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Tale of two science teachers' formative assessment practices in a similar school environment

Tale of two science teachers' formative assessment practices in a similar school environment

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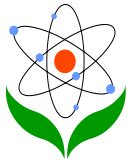**[1]E-mail: renukasivam@um.edu.my**
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Contents

Abstract

There is an accumulating research base that supports the effectiveness of formative assessment practices in enhancing the quality of educational outcomes, yet research findings

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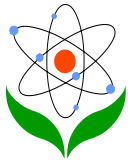Tale of two science teachers' formative assessment practices in a similar school environment

seem to indicate sluggish implementation of these formative assessment strategies in the classrooms. Many factors influence teachers' formative assessment practices including the school environment. A school environment can be broadly characterized by its members, facilities and policies. They are external factors that can affect teachers' practices. In this study, the extent of the influence of a school environment in influencing teachers' formative assessment practices was investigated. Using a qualitative approach, the study examined how two teachers teaching in a similar school environment conducted their formative assessment practices. The findings revealed that the two teachers exhibited very different formative assessment practices. The implication is that perhaps having similar school environment may not be the only factor that influences teachers' formative assessment practices. This study suggests that perhaps the bidirectional relationships between teachers and their environment play a more significant role in determining teachers' practices.

Keywords: Environment, Formative Assessment, Science Teacher, Primary School

Introduction

Formative assessment has proven to enhance student achievement for all types of students, at various grade levels and in any educational context worldwide (Black & Wiliam, 1998; Hattie & Timperley, 2007; Robinson, Myran, Strauss & Reed, 2014). The promises of positive outcomes of formative assessment have inspired many educational systems to reform their education system to embrace formative assessment. This is especially true for nations with high stake external examinations. These external examinations have constantly been associated with low level cognitive outcomes that are easily achieved through rote-learning and regurgitation of data and facts (Berry, 2011; MOE, 2013). This has led to students' not developing higher order thinking and twenty-first century skills that are pivotal for their future (Baird, 2010; Bloxham & Price, 2015).

Formative assessment was defined by Black and Wiliam (1998) as 'all those activities undertaken by teachers, and/or by their students, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged' (p. 7). Formative assessment is also referred to as Assessment for Learning (AfL) as this assessment is embedded and used during the learning process (Sach, 2012). The formative assessment framework suggests that teachers (a) clearly define the learning goals, (b) collect information about where students are currently in their learning and (c) identify the gap between their students' current learning and desired learning goals and to take action to close that gap; but consciously involving students throughout this entire process (Bell & Cowie, 2001; Black, Harrison, Lee, Marshall & Wiliam, 2004; Yin, Tomita & Shavelson, 2014).

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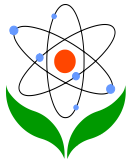Tale of two science teachers' formative assessment practices in a similar school environment

Embedding formative assessment into daily practices would require substantial shift in teachers' knowledge and skills and this process can be enhanced if a supportive school environment and infrastructures are present (Schneider & Randel, 2010). Features of the school environment such as school readiness to support and guide teachers, adequate resources (time and space for collaboration, availability of comprehensive materials), trust and positive working relationships with peers, classroom sizes, and student composition will influence teachers' implementation of assessment practices (Miller & Cunningham, 2011; Nair, et al., 2014). For instance, school readiness to support teachers in implementing formative assessment in their classrooms would depend very much on their school principals. School principals act as gatekeepers in providing their teachers with beneficial and valuable resources (Smith, 2011; Stein & Nelson, 2003). If school principals are knowledgeable on assessment related matters they would play an influential role in establishing a supportive working environment for teachers to implement formative assessment (Pecek, Zuljan, Cuk & Lesar, 2008). Therefore, teachers who work in this kind of school environment are motivated and thus have a greater chance of successfully implementing formative assessment strategies in their daily classrooms.

This paper is part of a larger study that investigated five Year Five science teachers' assessment knowledge and practices. These five teachers came from three different schools. In the original study, there were two teachers that taught in the same school, had very similar professional background and taught students of similar academic ability. It is these two teachers that the researchers would focus on in this paper. Thus, the purpose of this paper is to examine how these two teachers implement formative assessment strategies in their daily classrooms as they worked in similar school environment.

