

Assessment of Student Development and Learning in IB PYP Schools

Final Report

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Executive Summary

Education systems worldwide are increasingly focusing on how to integrate assessment with teaching to improve student learning and education (Shute & Becker 2010). In particular, there is a growing focus on providing professional learning opportunities for teachers that aim to develop their understandings of assessment literacy and the various practices for implementing reliable and valid assessment within the classroom that will inform future teaching and learning. Furthermore, with the substantial growth of the International Baccalaureate (IB) programme across the world, the International Baccalaureate Organization (IBO) has recognised that support and future development of the organisation's Primary Years Programme (PYP) will require information relating to how assessment is perceived and used by teachers in the IB PYP worldwide. This organisational interest is also connected with the comprehensive review of the IB PYP and the rising interest globally in better understanding the assessment literacy of teachers.

Therefore, the aim of this project was to investigate how IB PYP World Schools define the purpose of educational assessment in their *assessment policies* and their *assessment practices*. This investigation offers a deeper understanding of the assessment cultures within these IB PYP World Schools and provides insights into the current assessment literacy of teachers. In addition, this investigation sought to identify the specific professional learning needs and support required for teachers working in IB PYP World Schools.

Specifically, this project examined how IB PYP schools across the world:

- understand the role of evidence in assessment and provide documentation of student growth of knowledge, understanding and skills;
- provide evidence of students' progress in demonstrating the IB Learner Profile; and
- understand the role of assessment for the purpose of gathering evidence based on a developmental model of teaching, and use this to identify and provide learning pathways for students with respect to developmental outcomes.

This study sought to address the following key areas of inquiry:

- *How do PYP schools define educational assessment?*
- *How do teachers in PYP schools see the purpose of assessment?*
- *How do teachers in PYP schools use assessment to plan for depth and rigour of learning?*

Literature Review

The first part of this project was a literature review that built on the work of Harlen and Johnson (2014), who reviewed the literature relating to assessment in the IB PYP for the IBO. The literature review for this project focused primarily on literature published between 2012 and 2014. It identified six key focus areas:

- teacher beliefs and the ways these shape assessment practices;
- the way standardised testing impacts or challenges assessment in schools and their communities;
- the growing culture of assessment for learning as part of formative assessment practices;
- the need to balance formative and summative assessment;
- the recognition of the importance of assessment of ‘soft skills’ such as social and interpersonal qualities; and
- the affordances of information and communications technology (ICT) for assessment for, of and as learning.

Although there is interest in how developmental approaches and neuroscience might influence the field of assessment in learning and education, we found little research (and few empirical studies) in these areas.

Research Design and Methods

The empirical research was undertaken between June 2014 and October 2015. It involved a case study approach with two phases of data collection methods: a preliminary online survey, and detailed focus groups and interviews to follow up on themes identified in the survey. The research questions and propositions that framed the study are shown in the following table.

Eight IB PYP schools were included in the research, with three schools representing the IB Africa, Europe and Middle East, two schools representing the IB Americas and three schools representing the IB Asia-Pacific region. We selected schools carefully to ensure the research reached a wide range of IB school types.

The aim of the IB PYP assessment case studies was to develop an understanding of the way teachers in IB PYP schools see the purpose of assessment and how they use assessment to plan for depth and rigour of learning. To examine this proposition, the IB Assessment project explored similarities and differences between cases. The approach was driven by clear research questions, a set of propositions and well-identified data sources. The questions asked in the teacher surveys, interviews and focus groups were based on the literature review and the research questions.

<i>Research questions</i>	<i>Propositions</i>
<i>1. How do IB PYP schools articulate their approach to assessment and the way it is used for supporting student learning?</i>	<i>IB PYP schools differ in the way assessment is used to support student learning</i>
<i>2. How do IB PYP schools and the teachers in these schools implement assessment design that reflects the diversity of purposes of assessment (assessment of, for and as learning)?</i>	<i>Teachers in IB PYP schools use and design assessment for a range of purposes</i>
<i>3. How do IB PYP teachers understand the role of evidence in assessment and provide documentation of student growth of knowledge, understanding and skills?</i>	<i>Teachers in IB PYP schools understand the role of evidence in assessment and its impact for student learning</i>
<i>4. How do IB PYP teachers identify students' current level of development and use it to plan for depth and rigour of teaching and learning?</i>	<i>Teachers in IB PYP schools use work samples and other evidence to identify students' levels of development. This evidence is then used to plan for depth and rigour of student learning</i>
<i>5. How do IB PYP teachers provide evidence of students' progress in demonstrating the IB Learner Profile and use this evidence to support future learning?</i>	<i>Teachers and schools can identify student progress in demonstrating the IB Learner Profile. Evidence of student progress on the Learner Profile is used to plan for further development of these attributes</i>
<i>6. How do IB PYP teachers integrate the role of formative feedback and formative assessment in learning?</i>	<i>Schools and teachers align their school assessment policies and practices with the IB PYP guidelines, which incorporate planning for student learning and growth along a developmental continuum</i>

The research produced both quantitative and qualitative data. Four data sources were used to generate each of the case studies:

1. a teacher survey which invited teachers to rate a set of statements about their beliefs and practices and included two open-ended questions;
2. an interview with the PYP coordinator;
3. a focus group interview with up to three teachers (including discussion of their assessment artefacts); and
4. a desk audit of the school's website and an analysis of assessment policy documents.

The results of our analysis are presented in three sections within the report. The sections address the results of the survey of teachers in the eight case study schools (97 participants); the eight detailed case studies; and the cross-case analysis responding to each of the six research questions and propositions presented in the earlier Table.

Findings and recommendations

This project produced six key findings. Recommendations following from each of the key findings are presented below.

1. Assessment in IB PYP case study schools was described as holistic, comprised of both formative and summative assessments, ongoing, and adopting a wide range of assessment strategies. The commitment to both formative and summative assessment is evident in school websites and their publicly available documents and it is articulated clearly by PYP teachers and coordinators. Some tensions were observed between mandated external standardised testing and assessment approaches, particularly formative approaches developed within the school.

It is recommended that schools caught between jurisdiction-mandated testing and school-based assessment receive additional support from the IBO to develop strategies for educating whole school communities about the value of a rich and balanced approach to formative and summative assessment.

2. Teachers in this study supported a holistic approach to assessment and warmly embraced the concepts and practices associated with assessment of learning and assessment for learning, but their attitude to assessment as learning was still developing. Purposeful self-assessment approaches were still in development and teachers were openly cautious about peer assessment.

It is recommended that the IBO publish a guide to assessment that supports staff in PYP schools in their use of a range of assessment strategies. The aim of such guidance would be to give teachers confidence in their current practices, and to suggest further options for their consideration, particularly in the area of Assessment as Learning, outlining not only a range of strategies with this purpose but clearly articulating how these strategies can build metacognitive skills and support students to become lifelong learners.

3. Teachers in the case study schools provided and described a rich array of activities, strategies and assessment artefacts, demonstrating a strong grasp of the evidence required to assess student growth of knowledge, understanding and skills. Rubrics and portfolios were widely used but many teachers questioned the form, purpose and function of the portfolio, seeking clarity on how to use this tool more effectively.

It is recommended that – while portfolios have developed rapidly across all education sectors, increasing their affordance as an assessment and reflection tool, particularly in

digital formats – teachers in IB PYP schools should receive professional learning and development around the concept of portfolios and how to better manage the evidence for, of and as learning that portfolios, particularly digital portfolios, provide to teachers, students, parents and other stakeholders. This would include how to maximise their potential as both a formative and summative assessment tool that reflects assessment validity and reliability, and incorporate the role of moderation to assist in making professional judgments. The affordances of ICT for assessment need further promotion, with opportunities for schools to showcase their practices to benefit the IB world school community.

4. The case study schools and their teachers used a wide range of evidence to illustrate current levels of development and knowledge. They reported that this evidence was used to plan for personalised learning, ensuring that students were working and learning at the appropriate level, with clear goals for the next stage of their learning. However, although schools embraced the concept of a developmental continuum, they found it very difficult to articulate which framework they currently used or should use.

It is recommended that teachers be given guidance to support a developmental approach to assessment. A framework or continuum document would assist teachers to position students on some common continuums and support their learning with greater confidence. These continuums would relate to academic areas of development but should include other areas such as social and emotional learning.

5. Teachers in the eight case study schools in this project enthusiastically supported the Learner Profile, however, most teachers found it difficult to conceptualise progress and there were no continuums available for guidance. Several teachers and coordinators supported the idea of a continuum to guide them with assessment on the Learner Profile.

It is recommended that the IBO develop a continuum of development for each of the Learner Profile attributes to support the development of more effective assessment for learning in this important domain of student learning and personal growth.

6. Teachers in this project recognised the critical role of feedback, its role in formative assessment and its potential for supporting student learning. They articulated how they provided feedback in all of its forms, rejecting the concept of personal praise in favour of process praise. In particular, they advocated moving towards process feedback that is specific, informative and focuses on facilitating children to evaluate their own learning performances to gain mastery. Self-assessment was highly valued for its ability to build reflective lifelong learners. Teachers were more equivocal about peer assessment, expressing doubts about its value as a valid assessment tool and caution about the risks of using peer assessment or peer feedback – in the absence of strong modelling – for their student body.

It is recommended that teachers in IBPYP schools receive additional support in implementing peer assessment and peer feedback in their schools. This could take the form of well-constructed videos or online professional learning and development resources that address the how and why of peer feedback and the role it can play in supporting student learning. The concept of parent feedback deserves further investigation. This approach has great potential to build stronger parent-school relationships and bring parents into the assessment cycle in a purposeful way.

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List of Abbreviations

AfL	Assessment for Learning
CEFR	Common European Framework for Reference of Languages
DIBELS	Dynamic Indicators of Basic Early Literacy Skills
DP	Diploma Programme
DRA	Directed Reading Assessment
IB	International Baccalaureate
IBO	International Baccalaureate Organization
ICAS	International Competitions and Assessments for Schools
IBT	International Benchmark Test
ICT	Information and Communications Technology
ISA	International Schools Assessment
LP	Learner Profile
MYP	Middle Years Programme
PAT	Progressive Achievement Test
PE	Physical Education
PIPS	Performance Indicators in Primary Schools
PISA	Programme for International Student Assessment
PYP	Primary Years Programme

Introduction

Education systems worldwide are increasingly focusing on how to integrate assessment with teaching to improve student learning and education (Shute & Becker 2010). More particularly, there is a growing focus on improving the assessment literacy of teachers; that is, improving teacher knowledge of how to implement reliable and valid assessment within the classroom that will also inform their future teaching to develop student learning, knowledge and skills, which is often associated with Assessment for Learning (AfL) (Gardner, Harlen, Hayward & Stobart 2010). Partially, this growing interest in teacher assessment literacy is due to an emerging awareness that the external national and international standardised testing that currently dominates governments' educational policies has limitations; these limitations dissipate if teachers have high-quality assessment literacy (Gardner et al. 2010; Klenowski & Wyatt-Smith 2014). Creating assessment-literate teachers requires teachers (and school communities) to be cognisant of when and how to use each kind of assessment, as each has a 'role to play in improving teaching and learning, and needs to be part of a total, balanced and blended assessment system' (Shute & Becker 2010, p. 9). This contextual background, associated with the place of assessment in the classroom and its role in improving student learning, illustrates the complexity of assessment policy and practice and the need for teachers with high-quality assessment literacy.

Emerging assessment literacy frameworks provide evidence-based ways of understanding the attributes of teachers related to assessment of, and more importantly for the 21st century, *for learning*, with opportunities for assessment *as learning* (Earl 2003). The focus on developing teachers' assessment literacy responds to the increasingly complex understanding required by teachers of the form, function and role that assessment plays within the learning environment and educational policy contexts (Eyal 2012; Gardner et al. 2010; Popham 2009). These teacher assessment literacy frameworks provide insights that guided our literature review, informed question development for the research instruments, and assisted in our analysis of data.

With the substantial growth of the International Baccalaureate (IB) programmes across the world, the International Baccalaureate Organisation (IBO) has recognised that support and future development of the organisation's Primary Years Programme (PYP) will require information relating to how assessment is perceived and used by teachers, particularly in the IB PYP worldwide. This organisational interest is connected with the rising interest globally in better understanding the assessment literacy of teachers, and recognises that 'teachers are central in creating much-needed assessment reform' (Klenowski & Wyatt-Smith 2014, p. 1). The IBO sought to understand how the IB PYP school communities assess progress in student learning; hence, the aim of this project was to investigate how IB PYP World Schools define the purpose of educational assessment in their *assessment policies* and their *assessment practices*. The results of our investigation offer an understanding of the *assessment culture*

represented within these school communities, with insights into the current assessment literacy of teachers, and identify needs for further professional learning and development and/or other support required.

Specifically, the project examined how IB PYP schools across the world:

- Understand the role of evidence in assessment and provide documentation of student growth of knowledge, understanding and skills,
- Provide evidence of students' progress in demonstrating the IB Learner Profile, and
- Understand the role of assessment for the purpose of gathering evidence based on a developmental model of teaching, and use this to identify and provide learning pathways for students with respect to developmental outcomes.

We sought to address the following broad areas of inquiry:

- *How do PYP schools define educational assessment?*
- *How do teachers in PYP schools see the purpose of assessment?*
- *How do teachers in PYP schools use assessment to plan for depth and rigour of learning?*

Background to the Study

Making the IB PYP happen: perspective on assessment

Making the PYP happen (IBO 2009), the key document that guides the curriculum framework implementation of the PYP in IB schools, outlines several key assessment principles and practices. A section dedicated to the ‘assessed curriculum’ (pp. 44-55) examines IB PYP philosophy and practices on assessment, and outlines that the ‘prime objective of assessment in the PYP is to provide feedback on the learning process’ (IBO 2009, p. 44). It is implied that feedback is provided in multiple forums such as to students on assessed work, and parents/guardians through reporting strategies (e.g., written reports, three-way conferences).

There is recognition in *Making the PYP happen* (IBO 2009) that the assessment culture (e.g., policy, processes and practices) developed in the school must align with the PYP philosophy and objectives of the programme, which includes incorporating the assessment of inquiry-based learning that is central to the PYP curriculum framework. Both elements of inquiry-based learning must be reflected in the school’s assessment approach: ‘assessment on the process of inquiry as well as the product(s) of inquiry’ (IBO 2009, p. 44). Furthermore, *Making the PYP happen* (IBO 2009, pp. 54–55) provides guidance to schools on developing its assessment policy. The advice suggests three main areas for policy development: (1) purpose of assessment; (2) principles of assessment; and (3) assessment practice. A further support to guide schools in establishing and sustaining their assessment policy and practices is the *Standard C4: Assessment in Programme standards and practices* (IBO 2014, pp. 13-14), represented in Figure 1. There is recognition that evaluation plays a role in the programme’s ‘continuing improvement’ (IBO 2009, p. 44), yet *Making PYP happen* (2009) and the *Standard C4: Assessment* (IBO 2014, pp. 13–14) contain little that could guide schools in their evaluative processes and practices.

The building and sustaining of the school’s assessment culture implies that beliefs central to IB, as encapsulated in its mission statement (i.e., developing caring students with inquiring minds who are also taking actions to ‘create a better and peaceful world through intercultural understanding and respect’ (IBO 2009, p. 2)) need to be evident in the school’s assessment approach. This also suggests that the IB Learner Profile (LP) (see Figure 2) must be incorporated into the assessment approach developed by the school. Furthermore, while the IB PYP Exhibition is seen as a significant way for students to show their consolidated learning in the final year of the PYP (i.e., summative assessment), it is simultaneously a way to demonstrate the progression of their learning (i.e., formative assessment). Therefore, the IB PYP Exhibition should also be a critical component of the school’s assessment culture.

Figure 1: Assessment standard in the IB PYP

Standard C4: Assessment

Assessment at the school reflects IB assessment philosophy

1. Assessment at the school aligns with the requirements of the programme(s).
Requirements for the Primary Years Programme
 - a. Assessment at the school is integral with planning, teaching and learning.
 - b. Assessment addresses all the essential elements of the programme.
 - c. The school provides evidence of student learning over time across the curriculum.
2. The school communicates its assessment philosophy, policy and procedures to the school community.
3. The school uses a range of strategies and tools to assess student learning.
4. The school provides students with feedback to inform and improve their learning.
5. The school has systems for recording student progress aligned with the assessment philosophy of the programme(s).
6. The school has systems for reporting student progress aligned with the assessment philosophy of the programme(s).
Requirements for the Primary Years Programme
 - a. Student learning and development related to all attributes of the IB learner profile are assessed and reported.
7. The school analyses assessment data to inform teaching and learning.
Requirements for the Primary Years Programme
 - a. The school ensures that students' knowledge and understanding are assessed prior to new learning.
8. The school provides opportunities for students to participate in, and reflect on, the assessment of their work.
9. The school has systems in place to ensure that all students can demonstrate consolidation of their learning through the completion of the Primary Years Programme exhibition, the Middle Years Programme personal project and the Diploma Programme extended essay, depending on the programme(s) offered.

Excerpt from *Programme Standards and Practices* (IBO 2014), pp. 13–14.

Making the PYP happen (2009) identifies that assessment in the curriculum is expressed in three interrelated areas: *assessing* student learning; *recording* the student learning through collected and analysed data; and *reporting* the student learning through a communicative strategy. Each of these assessment components are discussed within this section of the curriculum framework and summarised below.

Figure 2: IB Learner Profile

IB learner profile

The aim of all IB programmes is to develop internationally minded people who, recognizing their common humanity and shared guardianship of the planet, help to create a better and more peaceful world.

As IB learners we strive to be:

<p>INQUIRERS We nurture our curiosity, developing skills for inquiry and research. We know how to learn independently and with others. We learn with enthusiasm and sustain our love of learning throughout life.</p> <p>KNOWLEDGEABLE We develop and use conceptual understanding, exploring knowledge across a range of disciplines. We engage with issues and ideas that have local and global significance.</p> <p>THINKERS We use critical and creative thinking skills to analyse and take responsible action on complex problems. We exercise initiative in making reasoned, ethical decisions.</p> <p>COMMUNICATORS We express ourselves confidently and creatively in more than one language and in many ways. We collaborate effectively, listening carefully to the perspectives of other individuals and groups.</p> <p>PRINCIPLED We act with integrity and honesty, with a strong sense of fairness and justice, and with respect for the dignity and rights of people everywhere. We take responsibility for our actions and their consequences.</p>	<p>OPEN-MINDED We critically appreciate our own cultures and personal histories, as well as the values and traditions of others. We seek and evaluate a range of points of view, and we are willing to grow from the experience.</p> <p>CARING We show empathy, compassion and respect. We have a commitment to service, and we act to make a positive difference in the lives of others and in the world around us.</p> <p>RISK-TAKERS We approach uncertainty with forethought and determination; we work independently and cooperatively to explore new ideas and innovative strategies. We are resourceful and resilient in the face of challenges and change.</p> <p>BALANCED We understand the importance of balancing different aspects of our lives—intellectual, physical, and emotional—to achieve well-being for ourselves and others. We recognize our interdependence with other people and with the world in which we live.</p> <p>REFLECTIVE We thoughtfully consider the world and our own ideas and experience. We work to understand our strengths and weaknesses in order to support our learning and personal development.</p>
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The IB learner profile represents 10 attributes valued by IB World Schools. We believe these attributes, and others like them, can help individuals and groups become responsible members of local, national and global communities.

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Assessing student learning

Making the PYP happen (2009) contains discussion of both formative and summative assessment as ways to assess student learning. Although not formally stated in the advice within *Making the PYP happen* (2009), Assessment for Learning (Harlen & Johnson 2014) is mentioned in the discussion, particularly associated with formative assessment. Aspects of Assessment as Learning (Earl 2003) also appear through the expectation that self-assessment and reflective assessment form part of the PYP assessment approach, although this is not an area that is strongly developed in the guidelines to schools. Another area that is under-

represented in the PYP guidelines is the role of feedback in assessment and how this can be applied in diverse contexts for diverse learners.

Making the PYP happen (2009) states the IB position on standardised achievement tests (p. 50). The IBO doesn't disregard standardised achievement tests, as it recognises that schools can be bound to local, state or national requirements. Consequently, schools are asked to consider the relevance, impact and implications of participating in such external testing and the PYP context. Where possible, in this project we explored with schools how they monitor and enact these guidelines about standardised testing.

Recording student learning

Making the PYP happen (2009) emphasises the need to collect and analyse data (assessment of student learning) through the use of multiple and diverse strategies (observations, performance assessments, process-focused assessments, selected responses and open-ended tasks) and tools (rubrics, exemplars, checklists, anecdotal records, and continuums). The use of portfolios is encouraged to enable students to actively represent their learning and reflections on their learning. A complex understanding of portfolio use is represented in the *Making the PYP happen* guidelines (2009, p. 50).

Reporting student learning

Reporting means the way assessment is communicated appropriately to students, parents and guardians as well as for other audiences or stakeholders. A range of reporting strategies is discussed in *Making the PYP happen* (2009), including conferences and written reports. There is also a guide for developing a written report format, which suggests inclusion of:

- the Learner Profile;
- transdisciplinary units and the subject-specific teaching;
- opportunities for comments from all teachers involved in the student's progress; and
- all the essential elements of the programme. (IBO 2009, p. 53)

Summary of Harlen and Johnson (2014)

The IBO commissioned Wynne Harlen and Sandra Johnson to review current thinking and practices in assessment within the IB PYP, which they completed in January 2014 (Harlen & Johnson 2014). Their report contains a comprehensive review of theoretical understandings and practices of assessment to improve student learning, and outlines the implications of their findings for the PYP. A summary of the key findings from the report follows.

The strong presence of formative assessment in the IB PYP aligns the assessment practice to IB curriculum values and the centrality of the inquiry learning process. As Harlen and Johnson

(2014) concluded, the emphasis on the use of formative assessment is reflective of the strong evidence in the literature that formative assessment significantly improves student learning. However, the authors concluded that there is a need for PYP teachers to better understand and use formative assessment as integral to their teaching, rather than a separate activity. For example, it was recommended that the IBO support teachers to differentiate between formative and summative assessment in order to be more precise in the alignment of the assessment type and its intended purpose. Differences in assessment characteristics include purpose, function, form, validity and reliability requirements, which imply different strategies are applied depending upon the assessment type. Harlen and Johnson (2014) outlined the key features of formative and summative assessment, and these are represented in Table 1.

Drawing on Wynne Harlen's earlier work, Harlen and Johnson outlined the 10 principles of assessment practice (Gardner et al. 2010, pp. 30–31) and suggested that these principles 'should be used as standards to aim for in planning or evaluating assessment procedures or proposals' (Harlen & Johnson 2014, p. 23). Table 2 identifies these 10 principles. In Section 3 of the report, Harlen and Johnson (2014) compared these principles with those identified in the PYP. They found that the IB assessment principles are operational rather than focusing on 'quality expectations' and also stated as 'almost value free', and so could be improved by rewriting them to better represent and clarify the assessment philosophy of IB (Harlen & Johnson 2014, pp. 24–25).

