

Exploring and evaluating differentiated assessment practices of in-service teachers
for components of differentiation

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Abstract

Classroom assessment is central to effective teaching and learning, making assessment literacy a core component for teacher education. The present study explores self-reported, differentiated assessment practices of Malaysian in-service teachers. The practices were evaluated using an analytic framework that was developed based upon the existing literature on components of differentiation. Data were collected from 32 in-service teachers using open-ended survey questionnaires. Twelve of the teachers also participated in in-depth interviews. Documents provided by the teachers were also analyzed. Data from the open-ended survey were analyzed using NVivo11 to develop codes for the analytic framework. The findings offer insights into teachers' knowledge, application, and interpretation of differentiated assessment practices. The discussion explores teachers' explanations of their own practices and, further, recommends ways to improve knowledge and application of differentiated assessment. The implications of the findings are discussed for assessment literacy- related professional development for teachers, school management and policies to facilitate implementation of differentiated assessment.

Keywords: differentiated assessment; assessment literacy; assessment practices; analytical framework; students; classroom

Introduction

Synthesis of research related to teachers' assessment practices has established strong links between teachers' assessment practices and students' learning achievement (Black & Wiliam, 1998; McMillan, 2013; Moon, 2010). Therefore, it is essential for teachers to acquire skills and knowledge to conduct classroom assessments in an effective manner. Stiggins (1991) first introduced the term 'assessment literacy' to define a set

of competencies and skills required to design, implement, and interpret effective assessments. Kahl, Hofman, and Bryant (2013) define assessment literacy as ‘teachers’ ability to create/select and effectively use classroom assessments for a variety of purposes’ (p. 5). However, there is still no consensus on how assessment literacy should be defined since assessment requirements are contextually sensitive. Nevertheless, professional standards and research emphasize that assessment literate teachers would be able to successfully develop and administer effective assessment and score students’ performance for effective learning (Chappuis, Stiggins, Chappuis, & Arter, 2012; Popham, 2011), monitor students’ progress and make adjustment to their instruction (DeLuca & Bellara, 2013).

Students are diverse in their skills, prior knowledge and understanding which, in turn, affect the pace at which they comprehend new contents and demonstrate their learning (Chapman & King, 2005). Therefore, teachers’ ability to choose and employ a variety of measures that are appropriate for students’ level is central to effective assessment. Differentiation in assessment is an approach that enables teachers to create opportunity for students from diverse academic backgrounds to effectively demonstrate their learning and allows teachers to use a variety of tools and techniques to gather data on students’ progress throughout the learning period (Tomlinson & Moon, 2013). Varsavsky and Rayner (2013) describe differentiated assessment as ‘an educational structure that seeks to address differences among students by providing flexibility in the levels of knowledge acquisition, skills development and types of assessment items undertaken by students’ (p. 790). Differentiated assessment not only provides quality data on students’ progress and instructional decisions but also develops divergent and creative thinking among the students (Brown, Bull, & Pendlebury, 2013).

Differentiated assessment in itself would not be beneficial and be meaningless

unless there is differentiation in instructional practices as well. Differentiation is a teacher's proactive response to learners' needs (Tomlinson & Moon, 2013). Karp and Voltz (2000) further add that

as teachers learn and practice various teaching strategies, they expand the possibilities for weaving rich, authentic lessons that are responsive to all students' needs ... the adherence to a single approach will create an instructional situation that will leave some students unraveled and on the fringe. (p. 212)

The idea of differentiation in the classroom is grounded in sociocultural theory (Vygotsky, 1978) and principles of inclusion and equity which propose that developmental appropriate activities, according to a particular social and cultural context, will enable teachers to take full advantage of every student's ability and give each one of them an opportunity to participate and learn (Tomlinson, 1999). The practice and educational effectiveness of differentiated instruction has gained popularity for improved instruction (Tomlinson, 1999), student engagement (Johnsen, 2003), and learning and achievement (McAdamis, 2001).

Although it is established that differentiated assessment is at the core of effective assessment and learning, the literature on teachers' assessment literacy suggest that several teachers remain ill-prepared for designing, developing, and implementing assessment in an effective manner (Bol, Stephenson, O'Connell, & Nunnery, 1998; Popham, 2009; Stiggins, 1999). The present study is situated in the Malaysian context where educational reform planning is communicated through the Malaysian Education Blue Print (2013–2025) published by the Ministry of Education. The Blueprint emphasizes teaching practices for developing higher order, critical and innovative thinking skills among the students. While the Blueprint addresses the issue of academic diversity of the learners through differentiated instruction, it does not explicitly address the issue of differentiation in assessment practices. Although there is empirical evidence of Malaysian teachers using some form of differentiation in their

instructions, information on their differentiated assessment practices is still missing (Othman, Salleh, & Norani, 2013). Moreover, despite perceived effectiveness and value of differentiated assessment, there is still a lack of studies exploring and investigating differentiated assessment in the literature (Varsavsky & Rayner, 2013).