We took on an ecological perspective to define school environment (Bronfenbrenner, 1977). In this ecological perspective, school is placed in a system with many layers and these layers of the environment interact with teachers and have a significant impact on their practices. Since school environment influences teachers' practices, different school environments would give rise to teachers exhibiting different practices. Thus, it could be said that teachers' practices would perhaps lie along a continuum. In the context of this paper, the researchers would like to investigate whether if two teachers' professional backgrounds were very much alike and if they worked in a similar school environment, would their formative assessment practices then lie closer along this continuum?
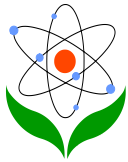
Literature review

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The school environment is a complex environment and can be defined using the Ecological Systems Theory (Bronfenbrenner, 1995). This theory explains how a person's development is influenced by the various subsystems and the relationships that a person forms with each of the multi-layered environment. The microsystem is the environment closest to the person and one in which he/she has direct contact with. Thus, the microsystem environment has the greatest influence and impact on individuals' development and actions. The microsystem consists of entities which are other individuals and physical infrastructures. These entities also tend to form bidirectional relationships with the individual. Bidirectional relationships are dual way relationships where how an individual interacts with the entities in his/her microsystem would correspond with how these entities respond to that individual.

The next subsystem is the mesosystem. The mesosystem of an individual is the subsystem that shows how the various entities in a person's microsystem interact with each other. This is because the entities in the microsystem of an individual do not behave independently but are interconnected. As an example, both the students and the school principal exist in the teachers' microsystem environment but these two entities (students and school principal) are interconnected which means that the students and school principal can interact with each other with or without the presence of the teacher. The last two outer layers on an individual's environment is the exosystem and macrosystem, respectively, where in these subsystems the individual does not participate actively but decisions made in these systems may have an effect on them. Therefore, the Ecological Systems Theory (Bronfenbrenner, 1995) allows for the interactions between the individual and each of his/her subsystem to be studied. Since the microsystem has the most influence on an individual's actions, therefore the microsystem of the teacher must be highlighted when investigating the role of school environment in influencing teachers' formative assessment practices. In this context, the teacher's microsystem or school environment would include the student composition (i.e. class sizes and student ability), school management (i.e. school principal), peers (i.e. supportive and collaborative), and facilities and resources available (i.e. technology, materials and time).
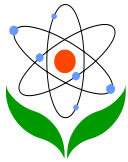
It is shown that environment is a very complex concept and it influences individual's behaviour (Martin & Mullis, 2013). Thus, we postulate that school environment plays an instrumental role on how teachers might conduct their formative assessment strategies in their classrooms. Even though formative assessment is shown to be effective in enhancing students' learning outcomes and ultimately achievement, teachers' implementation of formative assessment in the classroom is still sluggish (Brown, Kennedy, Fok, Chan & Yu, 2009; Yin, et. al., 2014). This is because the implementation of effective formative assessment practices would require teachers to develop new classroom strategies and relationships with their students (Wiliam & Thompson, 2007). Teachers must shift their roles

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from knowledge providers to facilitators and learn to create high quality learner-centred activities where knowledge is socially and collaboratively constructed through group work (Cizek, 2010). Teachers must learn to provide immediate and constructive feedback and evaluation on learning and this should be done in a nonthreatening manner (McMillan & Hearn, 2008). In addition, teachers must activate their students to become instructional resources for each other and provide ample opportunities for them to evaluate their own and others' learning (Spiller, 2012).