The Harlen and Johnson (2014) review implied that there are significant opportunities to further examine how IB PYP teachers are:

- integrating self and peer assessment as part of formative assessment;
- teaching students the skills of self and peer assessment; including an exploration of metacognitive development of students; and
- using moderation, particularly in the PYP Exhibition, to assist in applying 'criteria in a standardised way so their students' achievements are as fairly assessed as possible.' (Harlen & Johnson, 2014, p. 61)

The principles of assessment practice (Table 2) and the findings from the Harlen and Johnson (2014) review presented above informed the data generation and analysis for this project, which focused on gaining a practical understanding of IB PYP school practices and assessment cultures.

Table 1: Key features of formative and summative assessment (adapted from Harlen & Johnson 2014, pp. 12-13)

Formative Assessment	Summative Assessment
<ul style="list-style-type: none"> • Feedback to the students that provides advice on how to improve or move forward, and avoids making comparisons with other students • Students understanding the goals of their work and having a grasp of what is good quality work • Students being involved in self-assessment so that they take part in identifying what they need to do to improve or move forward • Students engaged in expressing and communicating their understandings and skills, initiated by teachers’ open and person-centred questions • Dialogue between teacher and students that encourages reflection on their learning • Teachers using information about ongoing learning to adjust teaching so that all students have opportunity to learn 	<ul style="list-style-type: none"> • Relates to achievement of broad goals expressed in general terms rather than the goals of particular learning activities • Results reported at certain times, not as an everyday part of learning • Uses evidence obtained when students are involved in special tasks or tests as part of, or in addition to, regular work • May be based on teachers’ judgements, tests or a combination of these • Involves judging the achievement of all students against the same criteria or mark scheme • Requires some measures to assure reliability • Typically provides limited, if any, opportunities for student self-assessment

Table 2: Principles and standards of assessment derived from literature and practice (from Gardner et al. 2010, pp. 30–31)

Principles of assessment practice
<ol style="list-style-type: none">1. Assessment of any kind should ultimately improve learning2. Assessment methods should enable progress in all important learning goals to be facilitated and reported3. Assessment procedures should include explicit processes to ensure that information is valid and is reliable as necessary for its purpose4. Assessment should promote public understanding of learning goals relevant to students' current and future lives5. Assessment of learning outcomes should be treated as approximations, subject to unavoidable errors6. Assessment should be part of a process of teaching that enables students to understand the aims of their learning and how the quality of their achievement will be judged7. Assessment methods should promote the active engagement of students in their learning and its assessment8. Assessment should enable and motivate students to show what they can do9. Assessment should combine information of different kinds, including students' self-assessments, to inform decisions about students' learning and achievements10. Assessment methods should meet standards that reflect a broad consensus on quality at all levels from classroom practice to national policy

Research Design

Themes from a review of recent literature on assessment

The purpose of this brief literature review was to build on the Harlen and Johnson (2014) report for the IBO by reviewing literature published since the report was submitted (i.e., 2012–2014), and comparing the themes in the two reviews to identify current trends in assessment that also resonate with the IB PYP curriculum framework. Harlen and Johnson's (2014) literature review is comprehensive and indicative of contemporary understandings of good principles and practice of assessment. Working with the Harlen and Johnson (2014) recommendations as summarised in the previous section, this literature review also informed the design and development of research instruments in the data generation phase of the project, as well as data analysis. Most of the literature reviewed consists of empirical studies of school assessment cultures and practices that improve student learning.

Literature review – approach

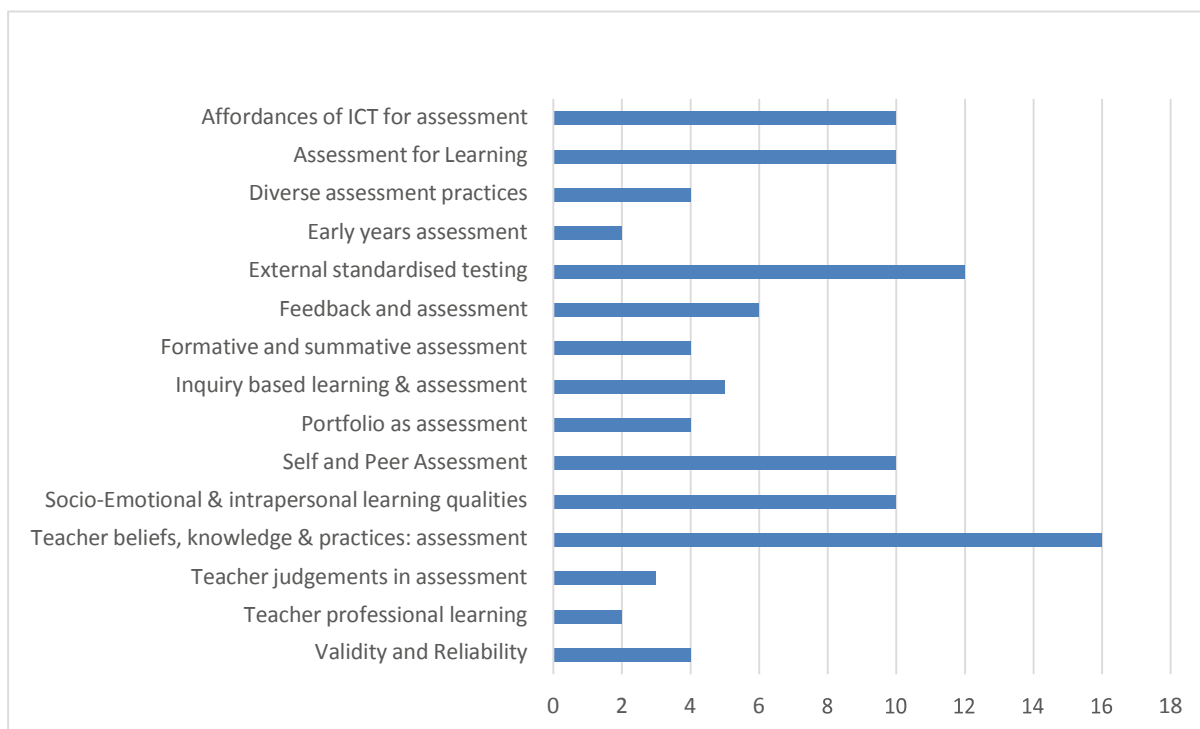
As previously noted, our literature review updated the recent IBO-commissioned work of Wynne Harlen and Sandra Johnson (2014), incorporating literature on assessment from 2012–2015. We searched all 62 databases listed on the EBSCOHost platform to ensure that studies from a range of disciplines were included. The inclusion criteria were that articles had to be published between 2012 and 2014, and in English. The search terms used were 'assessment', 'primary / elementary education', 'developmental psychology', and 'neuroscience.' Studies which focused on early childhood or high school education, health, special education, English as a foreign or second language, and studies which evaluated an intervention were excluded.

We found 138 articles in the initial search and manually screened them against the inclusion and exclusion criteria. A document not identified in the search was included for its relevance – a recently published book on assessment for teaching (Griffin 2014). Seventy-two articles were eligible for review and input to an Excel database for comparison and data extraction.

Analysis of literature review data

Each literature artefact was coded with up to three categories to represent its key themes. These themes often overlap, but serve to highlight the emphases or foci of the artefacts. Figure 3 shows the outcomes of the initial analysis of the 72 artefacts. As shown, we used 15 coding categories to identify artefact themes. Key features from this analysis of the literature review artefacts are outlined in the following discussion.

Figure 3: Initial analysis of literature review artefacts



The category most frequently represented in the literature review was *Teacher beliefs, knowledge & practices*, appearing as a theme in 16 artefacts (e.g., Brown, Harris & Harnett 2012; Chr  n  n & Cosgrave 2013; Nsibande & Modiba 2012). While this category contains diverse subthemes, it is dominated by research that specifically explores teachers’ beliefs about assessment and how these beliefs shape their practices. This theme highlights the critical significance of teachers’ beliefs in not only shaping their practice but developing the school’s assessment culture. This finding signalled the need for our study to unpack teacher beliefs and how they influence assessment practices within the school community. This theme, along with others such as *Teacher judgements in assessment*, *Teacher professional learning*, *Formative and summative assessment* and *Validity and reliability* are key elements in the development of the teacher assessment literacy that is emerging as critical in the current climate of high-stakes testing and accountability across the globe (Gardner et al. 2010; Klenowski & Wyatt-Smith 2014).

Another highly represented theme in the brief literature review was *External standardised testing*, which occurred across 12 artefacts (e.g., Bradbury 2014; Strakova & Simonov   2013; Tveit 2014). The frequency of this theme suggests that high-stakes testing practices are creating substantial impacts on school assessment cultures, and adding tensions between state accountability of schools as systems in contrast to educational reforms that focus on learning and Assessment for Learning. The *Making the PYP Happen* (2009) guidelines ask schools to consider whether they should participate in these standardised testing practices.

The next highly represented series of categories is related to *Assessment for Learning* (10 artefacts, see Figure 3) – a focus of the Harlen and Johnson (2014) report. This literature review supports Harlen and Johnson’s call to unpack the complexity of teacher knowledge and practice to implement *Assessment for Learning*, particularly in the areas of *Self and peer assessment* (a highly active area, with 10 artefacts in this brief review) and *Diverse assessment practices*, which frequently also highlight the challenges of assessment design for teachers. A recent study by Lysaght and O’Leary (2013) offered a tool to audit teachers’ understanding and use of *Assessment for Learning*. Some of this work was drawn upon for the survey instrument design for this study.

Critical to *Assessment for Learning* is the role that effective formative feedback, which can be enacted by teachers and/or students, plays in learning (e.g., Wiliam 2011). Review of the recent literature reinforces the significance of effective feedback for improving student learning: Hasselgreen (2013) adapted the Common European Framework for Reference of Languages (CEFR) to guide teachers to provide effective feedback to students in their literacy development other than in their first language. The research piloted and revised the teacher guidelines to assist teachers to show how students progressed in their development of language literacy over time through a scale of descriptors. This approach might be useful in supporting IBO to develop resources and/or programs associated with themes such as effective feedback and assessing along developmental continuums.

Another relevant focus is the impact on students in the process of receiving feedback, which Hargreaves (2013) explored. The study captured the characteristics that students value in feedback, so it can inform teachers as to what makes for effective feedback. Context is likely to be important; IB teachers could create and design a similar project to ascertain what is valued by their own students and their communities.

Peer assessment is the students’ activity in the assessment cycle, and plays a significant role in Assessment for (and as) Learning through improving student learning and building intrinsic motivation and self-responsibility for learning. However, in a review of the literature, Tillema (2014) found the effects of student involvement in assessment are under-researched. Tillema (2014) identified five types of peer assessment that could form a continuum from simple student involvement in peer assessment (peer marking) through to the most complex (peer evaluation). More complex peer assessment incorporates more characteristics (or qualities) of involving students. Six characteristics or qualities potentially contribute to student involvement in peer assessment: goal formulation, task formulation, formulation criteria, scoring, giving feedback, and decision-making (Tillema 2014, p. 42, Figure 3.1). Of these qualities, ‘scoring’ is the simplest strategy and the one teachers use most often, while ‘goal formulation’ is the least used. With increasing complexity of student involvement in (peer) assessment, there is a greater demand for supporting students to develop skills to actively and effectively participate in the assessment cycle. A wonderful video clip, *Austin’s Butterfly* (Expeditionary Learning, 2012, <https://vimeo.com/38247060>), illustrates the power of

supporting students to develop their skills in peer assessment as a tool in Assessment for/as Learning.

The conceptualisation of self-assessment embodied within Assessment as Learning is gaining greater momentum for it to be distinguished as a separate category from Assessment for Learning (Earl 2013). Many researchers have examined how student skills can be developed to enable students to self-assess effectively. Dann (2014) introduced an interesting alternative perspective, unpacking the complexity of self-assessment from a deepened sociocultural perspective. She offers a framework in which the focus is on students and how they construct their learner identities and receive, give and interpret feedback and enact it.

Formative and summative assessment was a theme raised in Harlen and Johnson's (2014) report: that teachers need to enhance their professional knowledge and skills to distinguish between formative and summative assessment, and better apply formative assessment with diverse strategies that are also valid and reliable. In particular, for example, teachers need training for effective implementation of formative assessment practices, such as the development and use of rubrics for effective formative assessment and other strategies for continuous classroom assessment (e.g., Ali, Shah & Gujjar (2014) provided a rubric for measuring a teacher's familiarity with a range of assessment strategies). Such nuanced understandings and practices are also explored in the conception of quality teacher assessment literacy. Again, concepts from themes overlap or intersect, but the unpacking of concepts helps to broaden the understanding of how school assessment cultures are created and sustained. Our study's challenge was to capture these multiple dimensions of assessment in PYP school communities.

The literature review highlighted some additional interesting themes, such as *Socio-emotional & intrapersonal learning qualities* (represented by 10 artefacts, as shown in Figure 3). Findings from these studies confirm growing interest in understanding the roles and the assessment of the 'soft' skills often associated with 21st century learning, such as collaboration, wellbeing, motivation, self-esteem, and metacognition. This thematic area is strongly congruent with the IB PYP philosophy and underpins the conception of the IB PYP LP, which is also identified as an evolving area for deeper development and engagement amongst PYP schools and teachers as they go about their work. It was also of interest to note that the two early years assessment artefacts (which focus on early years of primary, rather than early childhood education) in the literature review (see Figure 3; Bradbury 2013; DeLuca & Hughes 2014) intensely explored these holistic/whole child development and learning approaches. Further exploration and learning from the early years assessment area may provide a stimulus to adapt approaches for the latter years of the PYP curriculum.

An emerging theme not extensively discussed in previous IB research reports is the role that ICT plays in assessment within the PYP curriculum. Our literature review identified a growing research interest in the affordances of ICT for assessment (as represented in Figure 3, with 10

artefacts). Many of the artefacts collected in this literature review explored how ICT can be used to provide timely feedback and bring authenticity to learning through, for example, simulation-based learning environments. We investigated this area further to reveal the current state of play in IB PYP schools.

Two areas of interest for the IBO are poorly represented in the literature review: developmental approaches to assessment, and the impact of neuroscience in education with implications for assessment. This first area was best captured by the work of Patrick Griffin's team (Griffin 2014), which established a developmental model of assessment. Förster & Souvignier (2014) investigated a related concept, Learning Progress Assessment, that is also strongly coupled with diagnostic assessment and using assessment to inform teaching, and which could be further explored to identify the interrelationships between approaches and possible implications for the IB PYP.

Interest in developmental assessment approaches arose in the last decade of the twentieth century. For example in Australia, Masters and Forster (1997) used research from the National Schools English Language Survey to develop teacher-friendly resources to support teachers in understanding theoretical concepts such as developmental assessment and progress maps to inform their assessment practice (see Masters & Forster 1996a and 1996b). Progress maps are underpinned by what is valued (e.g., learning intentions, success criteria) and are informed by well-constructed learning continuums or learning progressions, which describe the nature of development in an area, while developmental assessment is the process of monitoring student progress in an area (Forster 2009; Forster & Masters 2010). There is increasing interest in developmental assessment approaches globally, particularly as affordances of ICT provide greater capacity for assessment data collection, monitoring, interpretation and reporting. Another example of a developmental assessment approach is the work of Patrick Griffin's team at the University of Melbourne (e.g., Care et al. 2014; Griffin 2014). Such developmental assessment approaches are often underpinned by theories of assessment for learning and sociocultural learning theories such as Vygotsky's concept of the Zone of Proximal Development (Vygotsky 1978). These approaches respond to increasing calls from teachers for ways to manage and interpret the ever-growing assessment data they collect to inform their teaching. For educators, an essential feature of a progress map is that it 'describes and illustrates [a continuum of] developing competence in terms of words and examples' (Masters & Forster 1996b, p. 4). Progress maps can be used to illustrate teachers' ideas about levels of learning and expertise in a specific area of learning, for example, story writing. The collaborative effort in building the underlying continuum for a progress map, and its illustration by examples of children's work, form a vital aspect of teachers' professional learning. A study of early childhood educators' assessment approaches explored the way some teachers adopted a developmental approach to assessment and used it to make meaning of their practices within their curriculum stance. (Pyle & DeLuca 2013).

The second area of interest to the IBO that was poorly represented in our preliminary

literature review is the influence of neuroscience in education. This is probably unsurprising, as interaction between the two fields is minimal and moreover, when neuroscientists and education researchers come together, myths are frequently manifested, as Paul Howard-Jones explained in a recent article (Howard-Jones 2014). However, large research groups such as the Science of Learning Centre in Australia (<http://slrc.org.au>) and the Stanford Neuroscience Institute (<https://neuroscience.stanford.edu>) are seeking to bring neuroscientists and educators together to explore their concepts, assumptions and methodologies. One way that neuroscience and education can work together is in examining the brain processes of teaching strategies and their underlying assumptions. This has been demonstrated in studies of letter-learning (James & Engelhardt 2012) and in (controversial) areas such as bilingualism (Pettito 2009); greater understanding of brain activity in these areas offers new insights into possible teaching practices. The combination of neuroscience and education needs further exploration.

Our review of recent literature on assessment and the background to the study identified issues and factors that informed our research design and analysis, including the research instruments for data collection and frameworks for data analysis. The literature review indicates that there is increasing acknowledgement that the theoretical constructs of *Assessment for* and *as Learning* are not fully realised in teacher understandings and/or practices (Black 2015). Accordingly, there is a need to think about how to support teachers and schools to engage with *Assessment for* and *as Learning*, which indicates further teacher professional learning (e.g., Birenbaum 2011; Smith 2011; Timperley 2014) and the need to broaden the notion of assessment literacy from being only about teachers (Gardner et al. 2010) to a more holistic concept that sees assessment literacy as creating positive assessment cultures for learning and building the assessment literacy capabilities of teachers, principals and students (Engelsen & Smith 2014).

Research Process

We adopted a case study approach in this project, collecting data from schools representing the IB Africa, Europe and Middle East, the IB Americas, and the IB Asia-Pacific region. The methods used to recruit schools, collect data from them and analyse the data are explained below.

Structure of the IB PYP assessment multiple case study research project

The aim of the IB PYP assessment case studies was to develop an understanding of the way teachers in IB PYP schools see the purpose of assessment and how they use assessment to plan for depth and rigour of learning. This purpose was underpinned by the theoretical position that teacher assessment literacy is critical to the way assessment is applied purposefully within planning and teaching to improve student learning (Black & Wiliam 1998; Faragher 2014; Gardner et al. 2010; Griffin 2014; Klenowski & Wyatt-Smith 2014).

We employed a multiple case study approach to examine this proposition and explore the way teachers in IB PYP schools understand the purpose of assessment and how these teachers use assessment to plan for depth and rigour of learning. The approach was driven by clear research questions (Table 3) and propositions and well-identified data sources. The questions asked in the teacher surveys, interviews and focus groups were developed from the research questions and the outcomes of the literature review.

In our study of multiple cases, a conceptual framework emerged from pattern matching that was supported by the overarching theoretical proposition; its adequacy, in terms of explaining the findings, was tested. This, combined with the strong case study protocol and clear set of propositions (see Table 3), contributed to the internal validity of the approach. The issues identified in the literature review combined with the research questions provided the basis for an initial conceptual framework.

Establishing clear propositions and a clear case study protocol reinforced the external validity of our approach. The early establishment of research questions exploring how assessment is used in IB PYP schools and the approach adopted for the selection of the case study schools ensured that our findings of this case study research would be capable of analytic generalisation (Yin 2014) that builds theoretical understandings of assessment practices in IB PYP schools. Furthermore, the strategy of using multiple cases from across the three IB global regions added to the generalisability of our findings.

Table 3: Matching research questions and propositions

<i>Research questions</i>	<i>Propositions</i>
<i>1. How do IB PYP schools articulate their approach to assessment and the way it is used for supporting student learning?</i>	<i>IB PYP schools differ in the way assessment is used to support student learning</i>
<i>2. How do IB PYP schools and the teachers in these schools implement assessment design that reflects the diversity of purposes of assessment (assessment of, for and as learning)?</i>	<i>Teachers in IB PYP schools use and design assessment for a range of purposes</i>
<i>3. How do IB PYP teachers understand the role of evidence in assessment and provide documentation of student growth of knowledge, understanding and skills?</i>	<i>Teachers in IB PYP schools understand the role of evidence in assessment and its impact for student learning</i>
<i>4. How do IB PYP teachers identify students' current level of development and use it to plan for depth and rigour of teaching and learning?</i>	<i>Teachers in IB PYP schools use work samples and other evidence to identify students' levels of development This evidence is then used to plan for depth and rigour or student learning</i>
<i>5. How do IB PYP teachers provide evidence of students' progress in demonstrating the IB Learner Profile and use this evidence to support future learning?</i>	<i>Teachers and schools can identify student progress in demonstrating the IB Learner Profile Evidence of student progress on the Learner Profile is used to plan for further development of these attributes</i>
<i>6. How do IB PYP teachers integrate the role of formative feedback and formative assessment in learning?</i>	<i>Schools and teachers align their school assessment policies and practices with the IB PYP guidelines, which incorporate planning for student learning and growth along a developmental continuum</i>

Ethics approval

An application for approval of the research project was developed and submitted to the Faculty of Arts and Education Human Ethics Advisory Group at Deakin University. Preparation of this ethics application involved the preparation of plain language statements and consent forms for the school principal, PYP coordinator, and teachers' focus groups. These documents are reproduced in [Appendix A](#). The teacher survey was also submitted for ethics approval. The rationale and process for developing the teacher survey is outlined below.

Rationale for data collection – sampling method

We sampled purposefully from a range of school types, locations and school age ranges in the possible pool of PYP schools across the IB regions. We made every effort to select schools with a reputation for effective assessment practices based on input from the IBO, a desktop audit of school websites and information from previous IBO reports. While it was acknowledged that the IBO supports English, French and Spanish, for the purpose of this investigation, only schools with teachers able to complete the interviews and survey in English were selected. Both private and state-funded schools were represented in the sample, but challenges encountered in recruiting led to over-representation of private schools. School sampling ensured coverage of a student age range from three to 12. As a result, some selected schools focus only on the PYP years of three to 12, while others cover from age three until the completion of secondary schooling. The IB research office provided assistance with initial school selection.

Recruitment of schools

The IB research department gave the project team a list of World IB schools that identified strong performers in terms of assessment practices. We then selected a subset of nine of these schools for initial contact. The selection process aimed to ensure that the case study schools represented a wide range of IB school types, including small and large schools, primary and early years, recently accredited schools, longstanding IB schools, and schools that also offered other IB programmes such as the Middle Years Programme (MYP) and the Diploma Programme (DP). Schools were contacted directly, initially via an email to the principal; this was followed up with a telephone call. This approach proved to be slow as principals were often quite difficult to contact and emails were frequently unanswered.

Due to the initial slowness of recruitment an alternative approach was implemented, whereby a school's PYP coordinator and principal were simultaneously emailed, then telephoned immediately afterwards. Many school principals were enthusiastic about participation but staff was less positive due to their other time demands, and this led to long delays in establishing whether the school would participate. These delays also meant postponing the data collection period to the end of the school year, which was unappealing to many schools due to the many time pressures they experience at that time of year. Hence, we widened the pool of schools for participation and conducted an intense recruitment campaign. The staff of the eight schools who participated in this project were remarkable in the way they embraced this project and gave their time so willingly and generously to provide the valuable data reported here. Although the project initially aimed for nine case study schools, due to the difficulties encountered in school recruitment only eight schools participated in the project.