Therefore, it is important to examine and evaluate the contemporary assessment practices of Malaysian teachers for improvements in assessment literacy training development programs. A systematic evaluation of contemporary assessment practices can successfully guide teachers' professional development programs to prepare teachers to become assessment literate, to efficiently design and implement appropriate assessment tools, gather authentic information and make accurate inferences for instructional practices and students' learning (Popham, 2009) and would also highlight the factor that would facilitate successful implementation of those assessment practices.

The present study explores Malaysian in-service teachers' differentiated assessment practices and evaluates the practices against the components of differentiation as proposed by Tomlinson (1999), Tomlinson and Imbeau (2011), and Tomlinson and Moon (2013). The question that guided the study was:

- (1) To what extent the components of differentiation are incorporated in differentiated assessments practices of in-service teachers and how?

Components of differentiated assessments

Based upon the works of Tomlinson (1999), Tomlinson and Imbeau (2011), and Tomlinson and Moon (2013), the elements of differentiated assessment can be described under when, what, how, and why headings. 'When' refers to the time of assessment, 'what' refers to the elements that can be differentiated, 'how' refers to the differentiation based on students' profile and 'why' refers to the reasons for

differentiation. The section below explains each of the categories in detail.

When to differentiate

For effective differentiation, Tomlinson and Moon (2013) emphasize time, which refers to the occasion when assessment should be conducted. According to them, pre-assessment that is conducted at the beginning of teaching any particular unit is the most appropriate and effective time. Information obtained from pre-assessment serves the diagnostic purposes to make amendments in instructional plans. Another occasion that Tomlinson and Moon (2013) suggest as effective for differentiated assessment is the ongoing assessment that goes along with the teaching of a lesson or a unit. Pre-assessments and ongoing assessments are two significant occasions for the differentiation to occur. It is then that a teacher can learn about the students' preferences, interests and learning profile. For such assessments, teachers can employ a range of strategies such as taking observation notes, journal entries, short-answer quiz, entry and exit cards, and answer using hand gestures, and so on to gain more information on students' current knowledge. This practice can provide immediate feedback to teachers on students' progress as well as their instructional effectiveness. However, pre-assessments and ongoing assessments are rarely used for assigning a grade. Summative assessments that are conducted at the end of a lesson or unit or school year have different roles in comparison to the other two assessments (Airasian, 1997) and are focused on assessing students' learning against a predetermined criterion and are used for the assignment of grades. Their outcomes have broader implication for students, teachers, parents, and policy matters. Although summative assessment is a formal process, Tomlinson and Moon (2013) recommend that a variety of tools and approaches can facilitate differentiation for this form as well. Primarily, for differentiation purposes, summative assessment can be conducted in multiple

forms such as exams, quizzes, writing prompts, presentation, and application tasks. Thus, avoiding closed tasks or traditional paper and pencil tests. Furthermore, elements of differentiation could be introduced in each form. For example, for a writing assignment students can choose to provide explanation in their preferred language or use images, charts, music, or templates as other options to finish their assignments. However, in all instances, the assessment goals remain consistent across options.

What to differentiate

Tomlinson and Moon (2013) suggest that the major mediums that teachers use for differentiation are content, process, product, and environment. Tomlinson and Imbeau (2011) explain that ‘content refers both to what students are expected to learn – what they should come to know, understand, and be able to do – (KUD) and how students access the essential knowledge, understanding, and skill’ (p. 18). Teachers can adjust or adapt the contents to be assessed in order to differentiate effectively. Tomlinson and Imbeau (2011) describe the process as activities that enable children to apply, transfer, and connect their own ideas into their lives and experiences. This indicates that the process which is central to differentiated instruction becomes equally relevant in differentiation for assessment when the teacher offers a variety of activities based upon students’ traits (interest, readiness, and learning profile) to give them the opportunities to demonstrate their knowledge. Product refers to the outcome produced at the end while students interacted with the material (content) and worked with the content in a variety of ways (process) (Tomlinson & Imbeau, 2011). It is also identified as summative assessment that presents knowledge, understanding, and skills (KUD) acquired during the instruction. Teachers can adjust the criteria and nature of the final product (on the basis of students’ traits) to be submitted for the summative

