use.

### **Data Use for Differentiated Instruction**

In a differentiated classroom, teachers adjust their lessons through the modification of content, process and/or product expected from students (Ruys, Defruyt, Rots & Aelterman, 2013; Smit & Humpert, 2012; Victoria State Government, 2019) as a mechanism of ensuring that the modification will meet the interest, readiness and learning profiles of each student (Nordlund, 2003; Tomlinson, 2001; Victoria State Government, 2019). The first requirement for data in differentiated instruction practice is pre-assessment and the data is pertinent in assisting teachers to determine the learning readiness of each student (Ruys et al., 2013; Smit & Humpert, 2012). In addition, data related to learners' interest and learning profiles is also essential (Tomlinson, 2001). Hence, the adjustment of content, process and product can only be planned and implemented effectively if the teaching and learning process is structured around this data (Victoria State Government, 2019).

The review of literature highlighted various structures of implementing successful differentiated instruction. These structures can be flexible and fixed (Tomlinson, 2001) and teachers, supported by assessment data and evidence, could freely adopt a blend of different approaches and strategies (Kotob & Arnouss, 2019; Tomlinson, 2001; Victoria State Government, 2019). A recurring theme across most literature reviewed was the use of flexible grouping (Tomlinson, 2001; Kotob & Arnouss, 2019; Victoria State Government, 2019) where collaborative learning strategies were planned and structured to meet learners of different or similar learning profiles, interest and readiness (Tomlinson, 2001; Victoria State Government, 2019). Customization and delivery of content formulated at three tiers was also noted from the reviewed literature. Teachers devised content at whole-group level for all learners before students engaged in collaborative learning at small group level and then individual level (Kotob & Arnouss, 2019; Victoria State Government, 2019).

Pre-assessment data was valuable for teachers to plan their differentiated instruction (Ruys et al., 2013). While teaching and learning process was ongoing, teachers needed continuous data to assist their teaching effectiveness primarily in guiding and evaluating their instruction. Moon (2010) indicated that effective differentiated instruction would require teachers to always be in the loop with data. Pre-assessment data was usually gathered

formally (Ruys et al., 2013; Smit & Humpert, 2012), however, the use of continuous data were often based on informal assessment tools and strategies (Moon, 2010; Ruys et al., 2013). Moon (2010) pointed out that effective differentiated classrooms were the evidence of data-based differentiated instruction approach as teachers utilized assessment data throughout the instruction: in planning with the use of pre-assessment data; in guiding instruction with the use of continuous data; and at the end-point of instruction in evaluating teaching effectiveness.

### **Data for Identification of Learning Readiness and Teaching Intervention**

Assessment data has also been found to be used within a developmental framework (Bruniges, 2019; Griffin, 2009; Griffin et al., 2010; Masters, 2018). A team of researchers from the University of Melbourne, Australia, developed a PD program involving teachers of more than 300 schools across the state of Victoria (Griffin et al., 2010; Zakaria et al., 2016). Operating within a constructivist learning paradigm, participating teachers were shown how to use assessment data to identify students' zone of proximal development (ZPD) or a point of learning readiness for every student. Using this information and based on empirically developed learning progressions, teachers introduced various intervention strategies at individual, small group and whole-class levels to scaffold learning (Care & Griffin, 2009; Griffin, 2009; Griffin et al., 2010; Zakaria et al., 2016).

To ensure success of the approach, teachers in the program must withdraw from deficit approach and embraced developmental approach. Griffin et al. (2010) described deficit approach as a focus on students' weaknesses and limitations. Developmental view enabled teachers to scaffold the learning of all learners with a focus on readiness to learn. Central to the approach was teacher collaboration. Teachers worked together in professional learning teams, challenged each other's practice and shared best practices (Care & Griffin, 2009; Griffin, 2009; Griffin et al., 2010).

The practice had been found to improve student performance significantly. The pre and post-test data indicated overall improvement of students from participating schools exceeded two to four times of the anticipated growth (Griffin et al., 2010).