Data collection

The participants in this study were eight case study schools, their teachers and IB PYP coordinators. We collected data using an online survey, interviews with PYP coordinators, focus groups with teachers, and a desk audit of policy documents.

Teacher Survey

A teacher survey was developed using both the findings of Harlen and Johnson's (2014) review and the updated literature review that forms part of this report.

The literature review generated for this report clearly identified teacher assessment beliefs and practices as a major theme in recent research on assessment in schools. We found that teacher beliefs were critical in shaping their practices and developing the school's assessment culture. This finding signalled the need for the current study to unpack teacher beliefs and how they influence assessment practices within the school community.

An initial set of statements (beliefs and practices) was generated from the research questions and propositions. These were refined and extended from the literature review and from Harlen and Johnson (2014), which were used to help construct clusters of items around key themes in the literature such as feedback and learning intentions. The final step in item generation involved a close reading of key journal articles identified in the literature review (Black & Wiliam 1998; Bradbury 2013; DeLuca & Hughes 2014; Holloway 2014; Lysaght & O'Leary 2013; Quellmalz et al. 2012; Ryan 2014; Walker 2011; Zuiker & Whitaker 2014). Key statements, quotes and findings from these papers were used to fine-tune the items and construct additional items for the first draft of the survey. Over 45 items were generated for the first draft; these were reduced to 20 focused on teacher beliefs and 18 focused on teacher practices in relation to assessment. In addition, we developed several specific questions to interrogate the use of a variety of assessment tools such as portfolios and checklists. The first version of the survey was carefully mapped back to the series of six research questions posed for this project.

The 20 'belief' questions were generated as a statement. Teachers were offered the choice of the following responses on a five-point Likert Scale (*Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree*). Several items were phrased negatively, aimed at avoiding respondents answering survey questions in an automatic way rather than by carefully reading each item.

The 20 'practices' items were also generated from these sources. A paper by Lysaght and O'Leary (2014) was of particular value for this process: it presents an instrument they developed to audit teacher's use of Assessment for Learning. It is a comprehensive tool with four separate scales that focus on different aspects of formative assessment. Its scope is significantly beyond what was required for the short teacher survey in this study, but the

question format was valuable. In Lysaght and O’Leary’s study, teachers were given statement items and asked how much this statement reflected their current classroom practice on the following rating scale:

- Embedded (happens 90% of the time)
- Established (happens 75% of the time)
- Emerging (happens 50% of the time)
- Sporadic (happens 25% of the time)
- Never (never happens)
- Do not understand (I do not understand what this statement means).

The advantage of this response format is that it is quite specific. The response choices are clearly defined in terms of a percentage of classroom practice, which reduces ambiguity and personal differences in the interpretation of words such as ‘embedded’ or ‘sporadic.’

In addition, the survey included a series of demographic questions. These were developed to provide a profile of the teachers who completed the survey in terms, of age, gender, experience and current year level taught. Teachers were asked to identify their school so that the survey results could be filtered and findings for each school could be analysed along with interview data to create each school’s case study.

Finally, we asked teachers to rank their use of a range of assessment practices identified from the literature and from IBPYP policy documents such as *Making the PYP happen*. Two open-ended questions were included at the end of the survey. These were:

- 1. Please describe a recent example of how you have used assessment to enhance student learning.**
- 2. What is the most innovative way you have used assessment in your classroom in the past six months?**

The teacher survey was refined through a series of four drafts, initially within the research team and then by asking two local teachers to complete the draft form of the survey. Items were refined for clarity and consistency. The final version of the survey was then uploaded to Survey Monkey (an online survey development and hosting website). Four local teachers completed the draft online version; their feedback showed that it was easy to follow and could be completed in less than 15 minutes. [Appendix B](#) contains a copy of the final survey.

Interviews

The interview schedule for both the PYP coordinator and the focus groups were developed after the teacher survey. The questions were informed by the literature reviews but primarily driven by the six research questions outlined in Table 3. The first draft of the interview

questions was discussed and analysed by the seven-member research team, resulting in refined sets of research questions. The interview questions for the PYP coordinator are listed in [Appendix C](#) and the focus group interview questions in [Appendix D](#).

PYP Coordinator interviews

After receiving consent forms from principals of the case study schools, plain language statements and consent forms were sent to the PYP coordinator and an interview was arranged. Various ICT tools were used for the interviews; the first was a software video interview package called *Go to meeting*. This tool involves a link invitation to the meeting that can be emailed in advance; the invited party downloads the meeting software by clicking on an embedded link. The meeting can be recorded and conducted either by videoconference or audio conference. This software package generates very clear recordings, which significantly aided transcription. *Go to meeting* was successfully used for several interviews, but with some schools we struck technical problems with firewalls or limited bandwidth. Skype and Microsoft Lync were used as alternatives for cases study school interviews. The telephone was also used if all video software proved to be ineffective. Back-up recordings were made of all interviews on a combination of iPhone, voice recorders and iPads. Teams of two research team members conducted each interview.

Focus groups

Each school's PYP coordinator invited three teachers to attend a teacher focus group discussion. Focus groups lasted approximately 45 minutes. Teachers were asked to forward up to three assessment artefacts prior to the focus group and speak to these in the discussion. The purpose of these artefacts was to show how teachers used assessment in the school, and more specifically how it was used to support student learning. Artefacts were scanned, photographed or forwarded as website links. Most teachers shared at least three artefacts, but time limitations meant some teachers only discussed one of their artefacts, especially when it was related to a whole unit of inquiry. In some schools only two teachers attended the focus group; in all schools, a range of year levels was represented. All focus group discussions were recorded using one of the tools described above and then transcribed.

Desk audit of policy documents

We requested that each PYP coordinator provide copies of any assessment policy documents that the school was willing to share. We conducted a desk audit of each school's website to gather additional data relating to stated assessment policies and assessment approaches.

Data analysis

A protocol was developed to support the school case studies. This process ensured consistency across the case studies and supported the cross-case analysis. The protocol was generated from the six research questions and their corresponding propositions ([Appendix E](#)).

Cross-case analysis

The case studies were coded for common and divergent themes relating to each of the six propositions in Table 3. These themes provided insights into both school-wide approaches and teacher practices and their understandings of the role of assessment in student learning.

Each case study school was given a pseudonym – a name of a precious stone. Teachers and IBPYP coordinators were also given pseudonyms, with the initial capital consistent with the name of the precious stone chosen for their school. Table 4 shows the names and the region for the eight case study schools in this project.

Table 4: Pseudonyms and regions of case study schools

School Name	Interviewees	Region
Agate	Anna (PYP coordinator) Teachers: Angela (Year 2) Alice (Year 5)	Americas
Diamond	David (PYP coordinator) Denise (Kindergarten) Debbie (Year 2) Donna (Year 4)	Asia-Pacific
Emerald	Edward (PYP coordinator) Ellen (4-year-old preschool) Eva (Year 2) Erica-May (Year 5)	Asia-Pacific
Opal	Olivia (PYP coordinator) Odette (Year 1) Oonagh (Year 4)	Africa, Europe & the Middle East
Pearl	Peter (PYP coordinator) Penny (Year 1) Pina (Year 4) Paulette (Year 5)	Asia Pacific
Ruby	Ruth (PYP coordinator) Ranita (Grade 1) Rohan (Grade 4) Ramira (Grade 5/6)	Africa, Europe & the Middle East
Sapphire	Sophia (PYP coordinator) Sara (Kindergarten) Saskia (Grade 2) Sally (Grade 6)	Africa, Europe & the Middle East
Topaz	Terry (PYP coordinator and classroom teacher)	Americas

Teacher survey data

In the original study design the survey data was to be used in the case study analysis, focusing on teacher responses in each school (n = 6 to 37). However, the full dataset of records from 97 teachers permitted wide-ranging exploration of teachers' beliefs and practices across the eight schools, so descriptive data for these concepts are also presented below.

Findings

The findings of this study are presented in three sections: the results of the teacher survey for all of the case study schools, the eight individual case studies, and the cross-case analysis.

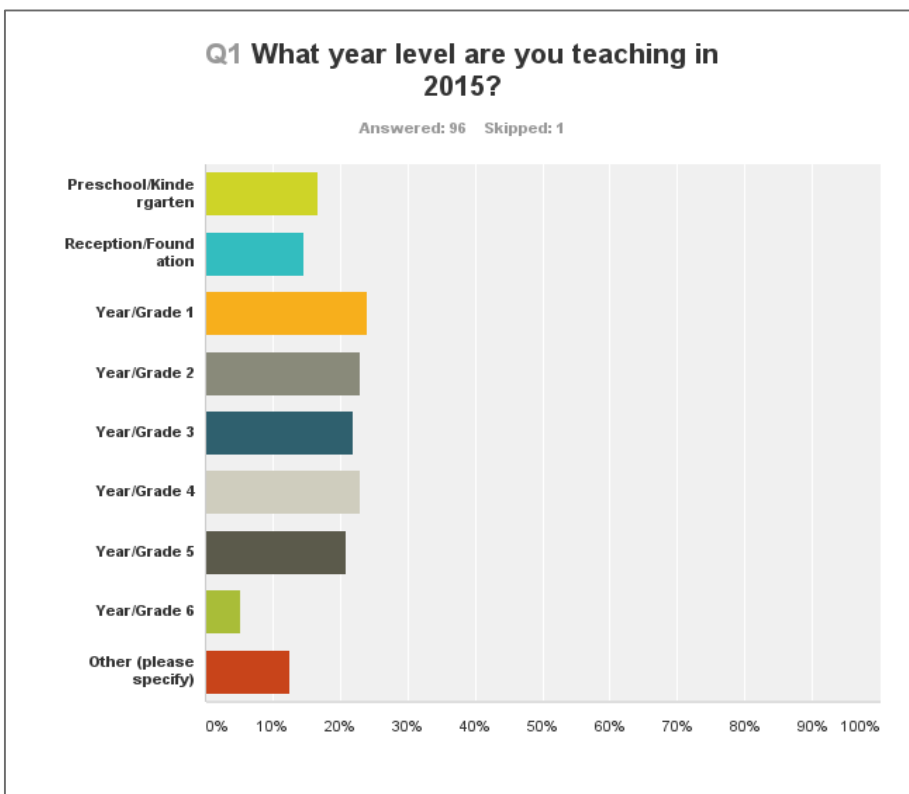
Teacher survey (whole group)

Teacher background information

Ninety-seven teachers completed the teacher survey. All eight schools were represented, but teacher responses were not evenly distributed. The number of respondents per school ranged from 37 to 6. Small numbers of respondents reflected the small staff size in some schools. The following descriptive data has been generated from the full data set of 97 respondents, but it should be noted that some teachers chose to skip some questions. Results from the two open-ended questions are not presented in this section, but have been incorporated into the case studies.

The teachers who completed the survey taught across all year levels, as shown in Figure 1. The early years were well represented but only a few Grade 6 teachers chose to complete the survey. This may reflect the demands of the final exhibition and the time of year the data was collected.

Figure 4: Year levels taught by teachers in IB PYP schools in 2015



Several questions explored the teaching experience of survey respondents. Most teachers in this study were experienced teachers with more than 10 years of general teaching experience and between four and 10 years of teaching experience in IB PYP schools (see Figures 5 and 6).

Figure 5: Years of teaching experience

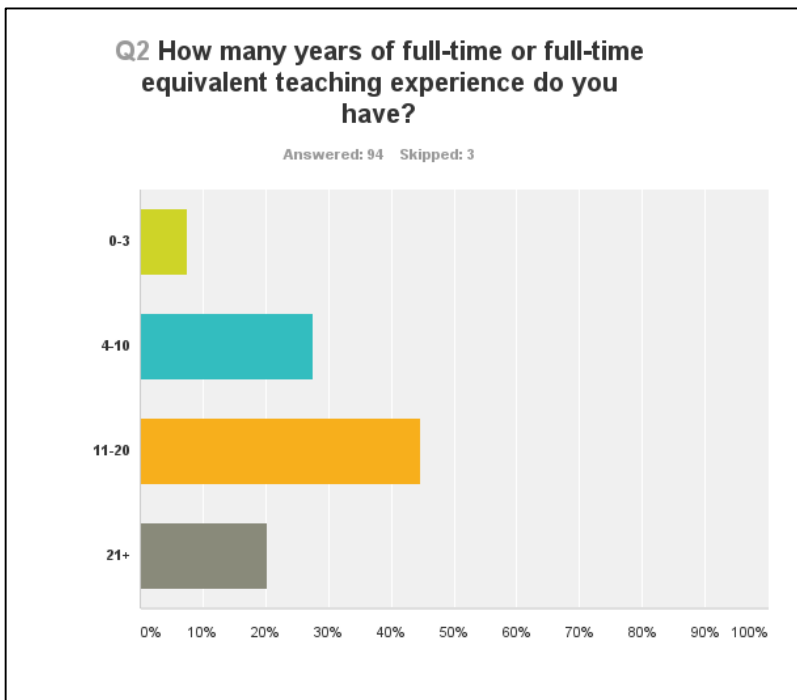
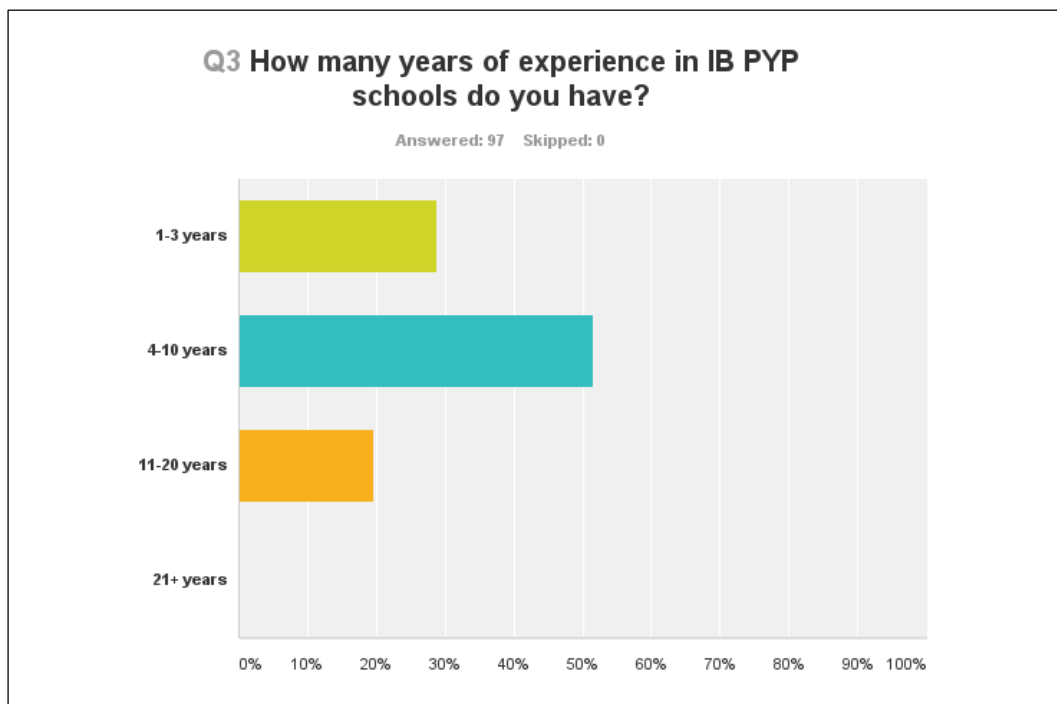


Figure 6: Years of experience teaching in IB PYP schools



Survey respondents were mostly female (80%) and 74% were in the 30–49 age group. Forty percent held a Masters degree as their highest qualification and very few had completed any IB certificates at a university level (7%). All respondents had attended at least one IB workshop in the last three years.

Teachers' beliefs about assessment

Teachers were presented with 20 statements relating to beliefs about assessment; the responses are summarised in Table 5. Five statements had a mean score above 4.2, indicating very high levels of agreement. These were:

- Statement 3: *Assessing student levels of prior learning is a key element of planning for effective teaching and learning* (mean score 4.46 and over 95% agreement);
- Statement 8: *When students understand the learning intentions for an activity they have improved learning outcomes* (mean 4.26, 84% agreement);
- Statement 13: *Involving students in their own assessment leads to improved learning outcomes* (mean 4.24, 95% agreement);
- Statement 17: *Self-assessment enhances student learning* (mean 4.26, 93% agreement); and
- Statement 19: *Providing feedback to students is the most important component of the assessment process* (mean 4.25, 96% agreement).

All five of these statements involve key elements of formative assessment, including self-assessment, evidence of level of prior learning, providing feedback and setting clear learning intentions that involve students. This finding implies that teachers in IB PYP schools have strong beliefs that assessment should be integrated with learning (Shute & Becker 2010). It also suggests that teachers in this study are committed to at least some of the ten principles of assessment outlined by Gardner and colleagues (2010).

Four statements had much more diverse responses. Statement 5, *Evidence from assessment is only valuable if it can be used for planning*, had a relatively even spread of responses from disagree to strongly agree. This finding suggested that teachers also believed that summative assessment was valuable perhaps embracing the idea that assessment should be a blended and balanced system (Shute & Becker 2010). There was also a range of responses to statement 6, *Student portfolios are effective strategies for assessing student learning*, with 15% of teachers disagreeing and 25% equivocal. This finding is particularly interesting, as portfolios were frequently discussed in the case study interviews and continue to be used widely in IB PYP schools.

Table 5: Teacher beliefs about assessment (eight case study schools)

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Responses	Mean score
1. Formative assessment is much more valuable to teachers than summative assessment	23.86% 21	50.00% 44	19.32% 17	4.55% 4	2.27% 2	88	3.89
2. In the early years, the main focus of assessment should be on identifying each student's current level of development	20.45% 18	61.36% 54	14.77% 13	2.27% 2	1.14% 1	88	3.98
3. Assessing student levels of prior learning is a key element of planning for effective teaching and learning	46.59% 41	50.00% 44	2.27% 2	1.14% 1	0.00% 0	88	4.42
4. I would describe my approach to assessment as holistic	22.99% 20	63.22% 55	9.20% 8	3.45% 3	1.15% 1	87	4.03
5. Evidence from assessment is only valuable if it can be used for planning	14.77% 13	39.77% 35	22.73% 20	20.45% 18	2.27% 2	88	3.44
6. Student portfolios are effective strategies for assessing student learning	10.23% 9	50.00% 44	25.00% 22	12.50% 11	2.27% 2	88	3.53
7. Students need advance understanding of the criteria for producing a quality product or performance	34.09% 30	46.59% 41	14.77% 13	3.41% 3	1.14% 1	88	4.09
8. When students understand the learning intentions for an activity they have improved learning outcomes	42.05% 37	42.05% 37	13.64% 12	2.27% 2	0.00% 0	88	4.24
9. The main purpose of assessment is to guide teachers and learners to close the gap between their current level of understanding and their desired learning goals	27.27% 24	51.14% 45	19.32% 17	2.27% 2	0.00% 0	88	4.03
10. Summative assessment tasks should provide the most valid measure of student learning	9.20% 8	28.74% 25	29.89% 26	29.89% 26	2.30% 2	87	3.13
11. Using assessment evidence to compare students creates competition that leads to improved learning outcomes	2.30% 2	6.90% 6	22.99% 20	55.17% 48	12.64% 11	87	2.31
12. It is difficult to assess student progress on the Learner Profile	11.76% 10	29.41% 25	35.29% 30	20.00% 17	3.53% 3	85	3.26
13. Involving students in their own assessment leads to improved learning outcomes	31.03% 27	64.37% 56	3.45% 3	0.00% 0	1.15% 1	87	4.24
14. Awareness of the demands of the final exhibition has an impact on my routine assessment practices	8.05% 7	32.18% 28	44.83% 39	10.34% 9	4.60% 4	87	3.29
15. Peer assessment is a poor strategy for evaluating student learning	1.15% 1	12.64% 11	21.84% 19	54.02% 47	10.34% 9	87	2.40
16. Effective assessment provides opportunities for students to share their understandings with others	24.14% 21	59.77% 52	11.49% 10	3.45% 3	1.15% 1	87	4.02
17. Self-assessment enhances student learning	37.93% 33	55.17% 48	5.75% 5	0.00% 0	1.15% 1	87	4.29
18. Developing formative assessment tasks is too time consuming	2.35% 2	8.24% 7	29.41% 25	40.00% 34	20.00% 17	85	2.33
19. Providing feedback to students is the most important component of the assessment process	42.53% 37	43.68% 38	10.34% 9	3.45% 3	0.00% 0	87	4.25
20. My approach to assessment is strongly influenced by my understanding of the skills students will need to have in order to successfully complete the final exhibition	6.82% 6	32.95% 29	40.91% 36	12.50% 11	6.82% 6	88	3.20

Teachers' responses to statement 12, *It is difficult to assess student progress on the Learner Profile*, were very diverse. Nearly a quarter of teachers disagreed with this statement and the most frequent response was *Neither agree nor disagree* (35%). This finding suggests that the LP presents a significant assessment challenge. Although most teachers described their approach to assessment as holistic (mean = 4.03), suggesting they embrace the assessment of the whole child, conceptualising how this might be enacted was a challenge. Other researchers have found assessment of 'soft skills' to be better represented in the early years and particularly in alternative settings such as Montessori, Froebel and Waldorf kindergartens (DeLuca & Hughes 2014).

Another negatively worded statement – no. 15, *Peer assessment is a poor strategy for evaluating student learning* – elicited diverse responses. Most teachers (64%) disagreed with this statement, but the remaining 36% were either equivocal or in agreement, confirming the finding in the cross cases analysis (yet to be presented) that peer assessment is emerging in schools rather than a practice that is currently enthusiastically embraced.

Two questions were asked about the role the final exhibition plays in shaping teacher assessment beliefs. In *Making the PYP happen* (2010), it is suggested that the IBPYP Exhibition should play a critical role in the school's assessment culture. It is interesting, therefore, to note the variability in responses to statement 14: *Awareness of the demands of the final exhibition has an impact on my routine assessment practices*, with just 40% of teachers agreeing with this statement, 15% disagreeing and 45% equivocal. A second statement (no. 20) probed this idea: *My approach to assessment is strongly influenced by my understanding of the skills students will need to have in order to successfully complete the final exhibition*. Thirty-eight per cent of teachers agreed, 19% disagreed and 41% neither agreed nor disagreed with the item. Only a small percentage of teachers completing the survey were grade 6 teachers but grade 5 was well represented, and the IB PYP documents suggest that the exhibition should impact significantly on the whole school's assessment culture. Our findings do not support this concept.