How does school environment influence teachers' formative assessment practices? If a teacher handles a small class size, the teacher and students are bestowed with more opportunities to interact with each other and subject matter and this spurs the implementation of formative assessment strategies because it enables the teacher to elicit more meaningful information about students' learning (Blatchford, Bassett & Brown, 2011). When teachers are able to elicit meaningful information about students' learning, they will be able to provide more tailor-made and constructive feedback. This action can tremendously help students with their learning. Teachers have commented that if they handled large class sizes, they are not motivated to implement formative assessment strategies because it require additional resources and often feel overwhelm to provide subjective judgement on students' ephemeral learning moments (Blanchand, 2008; Brown, et al., 2009; Pecek et al., 2008). It shows that a simple factor like class size can have an impact on whether teachers will be motivated to implement formative assessment strategies in their classrooms. Similarly, teachers who teach low ability students may be reluctant to deploy formative assessment strategies because this process involves challenging assessment tasks that requires time and effort for students to respond to these activities (Brown et al., 2009). This is a reality for many teachers, more so, for teachers working in high stake external examination environment where there is an enormous curriculum to cover and to prepare students for examinations.

Teachers, who work in schools that house 'state-of-the-art' technology, can use these technologies to enhance their assessment practices. For example, the presence of computers with Wi-Fi connection provide teachers with a rich source of information to create activities for students such as searching for information by themselves. This practice opens up opportunities for their students to take charge of their own learning; a pivotal strategy for formative assessment (Stiggins & Chappuis, 2006; Swaffield, 2011). Teachers can also provide immediate feedback through e-learning platforms such as through blogs and on-line quizzes. Teachers with easy access to these facilities in their environment are inclined to embed formative assessment strategies in their daily lessons. On the other hand, lack of these

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resources in teachers' working environment limits the possibilities for teachers to explore these formative assessment strategies in their classrooms.

Social relationships that teachers encounter in their working environment can also influence teachers' desire to practice formative assessment strategies with their students. Peers and school principals can provide supportive and collaborative environments as teachers develop their assessment skills on a personal and professional level (Smith, 2011; Smith & Engelsen, 2012; Stiggins & DuFour, 2009). Peers provide support and scaffold teachers' formative assessment practices as teachers work together and have opportunities to witness how their colleagues tackle difficult situations in implementation of formative assessment and how they overcome these obstacles (Forte & Flores, 2013). In contrast, school environment where there is lack of support from peers; teachers are often compelled to work in insolation and are often denied of road maps on how to improve their assessment practices. Similarly, working under the leadership of dynamic and knowledgeable school principals who are agenda setters, knowledge brokers (support teachers pursue for learning about assessment) and motivators for teachers to acquire knowledge and skills on formative assessment may propel teachers to practice formative assessment strategies in their classrooms (Black et al., 2004; Printy, 2008).
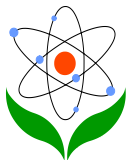
The review above acknowledges that the entities within the microsystem layer of teachers' school environment have great influence and impact on whether teachers are motivated or discouraged to implement formative assessment strategies into their daily classroom activities. In this paper, there is an interest to find out if two teachers with very similar professional background and teaching in similar school environment, would their formative assessment practices lie closer along this formative assessment practice continuum?

Methodology

In this section, the sample, the data collection techniques and data analysis will be discussed.

The Participants and Selected School Environment

Hafiz and Alif (pseudonyms) are Year Five Science teachers. Both were male teachers, of similar ethnic background and were in their mid-thirties. They had been teaching in SK Bintang (pseudonym) for the past 12 years. Both of them had not attended any professional development programmes in the past three years prior to this study. Hafiz and Alif taught students of the best classes. Placement of students into their respective classes was based on the previous Year Four final examination which consisted of scores of the four core subjects: Bahasa Malaysia, English, Mathematics and Science. The top 75 scorers were placed into two classes 5 *Merah* and 5 *Kuning,* randomly.Hafiz taught 5 *Merah* and Alif taught students of

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5 *Kuning*; these students are high academic ability students. Hafiz had 37 students in his class whereas Alif had 38 of them. The ratio of boys to girls in each class was almost equal. Majority of the students in both the classes held positions such as school perfects and librarians. Although both were qualified to teach science, the difference between Alif and Hafiz was that Hafiz was in the process of obtaining his Master's degree whereas Alif has only a bachelor's degree in science education. In addition, Hafiz had been teaching Year Five science for eight years and Alif had five years under his belt.
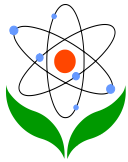
School Environment

Their school principal was a very open-minded and forward thinking lady who welcomed innovative and challenging programmes for her staff members. For example, during the meeting to obtain permission to enter the school for this study, the school principal commented that research about her school was considered a positive affair. She was very enthusiastic about the study and enquired more about what and how the study would be conducted. From the informal conversations with her, it became explicit that she was knowledgeable and was keen to learn. She also treated her teachers with respect and encouraged them to participate in this study.