assessment. However, in order to maintain equity and fairness in assessment criteria, Tomlinson and Moon (2013) emphasize the importance of clear identification of learning goals in terms of KUD. Assessment criterion for all forms of assessment must be tightly aligned with the assessment goals. In order to ensure this, Tomlinson and Moon (2013) provide five indicators that are (1) the assessment should mirror the learning goals, (2) the content of the assessment must reflect the relative importance of each learning goal, (3) the format of the assessment must be aligned with the cognitive level of the learning goals, (4) the range of knowledge indicated by the learning goals should be in the range of knowledge reflected in instruction, which, in turn, is the range of knowledge needed to appropriately respond to assessment items, (5) an assessment should not require students to have specialized knowledge, understanding, skill, or resources beyond what is targeted by the learning goals and is taught or available in class. Differentiated assessment can allow students to demonstrate their KUD in a variety of ways. However, to ensure equitable differentiation, the five stipulated criterion must remain the same across all options. Manipulating the learning environment is one of the ways that can make differentiation possible. It refers to both physical and emotional support for differentiation (Tomlinson & Imbeau, 2011). Teachers can adjust the environment to facilitate differentiation during the assessment by extending a variety of support such as manipulating the physical environment, facilitating cognition, showing empathy, and providing motivation.

How to differentiate

Tomlinson (1999), Tomlinson and Imbeau (2011), and Tomlinson and Moon (2013) describe how or upon what basis a teacher can possibly differentiate. According to them, teachers can differentiate on the basis of students' readiness, interest, and

learning profile. Tomlinson and Moon (2013) describe readiness as ‘a student’s current proximity to specific learning goals, targets, or outcomes’ (p. 10). A teacher can differentiate assessment by attending to students’ readiness needs such as providing explicit instructions, giving them flexible time limits or using technology to assist with reading and writing needs. Interest refers to students’ inclination or passion for a particular topic or topics and skills. Directing students’ activities toward their area of interest is well known for keeping students engaged and motivated to perform (Kaur, Awang Hashim, & Noman, 2015). Teachers can differentiate assessment activities by providing choices for students according to their interest to display their knowledge and skills. For example, if an assignment requires a critical essay on a piece of art, then teachers can give students multiple options such as poetry, music, or other kinds of art work of their interest to choose from. Learners’ profile comprises factors that define an individual’s personality such as gender, race, culture, language, and other preferences for learning modes. The goals for attending students’ personal profile in creating assessment are to facilitate and create a variety of ways for students to become engaged and demonstrate their learning (Noman & Kaur, 2014; Tomlinson & Moon, 2013). For example, some students feel more empowered working individually rather than working in a large group. Teachers can facilitate differentiation at the time of assessment by acknowledging the personal profile of students.

Why to differentiate

Tomlinson (1999) proposes three important reasons for differentiation, namely, accessibility, motivation, and efficiency for learning. Differentiation in assessment created with the intention to make learning accessible to all students refers to giving opportunity or creating ways for all students to demonstrate their understanding. Differentiating for motivation refers to encouraging students to perform by relating it

to their interests and learning profile and having them believe in their capability to perform. Differentiating assessment for efficiency refers to generating valid information to make effective decisions about students' progress (assessment of learning) and instructional planning (assessment for learning) (Tomlinson & Moon, 2013).

On the whole, for effective differentiation, teachers must identify students' interest, gauge their readiness, and consider their personal profile to differentiate the content, process, product, and the environment. Teachers can incorporate these principles for pre-assessment, ongoing assessment, and summative assessment. Moreover, if teachers' reasons for differentiation are for accessibility, motivation, and efficiency of learning then this can serve as an exemplary practice in teaching and learning.

Method

Setting and participants

The present article reports on the exploration and evaluation of differentiated assessment practices that can give direction for teachers' assessment literacy development and other factors that would facilitate successful implementation of differentiated assessment. The participants for the study were invited through emails as well as posters with details of the study and invitations of participation were posted in various classrooms. The participation in the study was voluntary. Institutional permission was obtained before making the participation call.

All the students pursuing master's degree programs at the faculty of education at a large public university in Northern Malaysia were invited to participate in the study. Out of these, 58 students from four different classes agreed to participate. All of them were in-service teachers and were enrolled in the educational testing and

measurement course. However, for final data analysis, data from only 32 participants were included (See details in data collection section). Out of the 32 participants, 9 were males and 23 were females. The age of the participants ranged from 27 to 44 years old. The teaching experience of 14 participants ranged between 3 and 5 years, and for the remaining 18 participants, from 6 to 12 years. The participants reported teaching a variety of subjects which included Mathematics, Science, English language, Malay language, Islamic studies, Tamil language, and Physical and Music education. Twenty-seven teachers were teaching in middle school, three were teaching in high school, and two were teaching in elementary school. All of them reported attending at least one professional or educational course on assessment and testing in education.