Teachers' assessment practices

Table 6 presents teachers' responses to 18 statements focused on their assessment practices. Six were reported as well established (75%) or embedded (90%) in their daily teaching practice:

- Statement 1: *I use evidence from assessment of my students to plan for teaching and learning* (86.5% embedded or established);
- Statement 4: *My students have a clear idea of the purpose of the learning tasks they undertake* (86.5% embedded or established);
- Statement 8: *I give students specific feedback throughout each learning activity to support their learning* (83.7% embedded or established);

- Statement 11: *I provide feedback during learning rather than after the learning process* (72.5% embedded or established);
- Statement 12: *I use feedback to help focus each student on the next step in their learning* (82.5% embedded or established); and
- Statement 13: *I use talk-based assessment (such as discussion, conferencing and questioning) as a formative assessment strategy* (74% embedded or established).

Teachers' responses to these statements support the strong focus on formative assessment that was evident in teacher beliefs. They highlight the reported practices associated with use of evidence for planning, providing clear purpose to learning tasks and indicating the high level of importance attributed to feedback in the learning process. Assessment as learning was also highlighted in teacher survey responses, with the use of talk-based assessment and provision of feedback during the learning process.

Several assessment practices were identified as never or sporadically used (25% of the time):

- Statement 7: *I use peer assessment in a way that enhances student learning* (43% never or sporadically used);
- Statement 9: *I use online self-assessment tools to support improved learning outcomes* (71% never or sporadically used); and
- Statement 16: *Portfolios are used to develop learner autonomy* (41% never or sporadically used).

Almost 60% of teachers in this study reported that they never used online self-assessment tools. This finding needs further exploration as it could relate to many factors, including the value attributed to such tools, the level of ICT use and access in the school, and how teachers value packaged assessment tools as compared to tasks designed by teachers. According to the teacher survey, peer assessment is not a well-established practice and some teachers remain dubious about its value as an assessment tool. As Harlen and Johnson (2014) suggested, there is a need to further examine how IB PYP teachers are (and could) integrate self- and peer assessment as part of formative assessment. In addition, some doubts are raised here about portfolios and their role in student learning. Most teachers use them, but their purpose as tools to support learner autonomy is not embedded in teacher practice. This issue is examined further in the cross-case analysis.

Table 6: Teacher assessment practices

	Embedded (happens 90% of the time)	Established (happens 75% of the time)	Emerging (happens 50% of the time)	Sporadic (happens 25% of the time)	Never (never used)	Do not know what this means	Respon ses	Mean score
1. I use evidence from assessment of my students to plan for teaching and learning	51.85% 42	35.80% 29	9.88% 8	2.47% 2	0.00% 0	0.00% 0	81	1.63
2. I call on my knowledge of brain development, and its relationship with learning, to develop my assessment approach	12.66% 10	25.32% 20	29.11% 23	18.99% 15	10.13% 8	3.80% 3	79	2.96
3. I use evidence of student learning to place each student on a developmental continuum	17.28% 14	27.16% 22	34.57% 28	13.58% 11	4.94% 4	2.47% 2	81	2.67
4. My students have a clear idea of the purpose of the learning tasks they undertake	37.04% 30	49.38% 40	12.35% 10	1.23% 1	0.00% 0	0.00% 0	81	1.78
5. My students demonstrate a strong understanding of their learner profile	16.05% 13	33.33% 27	37.04% 30	9.88% 8	2.47% 2	1.23% 1	81	2.52
6. My students use self-assessment to support their metacognitive development	7.41% 6	30.86% 25	33.33% 27	24.69% 20	3.70% 3	0.00% 0	81	2.86
7. I use peer assessment in a way that enhances student learning	9.88% 8	19.75% 16	27.16% 22	38.27% 31	4.94% 4	0.00% 0	81	3.09
8. I give students specific feedback throughout each learning activity to support their learning	43.21% 35	39.51% 32	17.28% 14	0.00% 0	0.00% 0	0.00% 0	81	1.74
9. I use on-line self-assessment tools to support improved learning outcomes	2.50% 2	7.50% 6	16.25% 13	12.50% 10	58.75% 47	2.50% 2	80	4.22
10. My feedback takes the form of general praise	10.00% 8	10.00% 8	17.50% 14	41.25% 33	15.00% 12	6.25% 5	80	3.54
11. I provide feedback during learning rather than after the learning process	36.25% 29	36.25% 29	23.75% 19	1.25% 1	0.00% 0	2.50% 2	80	1.98
12. I use feedback to help focus each student on the next step in their learning	33.75% 27	48.75% 39	16.25% 13	1.25% 1	0.00% 0	0.00% 0	80	1.85
13. I use talk-based assessment (such as discussion, conferencing and questioning) as a formative assessment strategy	38.27% 31	35.80% 29	18.52% 15	3.70% 3	3.70% 3	0.00% 0	81	1.99
14. I use rubrics as an assessment tool with my students	19.75% 16	32.10% 26	32.10% 26	12.35% 10	3.70% 3	0.00% 0	81	2.48
15. In my classroom, portfolios are used to highlight the learning process	18.52% 15	27.16% 22	19.75% 16	12.35% 10	20.99% 17	1.23% 1	81	2.93
16. Portfolios are used to develop learner autonomy	8.97% 7	26.92% 21	15.38% 12	17.95% 14	23.08% 18	7.69% 6	78	3.35
17. I work collaboratively with other teachers to moderate assessment judgements across the teaching team	23.46% 19	28.40% 23	22.22% 18	19.75% 16	6.17% 5	0.00% 0	81	2.57
18. My students view assessment feedback as a valuable means of gaining information about their own progress	19.75% 16	38.27% 31	35.80% 29	2.47% 2	2.47% 2	1.23% 1	81	2.32

Teachers' use of a range of assessment tools

Teachers were asked four individual questions to identify which tools they used for different assessment purposes. They were asked to rank four different assessment tools from most frequently used to least frequently. Rubrics were ranked the highest, followed by anecdotal records, checklists and then exemplars. Teachers were also asked which tools they were most likely to use for planning an inquiry unit. Rubrics, anecdotal records and open-ended tasks were all rated similarly, with 50-60% of teachers suggesting that the use of these tools was embedded or established in their daily practice. In contrast, tests and quizzes were reported as only sporadically or never used by 65% of the teachers surveyed.

Teachers reported that the tools they were most likely to use to assess progress on the Learner Profile were anecdotal records (47% embedded or established), self-assessment (40% embedded or established) and performance tasks (51% embedded or established). Peer assessment was most likely to be reported as sporadically used (43% of teachers) and no respondents reported using open-ended tasks to assess progress on the LP.

Case studies

Agate School

School Context

Agate School is an independent, non-denominational, coeducational school with over 240 students and 36 faculty staff members. It is a well-established IB school that supports the learning of students from preschool (aged three) until the end of high school (Year 12). It is located in the IB Americas region and focuses on performing arts, physical education, outdoor education, and community service, in addition to its core academic subjects. It is ranked the top elementary school in the region and in the top 5% of public and independent schools in its region, according to an independent assessment. The language of instruction is English. The school's mission is to engage students using a 'spirit of inquiry' and to inspire its community to be compassionate, knowledgeable and principled global citizens. A key phrase in the school's mission statement is 'respect, challenge, pursue and develop.'

Purposes of Assessment

The teachers at Agate School use a range of assessment tools and strategies. Anna, the IB PYP coordinator, reported that the school uses PM Benchmarks, a reading assessment tool for primary students, and will be using a similar tool, Dynamic Indicators of Basic Early Literacy Skills (DIBELS), from kindergarten level upwards in the following year. Anna stated that these tools are used to obtain an understanding of the students, and that:

... these are the more formal testing things that we do at the start of the year and at the end of the year and it's just we use that solely for planning. We're trying to make a picture of the class of what's happening with them as learners and it also helps teachers know what if you start seeing a pattern nobody has a clue how to work out. As a teacher you need to rethink how we're presenting it to the students.

Six teachers across all PYP levels in the school (Years 1 to 7) completed the survey. Results showed that Agate School's teachers believe that assessments are an important part of teaching, with four of six teachers strongly agreeing or agreeing with the statement *the main purpose of assessment is to guide teachers and learners to close the gap between their current level of understanding and their desired learning goals*. In addition, teachers believe that assessment allows students to demonstrate their understandings, with five of the six teachers agreeing or strongly agreeing that *effective assessment provides opportunities for students to share their understandings with others*. A majority of teachers also believe that assessment provides an important mechanism for feedback, with five of the six agreeing or strongly agreeing with the statement *providing feedback to students is the most important component of the assessment process*.

Teachers at Agate School agreed that another purpose of assessment was to understand where their students started in their learning process. Survey data indicated that all six teachers agreed or strongly agreed with the statement *assessing student levels of prior learning is a key element of planning for effective teaching and learning*. Similarly, responses from the interview with the IB PYP coordinator showed an emphasis on using diagnostic assessment for planning and understanding the status of children's current learning. Anna stated that the school focused on a 'spiral assessment...so we're always in an action cycle of assessment.' Initially the school focused on acquiring background knowledge of their students, and doing a lot of 'diagnostic stuff at the start of the year which helps guide our teaching.' This 'diagnostic stuff' included classroom profile meetings, some pre-assessment once the school year had commenced, and then meetings of education specialists, teachers and administrative staff to address the needs for improvement as a class and at an individual student level. Anna reported that 'to [me] that's one of the most important assessments at the start...it's kind of a bigger picture assessment.'

Further purposes of assessment included the importance of employing multiple assessment strategies to understand student learning and to plan for further teaching and learning. These assessment strategies included self-assessment, peer-assessment, performance assessments, and rubrics.

Self-assessment and the co-construction of assessment criteria were depicted as important. Anna talked about how the students co-created some of the assessment criteria with their teachers. Anna's characterisation of the school's use of co-creating assessment criteria was consistent with the views of all six teachers, who either agreed or strongly agreed with the statement *students need advance understanding of the criteria for producing quality*

product or performance. Anna also stated that ‘we try to make it very much a dialogue and quite an emphasis on self-assessment and reflection by the students.’

In addition, self-assessment was seen to be a way to improve learning outcomes and enhance student learning, with all six teachers agreeing or strongly agreeing with the statement that they *involved students in their own assessment leads to improved learning outcomes*. Anna, the IB PYP coordinator, felt that teachers were confident using self-assessment and students were as well, preferring it to other tools such as peer assessment. She noted:

I think we’re much stronger at self-assessment at this school and I think that comes from the comfort level of teachers. We’re always concerned we’re going to harm our children and they get their feelings hurt, but it’s just getting used to the fact that it’s about the work.

Anna also talked about an experience her students might have with writing. The students would co-create their criteria with a teacher first; the students would write a first draft and the teacher would encourage them to give each other feedback. The students would then look at their own criteria and talk to students who were better at giving feedback. The students then give themselves feedback, followed by teacher feedback about how they might reach their own success criteria for writing. Anna stated:

[What] one of our teachers actually does is send the students – she asks the students to highlight in pink something that makes them tickled pink – something they are really proud of in their writing ... and then the student is asked to highlight blue is something I feel I need to work on. These highlighted sections are then the focus of further discussion with the teacher afterwards.

Agate School teachers were equivocal about the importance of peer assessment, with two of the six teachers agreeing that *peer assessment is a poor strategy for evaluating student learning*, while three disagreed and one strongly disagreed with the statement.

Further scrutiny of the data showed that performance assessment in Agate School is conducted via the regional government’s performance standards, which address abilities including reading, writing, numeracy and social responsibility. The use of the performance standards is voluntary, but they are widely used at Agate School. Anna stated that

We really use way more than anybody uses and it’s quite a bit because they’re really a way of students having a sense of where they’re meant to be or what they’re working towards. So set goals from that.

Rubrics were also widely used in the school and were seen as a beneficial tool. One teacher, Alice, stated ‘I use them a lot, like 95% percent of the time.’ This view is consistent with responses in the teacher survey. When asked to rank the assessment tools used in their

school, all six teachers selected rubrics as being *frequently* or *most frequently* used. Five of the six teachers responded to the statement *in my classroom, a range of assessment tools are used with students to gather evidence that assists with planning inquiry units* by indicating that rubrics were used 75–90% of the time. All six teachers also responded that they used rubrics as an assessment tool 75–90% of the time.

Anna said that while they used rubrics (provided by the regional government) a lot, she felt that a good rubric was hard to create and often the language could be confusing: ‘Not everything is quantifiable and easy to explain with a rubric...and even students co-creating the rubric is hard because of the language.’ She felt that while they were widely used, they still had further work to do noting that ‘our kids and staff aren’t there yet about co-creating rubrics with kids. It’s more success criteria.’

Alice, who works with Year 5 students, provided an example of a rubric which she felt allowed a teacher to look at a range of skills related to inquiry learning, stating that ‘it’s not one thing, so a rubric allows you to look at various things, as in approaches to inquiry, building of knowledge, skill set you have. That would be why we would choose rubrics.’ In conjunction with self-assessment and input from peers and other staff, Alice felt they provided a great deal of information and a rich understanding of her students: ‘we need to have their input, their thoughts on their peers as well as my thoughts, and I get feedback from their mentors in the process as well. So we need many perspectives on it.’

Alice felt that the students were accustomed to using rubrics, stating that:

students are very used to highlighting or self-assessing before I do, so that’s great, they’ll either build the rubric, or be given a rubric ... so they highlight their comfort level with the knowledge and that goes together ... with more traditional forms of assessment.

In addition, Anna believed that rubrics offered students a direction for their learning if they felt they weren’t achieving their goals, stating that ‘it opens the idea of, here’s the many parts of learning, this is what’s going well and these would be next steps ... so absolutely I find it useful, we always have a next step after every discussion.’

Using assessment to support student learning

All teachers surveyed at Agate School indicated that they regularly used evidence from their students’ assessment in future planning. All six teachers reported that using evidence from assessment of their students to plan for teaching and learning was established or embedded practice (75-90% of the time).

When talking about the use of portfolios for assessment, Anna described how the school was in the process of introducing e-portfolios to the students, with the aim of making it a ‘more authentic, in-time assessment of kids as opposed to this (the current portfolio) that

happens three times a year.’ While e-portfolios had received backing from the school’s administration, it had been shelved temporarily as the teacher who was the driving force behind it was on maternity leave. (This highlights the need to have champions for the development of new assessments.) Anna described her enthusiasm about students being able to add to the e-portfolio themselves, putting in their reflections and being in charge of their own learning and what they felt was important. She exclaimed ‘how awesome that would be when you get to the end of your learning journey at school and grade 12 you have this incredible positive digital footprint.’

The majority of teachers at Agate School indicated the importance of co-construction of assessment criteria and the students having a good understanding of the purpose of the learning tasks they undertake, with all six teachers agreeing with the statement *my students have a clear idea of the purpose of the learning tasks they undertake* (75–90% of the time). Teachers reported that co-constructing criteria with students was important to support student learning, but also that any feedback given needs to address the criteria and what the student is doing. Anna said:

I think it’s good to be specific with your feedback. If you’re working on a particular skill ... you can ask questions to try and push their thinking further or you have criteria for what they’re meant to be doing so you can use those as starting points for giving feedback.

In the survey, teachers were invited to give an example of how they used assessment to enhance student learning. One teacher responded as follows.

An example of how I used assessment to enhance student learning is recent formative assessment in our unit about innovation. Students were exploring the concept of innovation and our ‘case study’ was simple machines. Following several exploration and inquiry activities, students were asked to create their own compound machine using any materials they wanted. The goal was to create a machine that would do something helpful for us in everyday life. Students presented their machines to their peers and other classes. The focus of the assessment was twofold: one – students had knowledge of types of simple machines (including three classes of levers) and two – students understood the concept of innovation (i.e., that they have applied their knowledge to create something new or adapted from another idea). Students created things like a catapult that tossed cereal into a bowl. It was a fun time in the class. We held an Invention Convention and invited other students to come and see the compound machines and celebrate with us. This assessment enhanced student learning because it was student-driven, open-ended (i.e., they could use any materials they wanted) and they could create anything they wanted. Students were motivated and excited about applying their knowledge and presenting their machines to others.

Identifying student learning along a developmental continuum

Development continuums had not yet been introduced to Agate School and Anna, the coordinator, suggested the school was exploring the best ways use them, stating that ‘we don’t really know what it means or we do know what it means, but if you have a kid in grade 2 and you just say they’re exceeding for grade 2, what can they do?’ However, she and the staff were resolved to use them with

maths continuums, reading and writing continuums that get passed on from grade to grade ... the way we’re planning to use the continuums is a way of more efficiently giving from teacher to teacher information about the child as a learner.

Anna also said that it would be beneficial for the school community to be taken on the same journey into the future:

... so at the moment I think it will be something that we use for planning in the planning process, but at some point I would like to invite the parents into the conversation about continuums. They give you so much more information.

Assessment and the Learner Profile

Four of the six surveyed Agate teachers agreed with the statement *It is difficult to assess student progress on the Learner Profile*, with the remaining teachers ambivalent (neither agreeing nor disagreeing) or strongly disagreeing. Five of the six reported using self-assessment and anecdotal records more than 90% of the time to assess student progress on the learner profile. Performance and peer assessment were sporadically used and open-ended tasks were never used. Furthermore, four teachers reported that their students *demonstrate a strong understanding of the learner profile* 75–90% of the time.

The teachers and the coordinator had different views on the use of self-assessment in the LP. One teacher felt that ‘it’s embedded right through, what they’re using, what parts of the Learner Profile they are using all the way along. So that’s their weekly reflection ... like where do you think you’ve grown and developed as a learner?’ In contrast, Anna felt that they didn’t use self-assessment effectively in regard to the LP, stating that ‘we don’t assess formally in any grade and I don’t think we are strong enough on the self-assessment too.’

The role of formative feedback

The teachers at Agate School valued the use of formative assessment, with five of the six agreeing with the statement that *formative assessment is much more valuable to teachers than summative assessment*. They also believed that formative assessment was worth spending time on with five out of six teachers disagreeing with the statement that *developing formative assessment tasks is too time consuming*.

The use of *talk-based assessment (such as discussion, conferencing and questioning)* as a *formative assessment strategy* appeared to be ingrained within the Agate School, with all six teachers reporting that they used it in 50–90% of their teaching time.

Teacher Angela uses formative assessment with her year two students to ensure that they are understanding what she is teaching them ‘to make sure that moving on is okay or review is necessary, or a little bit of both, which is usually what it is.’ In terms of planning, she finds it useful ‘to know that I can either move forward with whatever contents needs is coming next, occasionally it shows me that we need to go back and either review or approach something differently.’ Angela also felt that the frequent use of formative assessment meant that her students had an idea of what they didn’t understand, stating that

I have had students afterwards come to me...they quite often don’t know what this [type of mathematical task] is called...or they can point out what they found difficult and they realise ‘I found that difficult’, so it’s helpful, I think for them it gives them an idea.

Formative assessment allowed the students to ask Angela to clarify what they didn’t understand or for more examples to continue and consolidate their work.

Some teachers gave interesting examples of formative assessment as part of the teacher survey. For example:

Grade 7 students had an animal research project to do in French class. They had to present to the Grade 4 class, which had already done a unit on animal adaptations. This gave them a real audience and purpose. They were given a rubric and exemplar. They peer-assessed their presentations and were asked to reference the rubric and exemplar. They then used this feedback to make improvements to their presentations (Anonymous comment from Teacher survey)

A recent assessment led me to find that my students were not ready for the level of activity that I had planned for our unit. From this information I was able to plan an activity that was appropriate for their learning stage. (Anonymous comment from Teacher survey)

Overall, these responses and the above examples suggest that the teachers at Agate School use formative feedback as a central part of their work with their students.

Diamond School

School context

Diamond School is a large coeducational school with over 800 students, located in the IB Asia-Pacific Region. It is a well-established IB school and supports the learning of students

from preschool (aged three) until the end of high school (Year 12). As an international school, it enrolls students from more than 50 nationalities and over 30 mother tongues. The language of instruction is English. The mission statement of Diamond School includes words such as friendly, peaceful and cooperative. Collaboration also features in the school's stated values and beliefs, along with other key concepts such as integrity, respect, lifelong learning and an appreciation of diversity.

Diamond School's website states that the PYP is used for children aged 3–12 years. Diagrams of the IB PYP Model and the IB LP are prominently displayed.

Purposes of assessment

The vast majority of teachers described their approach to assessment as holistic. Thirty-one of the 37 surveyed teachers (covering all year levels) who completed the survey agreed with the statement that *the main purpose of assessment is to guide teachers and learners to close the gap between their current level of understanding and their desired learning goals*. The message from this school on purposes of assessment is neatly summed up by Debbie, the year 2 teacher in the focus group. She stated '... assessment is just another part of teaching and learning. I find it hard to put it in a box, it's all just what we do every day.'

Teachers who completed the survey were aware of the external assessment requirements for their school and were able to list such tests as the International School Assessment, Developmental Reading Assessment and PM benchmarking, but it was clear from all data sources that these external tests were seen as a requirement rather than a driver of assessment in the school. In the focus group, the teachers made it clear that they valued assessment tasks that provide insight into their students' current thinking. Year 4 teacher, Donna, shared a student's digital portfolio. Each student has their own website and is able to record their own description of how they have worked out a mathematics problem. She emphasised the enormous value of such digital methods of tracking learning and how it has provided her with much greater insights into her students' thinking. She stated 'what makes something like that useful is you see exactly how they're approaching a math's problem. In maths, it's so easy ... to look just at the final destination.'

Surveyed Diamond School PYP teachers reported several assessment tools were highly embedded in their daily practice (used 75–90% of the time); these were rubrics, open-ended tasks, and anecdotal records. The teacher survey indicated use of other assessment practices, such as performance assessment and self-assessment. Despite evidence of a strong belief in the value of peer assessment, the teachers at this school indicated that it was only emerging or used sporadically in their daily teaching practice. According to survey responses, tests and quizzes were much less commonly used. Some mixed views about the value of portfolios as an assessment tool emerged. Although the majority of teachers used portfolios, the mean score on the item *student portfolios are effective strategies for assessing student learning* was 3.73 (of a maximum of 5.00), which indicates that teachers

held a range of views on this question.

Further insight into the ways assessment is perceived and used at Diamond School was gained by an examination of the artefacts that Denise, Debbie and Donna brought to the focus group for detailed discussion. Denise, the kindergarten teacher, shared the portfolio of one of her students. She commented on the value of writing samples within the portfolio that highlighted the progress made over the year. She described the value of these samples as a self-assessment tool, enabling her to work with the student to set goals. She went on to show how she used symbols such as soccer balls to provide positive feedback that goals had been achieved, thus describing a feedback loop of sampling, reflecting, self-assessing and goal-setting that she felt characterised her assessment practices. Denise emphasised the role of students in assessment, asserting that readily accessible portfolios 'give students ownership and some control of their learning.' She expanded on this idea when talking about how her young students can use audiotaped blogging with iPads to create a commentary on their own work, further highlighting how self-assessment is used in her classroom to build confident learners.

Year 2 teacher, Debbie, shared an inquiry unit with us, indicating backward design was used to create a summative assessment task and generate a well-constructed unit of work. Debbie describes a rich open-ended task that was used initially to gauge students' understanding of the world map. This Assessment for Learning enabled her to shape the activities to meet each of her students' individual needs. The final assessment task asked students to apply the learning that had taken place to a new situation. Students were asked to create a new country and then show how it fitted into a map of the world. In this example, Debbie pointed out that the assessment activities and learning activities were neatly integrated, resulting in an 'authentic representation of the kids' understanding.' These two examples highlight the way that Assessment for Learning and Assessment of Learning might sit alongside each other in a PYP school (however, not every teacher sees them as compatible).