SK Bintang was a co-educational public primary school located in Selangor, a state in Peninsular Malaysia. The school was situated in a semi-urban area. The school had two computer laboratories, three science laboratories, one workshop for Living Skills Studies and 25 classrooms that were distributed among four blocks of three-storey in the school compound. In one of these blocks house the administrative floor, a book shop and the school library. The school compound was well kept with educational murals on the walls and a mini science corner with a pond and fish in it. Both Alif and Hafiz had access to the science and computer laboratories. SK Bintang had eight classes of Year Five and Hafiz, Alif and another female teacher (who did not participate in the study) taught at this level. According to both, Alif and Hafiz, all Year Five teachers normally got together to discuss about the coverage and preparation of school-based examination papers.

The Data Collection

The study used data collection techniques namely classroom observations and interview sessions. The study employed passive participation observation. At first, the researchers decided to use an observation protocol but during the pilot study it was discovered that much of the rich classroom discourse could not be obtained. It was decided that for the actual study a tape-recorder would be placed near the researcher who sat at the back of the classroom to capture the dialogue and discussions during the lessons. For easier comparison of teachers' practices, the two teachers were observed when they were teaching the topic 'Energy'. The

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researcher's field notes captured nonverbal interactions as well as a list of imperative questions about teachers practices that later would be asked during the interview sessions.

An open-ended interview protocol was used to probe for clarification about certain practices that the teacher exhibited during the lessons. The interview session would begin with a question and depending on the teacher's response another question was asked. The number of classroom observations depended on how long the teacher took to complete the topic on 'Energy'. Generally, the teachers took about 5-6 lessons to complete the topic. The interview sessions where conducted until saturation point where the researchers felt that the teachers were not putting forward any new information. The teachers in this study indicated saturation point after two sessions each lasting about 40 minutes.
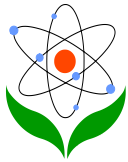
Data analysis

The audio-taped classroom discourse and interview sessions with teachers were transcribed verbatim. The transcripts from both, classroom observations and interview sessions were read and reread to elicit information about teachers' formative assessment practices. A matrix was created for each teacher. The matrix contained pre-determined themes such as 'Assessment', and 'Feedback'. Excerpts from the transcripts were coded and placed into the relevant pre-determined theme. When the excerpts could not be placed into any pre-determined theme, a new theme was allowed to emerge. In the original study, a new theme emerged named as 'Pedagogical Skills Associated with Assessment'. Once, each teacher had a matrix, the study used the constant comparative technique (Glaser & Strauss, 1967) to compare the two teachers' formative assessment practices (Charmaz, 2000, p.515). Once the comparison was done, the matrix was reviewed and discussed until consensus was reached. Peer debriefing was done to ensure the trustworthiness and dependability of the data analysed.

Results

For the scope of this paper, only two themes, 'Assessment' and 'Feedback' will be highlighted and discussed.

Assessment

Under this theme, the types of classroom activities and questioning techniques used by these two teachers will be discussed. Since both teachers taught in the same school, they had access to similar resources. One of these resources was a technological teaching aid provided by the Malaysian Ministry of Education. The teaching aid, called Teaching Courseware (TC), was parallel with the Malaysian Year Five Science curriculum and contained notes, simple

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demonstrations, selected practical work and interactive activities. In Hafiz's lesson, the Teaching Courseware (TC) would dominate the learning process. Hafiz would put on the TC and make the students interact with the activities, usually without any input or interaction from him. Observation data showed that the TC would be on for almost about 20 minutes without any interaction (asking questions and/or clarifications) among teacher and students. For example,

> The TC continues to show the concept of when substances gain heat energy, it becomes warmer. There was a picture of a cup that becomes hot as it gains heat from the hot water. The TC also shows that the handle of the cup receives less heat and thus can be held. The TC move to another concept that shows when substances lose heat it becomes cooler.
>
> Hafiz : ...Boil the water using bunser burner. Bunser burner has fire, so the fire (is) hot... the water will become hot after some time.
> Hafiz resumes the TC.

