'ASSESSMENT CAN DETECT IF STUDENTS UNDERSTOOD': SCIENCE TEACHERS' KNOWLEDGE ON FORMATIVE ASSESSMENT

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ABSTRACT

The Malaysian educational assessment system is moving the assessment process from summative to more holistic formative functions. With this change, there are tendencies that teachers' current assessment knowledge may become irrelevant or outdated. Assessment knowledge, be it declarative or procedural, is vital for effective teaching and learning as it is the precursor to how teachers conduct their assessment practices in the classroom. However, not all teachers are able to unlearn or relearn their existing knowledge to cater to the newly introduced formative assessment paradigm. Therefore, this study investigated primary science teachers' knowledge on formative assessment and one of its essential strategies - the process of providing feedback. Five primary science teachers participated in this study. The main source of data came from journals and interview sessions. The data revealed that some of the teachers' knowledge on assessment and feedback aligned with the principles of formative assessment. These include seeing assessment as a process and feedback given constructively and in a timely manner. However, teachers also espoused knowledge about assessment and feedback that are associated with summative functions. For instance, one teacher said that assessment can be used to keep students alert, and three teachers claimed that the function of feedback is to provide correct answers. Knowledge is developmental and therefore teachers have the potential to upgrade their assessment knowledge if provided with relevant support, guidance and resources. With accurate knowledge on formative assessment, teachers would be able to transform the knowledge into effective formative assessment strategies in the classroom.

Keywords: *assessment knowledge, formative assessment, science teachers, feedback*

INTRODUCTION

Education systems undergo reform in efforts to improve the quality of their educational outcomes. Research has shown that in the field of educational assessment, reforms are encouraging teachers to move away from the summative assessment towards more holistic formative assessment practices (Birenbaum et al., 2015). Popham (2008b) offers a definition for formative assessment as "a process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and

learning to improve students' achievement of intended instructional outcomes" (p. 6). Put this in a different way, formative assessment encourages teachers to be aware that they have to collect various assessment data by using written exercises, questioning techniques and classroom discussions. Armed with the information of how much their students understand the lesson, teachers then provide constructive feedback that allows students to move their learning forward. Concurrently, teachers use the information about their student knowledge to modify their own teaching. Thus, formative assessment is a cyclic process that involves assessment and feedback; with many researchers stating that feedback is the heart of formative assessment (Hawe & Parr, 2014; Popham, 2009).

Teachers who have been practising in high-stake public examination (summative) context may have to relearn or unlearn some of the assessment knowledge that they currently possess. In these environments, teachers often value grades and encourage rote memorization. Attending to teachers' assessment knowledge is important as the lack of knowledge on assessment can "cripple the quality of education" (Popham, 2009; p. 4). Studies still show that teachers do lack knowledge on assessment (Scott, Webber, Aitken, & Lupart, 2011; Veloo, Krishnasamy, & Md-Ali, 2015). Teachers are still confused regarding the spectrum of terminologies for assessment, the various principles attached for each type of assessment and their functions and purposes. This lack of knowledge on formative assessment can undermine teacher confidence in the actual implementation strategies in the classroom such as providing constructive and timely feedback and ultimately sound judgement on student work (Renshaw, Baroutsis, van Kraayenoord, Goos, & Dole, 2013; Scott et al., 2011).

The Ministry of Education of Malaysia had made a decision to reform the assessment system to move beyond a narrow summative (one-off public examination) to a broader approach on assessment as a means of supporting teaching and learning; through the introduction of school-based assessment or locally known as *Pentaksiran Berasaskan Sekolah* (PBS). The new approach to assessment empowers teachers to make professional judgement about the quality of student work, simultaneously helping students to attain their learning outcomes (Heitink, Van der Kleij, Veldkamp, Schidkamp & Kippers, 2016). Nonetheless, this empowerment comes with the requirements of sufficient knowledge (Teacher Education Department, Ministry of Education, 2007). Thus, this study investigated Malaysian primary science teachers' knowledge on formative assessment and one of its essential strategies - the process of providing feedback.