The challenge of competing purposes of assessment was highlighted in the interview with David, Diamond School's PYP coordinator. He identified some tensions he sees between formative and summative assessment. He stated that formative assessment, that is Assessment for Learning, is 'the most important stuff,' but he still sees a key role for summative assessment, particularly in relation to the role it plays in the backward design of inquiry based units of work. He noted that summative assessment tasks play a key role in unit design work. David said:

If the IB is saying that they're concept-based, (with an) understanding-based curriculum ... Then the curriculum has to be designed in a backward way, and therefore summative assessment is important for the design. Whereas if what the kids come to understand is determined by their interest and is more emergent ... then the summative assessment task and working backwards from that doesn't

matter because there isn't an end goal.

David commented that the competing tension between an 'emergent inquiry kind of philosophy' and 'understanding by design' is a huge discourse in PYP schools.

Using assessment to support student learning

The focus group teachers discussed the school's recent change of focus with respect to assessment. They reflected on an assessment workshop that the whole staff participated in at the beginning of the year and how it had led to an observable change of approach to assessment throughout the school. Donna stated that

You're not doing an assessment because we're supposed to do an assessment.... That refocus to what are we, as teachers, or students if they are self-assessing, going to do with the results of this assessment? ... Assessments ... are much more productive ... a much heavier shift on the formative side of things.

According to David, the PYP coordinator, this can look different depending on year level. David described the way assessment for learning was used in the early years as a documentation approach in which teachers document the process of learning, children's thought processes and decision-making, and then use it to inform the next stage of inquiry. This documentation also supported students to understand their own learning, to see how they have learned and that their ideas are valued.

Denise highlighted the importance of self-assessment as a tool to support learning in the early years. She said:

If they have the opportunity to self-assess and compare what they used to know with what they can do now, it gives them the courage and confidence to know we are all learners and to look at what they have to do next.

In the teacher survey, most teachers agreed that *in the early years, the main focus of assessment should be on identifying each student's current level of development* (mean score = 4). Denise elaborated on this and identified a dilemma for early years teachers. She described how she is often torn between the goal of play-based learning and following the needs and interests of the child, and the benchmarks that the curriculum imposes in areas such as phonics or mathematics.

According to David, the school has a policy of sharing learning intentions and success criteria with middle primary students. Students might be asked to informally self-assess against the success criteria with, for example, 'thumbs up, thumbs down, turn and talk as the teacher goes around and listens.'

Teachers' survey responses showed a high level of agreement with the statement *when students understand the learning intentions for an activity they have improved learning outcomes* (mean = 4.19). In addition, most teachers selected the 'established' response in terms of practices, indicating that their students had a clear idea of the purpose of the learning they undertook at least 75% of the time.

In the teacher survey, teachers were asked to *describe a recent example of how you have used assessment to enhance student learning. Please explain why you think this enhanced student learning*. Twenty-six teachers responded to this question, and 10 teachers provided examples of how they use self-assessment to support student learning. One teacher wrote:

Students self-reflected and used a continuum to place themselves in their understanding of a math concept. From that, they self-selected which group to join the next day. It meant that the second lesson targeted where they felt they were in their understanding.

Another responded:

Grade 2 students learned about actions/verbs and had to create a comic. It involved a checklist for self-assessment throughout the process, rubrics for summative peer assessment, written feedback from teacher to improve understanding and teacher and self-reflection at the end.

The teacher described this process as 'scaffolded learning with assessment.'

Identifying student learning along a developmental continuum

David stated that the belief of teachers at Diamond School is to place every child along a continuum and to take every child to their highest potential on that continuum. He acknowledged that some children would not meet the norm-reference for their age, while others will surpass it. He observed that a difficulty for IB PYP teachers relates to the curriculum or scoping documents that represent expectations for student learning at a grade level. He commented that teachers are not always sure whether to report on student progress according to the developmental continuum or to show where they sit in terms of some grade level standard. David feels there is nothing wrong with reporting against a grade level norm but suspects this contradicts the IB philosophy, thus leaving teachers with a dilemma. However, he was clear in regard to feedback to students, saying that norms are not helpful, and that what students need to know is how they are progressing along a continuum. In regard to selecting appropriate learning activities for an individual learner he stated that 'it's whatever they are ready for.'

The findings from the teacher survey suggest that Diamond School's teachers are challenged by the concept of developmental continuums. Only 17 of the 37 teachers described the practice of placing a student along a developmental continuum as embedded or established;

17 teachers said that this practice was emerging or sporadic, and three teachers said this approach was never used. Related to this topic is teachers' knowledge of emerging research about brain development and learning. Teachers were unlikely to agree that they used knowledge of brain development and its relationship with learning to develop their assessment approach (mean = 2.75).

In the focus group, Denise highlighted the value of portfolios as 'a yearlong summary over time that shows evidence that a child has made good progress.' Donna reinforced this position with her Year 4 students when describing a digital portfolio that includes audiotaped self-reflections. She commented that 'what I'm looking for ... is growth in their ability to talk about their thinking and express their strategies in maths.'

Assessment and the Learner Profile

In the teacher survey, most teachers agreed with the statement *It is difficult to assess student progress on the Learner Profile*, but there was a range of responses from *strongly agree* (five teachers) to *strongly disagree* (one teacher) (mean = 3.46). In regard to practices, most teachers felt that students only demonstrate a strong understanding of the learner profile 50% of the time. These perspectives were reinforced by the teacher focus group. Denise, the kindergarten teacher, described her use of the LP as immersive; she interweaves the vocabulary throughout the day's learning. She stated that formally assessing the LP would not be authentic; she prefers to reinforce the concepts as they arise in discussion. Debbie agreed, pointing out that the experienced PYP team at the school is highly adept at embedding the language of the LP in their everyday teaching. It is written into every unit plan, with some units purposefully highlighting particular qualities. Donna further emphasised the importance of reinforcing LP vocabulary and how her Year Four students use LP vocabulary in their reflections in their digital portfolios.

David, the IB PYP coordinator, confirmed that the teachers at Diamond School embedded the LP in their daily teaching, mainly asking students to self-assess their understanding. For example, a teacher might say 'turn to a friend if you've shared an idea today' or 'who thinks they could do better, what do you think?' and the teacher would go around and listen. He feels that the LP is often seen as more of a vision by teachers, making it hard to grasp, especially when it comes to assessment. The challenge for teachers, according to David, is trying to balance so many foci with the LP, 'Attitudes' and the content of the unit.

In David's view, continuums for the LP, especially in areas such as communication, would be of value to Diamond School teachers. He would like to see this come from the IBO. He said 'if it is important to every child in the school in every context then yes, it is something that we could be given and use.'

The role of formative feedback

The teachers at Diamond School were confident about the role of feedback in the assessment of student learning. The teacher survey indicated that provision of specific feedback was firmly embedded (14 teachers, 90% of the time) or established (15 teachers, 75% of the time) in their daily practice. Providing feedback during learning rather than after the learning process was also a well-established teaching practice. Teachers were confident about the purpose of feedback, with strong support for the use of feedback to help focus each student on the next step in their learning and a high level of agreement with the statement 'providing feedback to students is the most important component of the assessment process' (mean = 4.33). Overall these responses suggest that the teachers at this school embrace specific feedback as a key link between assessment and learning.

Peer assessment

Teachers were very positive about the value of peer assessment but less likely to use it in their teaching practice. In the teacher survey, most teachers disagreed with the statement that *peer assessment is a poor strategy for evaluating student learning* (mean = 2.46), suggesting that they considered it a valuable tool, but peer assessment was sporadically (25% of the time) used by most teachers (n = 16). Only four teachers reported that it was embedded (90% of the time) or established (75% of the time) in their teaching practices.

Although strong themes relating to the value of self-assessment emerged from the Diamond School teacher focus group, little mention was made of peer assessment. This reinforces the idea that it was not a well-used assessment tool for the three teachers interviewed. David noted the school's general policy of supporting peer assessment, but believed that this assessment tool was mostly used quite informally.

The affordances of ICT for assessment

A key additional theme that emerged from the Diamond School case study was the way the school embraced ICT in assessment practices. In the teacher survey, teachers were asked to *describe the most innovative way you have used assessment in the past six months*. Twenty-seven teachers responded to this question and 10 of these teachers described the way they used ICT in their assessment practice. Three teachers described how they used Book Creator as a reflection tool for both mathematics and English, enabling their students to record their thinking processes using this tool. Five other teachers mentioned Cam Studio, Doodlecast, Voice Thread and Easy Blog Junior as tools that could also be used to record student thinking and problem-solving. They highlighted the value of these tools for obtaining a lasting record of student thinking that can be checked at any time by the teacher yet is firmly student-centred. Two more teachers described the value of video for self-assessment of progress in learning English.

Emerald School

School context

Emerald School is a large coeducational independent school located in the IB Asia-Pacific region. English is the main language of instruction. The school has three campuses. The school's mission is to develop the whole person through the principles of learning 'to know, to do, to live with, and to be with innovation and wisdom.' The campus from which our data was collected has over 400 students, from early childhood (3–4 years) to Year 9 (14–15 years). According to the school's website, Emerald School has a strong commitment to providing an education that encourages every student to think critically, creatively and independently, to achieve excellence, and to develop an understanding of their place in the world.

Emerald School strives to develop the attributes of the IB LP in every student. Specifically, the school highlights that the framework of the PYP aims to develop students' capacities to be inquirers, knowledgeable, thinkers, communicators, principled, open-minded, caring, risk-takers, balanced and reflective. The website also clearly describes the IB PYP model including the key concepts, approaches to teaching, the IB LP, and the purpose of assessment within the school.

Purposes of assessment

Emerald School's assessment policy states that assessment is an integral part of all teaching and learning experiences, and includes both formative and summative assessment forms. The policy also states that the main purposes of assessment are to determine what the students know and understand, to inform teaching and learning, to monitor progress, to provide feedback to parents, teachers and students, and to monitor program effectiveness. Furthermore, assessment occurs in all facets of students' experiences at Emerald School and is central to achieving the

PYP's goal of thoughtfully and effectively guiding students through the five essential elements of learning: the understanding of concepts, the acquisition of knowledge, the mastery of skills, the development of attitudes and the decision to take responsible action. (Emerald School Assessment Policy)

Six Emerald School teachers, across all year levels, completed the online teacher survey. Four teachers strongly agreed with the statement *assessing student levels of prior learning is a key element of planning for effective teaching and learning*. Four of the six teachers who completed this survey item either strongly agreed (SA) or agreed (A) with the following statements:

- *Students need advance understanding of the criteria for producing a quality product or performance (SA=3, A=1)*

- *I would describe my approach to assessment as holistic (SA=1, A=3)*
- *When students understand the learning intentions for an activity they have improved learning outcomes (SA=1, A=3)*
- *Involving students in their own assessment leads to improved learning outcomes (SA=1, A=3)*
- *Self-assessment enhances student learning (SA=1; A=3)*

Four of the six teachers who completed this survey item neither agreed/disagreed (n=1) or disagreed (n=3) with the following statements:

- *Using assessment evidence to compare students creates competition that leads to improved learning outcomes*
- *Peer assessment is a poor strategy for evaluating student learning*
- *Developing formative assessment tasks is too time consuming*

Responses from the PYP teacher interviews indicated several key purposes of assessment that reflected the school's assessment policy and responses from the teacher survey. Four main themes emerged from the interview data: using assessment to plan and set goals for individual students as a way of differentiating learning; guide teaching and learning; provide evidence for accountability for teaching and learning; and provide feedback to parents, students, and teachers.

In relation to using assessment to plan for differentiated learning, all three PYP teachers and the PYP coordinator strongly articulated this as the main purpose for assessment. For example, the PYP coordinator, Edward, described the school's assessment as important for understanding where the children are at in order to plan for teaching and learning, stating:

you can't just start from where you think the year 3 curriculum says we need to start here, it's unpacking it further ... [to] understand ... how widespread the abilities of the students across the class are. [Assessment] identifies the areas of writing quite clearly and quite easily for students ... for the staff to understand ... in terms of understanding where the students were at and where they need to go.

Similarly, Erica-May described her use of a formal spelling assessment artefact for Year 5 students as a way for her:

... to differentiate and target their goals absolutely individually for each child ... this assessment artefact guides my planning, and certainly guides my teaching because I know what each child needs to focus on specifically.

The Early Learning Centre PYP teacher, Ellen, held similar views, describing her assessment process of using assessment outcomes to:

... set goals for the children, each individual goal. Then we plan learning experiences or what we call provocations for those, for that learning, and that's related to the child's ... needs...

Ellen further described the use of portfolios as an informal assessment tool for her three- and four-year-olds, stating that 'the purpose of this assessment is for teachers and parents ... to show how it's different for everyone, so this is very different to another child's assessment piece.'

All PYP teachers stated that assessment was necessary for accountability. Ellen depicted the use of the planning and observation documents used in the 3–4-year-old classes as a way of:

... recording that experience for that child and dated, and then to know, is a reminder for her too and keeps her accountable as to where she's at with each child and each goal, so that will help her then keep track of all that, keep track of every child and where they're going, so it's very individualised.

She also described the use of assessment portfolios as another way of ensuring they are accountable for the teaching and learning at their school, stating that:

It's a lot of work, needs a lot of work, but ... it's really worth it because it, you know in terms of our accountability, it's very, very clear, you know we can't just, gone are the days where you can go 'Oh yeah I'm pretty sure that they're pretty good at that,' there we have evidence.

Assessment practices at Emerald School include pre-assessment, formative assessment, and summative assessment. The six teachers who completed the survey stated that they frequently used anecdotal records, rubrics and checklists as tools for assessment but rarely or never used exemplars. Teachers also mentioned a wide variety of assessment practices that they include in their teaching 75% to 90% of the time. These practices included providing students with a clear idea of the purpose of the learning tasks they undertake, using evidence from assessments of students to plan for teaching and learning, giving specific feedback through each learning activity to support students' learning, and using portfolios to highlight the learning process. In contrast, other practices were used sporadically (25% of the time), such as peer assessment to enhance student learning, or never used, such as on-line self-assessment tools to support improved learning outcomes.

The PYP teachers who completed the survey indicated that self-assessment was a practice that was emerging (50% of the time) or happened sporadically (25% of the time) at Emerald School. However, responses from the teacher and coordinator interviews indicated that peer-assessment was an important practice within the school. For example, Edward, the PYP coordinator, stated:

the students use their own self-assessments, so feedback to themselves, and the approach of asking students to reflect on their own work is a pretty common approach within a classroom.

Furthermore, teachers indicated that students throughout the school were encouraged to reflect on their own learning, especially in their reports, with one teacher stating that:

there's also the opportunity that the students have in their student report ... they also reflect on their learnings, of also the things that they've worked well at, the things that they need to work on. There's always that idea of them being responsible for their own learning, and understanding (Anonymous survey response).

Such reflective practices, although challenging, were also encouraged in the 3–4-year-old classes. Ellen stated that 'children right down at three to four-year-olds, they're very young, it's hard to get them to reflect or to look where they need to go next, but we can.' Another teacher gave an example of 'innovative [practice], by getting the learner to do all of the hard work, as opposed to me, as the teacher, telling them what they have done wrong.' She gave an example of working with a year 5 child to correct three mistakes the child had made on a piece of work; she did not highlight them, but asked the student to find them.

Survey results indicated that peer assessment was a practice that was emerging (50% of the time) and happened sporadically (25% of the time) at Emerald School. Teachers in the primary years of schooling (Eva and Erica-May) indicated that peer assessment, while not used often, was an important part of teaching and learning. For example, Erica-May noted that there were many different forms of assessment used in her year five class, with peer assessment being one. She gave an example of the process of peer assessment for a writing sample, whereby students were required to note down three areas that they'd like their peers to assess them on. Peers' feedback was then discussed with the teacher. This teacher reported that she:

found peer assessments work really well in year 5 because whilst they're looking at someone else's work it draws attention to what they need to focus on in their own work.

Eva noted similar benefits of the use of peer-assessment in Year 2, stating that students 'don't see the mistakes in their own work, but they do see areas of improvement in other people's work that they then put into their own work.'

Similarly, Edward indicated that peer assessment is a common but perhaps a more structured approach used in the older years because there is a clear learning target and assessment criteria for each task. In contrast, peer-assessment in the younger years is quite different and although young children are 'very keen on giving feedback ... the teacher will probably work as a facilitator or mediator in some senses of how those conversations are constructed.' However, the term 'peer feedback', as opposed to peer assessment, is generally preferred at Emerald School because:

... we sort of felt that it's putting a lot of responsibility on a child to say, well you're assessing that child's work, when the child may not necessarily themselves be comfortable doing the task that was asked of them. (Edward, PYP Coordinator)

Using assessment to support student learning

It was evident from both the survey results and interview responses that a range of assessment tools were used regularly at Emerald School to plan for student learning. Survey results showed that open-ended tasks were well-established, while tests or quizzes were used sporadically (25% of the time) to plan for inquiry units. Interview responses from teachers and the IB PYP coordinator indicated that several practices involved the use of assessment data to plan for further learning. According to Edward, the idea of unpacking data from the broad range of assessment sources is 'probably something that has been missing from our school for a while and [in] the last few years has become a real focus for us.' In particular, the work of unpacking the results from some of the 'more formal tests that we've been doing' was a way of 'thinking about what does that tell us about the student, and what does that tell us about what the child knows now, and what does that mean for teaching.'

This school's approach to unpacking the data was also reflected in the teachers' responses. For example, Eva stated that she looks 'at the data, I look at their errors, I make an error analysis, I look at the chronological component that they're tripping up on, for each individual child.' Similarly, Erica-May uses the data to:

differentiate and target the teaching and learning absolutely individually for each child, and I've seen ... results have just improved out of sight. And the students are acutely aware of their own ... needs ... and it's improved their academic outcome beyond belief.

Similar practices of using assessment data to plan for learning for all aspects of the child was also reported in the pre-school environment. For example, Ellen noted that practice of writing a reflection for parents that closely links to the outcomes of the national early years framework was a result of using data from observations and formative assessment. This written document 'is a process at the moment but we've broken the reflection into the outcomes, so speaking about the child's identity, community, wellbeing, learning and

communication ... not just academic.' Ellen also highlighted the importance of linking assessment to learning goals for children, stating that:

During the process of assessment using the learning outcomes, educators grant great insight into children's relationships, interactions, ways of participating, learning styles, response to diversity, learning processes and dispositions, areas of interest and their understanding of concepts, and recognise and celebrate that children learn at different rates, in different ways and at different times.

Identifying student learning along a developmental continuum

Using a developmental continuum as a means of identifying student learning was used in some discipline areas within Emerald School, particularly literacy and numeracy. However, Edward stated that it is something that they are currently working on in other areas. The main purpose for using these specific continuums was to provide a 'common agreement across the board that people will refer to,' particularly when moderating students' work. Edward noted that these continuums are 'almost like the pre- and post-assessment, the pre-assessment to find out what they need to teach them.' He also reported that teachers 'use that continuum to use as almost like, I suppose a checklist of what the child is able to do, and use that to say, okay where to next.' Continuums are used as a way of ensuring consistency across teachers in identifying where students are at with their learning.

Similar views were evident in the teachers' responses where they reported using developmental continuums in mathematics and spelling to assist them with knowing where the students are at, ways to identify their specific learning needs, and strategies for moving them onto the next level. They also reported that they fed data from the continuums back to students to discuss 'what you're really good at, here's what we want to practice so they know exactly where they are and what they need to work on and they can make goals from that as well' (anonymous survey response). However, one teacher noted that there were some challenges around mapping developmental learning continuums against national curriculum continuums and IB PYP outcomes.

Assessment and the Learner Profile

In the teacher survey, teachers gave a range of responses, from *strongly agree* to *disagree*, to the statement *It is difficult to assess student progress on the Learner Profile*. In regard to practices, teachers felt that students only demonstrate a strong understanding of their learner profile 50% of the time. Both the teachers and the PYP coordinator reinforced these viewpoints. Edward stated that overall assessment of student progress on the LP at Emerald School was probably assessed 'very informally' and that the:

most formal aspect of it comes through a student reflection that we ask of the students to reflect on which aspects of the LP they're demonstrating, to what degree, and I suppose understanding where they're at in their understanding of that

LP ... it is not in the same way as we have developed assessment for reading and writing.

In addition, all teachers are instructed to refer to the LP in their reporting to parents and to use the language of the LP in their reports.

The IB PYP teachers stated that they embed the language of the LP into their everyday teaching, particularly throughout the inquiry units. Edward noted that teachers:

unpack each learner profile attribute, so that the students demonstrate their understanding of that learner profile, so it's an age-appropriate understanding for them, so it really comes from them, as opposed to us having pre-made posters on the wall of the learner profile, and that in itself gives teachers an understanding of where the students are at, as to their knowledge and understanding of that profile, so when they build that learner profile in the units of inquiry, they know what the students already understand, and so use that to, obviously work from.

The teachers reported that all areas of the LP are covered across all units of inquiry for every year level and that the IB PYP coordinator keeps a spreadsheet to ensure that each area is covered. They noted that the school uses a database whereby all areas of the LP are covered 'per unit of inquiry...and we make sure that we focus on those profiles as part of that unit of inquiry'. Teachers also reported that the learner profile language 'is part of the fabric, you know it might as well be woven into the carpet in each classroom. We have the posters up sure, but it's actually used, it's living' and is used as a 'great tool for praise ... it's not just words on a wall'

The role of formative feedback

The teachers and the PYP coordinator at Emerald School highlighted the importance of feedback in the assessment of student learning. This feedback occurred in the form of student, parent and peer feedback. Results from the survey showed that teachers gave students *feedback throughout each learning activity and during learning rather than after the learning process* 75% to 90% of the time. Three of the four teachers who completed the survey item about feedback also strongly agreed (n=2) or agreed (n=1) that *providing feedback to students is the most important component of the assessment process*.

Teacher interview data supported these views. Teachers stated that they provide feedback 'on a day to day basis' 'on a minute-to-minute, a lesson-to-lesson basis'. Such formative assessments included portfolios, running records, conversations with students and parents, checklists, observations, taking notes on what they see, and 'making judgements based on how the student progresses over the course of time'. In addition, teachers stated that the feedback may 'come in by QuickTime, like you know, in real-time feedback in terms of there and then' or 'feedback is used in a way and it might be through a comment on a page or it might be through the oral feedback that the students understand what they've done well'

Ellen stated that in the early years assessment is set up within the natural environment within normal everyday activities. She stated that:

It's not like a test situation where they're sat down and it's all formal, it's like something they would be doing in a classroom. The teacher would come along with a camera, which they're quite used to being photographed, and there would be a discussion between the educator and the child, and then her observations are written down with photos of what she's doing.

Similarly, Eva described the assessment feedback to her year 2 students as different to that in other year levels, but knows that 'in year 2, we'll often just verbally discuss, you know with their writing say "Oh look, what do you want to get better at, what are you missing from here?">' Eva also noted that assessment feedback involves sitting down with the children:

... and you talk about their progress, talk about assessment that you've written in their books, areas that they can focus on. You kind of lead them to ... you guide them towards areas so that they can do it for themselves in, either later on in the year or in future years.