<div align="right">(Hafiz, observation)</div>

When the TC did ask questions, Hafiz seldom up-took these cues to invite his students to give their ideas. This meant that Hafiz rarely asked his students to express their thoughts or ideas about the content matter. The researcher's field note supported this observation.

> 'The teacher only asks questions from the courseware and did not ask if the students understood what they were watching. His wait time is generally less than five seconds and he tends to answer the questions himself.'

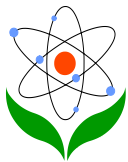<div align="right">(Hafiz, field notes)</div>

His questioning techniques during classroom discourses were rather weak as the questions he asked generally were close-ended questions. An example of the classroom discourse is shown.

> Hafiz   : Number 6?
> Ss   : D
> Hafiz   : Yes.
> Hafiz   : Number 7?

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(Hafiz, observation)

Other than using the TC, most of Hafiz's assessment tasks or questions came from the textbook. Hafiz conducted a very fixed style of teaching as he controlled the pace and the direction of his lessons. His students were of higher academic ability, yet they rarely participated or gave their ideas as Hafiz did not create opportunities for them to do so. Because of this, his students were seen talking and doing other work during their science lessons. The students were generally bored and it seemed that only a few students were paying attention. For example, one boy was doing his mathematics work under his desk (Hafiz, observation).

As a comparison Alif also used the TC. However, unlike Hafiz, Alif did not depend too much on it. When the TC asked questions, Alif would click on the pause button and discuss the questions with his students.

> *The TC was about how when substances gain heat energy, they become warmer. There was a picture of a cup that becomes hot as it gains heat from the hot water. Alif stops the TC.*
>
> *Alif   : Who can explain, why the cup is hot but the handle isn't?*
> *Ss   : Because the handle is plastic*
> *Alif   : Are you sure the handle is plastic?*
> *Ss   : It looks like the same material.*
> *Alif   : Yes, then why?*

(Alif, observation)

Even though both teachers taught high ability students, only Alif constantly ask higher-order thinking questions. He constantly asked students questions that require the students to think and acquire a robust understanding. In fact, Alif tend to ask follow-up questions (uptake students' answers) so there is a need for his students to be sure of what they are saying and have a good understanding of their answers.

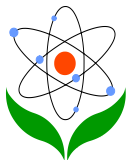> *Alif   : All get up. Start rubbing your hands for 30 seconds. Move faster and faster… Okay now, put your hands to your cheeks?*
> *Ss   :Warm… hot*
> *Alif   : Hot? Are you sure?*
> *Ss   : Warm*
> *Alif   :How can your hands become warm?*

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> Ss   : *Heat … By rubbing it.*
>
> Alif   : *So? How did your hands become warm?*
>
> Ss   : *Because you rub your hands*
>
> Alif   : *Why when you rub your hands it becomes hot. Because of what?*

<div align="right">(Alif, observation)</div>

Moreover, if there were any indecisiveness in his students' answers, Alif made his students look for more information from the Internet so that they are more certain with their answers.

> Alif   : *Okay so now, what is the exact body temperature? (Students were shouting out various answers). Okay, I give you 20 minutes to serve the Internet to get an answer. Hello! Human body temperature?*
>
> *Classroom becomes noisy as students surf the Internet and discuss with their peers. Then the teacher holds a discussion to allow students to share the information that they have obtained from the Internet.*
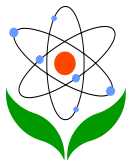> *Some said that body temperature 36.9 °C and 37 °C. Some said it was 98.2 °F.*
>
> Alif   : *Okay, Adrian, can you share with us your report? What are your findings?*