Data collection

Open-ended survey questionnaires and in-depth interviews conducted with teachers using document support formed the primary source of data. Qualitative approach was deemed appropriate to truly understand the differentiated assessment practices of teachers from a broad to focused spectrum. The data were collected in two phases over a period of seven months.

In phase 1, open-ended questionnaires were distributed to all the participants who were given four days to submit their response. The participants were asked to write their response in a casual reflective writing style, preferably typed on a computer to encourage longer responses. Open-ended survey questionnaires for qualitative research may limit the probing opportunity, however, open-ended survey is considered a rich and valid source of information as it does not limit the response options, offers enough time to reflect and respond and respondents can answer without being influenced by the researcher (Foddy, 1993; Schaefer & Dillman, 1998). The questionnaire collected information on teachers' age, gender, subject area, class level, and number of years of

teaching experience. The open-ended questionnaire comprised two main questions (1) Do you practice differentiated assessment, and if yes, what are the strategies that you employ to conduct differentiated assessment? (2) What are your reasons for conducting differentiated assessment?

Out of 58 participants, 47 returned the questionnaires. Responses of six participants were not coded as they were submitted in the Malay language and nine teachers responded that they do not practice differentiated assessment at all. Thus, the data from the remaining 32 teachers were utilized for the final analysis.

In phase 2, 12 teachers from the same group of participants were randomly selected and invited for in-depth interviews. They were also asked to provide documentary support for their open-ended interview responses. Those documentary evidences comprised sample assignments of project activities and assessment, assessment instructions and plans, and formative assessment reports. For example, if the teachers mentioned that they differentiated in the language and vocabulary by providing prompts, they supported their claims through submitting their assessment documents. Teachers also presented their project reports which detailed how learning goals were measured using a variety of criterion. In-depth interviews are one of the key methods in qualitative studies to obtain detail information on participants' experiences, feelings, and perspectives (Creswell, 2009). The primary goal of the interviews was to acquire comprehensive understanding of the processes that guided teachers' differentiated assessment practices. This was achieved by understanding the rationale for employing the differentiated assessment practices that were reported in the questionnaire and scanning documentary evidence for triangulation purposes. Interview protocol was developed to guide the in-depth interviews, however, the follow-up questions were formed on the basis of the responses provided. Teachers

were asked to describe their differentiated assessment practices and explain the process of how they did it and what were the out-comes? Several probing questions were utilized, for example ‘what made you choose this strategy? Did this practice provide you enough information about students’ learning? Why didn’t you choose an alternative way?’ These questions helped us understand their rationale for choosing a particular strategy of differentiated assessment by revealing the issues regarding their beliefs, misconceptions, and perceived barriers within the school system and assessment process. Each interview lasted between 40 and 90 min. All the interviews were recorded with the permission of the participants and were transcribed for analysis.

Data analysis

The central aim of the study was to investigate how differentiated assessment practices of in-service teachers are aligned with the four components of differentiation, which are: (1) when (pre, ongoing, and summative), (2) what (content, process, product, and environment), (3) how (interest, readiness, and learners profile), and (4) why (accessibility, motivation, and efficiency) (Tomlinson, 1999; Tomlinson & Imbeau, 2011; Tomlinson & Moon, 2013).

The two sources of data were open-ended questionnaires and in-depth interviews with support documents. Therefore, the data were analyzed in two phases. In the first phase, 32 data-sets from open-ended responses were analyzed using NVivo11. Teachers’ explanations of their differentiated practices were coded based on the components of differentiation.

For the first two rounds, the researchers individually created exhaustive lists of codes and then came together to discuss codes and their categorization. Given the nature of the categories specified as the components of differentiation and teachers’ reported assessment practices, it was an elaborate process to reduce the codes and

assign them to the corresponding categories. There were instances when certain codes for assessment practices intersected while assigning them to a category. However, the assignment to a specific category was resolved by examining the purpose behind every assessment practice (activity). For example, the process category was only coded for the variety of activities that the teachers used for differentiated assessment; however, the intention with which those activities were designed for was coded for interest, readiness, or learners' profile. After three rounds of coding (two separate and one combined), we inductively created 53 codes altogether and assigned them to the categories as shown in Table 1. These codes served as an analytical framework for exploring and evaluating differentiated assessment practices of the teachers. The method of developing an analytical framework to assess classroom approaches has been effectively used by Mesa, Celis, and Lande (2014). Similar to their method, we used NVivo11 to calculate the frequency of codes in each participant's practices. However, due to the large number of participants and codes we only report the cumulative number of codes (Table 2) occurring for each category to be able to analyze the nature of differentiated assessment practices within the established framework.