Emerald School is beginning to encourage parents to provide student feedback based on assessment results. According to Edward this practice is still being worked on, but the school does try to 'encourage the parents to provide feedback as well, so it's through the reporting system there's a feedback sheet that's given.' Overall, responses from the IB PYP teachers and the coordinator suggest that providing specific feedback is an important link between assessment and learning.

Opal School

School context

Opal School is a coeducational school situated in the IB region of Africa, Europe and the Middle East. It opened in 2005 with over 500 students from 55 countries and an equally diverse faculty of over 50 members of 18 different nationalities. In September 2014 the school had more than 2000 students from 77 nationalities, and more than 260 staff from over 30 nationalities. Opal was the first school in the country to offer a rigorous curriculum and language programme based on the three programmes from the Geneva-based IB PYP, MYP and DP. These programmes are taught in English at Opal School.

The school's mission is to empower students with a holistic, rigorous and international education for success in an ever-changing world, with achievement, collaboration, integrity,

respect, and responsibility as its core values. With respect to the school's IB PYP, the school website offers visitors an overview of the skills students develop (social, research, thinking, communication, and self-management) and the attributes of its students that make up the PYP LP (inquirers, thinkers, communicators, risk-takers, knowledgeable, principled, caring, open-minded, reflective, and balanced).

Purposes of assessment

According to Olivia, the PYP coordinator, teachers in the PYP use a variety of assessment strategies. These include both formal, standardised assessment instruments as well as informal teacher-devised assessments. In Olivia's view the mix is necessary and useful, as it provides evidence of student learning for teachers who want to provide feedback to students on their day-to-day learning, as well as a recognised standard for parents and public educational authorities. For example, she made reference to the 'Cambridge benchmarks' as a useful set of reference points for both teachers and parents. In addition, Olivia identified an issue with respect to perspectives on assessment at the Opal School in that the parent body includes parents from cultures for whom assessment 'provides a percentage' or a grade, rather than teachers' comments on performance.

The PYP coordinator pointed out that the school is a commercial enterprise, and that the owner wants to make the school the most prestigious in the country. Therefore, there is an ever-present need to make the student learning outcomes easily compared against other schools. The use of standardised assessment instruments partially addresses this goal.

The focus group teachers at Opal School, Oonagh (Year 4) and Odette (Year 1), provided details of their assessment practices during interviews, as well as pictures of some assessment artefacts. The types of assessment used at the Opal School were described as pre-assessments at the beginning of a unit of work, formative assessment during the unit, and summative at the end of the unit: the pre-assessment and the summative are used to provide an observation of change in a student's thinking or understanding. However, in addition to these assessments there is a Think 1: a student statement of what he or she thinks before the unit, and a Think 2: a student statement about what he or she now thinks and how he or she thinks they have changed.

Oonagh described the summative assessments as follows: 'sometimes they're a poster, sometimes a design, sometimes group work ... sometimes it's setting up a market ... it's not always paper and pencil.' She went on to say how the summative assessment was moderated by the teachers so that ratings of children's work would be consistent. These ratings, from 1 to 7, are required by the national education authority to satisfy their need for a numerical score or outcome for children. Oonagh said that the teachers use these seven levels to build rubrics for assessing each unit. She noted that an example of a rubric in use was for a piece of writing, and the students used the rubric for self-assessment. She said that using rubrics for self-assessment was a common practice across the school, but early in

each year time was spent ‘training [students] ... because the expectations were different.’

Odette confirmed what Oonagh had said about the three types of assessment and the use of rubrics. However, she gave an anecdote that showed the students, in their pre-assessment knew a lot of the content that had been planned for the unit, and so the teachers changed the content and she finished by saying that ‘we really use it [pre-assessment] in our planning.’

Assessment at Opal School consists of pre-assessment, formative assessment and summative assessment. A wide range of assessment strategies are employed, and these can be divided into standardised and informal/teacher-devised categories. Staff mentioned six standardised assessment instruments, including the Cambridge Achievement Test and Performance Indicators in Primary Schools (PIPS), both from the UK, and the International Benchmark Test (Australia). As mentioned above, these assist teachers to provide standardised evidence for some parents for whom this is necessary, but also for teachers to support what they are doing informally with portfolios, observations and other less well-defined strategies, for ‘showing progress’ (Olivia).

Numerous informal assessment strategies are employed at the Opal School. In the teacher survey (completed by nine teachers, across all year levels), teachers were asked about their frequency of use of different assessment strategies: observation, performance, process, and portfolios were used equally and most often. Informal tests, that is, single-occasion exercises, were the least used strategy. However, the overall position for teachers at the Opal School is that this range helps them to ‘cater for student needs,’ as Olivia put it.

The use of particular assessment tools by teachers at Opal School was also explored in the teacher survey. Of the four tools listed (exemplars, checklists, anecdotes and rubrics), rubrics were selected by eight of the nine teachers to be their most frequently used assessment tool. Checklists were also ranked very highly by most teachers.

Oonagh and Odette are consistent in their approach to assessment, and their data suggest assessment is similar in the work of other teachers. Simply stated, the pre-assessment and Think 1 tasks are to reveal what students already knew about a topic, and this is used to assist in planning units of work. During the planning, teachers use:

... the PYP scope and sequence ... but with age expectations we needed to have a little bit more concrete guidance ... so we brought in the Cambridge benchmarks ... [and] took from the age expected levels (Odette).

These guidelines are necessary to satisfy education regulators, but are also useful with a cohort of students arriving from many different countries and backgrounds.

A feature of assessment at Opal School is what Oonagh termed ‘the planning document,’ which is a rubric in matrix format that is used to ‘make sure we’re not just assessing

knowledge, we're looking at the other criteria too.' These 'other' criteria cover trans-disciplinary skills, attitudes, actions, and concepts. Thus, assessment and planning of units are well integrated, not only by the staff but also with input from students.

Using assessment to support student learning

All three Opal School interviewees made many comments on the use of assessment in their classes and the school in general. Every unit is introduced with a pre-assessment in order for teachers to understand what the children already know, and thus plan for appropriate learning experiences for students. Odette's comment that 'we kind of train the kids towards something like that [self- and peer-assessment],' which she believed helps the students in their learning.

Identifying student learning on a developmental continuum

Placing students on a developmental continuum appears to be most readily achieved through the Cambridge benchmarks and other standardised assessments such as the International Benchmark Test (IBT). Both of these place those assessed on either a 'scale' (IBT) or a 'ladder' (Oonagh). Oonagh also commented that many other standardised assessment tools do this and often include age or grade norms as well.

Assessment and the Learner Profile

Results of the teacher survey showed that when considering which aspects of assessment were used for placing students on the LP, peer assessment was the most used by teachers, and anecdotal records the least used. Peer assessment is used 50% of the time by most teachers, while self and performance assessments are used 25% of the time, and anecdotal records are used only 10% of the time.

The role of formative assessment

Formative assessment was the phrase the interviewees used most frequently, and it clearly plays a critical and central role in the school's assessment regime. The type of feedback varied across subjects and teachers from verbal to written comments, but the emphasis on peer and self-assessment means that a great deal of feedback is from peers or the student themselves, enhanced with rubrics.

Affordances of ICT for assessment

The use of ICT was another emerging theme from the data collected at Opal School. The major use of ICT for assessment at Opal School was in the area of student portfolios. These were originally collections of paper artefacts, but the upper primary year levels now create e-portfolios for English and mathematics. However, the students started complaining that they were just putting in material to make the e-portfolio look 'pretty and big' The students wanted to have subjects in which they felt they were not doing well included in their e-

portfolio, so that they would get feedback on their work and thus improve. The staff have acquiesced to this demand. One other instance of an interesting use of ICT was described as follows:

We used a Google Form as an individual assessment – with Fluberoo as an automatic checking and grading tool. Kids liked that it was on-line, however coming up with closed answer questions was a limitation (Fluberoo could only handle those kinds of closed answers). (Anonymous teacher from teacher survey)

Pearl School

School context

Pearl School is a private coeducational independent school located in the IB Asia-Pacific region. The school has approximately 1500 students across junior, middle and senior schools, all located on the same campus. The junior school, from which the data for this case study was collected, caters for students from kindergarten through to Year 6. The main language of instruction is English and all students across the school are taught Mandarin. The school is committed to developing an international perspective and a sense of global awareness, and enrolls students from countries throughout Europe, the Asia-Pacific region and South America.

According to the school's website, Pearl School provides innovative programmes that reflect the attributes of the IB philosophy and framework. Programmes are designed to challenge students while ensuring that their natural inquisitiveness and creativity are fostered. The school's vision is to provide students with a 'superior all-round education, to prepare them to be responsible global citizens, to think creatively, reason critically, communicate effectively and learn enthusiastically throughout life.' The school's website also introduces the IB framework and provides a short video that describes the IB programme, including the IB LP.

Purposes of assessment

Pearl School's assessment and reporting policy states that assessment of student progress is an ongoing process that involves the use of a range of strategies to gather information about a student's learning in all areas of the curriculum. Specifically, the junior school assessment and reporting policy states that all assessment tasks are explicitly linked to each student's identified learning outcomes and that teachers will use this information to plan future teaching and learning experiences. A range of assessment strategies are employed at the school including both formative and summative assessment forms. Specifically, these strategies are used over a period of time to monitor student progress and include student observation, students self-assessment, peer assessment, teacher devised assessment tasks,

diagnostic and standardised tests (e.g., the Progressive Achievement Test (PAT)), checklists and anecdotal records. Pearl School's assessment policy also states that a variety of reporting procedures are commonly used to communicate information about student learning to parents. These include formal and informal written reports, parent-teacher interviews, students-led conferences, and the PYP exhibition.

Eleven teachers from across the PYP (preschool/kindergarten to Year 6) completed the online survey. Teachers either strongly agreed (SA) or agreed (A) with the following statements:

- *Assessing student levels of prior learning is a key element of planning for effective teaching and learning (SA=6; A=5)*
- *Involving students in their own assessment leads to improved learning outcomes (SA=3; A=7)*

Results also showed that the majority of teachers who completed this survey item strongly agreed or agreed with the following statements (neither agreed/disagreed = NA/D):

- *A formative assessment is much more valuable to teachers than summative assessment (SA=3; A=7; NA/D=1)*
- *I would describe my approach to assessment as holistic (SA=5; A=4; NA/D=2)*
- *When students understand the learning intentions for an activity they have improved learning outcomes (SA=4; A=4; NA/D=3)*
- *The main purpose of assessment is to guide teachers and learners to close the gap between their current level of understanding and their desired learning goals (SA=4; A=6; NA/D=1)*
- *Self-assessment enhances student learning (SA=2; A=8; NA/D=1)*

Majorities of teachers disagreed or neither agreed nor disagreed with the following statements:

- *Developing formative assessment tasks is too time consuming (NA/D=5; D=4; SD=2)*
- *My approach to assessment is strongly influenced by my understanding of the skills students will need to have in order to successfully complete the final exhibition (NA/D=6; D=2; SD=3)*

Responses from the three PYP teachers and the PYP coordinator interviews indicated several key purposes of assessment that reflected the school's assessment policy and responses from the online survey. Two main themes emerged from the interview data: using assessment to plan and set goals to support students as learners; and to guide

teaching and learning.

In relation to using assessment to *plan and set goals to support students as learners*, all three PYP teachers and the PYP coordinator strongly articulated this as the main purpose for assessment. For example, the PYP coordinator, Peter, indicated the school's assessment as important for understanding where the children are at and what they have done to support themselves as learners, stating:

...the aim of it [assessment] is what have the students done to contribute towards their own learning as a learner ... we looked at exploration and creativity and we did this and we did that and we did the other thing, and that's maybe more of a generic ... of what happened in class, whereas we're attempting to aim more about actually what the student has done to contribute towards their own learning.

Similarly, the PYP teachers described their use of assessment as a way for them;

... to differentiate and kind of give them [students] the freedom and the support depending what they need ... to give a scaffold for those kids that needed that.
(Penny)

... to look at actually students' prior knowledge and seeing what they knew in the beginning and what they thought their responsibility was. (Pina)

... to know where the children are at and applying the appropriate assessment task for the children at the right level. (Paulette)

All PYP teachers and the PYP coordinator also stated that assessment was necessary to *guide teaching and learning*. The PYP coordinator, Peter, highlighted the school's collaborative cross-year approach to support teaching and learning. Peter's responses included:

... so that person [teacher] is then working closely with the other teachers to make sure whatever is going on in class with assessment practices – whatever is common through the group of classes and we plan what we're doing in a collaborative manner so generally what's going on in the class might look slightly different but the assessment practice or the way things are done will be common through there.

... our key things that we pride ourselves on I guess is differentiating and learning across the school and then just knowing where the children are at and applying the appropriate assessment task for the children at the right level.

Peter further indicated the importance of using assessment as data to inform teaching and learning, stating:

... we are regularly collecting data and sort of going through and looking at it and just checking to make sure that as the students are moving that whatever it is they're

doing there is consistency, there is no great blurbs or dips or nothing is going on there.

Similarly, the PYP teachers described their use of assessment to guide their teaching and learning in order to scaffold students across year levels. Examples of teachers' responses are as follows:

... So when they [students] move on it's more the next teacher just takes them from where they are and moves them, hopefully moves them further from there. (Penny)

... gave a scaffold for those kids that needed that but it also allowed those kids that didn't – that had learnt how to do it to actually kind of go further with it. (Paulette)

The 11 teachers at Pearl School who completed the survey stated that they frequently used anecdotal records (mean =4.18) and rubrics (mean=4) as tools for assessment. But they used exemplars (mean =3.82) and checklists (mean=3.73) less frequently.

Ten teachers commented on *the extent to which assessment practices are reflected in your current teaching practice*. Results showed that teachers included the following two assessment practices in 75% to 90% of their teaching time:

- *use feedback to help focus each student on the next step in their learning*
- *use talk-based assessment (such as discussion, conferencing and questioning) as a formative assessment strategy*

The 10 teachers used various assessment practices in 50% to 90% of their teaching time. These practices included:

- *the use of evidence from assessment of my students to plan for teaching and learning*
- *the provision of student-specific feedback throughout each learning activity to support their learning*
- *the provision of feedback during learning rather than after the learning process*
- *the provision of opportunity for students to view assessment feedback as a valuable means of gaining information about their own progress*

In contrast, on-line self-assessment tools were never used and portfolios were used sporadically only (25% of the time).

Survey data from the 11 teachers and interview data (three PYP teacher and the PYP coordinator) indicated that assessment practices at Pearl School included formative assessment, summative assessment, peer assessment and self-assessment. Survey results showed that the majority of the 11 teachers either strongly agreed (n=3) or agreed (n=7) that *formative assessment is much more valuable to teachers than summative assessment*.

Eight teachers further indicated that they spent 75% to 90% of their teaching time in *talk-based assessment (such as discussion, conferencing and questioning) as a formative assessment strategy*.

The three PYP teachers and the PYP coordinator, Peter, shared examples of formative assessment during their interviews. Excerpts of their responses are as follows:

... the teachers will have one-on-one interviews with the students so have a talk to them about what they've been doing; where they're at; they will write things down in their books ... Lots of talking [in] either [a] formal or an informal sense. (Peter)

... we created together the shared rubric ... to kind of get them [students] started to go and investigate a conservation organisation of their own choice where they had to then just go through and find out what they actually do to help the species that they focus on and then use – create their own rubric to decide how successful that they thought they were and why. (Paulette)

Many of the artefacts that the three PYP teachers shared in their focus group interview were examples of inquiry unit activities. All teachers were asked to describe how these activities were used to assess the children's learning. For most teachers, these artefacts were ways to 'see how open the kids were ... and different ways of expressing themselves' (Paulette). Pina said 'it gave them an insight into their thinking ... some of them, you know, their thinking was quite shallow ... if some of them came up with some good open-ended questions or whether they still had closed questions.'

Survey results showed that the majority of the 11 teachers either agreed/disagreed (n=5) or disagreed (n=3) that *summative assessment tasks should provide the most valid measure of student learning*. Ten teachers confirmed that Pearl School participated in regional, national or international standardised tests (e.g., PAT, ICAS). In addition, of the 10 teachers who responded to the survey item that invited participants to indicate how often particular *assessment tools are used with students to gather evidence that assists with planning inquiry units*, seven indicated that tests or quizzes happen in 25%–50% of their teaching time. One teacher commented in the survey that '... in my role I assess reading and mathematics. Standardised assessments are generally used for these subjects.'

During the interview with the PYP coordinator Peter highlighted several examples of summative assessment, particularly for literacy and numeracy. Excerpts of his responses are as follows:

...we assess reading, so we use a benchmark system to assess reading so going through the different levels and the different colours there.

...We also do the ICAS¹ test, which is Australian and only for students who want to

¹ International Competitions and Assessments for Schools – independent skills-based assessments with a competition element.

do it, and another one which is the standardised [name of country] testing so we do that for students in year three and listening and mathematics and in year four, five and six – it's listening, mathematics, punctuation and grammar, reading comprehension and reading vocabulary.

...in mathematics we have something called JAM.

Survey results showed that the majority of teachers (n=9) disagreed that *peer assessment is a poor strategy for evaluating student learning*. However, only four of the 11 teachers used peer assessment frequently or very frequently. Among the 10 teachers who responded to the survey item *range of strategies to assess student progress on the learner profile*, the majority (n=9) used peer assessment in 25%–50% of their teaching time only. One of the teachers highlighted an example of peer assessment in his/her survey responses, stating:

[In] peer assessment during writing – shared writing with a partner – they give two stars (feedback related to the success criteria) and a wish (feedforward related to the success criteria). The children often respond differently to peer assessments and it provides strong motivation, enhancing the children's next steps.

During the interview, Peter confirmed that the school uses peer assessment. He stated that students may 'talk to a peer about their [work] – just based on what they personally thought that happens in a range of inquiry type things.' A PYP teacher further shared an example of peer assessment during her teaching experience, when trying to get the students to understand that others have different ways to express themselves when evaluating other people's work:

... [we wanted them to] understand that people have different ways of expressing themselves and so some of the kids to start with when they were looking – they'd go 'No, no that's wrong' – yeah they were using words like 'wrong' and that sort of thing. And then by the end they started to – it was more like 'Oh that's really interesting', 'oh yeah I can see why you thought that.' (Paulette)

Results showed that the majority of 11 teachers who completed the survey either strongly agreed (n=2) or agreed (n=8) with the survey statement *self-assessment enhances student learning*. Five teachers indicated that self-assessment was frequently/very frequently used in Pearl School. In addition, all 10 teachers confirmed that self-assessment happens in 25%–75% of their teaching time, while half of the teachers indicated that *students use self-assessment to support their metacognitive development* 50% of the time in their teaching practices. Further results showed that none of the teachers had used *online self-assessment tools to support improved learning outcomes*. One teacher commented on self-assessment in his/her survey responses, stating:

... Students have used peer evaluation and self-evaluation for their composition ... I have used a variety of assessment tools for this rich task without creating a test as

such. These formative assessments guided students throughout the process and the focus was on them unfolding the understanding and not on me teaching the skills.

During the interview, Peter confirmed that self-assessment is part of the practices in the school. He elaborated on the use of e-portfolios for self-assessment:

... we've also gathered an e-portfolio system at the start of this year so the students were able to use that ... they might do a piece of work and they will sit down and they will actually assess themselves against the criteria for what was expected of them and then talk to the teacher about theirs.

The three PYP teachers at Pearl School shared examples of ways that the students in their class assess their own work. Penny described the use of digital data such as videos, photos and audio recordings as a way for her Year 1 students to listen and reflect on their own learning. She also encouraged students to use a blog to comment on their oral communication skills and 'how they were developing.' Penny felt that it was 'for the children too they can go back in it now and look at it and say "Oh I wasn't very clear" or "I talked too quickly".'

Paulette described how her Year 5 students had to develop their own rubric to assess their understandings of their inquiry unit on conservation. She modelled the creation of a rubric with the children, then each student had to design their own based on their specific project. Once the students had created their own, they had 'to give a score of one to three and ... come up with a way of deciding how successful it was and why' Paulette reported that some of her students made their rubrics totally different from the modelled rubric 'so that it actually really, strongly reflected their organisation.'

Using assessment to support student learning

It was evident from both the survey results and interview responses that a range of assessment tools are used regularly at Pearl School to plan for student learning. Survey results showed that anecdotal records and open-ended tasks are well-established, while tests or quizzes are used sporadically to plan for inquiry units. Also, observation and process-focused assessments are frequently used in the school. In contrast, portfolios are not frequently used.

Interview responses from teachers and the IB PYP coordinator, Peter, indicated that several practices involved the use of assessment data to plan for further learning. According to Peter, it is important to collect data to support students' learning:

... we are regularly collecting data and sort of going through and looking at it and just checking to make sure that as the students are moving

Peter asserted that age appropriateness can be an important element of assessment practices, stating:

So the best we can, and I guess it's a little bit age dependent as well, but looking at inquiry type things that the younger children – giving them an idea of where they're going to and then ... whereas with the older students you can be a little bit more concrete of what's going on and possibly respond [to] them in a little bit of a different way.

The three PYP teachers and the PYP coordinator highlighted a range of IT tools used to support students' learning, including blogs and movie-making software:

...with that video footage now it's really interesting because we're blogging with our children now to go back and look at what the oral language skills were like.

...one of the things is the digital side of things as an assessment tool is really coming through strongly, be it photographs, be it video clips like this, that the child can watch, look at and see how they're going; how we as teachers can go back too as well so.

... I've got children making stop-motion movies, so again it's that whole moving (away from that) into a lot more creative and integrated forms of assessment.

... we've also gathered an e-portfolio system at the start of this year so the students were able to use that. (Peter)

Identifying student learning along a developmental continuum

Using a developmental continuum as a means of identifying student learning was discussed during interviews with the three PYP teachers and the PYP coordinator Pearl School. However, few details of implementation or assessments were provided, and some uncertainties were expressed. Excerpts of their comments are as follows:

... I'm not sure what you mean by that [developmental continuum]. (Penny)

... I think so much of what others said we don't really position them [developmental continuum] – we look at the phases as such, for example, with the oral language whether they are really still a phase one ... language and more those learning outcomes as opposed to... positioning them on a continuum. (Pina)

... Yeah so like – in Year 4 we teach a lot of skills as well; so it was interesting that we needed to probably give them more experiences of using [a developmental continuum]. (Paulette)

...I guess probably in a way that depending on which phase you're in or which level you're in as you move your way up the school – assessment practices will look different. So the three teachers I've got talking to you tomorrow – I've got one teacher in year one; one in year three and year five. So hopefully well I know because I've already seen what they've been doing ... talk to you about is just

showing that there's different practices going on I guess in year one than there are in year 5. Some will be the same and some will be different just depending on the age and the ability of the child. (Peter)

Assessment and the Learner Profile

In the teacher survey, four teachers agreed and five teachers neither agreed nor disagreed that *it is difficult to assess student progress on the Learner Profile*. In relation to practices, responses were mixed, with some teachers reporting that their students demonstrate a strong understanding of their learner profile 75% of the time (n=3), while other teachers believed that this happened 50% of the time (n=3) or sporadically (n=1).