LITERATURE REVIEW

According to Webster's Dictionary, knowledge is "the fact or condition of knowing something with familiarity gained through experience or association". Ryle (1949) stated that there are two types of knowledge, the 'knowing that' and 'knowing how'. 'Knowing that' is often associated with declarative knowledge that includes the recall of facts, principles, trends, criteria, and the interrelatedness between them. In contrast, 'knowing how' relates to procedural knowledge, which is the knowledge of how to do things (McCormick, 1997). For teachers, developing both, declarative and procedural assessment knowledge is crucial (Heritage, 2007) as they influence teachers' pedagogical practices (Edwards, 2013). For example, one of the important strategies of formative assessment is feedback. Feedback has actually four different types: evaluative-oriented feedback (stating simply whether the work is right or wrong); process-oriented feedback (providing comments on the process or strategies underpinning the task); self-regulative feedback (advising students on strategies that could improve their own work) and self-feedback (usually comments on effort and praise) (Hattie & Timperley, 2007). Yet research has shown that teachers' knowledge of feedback resides commonly about reporting right or wrong answers. Therefore, when asked how they would provide feedback to their students (procedural knowledge), they tend to state feedback is putting ticks and crosses in their students' notebooks and rarely giving comments, constructive or otherwise, on their students' work (Chua, Lee, & Fulmer, 2017). Since teachers' knowledge on the functions of feedback is limited, teachers fail to understand the power and the impact of feedback on student learning. Teachers use evaluative or self-feedback that usually does not improve the students' performance, which is what feedback can and should do (Hattie & Timperley, 2007).

When reform takes place, teachers would encounter a plethora of new terms such as formative assessment and assessment for learning (AfL) (Bennett, 2011) and strategies such as feedback. If teachers have limited knowledge on the principles of formative assessment, they might not be able to understand the subtle differences between these formative and summative functions of assessment (Houston & Thompson, 2017). For example, teachers may see formative assessment as a battery of tests, where once they administer these tests; it can overcome all their teaching problems (Popham, 2008a). In reality, the principles of formative assessment clearly claim that formative assessment is not concerned with the product of assessment (i.e. grades, ranking); rather it looks into the process of how teachers could use these tests for the betterment of their students' learning through the process of providing feedback (Dylan, 2017). Teachers must understand formative assessment as a process where they tailor-make their assessment to the learning needs of their students so that they (the teachers) are equipped to give constructive feedback (Kyriakides, Christoforou, & Charalambous, 2013).

Enhancing assessment knowledge to embrace changes in the landscape of educational assessment is not easy for teachers. Firstly, teacher education programmes which usually offer one or two courses on assessment have seen many "teacher candidates graduating with sizable knowledge gaps in this important field" (Volante & Fazio, 2007; p. 762). Thus, as assessment undergoes reform (from ranking students to supporting student learning), many teachers had not experienced these types of assessment practices when they were students (Dixon & Haigh, 2009; Volante & Fazio, 2007). Without a strong knowledge foundation of the principles of formative assessment, teachers may be clueless as to how they could proceed to elicit information from the assessment data to help students with their learning. Teachers do not have the knowledge to use their students' assessment results or the feedback from their students to learn about their students' learning processes (Baird, 2010).

Secondly, without a strong knowledge base on assessment, the tension between accountability (summative assessment) and improvement (formative assessment) ultimately compel teachers to practice ill-mannered practices in the classroom that do not lead to student improvement (Harris & Brown, 2009). Even teachers who do have relevant knowledge on formative assessment sometimes abandon the improvement aspect of assessment in favour of the accountability purpose of assessment when they face with unreasonable demands, such as wide curriculum and the conservative stakeholders' mind-set. Having a better understanding of teachers' assessment knowledge, may provide insights about teachers' actual assessment classroom behaviours (Marshall & Drummond, 2006). Thus, it is important to investigate teachers' assessment knowledge to see which aspects of formative assessment that require upgrading and to provide relevant support to ensure teachers successfully embrace these assessment reforms.