[Insert Table 1 here]

[Insert Table 2 here]

The second phase involved analyzing the interview data to understand the participants' rationale for employing the differentiated assessments practices. The two researchers read the transcript line by line and manually coded the data separately. Later, the two researchers compared their coding and, after discussion, assigned them to the categories of when, what, why, and how. These data facilitated discussion of our findings in a comprehensive manner.

Trustworthiness in qualitative research is established by ensuring credibility of data (Merriam, 2009). In the present study, to ensure that the data were congruent with

the reality, the researchers sent the interview transcripts back to the teachers for member check to ensure accuracy (Creswell & Miller, 2000). The researchers also conducted cross-verification of the data from the three sources (open-ended questionnaire, in-depth interviews, and documents analysis) for triangulation purposes (Merriam, 2009). This helped the researchers examine if there was an alignment between the information shared in the open-ended questionnaire and in-depth interviews. In addition, document analysis was used to verify the assertions made by the participants. Finally, the comparison of findings across different categories was used to triangulate the data. For example, if the differentiation in summative assessment category was the least popular practice, then differentiation under product category (summative output) also reflected the same result.

Findings

We present our results under four broad categories that represent the components of differentiation i.e. when, what, how, and when of assessment. To facilitate the analysis of how teachers' differentiated assessment practices were aligned with the components of differentiation, we present the frequency of codes and source for each category and under each category, we report quotes and passages using participants' pseudonyms.

When to differentiate

The analysis for this category was conducted on the basis of codes identified for pre-assessment, ongoing assessment, and summative assessment. The data in Table 2 suggest that differentiation in assessment occurred the most for ongoing assessment followed by the pre-assessment. However, differentiation was limited in the summative assessment. The data revealed that a moderate number of teachers (43%) practiced differentiation for pre-assessment purposes. Teacher Azma reported that 'I would use a variety of ways to assess students' knowledge before I begin teaching them the unit'.

Some teachers employed differentiation before planning the class activities and creating groups. For example, Teacher Boni stated that ‘... assessing students in the beginning always helps me create groups that are similar... and I can plan activities according to their level’. The frequency of the codes for ongoing assessment suggested that a large number of teachers (87%) practiced differentiated assessment throughout the unit or teaching plan. Teacher Diana says ‘... it is important for me to know if students understand the material that I present ... so I assess them throughout the instruction’. There was ample evidence to suggest that assessment was embedded in the instructional activities. The ongoing assessment did not have to be structured or pre-planned so it was easier for teachers to incorporate differentiation, as is evident from teacher Ibrahim’s statement ‘We can informally interact and hold discussion with students to measure their understanding and give feedback’.

However, the most striking finding was that there was almost a total lack of differentiation in summative assessment practices. Only a few teachers (6%) acknowledged that they used differentiated summative assessments. For example, creating tiered exam papers for final assessment and accepting a variety of portfolio for final grading. On the other hand, during the face to face interviews, several teachers revealed that the use of differentiated summative assessment is not very common. For example, teacher Savita said ‘using a variety of exam papers (tiered test papers) is not a standard practice at school neither it is encouraged through any policy’. Teacher Mary stated that, ‘most of the final exam papers (summative assessments) are created by the head of the department, so there is no opportunity for us to incorporate differentiation in those exams’. Several teachers suggested that the school management should introduce explicit policies to encourage teachers to incorporate differentiation in summative assessment as well.

Another significant explanation for teachers' inability to incorporate differentiation for summative assessment emerged from parents' preferences for a standardized score. Teacher Wan reported that 'for parents, final grades are the most important one and it has to come from the standardized exam which is the same for all the students'. Teacher Yati also reported that 'during parents and teachers meeting, we have realized that parents focus more on numerical score that too produced by the standardized class exam'. Similar concerns were voiced by teacher Boni, 'I would prefer summative assessment based on portfolios and presentation task where it is easy for me to introduce differentiation, but those tasks do not seem to satisfy parents'.

Thus, it is evident that parents' inability to understand differentiation, specifically for summative assessments, and lack of encouragement from the school management were among the few factors that discouraged differentiation in summative assessment.

What to differentiate

Among the major tools recommended for differentiation, the present findings suggest that teachers practiced differentiation in assessment most frequently through the process, followed by the differentiation through the environment. Differentiation through the product was the least practiced feature in the reported data. The information obtained regarding differentiation in content was unclear. The codes identified under the process category in Table 2 demonstrate that the teachers employed a variety of activities for differentiated assessment. A large majority of the teachers (90%) reported use of open book exam, written and verbal responses, observation, discussion and interaction, real-life demonstrations, graphic representation, and variety of presentation to assess students' learning. Teacher Hasina wrote:

In Q&A session, the students show their ability to think by giving opinion and sharing their knowledge. Then, I would assess my students from a portfolio that I asked them to make. The portfolio is a compilation of their exercises, handouts and homework that I gave throughout the semester. I make an observation of their portfolio every two weeks. Last but not least, my observation will definitely include speaking, listening and writing skills of each student while they do the activities.