How teachers use data and linking the use of it to improve student performance are still being widely explored. Many felt that teachers needed to be assisted, especially at the early stage of their career (Bruniges, 2019; Griffin et al., 2010; Zakaria, 2016). This assistance came in various forms and initiatives which included provision for better working environment, initiation of network between teachers and promotion of collaborative practices for teachers to grow (Bruniges, 2019; Masters, 2018; Zakaria et al., 2016). One of the initiatives undertaken by educational agencies worldwide is through professional development programs for teachers that targeted data literacy (Bruniges, 2019; Care & Griffin, 2009; Masters, 2019).

Black and Wiliam (1998) believed that raising the standards of learning is not the sole responsibility of teachers, and it is unfair to assume that feeding the teachers with input [pupils, teachers, other resources, management rules and requirements, parental anxieties, standards, tests with high stakes, etc. (p.1)] would eventually assist the teachers to produce good output [pupils who are more knowledgeable and competent, better test results, teachers who are reasonably satisfied, etc. (p.1)]. The two authors advocated strong emphasis for policy makers to provide direct help and support for teachers.

### **Local Research: Current Research Practice and Direction**

The current national curricula, the KSSR and KSSM, which build upon criterion-referenced framework provides an appropriate landscape for Malaysian teachers to optimize their use of evidence. Consisting of content standard (specifically focused statement of knowledge, skills and/or values of what students should acquire) and learning standard (learning quality and accomplishment stated in a form of criteria or indicator which describes content standard) (Arsaythamby, Rosidah & Rozalina, 2016; Curriculum Development Division, 2011; Tajularipin, Ahmad Fauzi & Suriati, 2015); the curricula promote a condition for teachers to integrate evidence use (Care & Griffin, 2009; Griffin et al., 2010; ).

Despite the need for evidence interpretation skills in ensuring teaching and learning effectiveness, the review of literature has illuminated minimal research interest on Malaysian teachers' ability to perform such skills. Local studies which examined teachers' assessment practice within the current curricula reflected a general trend on four focus areas: School-based Assessment (SBA), assessment-for-learning, authentic assessments, and Higher Order Thinking Skills (HOTS). In addition, there was a heightened interest among local researchers on teachers' assessment literacy or aspects within this construct. Even though there was a significant shift from norm-referenced framework to criterion-referenced framework in teachers' assessment practice, the review of literature has yielded no evidence of research that explored how teachers compared their assessment data against the learning standards. Given the limited findings on evidence use detailed in the local literature, exploration on three skills within evidence-based practice (data interpretation, data-driven decision making, and linking data to instruction) is not able to be reported in this article.

A review of literature concerning the assessment practice of Malaysian language teachers uncovered strong connection with traditional written assessments (Arsaythamby et al., 2016) such as quizzes, tests, examinations and writing tasks (Ch'ing & Soubakeavathi, 2013). The implementation of School-based Assessments (SBA) in primary schools beginning 2011 for standard one students and in secondary schools beginning 2012 involving form one students (Noraini & Zamri, 2016) marked increased teachers' autonomy in the assessment of student learning (Arsaythamby et al., 2016; Ideh Akbarpour & Wan Fara Adlina, 2012; Ravikumar, Abdul Ghani & Aziah, 2015; Ruzlan & Arsaythamby, 2017) and the detachment from pen-and-paper instruments to formative

(Aidarwati & Abdul Ghani, 2013; Nor Hasnida, 2016; Suzana & Jamil, 2012); and authentic assessment practices (Faizah, 2011; Razmawaty & Othman, 2017; Rohaya, Mohd Zaki, Hamimah & Adibah, 2014). SBA implementation has also diversified the themes and focus in language research and literature particularly in relation to increased attention given to assessment-for-learning (Mohamad Azhar & Shahrir, 2007;); specific types and forms of alternative assessments (Nurfaradilla, Siti Norhidayah, Mohammad Iskandar, Kasmah & Sharifah, 2010; Mohd Anuar & Zamiyah, 2010; Suzana & Jamil, 2012); and the roles of feedback in facilitating improvement of language skill attainments (Kayatri, Chai & Vahid, 2016; Mohamad Azhar & Shahrir, 2007; Siow, 2015).