The paper presented here is a part of a larger study. In the larger study, the researcher was interested in teachers' formative assessment knowledge and practices during the infancy stage of *Pentaksiran Berasaskan Sekolah*. However, for this paper, the focus is on teachers' formative assessment knowledge. Thus, the research question for this study is what are the selected Year 5 science teachers' knowledge on formative assessment and one of its essential strategies - the process of providing feedback?

METHODOLOGY

Sample

The sample for this study consisted of five teachers teaching Year 5 Science in three co-educational government primary schools located in a semi-urban area. Halim, Azif, Tisha, Zeena and Malini (pseudonyms) were selected based on their willingness to participate in this study. All teachers had more than four years of teaching experience in Year Five science. Except for Malini, all teachers taught students of higher academic ability.

Data Collection Techniques

This study utilized qualitative data collection techniques. These techniques included a Teacher Journals and interview sessions. The Teacher Journal consisted of four questions and they were about teachers' ideas/ knowledge on formative assessment and the process of providing feedback. The questions asked in the Teacher Journal reflected ideas found in the formative assessment literature (Black & Wiliam, 2003; Hattie & Timperley, 2007; Heritage, 2007). The participating teachers used the Teacher Journal to pen down all their ideas and knowledge about formative assessment. The interview protocol consisted of open-ended questions seeking clarifications of the responses written in the Teacher Journal.

Data Analysis

The researcher transcribed all the audio-taping of the interview sessions with teachers. The transcribed verbatim were presented to the respective teachers for member-checking. The researcher created a matrix (a table consisting of columns and rows) for each participating teacher. In this matrix, the first column consisted of themes such as assessment, feedback, PEKA (science practical continuous assessment) to name a few. The first row of the matrix comprises the sources of data (i.e. Teacher Journal and Interview). The matrix was completed by reading the interview transcripts and the teacher journal and filling up the matrix. For instance, Azif had written in his Journal that assessment is '*… to determine a student's knowledge and skills. Process involved by teachers and students*'. This excerpt was put into the theme 'Assessment' and the under the column for 'Teacher Journal'. Another example would be where Malini wrote in her Teacher Journal that assessment could help keep her students alert during her lessons. When asked to elaborate what she meant by this she explained '*…they will know teacher will ask questions – so they will be alert …*'. This statement was place under the theme Assessment' and under the column 'Interview'. Table 1 shows part of the matrix created for Malini.

Table 1
Part of the Matrix created for Malini

	MALINI	
THEME	**INTERVIEW**	**TEACHER JOURNAL**
Assessment	*'I ask questions in the class, they will know teacher will ask questions, so they will be alert. They will listen to what we are saying and try to concentrate in the lesson especially the weak students. … So they should be alert.*	*They are always alert with their studies.*

Once this process was completed for each teacher, the researcher relooked at the first theme – assessment- of all the five teachers in this study. The analytical process involved extensive reading of all the teachers' matrix and then taking these teacher responses and trying to group similar statements together by trying to describe what they had in common. A process of emergent analytic coding was used where *elements* were allowed to emerge from the data (Lankshear & Knobel, 2004). For example, Azif and Malini had stated that assessment is a process that occurs throughout the teaching and learning discourse. The researcher created an element – *Assessment as a process*. The elements were categorized according to the participants' own ideas or phrases. Table 2 shows an example of a theme, element and excerpts.