Responses from the interviews showed that the teachers and the PYP coordinator included all attributes of the LP in their planning of inquiry units but it was not common practice at the school to formally assess the IB Learner Profile. For example, Peter stated that:

... For each of our units of inquiry we did have a focus of an attribute or two of the learner profile and we're ... and once again it's really probably anecdotal notes. Some of the things we do might be based around the learner profile but as for actually assessing the attributes of the learner profile as such that really doesn't happen. Is more talking about being caring; seeing children being caring for example. There's no test or there's no real even assistant tasks or activities that we design specifically to see how ... but you can pick up anecdotally watching students doing things but just really I think where we would be coming from.

Peter also commented that the LP was used more 'to link together what we're doing vertically I guess across year levels and also like for example other aspects of our school.' Similarly, the teachers covered attributes of the LP 'with every unit and basically we try to let them [attribute] in as much as we can but we don't assess them like in an assessment tool anyway' (Pina).

The PYP teachers and the coordinator, while acknowledging that they do not formally assess the attributes of the LP in a formal way, agreed that it would be a useful thing to do in the future. Teachers gave some examples of how this may be done but acknowledged the difficulty in formally assessing some of the attributes. For example, Paulette stated that she believed that some of the attributes could be assessed with the use of photographs of student learning, noting that:

... Some of them [attributes] yeah absolutely yeah because you can really tell right from the photography ... the photographs sorry that are taken right from the start – it shows a real level of thinking and you know so you definitely could look at that because some kids it was very basic you know it had to be very obvious.

Paulette also reflected on another arts unit, which they commenced by going to the art

gallery to look at abstract paintings, and reported that assessment of the LP could be incorporated into some of the activities, stating:

... we don't formally assess them [attributes] but that's kind of what you're digging and delving with and trying to develop because that open-mindedness comes through here hugely to open the kids' minds up and also to develop them being a bit of risk-taker too because some kids just can't take that leap to doing something

Similarly, the Year 1 teacher, Penny, discussed possible ways that the attributes could be assessed in future units of inquiry. For example, she reflected on the last unit of inquiry about friendships and identity and possible ways that the attributes of the LP could be assessed:

... it screams 'communicator' to me; that's a really strong [concept] and the 'thinker' with the planning – being able to plan out what they could do, there's obviously the reflective component where they could be looking back on how they presented for this particular one next time they go to present, so I think there are lots of opportunities for that but we're not actually there yet.

Peter also raised some challenges with assessing the attributes, saying:

...I guess there's a lot of different ways that you could approach that ... we have things on our school newsletter or on our school website or when [in] a class ... assembly they're reflecting back on what they've been doing in class and we try and use the learner profile there as well. So the different attributes – so how have we been inquirers this year or this week or how well ... and then showing a little bit of what's going on to the community. So I'm just trying to think about different ways that the learner profile is alive really in our school, and so they are the sort of things. Once again it's not really a formal task or activity or anything, but it's showing what the children understand about that attribute.

The role of formative feedback

The teachers and the PYP coordinator at Pearl School highlighted the importance of feedback in the assessment of student learning. Results from the survey showed that 10 of the 11 teachers either strongly agreed or agreed that *providing feedback to students is the most important component of the assessment process*. Half of the teachers who completed the survey indicated that the practices of giving feedback *throughout each learning activity and during learning rather than after the learning process* are embedded in their practices 90% of the time. Eight of the 10 teachers also indicated that both the practices of using *feedback to help focus on the next step in [students'] learning* and the practice of giving

students specific feedback throughout each learning activity to support their learning happen 75% of the time.

These views were echoed by the IB PYP coordinator, who stated that:

...the teachers will have one-on-one interviews with the students, so have a talk to them about what they've been doing, where they're at; they will write things down in their books ... lots of talking [in] either [a] formal or an informal sense. Once again there's the e-portfolio type of idea so that teachers are able to provide feedback to the children. The parents can too and also for students as well. What else might we do? I guess they would get a report and things but that's not really pertinent. It's more something that happens as [close] as possible to the time when the activity or the exercise or the assessment task has been completed ... trying to give the students feedback as to where to next. The other thing we do in our reports is we have an emphasis on next steps for learning. So the more you talk about these things the more I guess you think about actually what you do.

Peter also commented on the opportunities to collect parents' feedback to support students' learning:

...there [are] opportunities for things like parents to hear what they've been doing and we can have a conversation either at home or mum or dad can put a comment into the portfolio itself, so there is sort of a bit of a two-way [process].

In focus group the PYP teachers made no explicit comments on the role of formative feedback. However, two survey participants commented that formative feedback may enhance students' level of thinking. Excerpts of their comments follow.

... I gave my students, who had been learning addition and subtraction strategies, a formative assessment with some more basic and some more complex questions requiring deeper thinking.

... formative assessments guided students throughout the process and the focus was on them unfolding the understanding and not on me teaching the skills.

Ruby School

School context

Based in Europe, Ruby School was established a few years ago and recently achieved IB PYP accreditation. Situated in the IB region of Africa, Europe and the Middle East, Ruby Primary School is currently offering early learning and the IB PYP. It is a small school with about 150 students and 16 teachers and one principal, who is also the PYP Coordinator. It is growing, building on its year levels with the view to eventually provide continuous IB education through to MYP and DP. Like many IB schools, it has great cultural diversity with 36 nations

and 31 languages represented within the school community. The school maintains a bilingual learning environment. Each class has two teachers, one a native English speaker and the other a native speaker of the national majority language.

The teaching staff reflects this cultural diversity and has a diversity of teaching experience, from recent graduates to mid-career teachers and those with deep teaching expertise. While a few teachers reported longer-term experiences within the IB education system, most have a diverse range of teaching experiences across international settings and limited explicit experience with the IB PYP. Just under half of the teachers within Ruby Primary School are early career teachers with 1–5 years of experience. For this reason, Ruth, the Principal and PYP coordinator, sees a significant part of her role as both coach and mentor to her staff as well as playing the important role of showing leadership in challenging their assessment beliefs and practices. Reflecting the IB PYP assessment philosophy with its emphasis on assessment for learning, Ruby Primary School's assessment policy outlines that 'assessment is integral to all teaching and learning' and that the 'prime objective of assessment in the PYP is to provide feedback on the learning process.'

Purposes of assessment

Both the PYP Coordinator and the focus group teachers were strongly aware that the national educational context within this European PYP school often contrasts sharply with the IB PYP philosophy of teaching and learning. Parents are shaped by the societal norm operating currently within the national educational system context, in which the focus is on the importance of schooling outcomes as represented by the results of testing. Through the interviews and focus group, a view emerges that the national educational system is quite traditional in its teaching (i.e., teacher-centred) and assessment practices are generally subsumed in a test culture where summative assessment is dominant. To illustrate the paradigmatic tension between philosophies, Ramira, a native of the country in which Ruby School is located, explains how deeply-rooted is the belief in the role of tests and summative assessment in the minds of students and parents.

... and we [teachers] experienced that many students still feel stressed when they're assessed, because they're kind of [an artefact of] study in the [national] system, especially parents ... they're not used to formative assessment. They don't see it as part of the whole. I mean for us [teachers] it's holistic because we also take into consideration the formative assessment, it's really important; and for them [parents] they just seem to think tests are important. But for us, especially for us teachers, exit slips really help us to see where the students are, where they stand. (Ramira, upper primary teacher, focus group)

Through her leadership as Ruby School's Principal and PYP Coordinator, Ruth has a community approach to shifting assessment cultures within the school community. She invests time to work with the school's parents to challenge preconceptions about tests as

the significant indicator of student learning. Ruth, along with her teachers, takes parents on a learning journey to understand a more holistic approach to understanding learning through a series of workshops:

... so this is the pressure ... and [it is] a circle and we try and get out of the circle by educat[ing] the parents through workshops to say okay not everything they [students] have to write down, they bring [to] us, is a test ... and yes, it's part of the [student's] mark but it informs us too for the teaching and the learning. [We are] educat[ing] ... people to think differently. (Ruth, Principal & PYP coordinator, interview)

One of the teachers in the focus group, Rohan, identified the significance of Ruth's role in building trust within the school community about the school's assessment policy and processes, particularly through the parent workshops. He articulated the value of the workshops with parents to unpack the IB philosophy of learning, teaching and assessment.

... there are a lot of parent workshops where they were familiarised with assessment, with the PYP in general, to try to make an average school day with [formative] assessments and procedures, and new words and topics; just [to make] a bit more familiar [to parents] so that they actually know what their children are doing at school. (Rohan, Year 4 teacher, focus group)

Six teachers who taught in the early years (years 2 and 4) completed the Teacher survey. They noted that standardised tests featured within the national landscape and were also undertaken by Ruby School students at relevant year levels (e.g., Year 4 for mathematics). It is also interesting to note that the surveyed teachers gave a variety of responses to one item about summative assessment and it being the 'most valid measure of student learning'. Three of the six teachers neither agreed nor disagreed with the statement; two teachers disagreed and one teacher strongly disagreed. This suggests that while there is commitment towards formative assessment amongst the teachers, there is respect for summative assessment within the curriculum.

In contrast to the national education system, Ruby School has a focus on a more holistic approach to assessment that incorporates both formative and summative assessment. There is a focus on developing formative assessment approaches, particularly to support inquiry learning, IB LP attributes and the IB attitudes. However, as Ruth mentioned in the interview, she feels that her staff 'could do better in the formative assessment than in the summative assessment,' particularly as it is shifting mindsets from the conventional way of teaching and learning within the country. The teachers also indicated that further professional learning is warranted; for example, three of the six teachers agreed with the statement *formative assessment is much more valuable to teachers than summative assessment*, while the other three teachers selected the neutral option. This suggests that the ways that formative assessment can contribute to teacher planning (Assessment for

Learning, as conceptualised by Lorna Earl (2003)) is not yet fully appreciated by all teachers at the school.

There was a strong sense that the teachers at Ruby School value formative assessment, and this was evident from the contributions of teachers in the focus group as well as those who completed the survey. For example, all teachers in the survey identified readily with the statement *I describe my approach to assessment as holistic*. In their responses to the survey or during the focus group, the Ruby Primary School teachers often recognised:

- their use of formative assessment approaches and using students' results from formative assessment to inform teacher planning for future teaching and student learning
- the interrelationship between learning intentions, task and assessment criteria to support student learning
- the use of peer and self-assessment in learning, particularly in developing IB LP attributes and IB attitudes
- the significance of providing feedback to students as part of the assessment process.

Nevertheless, discussions with Ruby School teachers suggest there are opportunities for deepening teacher knowledge and practice in the areas of formative assessment and teacher assessment literacy. For example, in the survey, teachers provided diverse views on the difficulty of assessing student progress on the LP, and about the contribution peer assessment can make to evaluating student learning (survey item 13).

Using assessment to support student learning

Diverse formative assessment practices are evident within the Ruby School, including assessment strategies such as observation of students, performance assessments, process-focused assessments, portfolios, rubrics and self-assessment. The following discussion identifies a range of assessment strategies used within Ruby School and begins to unpack the teacher thinking that is involved with the use of these assessment practices to support student learning.

Observation of students was the formative assessment strategy Ruby Primary School's teachers mentioned most often in both the survey and focus group. As explained by Ranita, observations, coupled with anecdotal records, provide significant data about student learning and support for future learning as well as teacher planning.

... we generally just do observations. So as a teacher I would just write down all the things that were good or not so good or the whole thing about it; and then try to put that together for that child in the child's records. And then also to pick from that, the two positives or one negative ... and then to try to work on that with that child for

the next thing. (Ranita, Year 1 teacher, focus group)

Analysis of the three main datasets of interview, focus group and survey show that rubrics are in common use within the Ruby School community, with a range of assessment practices that build critical student metacognitive skills. As teachers shared their use of rubrics in the assessment samples they outlined an increasingly sophisticated developmental approach to using rubrics with students. For example, Ranita, reflecting on her Year 1 learners, mentioned that the use of rubrics at this learning phase is simplified to a 'checklist' type of activity to assist students to focus on the important things in their learning.

I feel like it's a gentle introduction to the world of summative assessment for them [Year 1 students]; like clearly spelled out what's required ... and so we go through with them ... like I said, with a more simplified checklist to start with. (Ranita, Year 1 teacher, focus group)

As students become familiar with the structure of the rubric, they are introduced to a variety of ways to use the assessment tool to support their learning. For example, as Ranita reflected generally on Ruby Primary School's assessment practices, she noted that students from the early years to upper primary learn to:

... reflect on their own as well as their peers' [learning]; they see what's expected and what [is] to come next.

As well as getting feedback from the teacher through a strategy:

... like a tick box reflection ... like three ticks, and then they [students] keep that for the next time they do [a similar assessment, for example] a presentation so they can see where they need to work on, or ... which bits were weaker than others. (Ranita, Year 1 teacher in focus group)

The use of carefully constructed rubrics with such assessment strategies supports students to gradually build their metacognitive skills as they come to better comprehend what is expected of them in their assessment and gain perspectives about their own learning strengths and areas for improvement from teachers, peers and themselves. In the earlier years of the PYP, teachers are modelling the way to use rubrics to support the students' learning through the feedback strategies they provide. As students understand how to use rubrics to support their learning, the teachers explained that they can then sometimes get students to co-construct the rubrics and assessment criteria, which the teachers found deepened the students' engagement with their learning and assessment.

Assessment and the IB Learner Profile

It appears from the survey and focus group data that Ruby School teachers use self-assessment strategies regularly but find peer assessment more challenging to implement. Often our discussions with the teachers focused on how the self/peer assessments assisted

students to reflect on their progress towards developing and/or using IB LP attributes and/or the IB attitudes. Self-assessment techniques are used across the PYP either for immediate oral feedback from students to teachers about knowledge being learned (e.g., conferencing; use of thumbs up; 3–2–1) or more reflective moments captured in students' written feedback through use of exit slips, rubrics and checklists.

Rohan connected the themes of IB LP attributes and IB attitudes with assessment, stating that it is critical to make the links authentic to improve student learning about these important IB concepts and skill development. He described an example within the physical education (PE) classes, where:

... we do our best to integrate attitudes in the profiles within the lesson and within reflection and assessment. And I see this is a nice opportunity to get them [students] and apply that within the PE lesson. ... We practised in the gym first and then we took it outside, and I talked about the task itself. I told them what to do and I said, 'Okay guys, I will definitely need your integrity and fair play here; because I have 23 kids but I'm the only teacher, and we had four stations and I could only assess [one area/station at a time].' ... So we have to focus on specific exercises dealing with integrity, ...caring, open-minded [etc.] ... and really getting them [students] to think about 'Okay how would I rate my integrity after today's lesson? What does integrity mean? How can I apply that in PE?' (Rohan, Year 4 teacher in focus group)

The role of formative feedback and formative assessment

Teachers recognise that there are challenges associated with peer assessment and self-assessment, as Ranita revealed:

... I think the teacher assessment is easy, the peer assessment – yeah, okay – and I think trying to teach them [students] how to self-assess is more difficult How to be critical of your own work in a positive way. (Ranita, Year 1 teacher in focus group)

Both Ramira and Rohan agreed readily with Ranita's thinking about self-assessment. Rohan added that this has been recently a professional learning focus for the staff; teachers are focusing on how to provide better questions to their students to prompt self-reflection. Furthermore, added Ramira, making the reflection personal is a critical aspect to get right to help students develop their metacognitive capability for self-reflection. In one sense, Ranita summarised the value of self-assessment through her statement:

...[self-assessment] lets themselves reflect and self-assess; it really helps to see where they are, what they still have to do. I think they [are] way more independent in a way. (Ranita, Year 1 teacher, focus group)

The focus group participants found it difficult to articulate how they go about preparing their students for peer and self-assessment. It seems that their practice is informed by their

tacit knowledge the teachers might benefit from making their practice explicit within their teaching community. This would include sharing their insights and professional learning from their current practice related to peer and self-assessment as well as enhancing their teaching with new knowledge on peer and self-assessment pedagogies. On the other hand, their principal, Ruth, shared a thought-provoking narrative about how two Year 4 teachers, Rohan and Richard, support their students' preparation for peer assessment and learning to give each other peer feedback. Rohan and Richard use role-play with their students to practise their skills in giving and receiving peer feedback.

... in our Grade 4 [team] we have two male teachers and ... they prepare them [through] play – role play for them [the students] to see 'okay, this is how it works. And even if I criticise my friend or the other teacher, it doesn't mean that I don't like him anymore; it's just like it helps me to learn; helps me to reflect on the work and maybe I'm getting better next time. So I have seen these two guys very often playing role plays to help the kids understand okay it's nothing personal.' But we [teachers], for sure, [we] don't use enough time for preparing the kids. (Ruth, Principal and PYP coordinator interview)

Another challenge identified is developing students' skills for learning, particularly through the use of peer feedback and assessment, because the teachers feel that students may not have the skills to provide peer feedback in a constructive manner. Ruth concurred with this view and challenge, particularly within the national teacher-centred, cultural context within which the School operates.

... and peer feedback is kind of really difficult if it comes to friendships. I don't know, maybe I'm completely wrong, and I'm a bit old-fashioned, but we see it if they have to assess their friends or they are then worried that they might lose the friend. (Ruth, Principal and PYP coordinator interview)

The teaching team at Ruby School see the value of peer assessment in learning, but they are aware that they could do it better and it may be a further area for professional learning. This may include learning how to improve their assessment of students' progress on the IB LP.

Besides the use of 'observation of students', portfolios are the Ruby School's teachers' most commonly used assessment strategy. Portfolios are class-based, often incorporating summative assessment tasks. In addition, the teachers in the focus group also talked about a portfolio-like formative assessment strategy known as the Orange Book. They described the Orange Book as an individual's collection of work based on their formative assessment. The teachers use this strategy to redress the conception that assessment is only summative, and it is used as a tool to disrupt this thinking for both students and parents. In fact, in the course of the discussion the teachers decided they would like to rename the Orange Book to the What I know... Book, in order to emphasise the focus on formative assessment and that learning is part of a journey.

Ruth also mentioned the need to disrupt her teachers' thinking, particularly on formative assessment, because 'it is actually the more difficult thing for [them] too.' In her roles as curriculum leader and mentor, she tries to sustain the use of diverse formative assessment strategies.

... to sit together with [teachers], when they have planning time and to remind teachers of the use of different tools ... [and] what I found out and all the teachers find out [was] that they constantly use the same formative assessment tools and there is like a range of others. And so I keep reminding them, especially the young teachers, I work out with them different tools, how they can use it. (Ruth, Principal and PYP Coordinator interview)

Sapphire School

School context

Sapphire School was established in the 1960s. It is a medium-sized kindergarten to Year 12 school located in the IB region of Africa, Europe and the Middle East. As an international school, it embraces students from a wide range of cultures and over 60 countries. The school philosophy states that it embraces diversity and purposeful learning. The learning environment of the school is characterised by action, reflection and inquiry. The school offers the IB PYP for kindergarten through the primary years to Year 6, and became an accredited IB PYP school in 2007. The school offers the IB PYP and the DP but not the MYP.

Purposes of assessment

The school website identifies the prime objective of assessment of student learning as to give feedback to students to encourage the start of lifelong learning and to give feedback to teachers so that they can reflect on what to teach and how to teach it. The teacher survey was completed by nine teachers with representation from all of the PYP levels in the school except Year 5. Survey respondents strongly supported the concept of formative assessment, with seven of nine agreeing with the statement *Formative assessment is much more valuable to teachers than summative assessment*. Seven out of nine teachers described their approach as holistic, and most teachers were strong supporters of the concept that involving students in their own assessment leads to improved outcomes (mean = 4.13, where 5 = *Strongly Agree*).

Sophia, the PYP coordinator, used the term 'balanced' to describe the school's approach to assessment, and then identified three clear purposes. First, to get feedback on teaching practices adopted in the school. This purpose fits neatly with the stated goal on the school website – for teachers to use assessment to reflect on what and how they teach. The second purpose she described as identifying the strengths and weakness in their students and using

this information to monitor and evaluate every individual student. The third stated purpose for assessment was for reporting and discussion with parents. Sophia emphasised the importance of working in a team with parents to support student learning and development.

The team approach to assessment emerged as a strong theme in Sophia's interview. She described how the whole school had worked together to develop a consistent approach to assessment. She said 'we also have meetings where the coordinators will have shared what does an assessment look like in your classroom and we discuss that amongst staff.' The school has taken this approach a step further by working with both the senior secondary staff who teach in the DP and the PYP staff to develop consistency in their approach to assessment. Sophia supports this approach, with the rationale that 'what we start with and what we come up with, the expectations are the same.'

The focus group teachers describe a methodical, ongoing and longitudinal approach to assessment. Sara, the early childhood teacher, shared a checklist that she uses with her young students when they are learning letters and sounds. The checklist is used as formative assessment to ascertain what each child knows and to plan appropriate teaching activities. She uses it to continually assess her young students' development, identifying gaps in learning and provide additional intervention for student who are not grasping key concepts. At the other end of the PYP, Sally, the Year 6 teacher, picked up on this theme of viewing assessment as a journey. She described how Year 6 students work towards the final exhibition, taking a field trip and exploring global issues before working together to collectively chose one global issue as the focus of their exhibition. They then go on to independently research their own inquiry related to the central idea. The artefact Sally shared is a rubric that is used at the end of the exhibition as a summative assessment tool but also used for observations and note-taking throughout the whole inquiry unit as a form of Assessment as Learning.

The importance of formative assessment as an assessment tool for teaching and learning at Sapphire School was further highlighted in the focus group in a discussion with Saskia, the Year 2 teacher. She said 'we tend to use a lot of formative assessments for my children and every time I mark their work I'm looking for things such as how they have set out the story.' She asks her students to record what they want to do better at, working with them to set their own goals. She identified an informal approach to monitoring progress: 'every day that you're teaching the child, you're watching them and you see what that particular child can and can't do and you try and plan something.'

Saskia discussed her formative and summative assessment cycle. She described how she realised that not all class members had mastered the concept of speech marks; she then planned activities around how to use speech marks and gave them a new activity to see if they could apply this knowledge in a new situation. Sara also identified how she uses summative assessment to gain insights into what students have learned in an inquiry unit.

The unit focuses on the different ways people can express themselves. She asked her kindergarten class to remember the different ways they had learned to express themselves, and then to identify their favourite way. Each child was then asked to perform in front of the class in that mode, singing, dancing, acting out a story, painting, and so on.

Sophia summarised the school's approach to the assessment cycle. She was clear that both formative and summative assessments are valued. She highlighted the value of performance-based assessment and open-ended tasks as tools for formative assessment, and the use of self-assessment tools such as rubrics to encourage students to think about their own work and set their own goals. Finally, she described the use of flowcharts and graphic organisers to encourage both teachers and students to identify and reflect on the assessment–learning cycle.