There has been a substantial amount of studies which investigated teachers' assessment practice particularly in light of the implementation of School-based Assessment (SBA) in 2003 and Classroom-based Assessment in 2011 (Ministry of Education Malaysia, 2019). One of the aspects of teachers' assessment practice that piqued researchers' interests is formative assessment (Faizah, 2011; Mohd Yusof, 2013; Othman, 2018). The research focus is justified given the autonomy that teachers experience in making decision about their continuous assessment practices while working within SBA (Mohd Aisamuddin & Rohaya, 2013; Chan, 2008). The launch of Malaysia Education Blueprint 2013-2025 had diverted research focus to authentic assessment (Arsaythamby et al., 2016; Razmawaty & Othman, 2017); and Higher Order Thinking Skills (HOTS) (Razmawaty & Othman, 2017; Yin & Yusof, 2014).

Interestingly, the search for local studies that explored teachers' data literacy, specifically data interpretation skills and how this data is linked to instructional practice, has yielded rather limited results. The review of literature uncovered only two local studies that examined aspects pertaining to teachers' data capacity: one by Wan Mohd Zuhairi (2017) and the other by Mohd Faizal, Samsairee and Yusaini (2018). Wan Mohd Zuhairi (2017) investigated the manner primary school teachers managed their evidence during the teaching and learning of Arabic language. The term evidence management in Wan Mohd Zuhairi's study was used to encompass the process of assessment planning, identification of classroom strategies, interpretation of evidence and reflection of teaching process. In Mohd Faizal et al.'s (2018) study, data use was examined from a much bigger perspective. Mohd Faizal and his co-researchers analyzed primary school teachers' capacity to interpret and use evidence as a basis for organizing high impact intervention programs at school level. The skills investigated included item analysis based on the schools' test and examination data. Teachers' perceptions with regard to the importance of data-driven intervention programs were also examined.

Even though the theme of data literacy, data capacity and evidence use were traceable in a number of other studies, these constructs were investigated as a minimum subset of much larger constructs – usually teachers' assessment skills and assessment practices. For examples, studies by Arsaythamby et al. (2016), Charanjit, 2014; Habibah (2016), Mahaya, Azizah, Mohd Fairuz, Mohd Arif and Hariyanti (2019), Suria and Nurfirdawati (2017), and

Suzana and Jamil (2011). In these studies, data literacy-related skills were sampled by only one up to five items in the instruments.

Despite a significant shift from norm-referenced framework to criterion-referenced framework in teachers' assessment practice (Griffin, 2009; Masters, 2018; Woods & Coles-Janess, 2018; Zakaria et al., 2016), the review of literature has yielded no evidence of research that explored how teachers compared their assessment data against the learning standards. An examination of teachers' evidence use would make transparent of teachers' assessment practice. The understanding of how teachers operate their evidence would provide insights into the process of how teachers make sense of their students' assessment data. Having the information about how evidence is interpreted and adopted will signal, first, the quality and sufficiency of evidence gathered; and second, the quality of instructional decisions made; and third, whether teachers integrate evidence in their instructional practice and the extent to which evidence informs practice.

In addition, a true measure of KSSR and KSSM's effectiveness could only be ascertained if evidence of learning is used to further inform practice (Cawsey, Hattie & Masters, 2019; Masters, 2018), and brought about improvement in learning (Diery, Vogel, Knogler & Seidel, 2020; Griffin & Francis, 2018; Popham, 2018; Woods & Coles-Janess, 2018). The gray area with regard to what teachers do with their evidence after it has been gathered, analyzed and reported keeps us in the dark as to whether teachers are fully utilizing the criterion-referenced framework and the levels of progression prescribed in the standard curriculum documents. There is no evidence to indicate whether teachers do, in fact, interpret their evidence and use the interpreted evidence in a manner that enhance teaching and learning activities. An in-depth investigation of teachers' evidence-based practice would pave the way towards identifying whether teachers are equipped with sufficient assessment literacy to support the use of evidence. This, in turn, would assist in understanding the qualms and challenges that they experience in working with evidence.

## **Conclusion**

The article demonstrates a wide gap of research interest uncovering aspects pertaining to evidence use between teachers globally and locally. Understanding how teachers interpret their evidence and the manner evidence is integrated into their subsequent instruction will illuminate the exponential role of evidence in instructional decision-making process as well as how the instructional decisions are executed as intervention strategies. An investigation of Malaysian teachers' data literacy practice has never been more timely in light of the implementation of learning progressions (criterion-referenced framework) in measuring learners' growth and achievements as well as increasing teachers' access to various forms of data.

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