Table 2
An example of a theme, element and excerpts

Theme	Element	Excerpts
Assessment	Assessment as a Process	'… *to determine a student's knowledge and skills. Process that involved by teachers and students….'* (Azif, Journal) '… [assessment] *process is done from day to day basis'* (Malini, Journal) '*…when we teach the students, we ask them questions … …then we assess them by giving questions based on the topic.'* (Malini, Interview)

The initial elements within each theme were reviewed and revised with the teachers' responses. When the teachers' responses did not fit into the emergent elements, a new element was defined. These elements were presented to peer-reviewers and necessary changes were done.

RESULTS

Due to the rich data obtained from the larger study, this paper would only focus on two themes, which are 'assessment' and 'feedback'. Generally, teachers' declarative knowledge that seem to complement formative assessment principles but their procedural knowledge, which is how they would carry out the process and the rationale for it, tend to show some characteristics of summative functions.

Assessment

Under the theme 'Assessment', some of the elements that emerged showed that the participating teachers had knowledge about assessment that aligned with the principles of formative assessment. These elements included 'assessment as a process', 'assessment use to elicit students' weaknesses' and 'assessment can be used by students'. In contrast, some of teachers' espoused assessment knowledge was very much entrenched with the high-stake examination (summative) paradigm such as 'assessment as a tool' and 'assessment to keep students alert'.

Assessment as a process Azif and Malini looked upon assessment as a process which was on-going throughout the teaching-learning discourse. For them, assessment involved both teachers and students.

> '…*Process involves teachers and students. It occurs throughout the learning process when the teachers ask questions to students.'*   (Azif, Journal)

Azif and Malini perceived assessment as a process that was performed regularly through questions by the teacher to elicit students' understanding.

Assessment use to elicit students' weaknesses Azif, Tisha, Malini and Halim claimed that through assessment (questioning and discussions) they were able to elicit their students' weaknesses. Azif said that he would cross-examine his students with questions and if they could not answer him, then he said he inferred that they had not understood that lesson. Tisha also viewed assessment as identifying her students' weaknesses. Where Azif cross-examined his students, Tisha said that she would conduct the assessment in an examination-style setting so that she could get the true picture of the obstacles that were preventing her students from understanding the subject matter.

> '…*I do it like a…exactly like an exam hall, so no discussion – no nothing …. Once they have finished, then only we will discuss to see what is their weakness.'*
>   (Tisha, Interview)

Malini said that assessment provided her a path to identify her students' weaknesses, thus presenting her with the opportunity to improve them. Halim had mentioned that assessment could '*solve any problem*'. When he was asked to specify what he meant by 'solve any problem', he said that assessment can identify students' weaknesses.

> '*… after we mark the paper…we look (for) the weaknesses of the students …identify the topics the students don't know….*'   (Halim, Interview)

Halim's rationale for needing to know if his students had understood the lessons was that once he knew that his students had understood the present topic, he could proceed to more advanced topics. Thus, Halim and Malini had stated that by eliciting their students' knowledge (or lack of it), they could modify their teaching to accommodate their students' learning.

Assessment used by students Halim, Tisha, Azif and Zeena believed that assessment data could be used by the students to identify their own lack of understanding of the topic that they were currently learning. Azif further stated that assessment data could help his students to get to know their own abilities and thus be able to improve their work.

> '*… [the students] know their ability and improve their knowledge… will know or become aware of the goals / objective. … If students (are) unable to answer, they will realize that they should study harder*'   (Azif, Teacher Journal)

Moreover, he said that assessment could also make his students more aware of their learning goals and objectives. Zeena believed that assessment could help students know their weaknesses and remember their mistakes.

Assessment as a tool Tisha had written in her Teacher Journal that assessment could be looked upon as an '*instrument*' (the researcher interpreted the term 'instrument' as 'tool') to determine students' understanding. Tisha elaborated what she meant by this statement in an interview session.