Teachers (75%) also reported manipulating physical, personal, and social environment to facilitate differentiation during assessment. For example, one of the teachers mentioned 'I would motivate the student, if he or she has reading difficulty, I would assist in reading and encourage them to think and not leave the question'(Teacher Namata). The data suggest that teachers were unable to employ ample differentiation in the product. The data suggested that 'product' would generally mean the outcome produced at the end of a lesson that is to be graded for the final assessment. Teacher Niza reported that 'the summative assessment has to be the final exam paper; I can't produce that score on the basis of a project or any other assignment'. Also reported earlier, differentiation in assessment is yet to become a policy at school level, and this prevents parents and school administration from accepting final grading done on the basis of differentiated techniques.

How to differentiate

For this category, the data suggest that teachers successfully differentiated on the basis of students' readiness, interest, and learning profile. Seventy-five percent of teachers reported differentiating in ongoing assessment on the basis of students' readiness by creating opportunities for everyone to demonstrate their understanding. For example, teacher Yati stated that '... for drama some pupils will act, few pupils will prepare the props to complement the act, some will write scripts for the act and few pupils will do the assessment of other'. The findings during the interviews also suggested that the intention of a few teachers for differentiation was to facilitate academically weak

students.

Some teachers also reported (46%) differentiating assessment on the basis of students' profile by creating items that were gender, race, and socioeconomic status appropriate and were aligned with students' preferred style. Teacher Maher wrote:

This way I can encourage them to talk in the classroom. For weak pupils I encourage them to talk in their mother tongue later I translate for others in English. At the end of the lesson pupils understand the content of the lesson that day.

In face to face interviews, teachers revealed that, given the multiracial nature of Malaysian society, it was important that the assessment and instruction was appropriate for pupils' culture and language. Teachers (59%) also reported employing differentiation in assessment on the basis of students' interests. Teachers allowed them choices to finish the task in a way they preferred. For example, Teacher Hasan said 'If my goal was to teach values for compassion, students can choose to design a graphic or write a song or poem'. During the interview, teachers reported that the central aim to align assessment with students' interest was to engage students in learning and make it a less stressful experience. For example, teacher Jamila wrote:

I give them a piece of paper then they have to write down what activity they like during the class. After that I plan activities that can meet objectives of the lesson so that they can gain knowledge in an enjoyable way.

However, in face to face interviews, teachers revealed that differentiating for readiness was more appropriate compared to differentiating for interest because of the large class sizes and time constraints. Teachers also feared that accommodating students' interest in classroom activities will make them less creative in future. For example, teacher Nadia said:

... when the teacher caters too much of the learner's interest, they will become lazy, and less creative. Learners who feel comfortable being in their comfort zone would rather be selfish than being active in class. They will become more

confident on the things that they are good at and will ignore something new or something that would challenge their capabilities.

Why to differentiate

This category revealed teachers' intention or reasons for employing differentiation in assessment. From the given framework, differentiating for efficiency was the most significant followed by differentiating for motivating students, and differentiating to give access of learning to all students. Eighty-one percent of teachers reported differentiating with the intention of increasing efficiency of the teaching and learning process. Most teachers reported that differentiation was practiced to improve instructional practices and enhance students' learning. For example, teacher Kanna said that, 'Differentiated assessment helps us understand students in a better way and to design better lesson plan for them', while teacher Hasina claimed that 'Differentiation in assessment made us think innovatively and creatively which in return improved our teaching plan'. Twenty-five percent of teachers reported that they differentiated in assessment to motivate students to perform, to help them master the content and believe in their own capability. Teacher Mages reported that '... differentiation in assessment help students believe that they can also perform and excel'. Teachers' intention to differentiate was also driven by their desire to strengthen student-teacher relatedness. For example, Teacher Mary expressed that '... students also feel teacher always take care of them. If we provide differentiation in assessment students will love that subject more'. However, only 9% of teachers stated that they employ differentiation with the intention of providing access to all students by creating equal opportunities for all students to perform. For example; Teacher Nadia stated that 'it is not necessary that everyone is good at writing test, it is my duty to offer them other options to show their understanding'. The reason for this deficit was explained during

the face-to-face interview; teachers revealed that in order to create opportunity for all students to perform issues regarding establishing equity were of major concern. For example, Teacher Azma said ‘our intentions are to create multiple opportunities for students to perform, but establishing fairness requires lots of time and effort’. Additionally, Teacher Savita said, ‘I wish to offer multiple assessment tasks, but when the classrooms are large, it is difficult to ensure that all my methods are fair and appropriate for all’. In conclusion, teachers’ reasons to differentiate were more inclined toward improving instruction and students’ motivation while the intention to make learning accessible to all students was by and large ignored.