<div align="right">(Alif, observation)</div>

Alif's lessons were more student-centred as he created opportunities for his students to work in groups. Alif also did not confine his classroom activities to the TC and textbook only. In addition Alif asked questions from activity books and from the Internet. In this manner, Alif exposes his students to the various ways a question may be asked. For example, Alif had downloaded a question from the Internet on the concept of expansion and contraction. One of the questions asked the students to '*Draw a conclusion based on your observation*'. A student asked Alif where he was supposed to draw the conclusion as he literally thought that he had to draw a picture to explain the conclusion (Alif, observation). This question was worded very differently from the questions in the Malaysian textbooks and local context. Alif had to explain to his students that the question actually meant for them to explain the conclusion of the experiment. Since Alif took the trouble to prepare questions from multiple sources, his students were exposed to different ways the questions can be asked.

When the researcher asked Alif why he took the trouble to prepare various assessment tasks

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and from various sources, Alif stated that he did not want his students to feel bored and so they will be motivated to learn the science.

> '… for them to learn various skills and avoid feeling bored. …Are attracted to the subject… when students are confident, they are close to me, friendly, so they will be brave to try even if they do not know the answer, they will be brave to try.'

(Alif, interview)

Feedback

Feedback can only be given if there was an assessment task done. Unless teachers ask questions or provide tasks to their students, no students' responses will be forthcoming that can assist the teachers gain understanding of their students' learning progression. With this understanding, only then can teachers provide appropriate feedback (Black et. al., 2004). Both teachers taught students of similar academic ability. Since Hafiz's assessment tasks were only confined to the TC and textbook, his questioning techniques were focused on lower order thinking questions. Perhaps because of this he was unable to gain necessary information on his students' learning progression and thus the quality of feedback he provided his students were generally evaluative. He normally provided the right answer without discussing the subject matter with his students. For example, instead of encouraging his students to elaborate on their answer '*the colour*' as shown in the excerpt below, he provided them with the right answer. It was observed that even when his students provided the wrong answer, he simply corrected them without any further discussion.

> *Hafiz : …Okay, what is observed?*
> *Ss : Litmus paper (students are uncertain of their answer)*
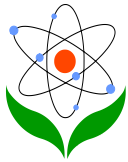> *Hafiz : No.*
> *Ss : The colour.*
> *Hafiz : No.*
> *Ss : The colour of litmus paper?*
> *Hafiz : The colour change of litmus paper. You write that down.*

(Hafiz, observation)

In contrast, since Alif constantly asked his students for reasons and justifications and he provided assessment tasks from various sources, he was able to obtain a better landscape of his students' understanding of the subject matter. Consequently, he was able to provide

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constructive feedback. Constructive feedback is antithesis to evaluative feedback where teachers show students where their strengths and weaknesses are.

> Alif   : Can you hold and touch the thermometer's bulb?
> Ss   : No.
> Alif   : No, why?... Give reasons.
> S   : Mercury.
> Alif   : There is mercury there. So why can't we hold the bulb?
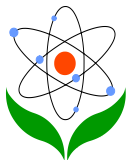> S   : The mercury can go into our skin. ...
> Alif   : The mercury is very sensitive to heat. When the mercury gains heat it expands and it will rise.

(Alif, observation)

Even when his students gave him the right answer for the question, *can you hold and touch the thermometer's bulb?* not only did Alif praise them and then move on, but he followed up on his students' answers and asked them to give him reasons for their answers. Only when he discovered where in the learning progression his students' lacked understanding (mercury can go into our skin), did he then provide his students with the accurate explanation.

Discussion

In this study, the school environment was defined from an ecological perspective using Ecological System Theory (Bronfenbrenner, 1997). Teachers' environments that are closest to them are the microsystem where all the entities in this system have great influence on teachers' practices. Hafiz and Alif taught in the same school and were teaching Year Five science to high academic ability students. Both of them were under the leadership of a dynamic lady who welcomed innovation into her school and was keen to support and encourage her teachers to sour professionally. Despite working in similar environment, the findings revealed that these teachers' formative assessment practices, in terms of quality of tasks and questioning techniques (Assessment) and feedback were very different. Even though both teachers used the same resource, the Teaching Courseware (TC), Alif used the TC to support his teaching whereas Hafiz used the TC as his main source of teaching. By competently pressing paused on the TC and asking students relevant questions, Alif has created opportunities to interact with his students and the subject matter (Blatchford et al., 2011). This enabled Alif to elicit more meaningful information about his students' learning (Clark, 2015). He was able to elicit where his students lack understanding and was able to respond to his students' learning needs (Nair et al., 2014; Wiliam & Thompson, 2007). In