> '*We test them, we give them questions based on the topics that I have taught them and then I will know where they stand and everything.*'   (Tisha, Interview)

Zeena explained that her idea of assessment was to use it to '*detect*' if the students were able to understand the subject matter, especially from the outcome of their responses on a task. The researcher postulated that the word 'detect' used by Zeena to describe assessment could be interpreted as it being a tool to detect students' understanding. The researcher deduced that both Tisha and Zeena conceived assessment as a tool to bring to light what their students had understood of their science lessons. Tisha and Zeena seemed to be in agreement with Azif and Malini when they mentioned that this (checking if students had understood what had been taught) could be done through questioning.

Assessment aid in keeping students alert Malini wrote in her Teacher Journal that assessment enabled her to keep her students alert during her lessons because according to her, they would try to concentrate during her lessons because they knew that their teacher would be asking them questions throughout the classroom discourse.

> '*I ask questions in the class, and then they will know teacher will ask questions – so they will be alert. They will listen to what we are saying and try to concentrate in the lesson especially the weak students.*'   (Malini, Interview)

Tisha also mentioned that assessment be used as a vehicle to obtain information as to whether her students were paying attention or their minds were wandering.

> '*…Some children will look as though they understand but they don't understand; then we ask the question whether they really paying attention, they really understood or not that particular topic*'   (Tisha, Interview)

Feedback

Teachers' declarative knowledge on feedback seemed aligned with formative assessment principles except for one element - *Feedback should be task-oriented (Evaluative)*. This meant that teachers were able to state the importance of feedback and the characteristics of feedback. Yet, these teachers' procedural assessment knowledge was rather entrenched in more summative paradigm where these teachers believed that feedback is about students getting the right answer.

Feedback to improve student learning Teachers in this study claimed that after obtaining students' responses, they provided them (their students) with appropriate feedback. Halim said that if his students got the wrong answers, he would provide them with the right ones. He added that he would not get angry if his students could not answer his questions. Azif said that when his students gave an incorrect answer, he would ask his students to explain to him what they had inferred from that question. He said that he did this because he wanted to make sure that his students had truly understood the question.

> '… first I go to the students, ask them, let them explain to me. Maybe they do not understand the question. Sometimes they miss the points given to them.   (Azif, Interview)

Azif said that when he provided feedback to his students, it was in a constructive manner so that students would not be afraid to ask for help/clarification when they faced academic problems in the future; in his own words '*we try not to embarrass the students*'. Azif summarized that after eliciting his students' weaknesses, he would do '*repetition or revision*' (Azif, Journal) with them. He said that he provided feedback by explaining, exploring the Internet, and holding discussions where students would share their findings.

Tisha said that once she had identified her students' weaknesses, she would rectify them by '*improve*[ing] *the weak areas*' (Tisha, Journal). She also stated that she would repeat the lesson, explain it again or form smaller groups and give them extra work. Tisha said that her students were so vocal that sometimes they would demand from her an explanation (feedback) on why their answers were wrong whereas their friends' answers were correct. Tisha added that she would explain to her students by highlighting to them the areas or instances where they might have misinterpreted the questions.

> '*Some of them (will) ask me back – "Why teacher, why is my answer wrong and why is hers correct?" So I explain to them why is theirs wrong or … maybe they have read the question especially when it comes to objective… it's not correct or sometimes they will be thinking we are asking for the correct answer but supposed to be not correct answer which is not the answer. So things like that they will ask, I will highlight to them…*'   (Tisha, Interview)

Zeena said that if her students' answers were incorrect, she would provide them with the right answer and ask them to repeat it. She said she would then provide her students with similar questions which they had to answer. When Malini's students provided her with incorrect answers, she said that she would explain the topic again to her students. She believed that explanation was the best way to enable them to have the right understanding but admitted that providing notes and exercises could also help.

Feedback should be immediate All the teachers in this study stated that they held discussions with their students; these were held either during classroom discourse when the teachers were explaining new concepts to their students, after written exercises, or even during pre- and post- practical work. Azif and Tisha claimed that they held discussions with their students because they recognized this is where they could provide immediate feedback to their students.