Discussion

The overall assessment of the findings suggest that the categories such as differentiating for ongoing assessment, differentiating for process, differentiating through environment, and differentiating for efficiency were consistent with the principles of differentiation. Categories like differentiating for pre-assessment, interest, learners’ profile, and motivation were moderately aligned with the principles of differentiation. However, categories such as differentiating for summative assessment (when to differentiate), product (what to differentiate), and accessibility (why to differentiate) were poorly aligned with the principles of differentiation. The plausible reason for such findings could be that even though the teachers were aware of differentiation and its positive outcome, parents and school policies were not favorable to encourage it at all times. It was reported that parents preferred assessment results through standardized testing, thus allowing teachers to mainly incorporate differentiation in ongoing assessments only. The same reason explains the inability of teachers to incorporate differentiation in product. Additionally, teachers’ inability to manage time and put effort in to creating a variety of assessments (for accessibility) that

are equitable revealed a lack of preparedness among teachers in terms of applying differentiation. Furthermore, it is revealed that large classroom sizes also inhibited implementation of differentiated assessment as it requires more planning time. Therefore, schools need to equip teachers with more strategies for how to differentiate in the face of limited time and large classes.

It was also observed that the teachers had misconceptions that differentiated assessment is for students of lesser abilities and offers alternate ways that are less difficult for them. The face-to-face interviews suggested that the activities were centred on the idea of creating opportunity for everyone to perform according to their readiness and were focused more on the weaknesses of students rather than working upon their strengths. Therefore, it is important that teachers understand that ‘differentiation is not a plan to provide students with different learning objectives, but rather provides various routes to accomplishing the same essential goals’ (Tomlinson & Moon, 2013, p. 98). Also, teachers need to understand that the scoring system and criteria for assessing the common goals needs to be consistent even though the assessment method may differ (Wormeli, 2006). This would facilitate teachers’ intention to provide equal opportunities for students to demonstrate their knowledge.

The follow-up face-to-face interviews provided essential explanations on the teachers’ rationale for employing differentiated assessment practices. It was suggested that policy-based decisions from higher levels have the potential to facilitate teachers’ practices and inform parents in understanding differentiated assessment more comprehensively. Policy-related challenges in successful implementation of formative assessment practices are fairly common across the literature (Hill & Evers, 2016). Similar to those, the findings of the present study also indicate that there is an urgent need to establish a connection between assessment

policies and practices so that the gap between the Malaysian educational reforms for learning and the model of assessment of learning can be narrowed and teachers can successfully integrate differentiated assessment. Overall, the findings suggest that teachers have embraced differentiated assessment practices to improve instruction as well as students' learning, but there are still a few issues to be addressed.

Conclusion

Teachers' involvement is central in educational reforms; therefore, their understanding and application of contemporary teaching and assessment practices must be investigated in depth (Box, Skoog, & Dabbs, 2015). The findings of this study offer insights into teachers' knowledge, application, and interpretation of differentiated assessment practices. Using the components of differentiated assessment, the researchers were able to examine and further recommend ways for successful implementation of differentiated assessment practices. Shulman (1986) offered three forms of teacher knowledge, namely: propositional which is the knowledge gained through work experience, theoretical which is the knowledge based on analytical reasoning, and strategic knowledge, which refers to the strategies that teachers use to overcome issues and problems confronted in practical situations. It is important that teachers develop and enhance strategic knowledge which is more crucial than propositional and theoretical knowledge because it goes beyond 'how' and is concerned with 'what' and 'why' (see Box et al., 2015). Teachers' strategic knowledge can be enhanced with the aid of external factors that include appropriate professional development activities which are driven by the evidence of what teachers know, and what are their beliefs. This, in turn, can improve teachers' classroom practices for teaching and learning. Pre-service teacher education programs mainly focus on

strengthening theoretical knowledge, however, findings from studies like the present one can contribute in continuous examination and development of in-service teachers' professional capabilities.