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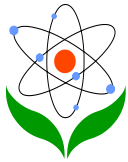Tale of two science teachers' formative assessment practices in a similar school environment

contrast, Hafiz rarely asked questions and interacted with his students because he had the TC on most of his lessons. He was unable to elicit students' lack of understanding and therefore was unable to modify his teaching to cater for his students' needs (Black & Wiliam, 1998; Robinson et al., 2014). Formative assessment encourages teachers to modify their teaching so their instruction will cater for their students' learning needs. Since Hafiz was unable to do so, his students looked bored and some were even doing other matters not related to science.

Formative assessment requires students to take ownership of their learning so that they can become autonomous learners (Sach, 2012; Spiller, 2012). Alif had provided his students with the space to collaborate and take ownership of their learning. Alif was able to play the role of a facilitator as his students worked collaboratively in groups (Cizek, 2010). Though Alif and Hafiz had the same number of years of teaching experience and the same class size, Hafiz did not seem to allow his students to take ownership of their learning and to work collaboratively. This is perhaps due to Hafiz being unable to elicit his students' learning progression and thus he had to rely on himself to determine the pace and flow of the lessons. Being a facilitator is one of the skills that teachers find difficult to acquire as teachers are so use to being the knowledge provider in the classroom (Brown et al., 2009; Tan & Leong, 2014).

Feedback is the heartbeat of formative assessment (Hattie & Timperley, 2007). Letting students know where they are currently in their learning and how they need to progress can be done with constructive feedback (Black & Wiliam, 1998). Constructive feedback let students know their strengths and weaknesses of their work rather than simply providing the students with the right answer. The data showed that Alif was, to certain extent, able to provide constructive feedback on his students' work but Hafiz was unable to do so. Hafiz seemed more interested in making sure his students got the right answer instead of finding out their understanding of the subject matter. Thus, Hafiz seem to provide evaluative feedback that is antithesis to the concept of formative assessment (Hattie & Timperley, 2007; Swaffield, 2011).

It was expected that since Hafiz and Alif had very similar academic qualifications, years of teaching experiences, taught in the same school, interacted with the same principal and colleagues, had similar access to the school facilities, taught students of similar academic ability and in relatively similar classroom sizes, that their formative assessment practices would lie closer along the continuum. This is because studies have shown that environment can influence teachers' practices (Miller & Cunningham, 2011; Rivkin, Hanushek & Kain, 2005). Yet these two teachers' formative assessment was so different and seemed to lie on opposite ends of the formative assessment practice continuum.

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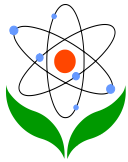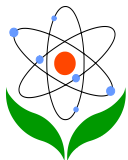
Conclusion

This study shows that teachers within the same school environment can exhibit formative assessment practices that are poles apart on the formative assessment practice continuum. It supports many other studies that show how teachers in similar schools have very different formative assessment practices (Black et al., 2004; Marshall & Drummond, 2006; Robinson et al., 2014; Wiliam & Thompson, 2007). Therefore, it is not only the presence of the physical aspects or other individuals in the environment that have an impact on teachers' formative assessment practices. This study seems to indicate that investigations should probably go beyond the presence of the entities in the environment and to take a closer look at the bidirectional relationships which is also illustrated in the Ecology System Theory (Bronfenbrenner, 1995). Bidirectional relationships are the interconnectivity or communications between two entities in similar environment and their influences each other. For example, Alif and Hafiz were colleagues working in a similar school environment but they practiced very different formative assessment strategies. This may indicate that just the presence of other individuals in one's environment may not be single factor to influence their practices. Further studies should be done to investigate and examine these bidirectional relationships found in teachers' microsystem to see its impact on teachers' formative assessment practices.

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