> '… then immediately when they discuss they will understand better than you… mark like the normal exams you mark, then you return to them by that time they also have forgotten … they also don't bother already.'   (Tisha, Interview)

Malini said that she was able to provide immediate feedback by walking around her class as the students completed their work and mark their work on the spot.

Feedback can guide teaching Feedback from assessment tasks provided the teachers in this study a guide to modify their own teaching. Tisha said that feedback from her students' assessment tasks guided her on how much more input she had to put into her subsequent lessons (Tisha, Journal). She defined 'input' as

> '…explanation and everything and how you teach them, how you explain to them on the particular topic' (Tisha, Interview)

Zeena stated that external examination questions played a role on how she taught her students; she said that the feedback from this kind of assessment guided her during subsequent lessons. Halim and Azif mentioned that through feedback from assessment data, they could assess the level of their students' understanding; with this knowledge, they would modify their teaching.

> '…how far our student(s) understood the topic.' (Halim, Journal)

> 'So assessment is very important because we want to know the performance. Okay, if the pupils get may be 80 % and above, so that means our teaching is successful. If …a student gets 50 and below, so we need to cover up (the topic) again. (Halim, Interview)

Feedback should be evaluative-oriented Evaluative-oriented feedback takes place when teachers comment on students answers to state if they are right or wrong without further discussions. Halim said that he provided feedback where he prescribed the best answer for a particular question and, if written work, he made sure that the students wrote down the prescribed answer.

> 'first, students try to answer the question… and then we choose the best answer to write in the book.' (Halim, Interview)

Similarly, Zeena said that during classroom discussions, she provided feedback on her students' work by giving them the right answers. Both of them agreed that asking their students to write down the right answer, make their task of marking their students' notebooks would be easier.

> 'So if there is discussion, the students have the answers… so when we mark there will only be minor mistakes…' (Zeena, Interview)

Malini said that when her students did not write anything when assigned written work, she would just draw a big question mark on their books and return the books to them without any further discussions.

DISCUSSION

The teachers in this study held variety of declarative and procedural knowledge on assessment and feedback. Though some of the teachers' knowledge were more aligned with the principles of formative assessment and showed the 'improvement' aspect of assessment, many of the teachers did utter understanding about assessment that was still rooted in the more high-stake assessment principles. Though the sample size was small, these teachers did verbalized assessment practices (procedural knowledge) that were very similar. As an example, Azif, Tisha, Zeena and Halim claimed that they would use the assessment data elicited from the students to guide their subsequent lessons.

The teachers in this study looked upon assessment as an activity or as a tool. Those who thought of assessment as a tool might be in danger of viewing it as a product: 'danger' because as Popham (2008a) stated, formative assessment was not fully utilized in classrooms because teachers saw assessment as a product rather than as a process. This meant that teachers should not measure the *outcome* of their teaching-learning processes but assess their teaching–learning *process* and make adjustments to improve the learning outcomes of their students. The process of assessing the students should take precedence over the product (the final grades). Thus, Azif and Malini's idea of assessment as an activity seemed to align more with Popham's (2008b) idea of formative assessment.

Parallel with other studies, teachers in this study indicated that they could use assessment to elicit students' weaknesses, where they espoused that they would use assessment to see which aspects of learning that students had difficulties with; they then took the opportunity to modify their teaching and be better equipped to enhance their students' understanding (Black & Wiliam, 1998; Stiggins, 2001). In contrast, some of the teachers stated that they would use assessment as check points to see if their students were paying attention during their lessons. Teachers who had the knowledge of using assessment as a check point needed to take caution not to misuse or confuse assessment as a punishment; they should make it clear to their students that they, the teachers, cared about their students' learning (Black & Wiliam, 2003). This is because when teachers use assessment just as a form of classroom management, they are not exploiting its full potential, or theirs, and their students are not benefiting from their teachers' practices (Verkuyten, 2002). This study showed that teachers knew the importance of students knowing how to evaluate their own work and finding ways to improve their own weaknesses. Studies have shown that formative assessment involved students taking charge of their own learning (Frey & Schmitt, 2007) and if the teachers did indeed provide student autonomy during the assessment process, their actions would be consistent with principles of formative assessment (Black & Wiliam, 2009).