The findings from the present study highlight two key issues for differentiated assessment practice of Malaysian in-service teachers. First, the teachers were aware of basic principles of differentiation, students' diversity and individual learner needs as well as how differentiation benefits students' cognitive, affective, and emotional development. However, there were instances when gaps in teachers' knowledge on purpose of differentiation and its application were highlighted. While there was evidence that teachers demonstrated theoretical and practical knowledge, they were found wanting in the area of strategic knowledge. For example, they were unable to overcome the problem of limited time and large classes while implementing differentiated strategies. Therefore, through professional development modules, competencies and skills among teachers can be developed to modify and adapt assessment according to the learners' need in a given time. It is important for those modules to have teachers understand the principles of differentiation accurately and plan differentiated assessment proactively rather than making instant or reactive modifications (Tomlinson, 1999). Assessment literacy is considered a crucial element of teacher education; it is in the best interest of teachers to continue examining and upgrading their KUD for classroom assessment. Besides this, teachers can also be provided with mentoring that can help them reflect upon student needs, to design and implement appropriate responses to those needs. Schools can help teachers build partnerships with other teachers who practice differentiation to learn and gain strategic knowledge (Tomlinson & Moon, 2013).

The second issue suggested is that, to be able to bring differentiation into

mainstream assessment practices, teachers' competencies development may not be sufficient until commitment from major stakeholders, such as policy-makers, school leaders, administrators, and parents, is achieved. Stakeholders need to understand academic diversity among students and facilitate ways and create favorable conditions for teachers to respond to those variations. Schools can begin with establishing model practices for differentiated curriculum and instruction. School policies must encourage differentiation in assessment practices including summative assessments. School leaders should be willing to create environments that motivate teachers to reflect upon students' needs, to plan and implement a range of strategies to respond to those needs. Stiggins (2014) strongly recommends school principals understand fundamentals of sound assessment and make efforts to improve assessment literacy, not only among teachers and students, but other stakeholders as well. Although the findings of this study provide a framework for others to explore and evaluate assessment practices and make appropriate recommendations and interventions to improve those practices, future studies must incorporate classroom observation for exploring teachers' assessment practices. Moreover, as assessment becomes an integral part of teaching and learning, future research on factors that influence teachers' assessment decisions in response to diversity and equity can contribute guidelines to improve assessment literacy development programs for teachers.

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Table 1. Framework for evaluating differentiated assessment practices.

When	What	How	Why
Time of assessment	Differentiation in elements	Differentiation for student trait	Reasons for differentiation
Pre-assessment	Content (suitability)	Interest	Accessibility
(1)Conducts before the class/unit begins	(1)Adjusts contents to be assessed for relevance	(1)Evaluation is not stressful	(1)Gives opportunity for all to perform (fairness)
(2)Conducts before planning lesson		(2)Evaluation engages students	
(3)To know previous knowledge or determine readiness		(3)Students are offered choices to demonstrate knowledge	
Ongoing assessment	Process (activities)	Readiness	Motivation
(1)Conducts after every lesson/daily event	(1)Evaluates through verbal responses	(1)Items/tasks varies in complexity	(1)To encourage to perform
(2)Embeds in the instruction	(2)Evaluates through written responses/test papers	(2)Offers relevant resources for research	(2)To show interest in learning
(3)Observe and interact continuously for class effectiveness	(3)Evaluates through open book exams	(3)Uses a variety of item formats	(3)To boost self esteem
	(4)Evaluates using graphic presentation	(4)Uses tiered text	(4)To master the content
	(5)Evaluates through group presentations	(5)Provides reading assistance	(5)To increase relatedness
	(6)Evaluates through observations	(6)Provides extra form of support	
	(7)Evaluates using peer and self-evaluation	(7)Adjusts rubrics based on taxonomy	
	(8)Evaluates through real-life demonstration		
	(9)Evaluates through pop up quiz and speed test		
	(10)Evaluates through journal entries and reflections		
	(11)Evaluates using technology		
Summative assessment	Product(Summative show)	Learners' profile	Efficiency
(1)Give tiered exam paper at the end	(1)Evaluates on essay/journal	(1)Uses bilingual items	(1)To enhance learning
(2)Accepts portfolio for final grades	(2)Evaluates on exam paper	(2)Uses gender appropriate items	(2)To improve instruction
	(3)Evaluates on model/projects and portfolios	(3)Uses culture appropriate items	
		(4)Uses SES appropriate items	
		(5)Uses images and charts	
		(6)Uses multimedia	
	Environment (personal, social, and physical)		
	(1)Provides teacher support		
	(2)Provides peer support		
	(3)Demonstrate care and concern in instruction		
	(4)Creates non-threatening environment		
	(5)Shows respect		

Table 2. number of codes occurring in reported differentiated practices by number of participants.

Components	When			What					How		Why		
	Pre assess- ment	Ongoing assessment	Summative assessment	Content	Process	Product	Environment	Interest	Readiness	Learners' profile	Accessibility	Motivation	Efficiency
No. of codes identified	3	3	2	1	11	3	5	3	7	6	1	5	2
Codes frequency	16	18	3	17	91	4	22	29	42	19	4	11	22
No. of participants	14	10	3	12	26	4	14	19	20	15	3	8	16

Note: Total participants – 32 Total codes – 53.