In this study, the teachers' procedural knowledge on feedback ranged from repetition of the correct answers to exploring the Internet. The former is associated with task-orientated feedback (evaluative) whereas the latter can be associated with a more process-orientated type of feedback. The teachers in this study were more focused on providing the right answers (correctives), and indeed identified feedback with this, citing examples such as providing the right answers, re-explaining the topic, holding discussions and forming smaller groups to discuss the difficult concepts again. Teachers should use assessment data not only to do correctives but also to provide opportunities for students to do enrichment activities (Bloom, 1984; Guskey, 2005). Students who had mastered the concepts that they were currently learning must be kept motivated by enrichment activities to strengthen their understanding of the topic (Guskey, 2005). This was something that the teachers in this study appeared to be unaware of, meaning that it was lacking in their knowledge on feedback. They did mention the correctives, but none talked about how they would modify their teaching to motivate or keep the students who already had the correct understanding interested. For the teachers in this study, as long as the students understood the lesson, it was all right for them to proceed to the next topic. They (the teachers) did not realize that good students also needed stimuli and exercises to deepen their understanding.

Azif, Tisha and Malini felt that feedback is to be given immediately; otherwise, students took no interest in it. As Gareis (2007) noted, feedback separated by days or weeks become useless to the students. This was because when teachers provided feedback to their students, it should be able to answer these two questions, at least to some extent: '(a) How am I progressing in achieving what I set out to do? and (b) What do I need to do to continue my progress?' (p. 19). Teachers in this study were firm about the importance of providing the correct answers; Zeena even asked her students to repeat the answers so that her students might be able to 'memorize' the facts better. Studies have indicated that this practice mushroomed because the pressure of external examinations often forced teachers to 'teach to the test' (Shaver, Cuevas, Lee & Avalos, 2007; Shepard, 1997), and classroom assessments generally involved repetition where students memorize isolated facts that mimicked questions typical of external examinations (Stiggins, 2001). The participating teachers' knowledge of this aspect of feedback is antithesis to the principles of formative assessment because formative assessment involves tasks and activities that are diagnostic in purpose that should focus on illumining students' learning difficulties. Armed with this information, teachers must pursue and help students consolidate new learning.

CONCLUSION

When assessment reforms take place, teachers would need to reconceptualise their existing assessment knowledge to embrace the new paradigm. Darling-Hammond and Baratz-Snowden (2005) asserted that to become effective teachers, one of the main areas that teachers may focus is the knowledge on how assessment informs instruction. In the context of this study, there were evident that the teachers had

some assessment knowledge that was parallel with the principles of formative assessment. Bearing that in mind, teachers' espoused might not necessarily translate into actual practices (Pontefract & Hardman, 2005). However, there were also some instances where teachers described assessment knowledge that was very much in line with high stake external examination or summative functions. Teachers have the potential to upgrade their formative assessment knowledge if provided with relevant support, guidance and resources. As a start, providing professional development courses to consolidate teachers' knowledge on formative assessment and feedback are necessary. Next, the creation of assessment websites that focuses on the ideology of *Pentaksiran Berasaskan Sekolah* and success stories of teachers who were able to implement formative assessment strategies. As teacher knowledge is developmental (Barnett, 1997) these support and resources provide teachers with opportunities to enhance their assessment knowledge. The researcher strongly believes that with acquiring the relevant knowledge, this primary science teachers' assessment knowledge can be channelled to more skilled practices that truly enhance students' learning progression and the success of *Pentaksiran Berasaskan Sekolah*.

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