Using assessment to support student learning

The teachers at Sapphire School strongly support the participation of students in the assessment process as a pathway to improved student outcomes. In the teacher survey, there was a high level of agreement for the statement *When students understand the learning intentions for an activity they have improved learning outcomes* (mean = 4.25) and also for the statement *“Involving students in their own assessment leads to improved learning outcomes”* (mean = 4.13). In the focus group, Sara highlighted how she introduced self-assessment early in the year with her kindergarten students, using a poster and post-it notes so they could position their own learning along a continuum. Saskia encouraged her Year 2 students to set their own writing goals, and Sally described how her Year 6 students play a major role in determining the whole direction of a unit. She commented that ‘it is up to the children to make the case for the questions they want to answer’ within a particular unit. The way these teachers involve students in their own learning is further highlighted in the early groundwork that is critical in the final exhibition, where the students and teachers collaborate to develop the line of inquiry and the central questions.

In her interview, Sophia, the PYP coordinator, identified the key tools used for assessment at Sapphire School: portfolios, checklists, open-ended tasks and rubrics. She expanded on the use of rubrics and how the students often generate these. She also commented ‘we do a lot of self-assessment where the kids have options to think about their own work.’ Seven teachers provided diverse responses to survey questions focused on the embeddedness of a variety of practices in their daily work. To *my students have a clear idea of the purpose of the learning tasks they undertake*, only four teachers responded that this was embedded (90%) or established (75%) in their teaching. Despite this result, the survey question seeking a recent example of use of assessment to enhance student learning generated several student-centred examples, such as ‘I gave my young students a statement that they needed to agree to or disagree. I was amazed at how deep their reasoning was. In the process it turned into a fruitful class discussion.’

Identifying student learning along a developmental continuum

Sophia explained how the developmental continuum is conceptualised as a series of band widths in the school. She said:

... we use the continuum, so it's like in the PYP, we have a bandwidth in which we allow our students to be. Like we expect them to be in that bandwidth ... the starting point every year is pre-assessment so we assess our children to see where they are at that point in time ... it's individualised.

Further comments from Sophia and the artefacts shared by the focus group teachers support this strong emphasis on pre-assessment at every grade level, whereby students are assessed across key curriculum areas to see in which bandwidth they are situated. Sophia also described how some students who have been identified as needing additional learning support are offered it. The learning support teacher will work across a class but with several subtly targeted students who need additional help to attain the expected bandwidth for their year level.

Although Sophia did not identify the actual continuum document or policy used in the school, she did describe the structure of the continuum adopted. When asked to define the way bandwidths were used she said it was 'related to the content and the age group where they are working from.' Her descriptions identified a developmental continuum as a key assessment driver for Sapphire School. Pre-assessment was used to identify each student's place on the learning continuum. When they are found to be outside the expected bandwidth, intensive intervention is provided with the aim of moving each child along the continuum to their age-appropriate bandwidth.

Assessment and the Learner Profile

In her interview, Sophia outlines the purposeful planning that takes place to ensure each attribute of the LP is planned for and covered in the six inquiry units taught across the school. In regard to assessment, she described a process of self-assessment whereby students are asked 'to think about it with themselves and see where they are at the end of the year or during the unit ... how much of a thinker have they been or how knowledgeable.' She described the approach to assessment of the LP as reflective. The LP features on each student's report card and is included in his or her portfolio.

Sally provided a specific example of how the LP is assessed. During the final exhibition each student keeps a journal; they are asked to identify attributes of the LP that they have shown during the year as part of the lead-up to the exhibition. Sally said, 'it's not so much of an assessment but ... every couple of days the children write something about another child in class and explain why they think that ... I think they are very aware of it (the LP).' In the teacher survey, teachers identified performance assessment and anecdotal records as the most likely strategies to be used to assess the LP, with these two approaches used 75–90%

of the time by six of eight teachers. Self-assessment was reported as emerging (used 50% of the time) while peer assessment was either sporadic (three teachers) or never used (three teachers). No teacher reported that they used open-ended tasks to assess the LP.

Sophia outlined how deeply embedded the LP is in the school's philosophy. It is well supported by their parent community and the language of the LP is regularly heard. She said, 'I think that's [the LP is] a thing that we pay a lot of attention to because we want those values to be something that the children grow up with and hopefully demonstrate in the community.' Sara, the kindergarten teacher, acknowledged that the LP is a challenge. She said:

that is definitely something I want to work on more ... it's a little bit hard ... in this unit I've been able to report on it in my reports to say 'Poppy was a risk taker because she got up and sang her favourite song in front of the class.'

The role of formative feedback

The value placed on feedback at Sapphire School emerged strongly from the teacher survey, in which seven of eight respondents agreed or strongly agreed with the statement *Providing feedback to students is the most important component of the assessment process*. In addition, six teachers said that they used *feedback to help focus each student on the next step in their learning* 75-90% of the time. Sophia, the PYP coordinator, described feedback given in the school as 'very constructive.' Teachers also model this approach to students so that they use specific and constructive language when providing feedback to their peers, thus building both their collaborative skills and their capacity to support each other's learning.

Sophia described the school's approach to formative assessment. She told us the approach in the early years relied more heavily on observation of students during class discussion and visible thinking routines. Exit cards were used regularly to encourage reflection on learning. In middle and upper primary, students often used mini whiteboards to show their thinking. This tool provides teachers with strong evidence to plan for teaching and learning. Sophia described an integrated approach in which students participate in peer assessment using such activities as peer interviews and 'hot seating', co-constructed rubrics developed with students at the commencement of a unit of inquiry and shared target setting where 'we will be doing something and ... teachers use that to say you go back to your work and build on it using these targets.' Saskia, the grade 2 teacher, supported this perspective. She said 'we tend to use a lot of formative assessment ... the children record what they want to get better at or what they have done well in that particular piece of work.'

Topaz School

School context

Topaz School is a public, coeducational elementary school in the IB Americas region. It is large in comparison to other schools in the area, with around 650 students, of whom approximately 60% identify as Hispanic. It caters for students from Years 1 to 5. The language of instruction is English but communication with parents is in Spanish and English. A differentiated Spanish language instruction is offered for all students because that is the dominant language of the school community. The average income of parents is slightly lower than the state average (source: government website). The student-teacher ratio is lower for the younger year levels at 20:1, and rises to 31: 1 for Year 5. All of the teachers who responded to the survey were women with Masters degrees.

The school's mission statement includes words such as 'active compassionate lifelong learners' and an appreciation that those with different views can also be right (which is a feature of IB schools) but particularly relevant for this school. The school's website mentions the partnership between all stakeholders (students, parents/guardians and teachers), and this comes through clearly in the interview data with the PYP coordinator, Terry, on the question of *How does your school support your assessment policy and monitor individual teacher's use of this policy in the classroom?* Terry responded 'I think the parents monitor us better than the administration, don't they?' It is clear that the school's assessment policy is a 'living document,' and suggests an active role for all stakeholders.

The school's assessment handbook emphasises that students are aware of assessment guidelines or requirements before undertaking any area of study. The embedded nature of assessment in learning, the need for prompt and supportive feedback to students and communication with parents on a regular basis also feature. For teachers in particular, the use of assessment data to reflect on teaching and learning practices is highly valued.

Purposes of assessment

The teacher survey was completed by six teachers (one Year 1, two Year 2, one Year 3, one Year 4 and one Year 5). The majority of teachers at Topaz School described their approach to assessment as holistic (only one disagreed with this view). This was also reflected in their view of formative assessment as more valuable to teachers than summative assessment. Most teachers saw the main purpose of assessment as being to guide teachers and learners to close the gap between students' current level of understanding and their desired learning goals.

The school's approach to assessment of student learning has been influenced by a new nationalised system. The teachers surveyed reported that the school participates in several standardised tests: Smarter Balanced Assessment Consortium, Criterion Reference Test and Common Core (English and mathematics). None of these were commented on as drivers of assessment for learning; when teachers referred to assessments in the survey they

described ways in which they used assessments in mathematics and English, which were focused on individual needs.

In interview data, responding to the question about assessment tools used in the school, Terry described the use of Directed Reading Assessment (DRA) to assess reading level and comprehension. She went on to mention the use of some standardised testing such as Discovering Education Testing, which is used to project student growth from the beginning until the end of the year.

Using assessment to support student learning

An assessment guideline is published for all teachers and parents/guardians to see. This is described as a living and working document that sometimes brings the staff together while at other times causes staff to drift apart, especially between the lower and upper grades on how to grade or weight items and expectations. According to Terry, teachers often grapple together with questions such as: how are summative assessments looked at? Is this something that we grade? Is the rubric something that we include in student portfolios for them to look at in upper years?

During her interview, Terry described the assessment guideline as follows:

one of the really neat things is that [at] least at this point ... our whole grade level is always on board with the same assessment policies so we're trying to make it more fluid as a school, but at least I know when I have six other second-grade teachers working with me, we're all on the same page and the parents are seeing the same things.

In the survey, teachers were asked to provide a recent example of using assessment to enhance student learning. Topaz School teachers focused on broad areas such as reflective assessment procedures, where students looked back on their pre-assessment work to reflect on their own thinking and to address their own misconceptions, and end of year project-based assessments, in which students drew on skills learned throughout the year (across IB themes). Four of the examples related to reading and mathematics: examples include reading with students to develop independence while coaching and discussing goals and specific ways to reach these; holding reading conferences each month on reading growth, considering past goals and setting new ones. One teacher used an informal mathematics drawing task at the end of the year to quickly identify which concepts needed revisiting.

In her interview, Terry described how assessment for learning changes throughout the year as students' progress and gain greater understanding of what they can do, especially at the Year 2 level. Teachers take lots of notes on what students are doing and saying and give that information back to students, and this is followed up with a discussion. The writing down of those questions and the observations are considered to be really important. Little check-ins

like quizzes or tests are not used often. All grade levels use similar formative assessments to make sure that everyone is meeting their lines of inquiry and therefore preparing students for when they have the same summative assessment tasks. This means that, for example, with second-graders, even though each classroom will go in a different direction and pick up different inquiries, they can all meet the summative expectations at the end. (This was supported in the survey data, with all respondents agreeing that they collaborated with other teachers to moderate assessment judgements across the teaching team.)

Terry described summative assessment as 'usually pretty open-ended.' They often tried to include multiple intelligences (Howard Gardner's theory of Multiple Intelligences), which gives students the opportunity to show in various ways how they know what they know. In answering this question, Terry also referred to IB boards in classrooms on which students record questions; these show whether questions are shallow and so indicate if students have a basic level of understanding or are really thinking about it (the topic) and connecting to their planners.

An example from the survey data on innovative use of assessment shows the role of both formative and summative assessment:

We are currently working on 'Sharing the Planet' with the central idea 'Ecosystems are fragile and require care to maintain balance.' Students are researching their chosen biome through books and technology. Students are reading and discovering where in the world their biome is located, what the climate is like, and what animals and insects live in the biome. Students also discover life cycles and food chains in their biome. Next they create a diorama of their biome and then begin practising presentation skills of all they have learned with their peers, other grade level classes, and finally school parents.

This takes place just after Exhibition so the students have a better understanding of what a great presentation looks and sounds like. The summative assessment piece comes in when something upsets their ecosystem. As a grade level, teachers created different scenarios and one-on-one asked students what would happen. Students are assessed using a rubric. Students are assessed through formative assessments along the way, peer assessments, and rubrics. Finally, a reflection piece is placed into their portfolio so students recall their learning from year to year. I am not sure how innovative this is but the students are pretty charged up because of going to our fifth-grader's Exhibition and they could see how hard the fifth graders were working for many weeks. It really seems to give them so much more determination to do their very best. It means so much to the second-grade students when they present to a fifth-grader one-on-one and are critiqued by them. Parents are extremely proud as they listen to not only their own child's presentation but to other second-graders as well.

Identifying student learning along the developmental continuum

Terry described this in the following way:

Oh I think as we look at the whole school experience for grades 1 through 5 ... making sure that our curriculum is spiraling from the beginning. So having those, those peer line meetings (teacher meetings across year levels) and making sure that we're building background knowledge and then going deeper and deeper even when the common course (curriculum documents) says okay, you're teaching this for second and in fourth grade ... well we want it to look different There has to be something tougher that extends their understanding.

Assessment and the Learner Profile

The survey data on the item *It is difficult to assess student progress on the Learner Profile* showed that half the teachers disagreed with the statement, two were neutral and one agreed. The mean response was 2.5. In response to the item, *Describe how assessment of the Learner Profile might be used to support further development of learner profile attributes*, Terry responded that, on reflection, they did not really assess the LP in that way. She went on to explain how she saw it, giving an example of how one Year 2 student expressed her disagreement with another during a unit by saying 'I respectfully disagree with your stand,' and another example in which a student stated that he/she did not think another student was being a 'Thinker'. Terry noted that this use of appropriate vocabulary was evidence of the way students had developed LP attributes. She said she saw many such occurrences every day in the school.

The teacher survey results indicated that the LP is assessed using a variety of approaches. One teacher had embedded performance assessments in her program, four use them as established practice and one uses them sporadically. Open-ended tasks were not used by any of the six teachers for the purpose of assessing the LP. Self-assessment of LP attributes is used by five of the teachers as an established practice, while peer assessment is an established strategy for two teachers and only sporadically used by three teachers. Anecdotal records are embedded and established practice for two teachers and emerging for three; one teacher uses this strategy sporadically.

Three teachers indicated that student understanding of their LP is embedded, one that it is established, and one responded that it is emerging with her students.

The role of formative feedback

When asked about the way feedback is used to support learning, Terry stated that students are provided with a lot of feedback. She mentioned student portfolios as a wonderful way of achieving this, and noted how when 'student life' conferences were held in December they looked back at their work from the first unit of study. It is worth noting that one teacher in

the survey data indicated portfolios were never used for assessment; this was in response to the question *please rank each of the following assessment strategies used in your school*, so it can be assumed that she was referring to her use rather than the schools. Terry also involves students in helping her to create a rubric and holding themselves accountable. Students tell her what they should do to get an A. This kind of prediction of grades gives her feedback on what they know and what they expect from themselves.

When asked about peer assessment, Terry, who is also a Year 2 teacher, explained that it is not used as often. It is used more at an informal level, where students will use a heart or a star for a presentation to indicate something they liked and something else they would like done differently next time. She went on to comment that in terms of formal assessment it was not something she saw much in any area of the school. This is backed up by the survey, in which only one teacher responded that it is embedded practice in her classroom, with the remainder indicated that it is emerging or sporadically used.

The survey produced an average response of 4.50 to the statement *Self-assessment enhances students' learning*, showing all teachers were in agreement. Student self-assessment is undertaken at the end of a unit, providing a lot of information about what they enjoyed and became involved in. An 'IB at home' form is sent at the end of each unit. It seeks information from parents about what they are observing in relation to some of the material covered in the unit of inquiry. In the younger grades, staff do not know about a lot of the action that students take at home or in their wider community. It is important that action that results from their learning is recognised by students and their parents. Terry revealed that this 'has been really eye-opening this year.' She went on to think about units from which she gets nothing back from parents and wondered 'about what we're doing.'

Cross-case analysis

<i>Research Question 1</i>	<i>Proposition 1</i>
<i>How do IB PYP schools articulate their approach to assessment and the way it is used for supporting student learning?</i>	<i>IB PYP schools differ in the ways assessment is used to support student learning</i>

Cross-case analysis – research question 1

The eight IB PYP case study schools described in this report employed several approaches to assessment and used a variety of assessment strategies to support student learning. This section of the analysis presents overall findings from our analysis of school assessment policies, school handbooks, school websites and responses from teacher and IB PYP coordinator interviews. A high proportion of participants at each school reported that their main approach to assessment was holistic and that both formative and summative assessments were valued and employed at their school.

Results of a desktop audit of the websites of the eight IB PYP schools showed that six of the eight schools included publicly available assessment policies. All eight schools included aspects of the IB LP and IB framework within their mission statement, core values or vision statements. Such statements reflected four key themes:

- providing a superior education;
- providing programs that cater for individual needs of students so that they can reach their highest potential;
- develop the spirit of inquiry and open-mindedness; and
- preparing students to be responsible world citizens who respect diversity.

For example, Opal, Ruby and Agate Schools used terms such as ‘world-class,’ ‘superior’ and ‘international’ education to describe the main aims of education provided at their schools. In addition, all eight schools showed a strong commitment to developing programmes that incorporated the IB philosophy in supporting students’ learning and included terms such as ‘to challenge the creative mind,’ ‘to develop lively curiosity about things,’ to support a learning environment that is ‘characterised by inquiry, creativity, personal growth’ and ensures that students’ ‘natural inquisitiveness, their creativity and their inherent sense of fun are nurtured.’

Assessment policies

Examination of the assessment policies available from six of the eight PYP international schools showed four main themes: holistic assessment, ongoing assessment, use of summative and formative assessments, and use of a range of assessment strategies.

It was evident from all six assessment policies that ‘holistic’ assessment involved identifying the strengths and weaknesses of all students in all areas of their learning, including academic, social, emotional, physical education and sport. In order to assess all areas of each student’s learning schools employed a wide range of assessment strategies, including formative and summative assessments. Terms such as ‘balanced,’ ‘authentic’ and ‘comprehensive’ were often used to describe the holistic nature of their assessment. Some schools also stated that holistic assessment was valued and important for understanding children’s learning. For example, one school stated that ‘each component is important and should be valued for what it contributes.’

The second main theme to emerge from the inspection of the assessment policies included the notion that assessment needed to be ongoing. Terms such as ‘continuous’ and ‘ongoing’ were used, as well as describing the times throughout the year when assessment was to take place. It was evident that some schools included assessment dates for more formalised, standardised assessments that were often mandatory in order to meet particular government requirements. For example, one school’s policy described assessment as:

... an integral part of all teaching and learning experiences ... Assessment happens in all facets of school experience and is instrumental in the achievement of the PYP’s goal of thoughtfully and effectively guiding students through the five essential elements of learning.

It was also evident from school assessment policies that schools used a range of summative and formative assessments. Many schools included the specific terms ‘formative’ and ‘summative’ in their publicly available assessment policies, but not all schools explained the meaning of these terms. However, schools which included brief definitions of each term often accompanied these terms with specific examples and an outline of the importance of each in understanding each child’s learning needs. For example, formative assessment was described as:

... on-going and interwoven into the instructional process. It is implemented to inform students and teachers about student learning in order to plan the next stage of instruction. (Sapphire School)

... interwoven with the daily learning and provides both teachers and students with useful feedback on how well students are understanding and applying the new concepts, skills, and knowledge. (Ruby School)

... interwoven with daily learning and helps teachers and students find out what the students already know in order to plan the next stage of learning. Formative assessment and learning activities are directly linked; neither can function effectively or purposefully without the other. (Emerald School)

Similarly, summative assessment was described as follows.

Summative assessment takes place at the end of the teaching and learning process and gives the students opportunities to demonstrate what has been learned. Summative assessments may include any combination of the following: acquisition of data, synthesis of information, application of knowledge and processes. These can address multiple learning styles. (Ruby School)

Summative Assessment takes place at the conclusion of a period of learning and is implemented to give students the opportunity to demonstrate what has been learned. (Sapphire School)

Summative assessment, which occurs at the end of the teaching and learning process, provides students with opportunities to demonstrate what they have learned. It aims to give teachers and students a clear insight into students' understanding. (Emerald School)

Harlen and Johnson (2014) identified the need for IB PYP schools to differentiate between summative and formative assessment. Our study showed that many of the case study schools made a point of doing this in publicly available policy spaces.

Further scrutiny of the schools' assessment policies in relation to summative and formative assessment showed that some schools listed specific summative assessments that were further categorised into internal and external assessments. For example, some schools listed the specific assessments that were conducted as part of government requirements such as standardised tests and benchmarks, while other schools listed external international assessments such as the International Schools Assessment (ISA) and the OECD's Programme for International Student Assessment (PISA) as part of their summative assessments. Interestingly, Diamond School's website described its assessment policy in terms of external summative assessments only; it did not include any formative assessments. However, this may represent a lag in updating the school website, given that responses from focus group and PYP coordinator interviews showed that the school had spent considerable time recently on professional learning for teachers relating to assessment procedures, including both formative and summative assessments.

The final theme that emerged from our examination of assessment policies related to the use of a broad range of assessment strategies. Some policies listed the specific strategies used while others simply stated that multiple assessment strategies were employed. Schools which listed specific assessment strategies included the use of the following: observations,

portfolios, norm-referenced assessments, checklists, rubrics, anecdotal records, student self-assessment, peer assessment, teacher-devised assessment tasks, and diagnostic and standardised tests. Again, many of the assessment policies included a list of specific tests such as PAT, PM benchmarks and the online assessment tool e-asTTle.

Broad beliefs about assessment

Four main themes emerged from our examination of the survey and focus group and PYP coordinator interview data with respect to assessment policies: holistic assessment, ongoing assessment, use of summative and formative assessments, and use of a range of assessment strategies. The findings showed that while schools' broad beliefs about assessment reflected the contents of the assessment policies, there were also some differences.

Survey results showed that the majority of teachers believed that their approach to assessment is holistic. Responses from interviews also showed that school staff believed that assessment approaches needed to be balanced and authentic. For example, the PYP coordinator at Sapphire School described their approach as balanced and consistent so that all members of the community shared a common understanding. Similarly, a teacher at Opal School acknowledged the need for moderation to ensure a consistent understanding of students' learning. Furthermore, many teachers believed that it was important to employ a range of assessment strategies to ensure that students' learning needs were addressed and understood. Ellen from Emerald School noted that her school had broken down 'the reflection [on student learning] into outcomes, so speaking about the child's identity, learning and communication ... not just academic.' However, in terms of assessing all aspects of the child's learning, it was not evident how schools assess students' emotional and social wellbeing, inquisitiveness and open-mindedness. This challenge was further highlighted when participants were invited to comment on how attributes of the LP were assessed. Overall, most participants agreed that it is difficult to assess some of the attributes and yet were willing to explore ways to do this.

It was also strongly evident from participant responses that assessment is an ongoing process. Many teachers made statements like 'assessment is just another part of teaching and learning', and that feedback is 'provided on a day-to-day, minute-by-minute and lesson-by-lesson basis.' In addition, terms such as 'continual' and 'longitudinal' were used to describe the ongoing nature of assessment.

A third theme that emerged from survey and interview responses related to summative and formative assessment. All schools articulated the use and importance of both types of assessment, but there were differences in the perceived level of importance and the value of each in understanding children's learning and planning for future teaching. Specifically, there were different purposes for schools' participation in external, standardised summative assessments. For example, at both Ruby and Opal Schools there was tension around the inclusion of some summative assessments and the importance of using more formative

assessments. Both these schools are newly established IB PYP schools and are in the process of building a whole-community understanding of assessment, including teachers and parents. Traditionally both schools have predominantly documented students’ learning through the use of numerical grades based on formal standardised tests. In addition, parents within these communities appear to make decisions about enrolling their children into these schools based on results from external standardised test results and benchmarks. Dealing with such tensions is clearly a major challenge facing these schools. However, Ruth, the IB PYP coordinator at Ruby School, stated that there is a need for a community approach to shifting assessment cultures within the school community. This involves building trust with parents and educating both parents and teachers to understand the importance of a holistic approach to assessment that includes both formative and summative assessments.

In contrast to the tensions outlined in Ruby and Opal Schools, other IB PYP schools often articulated that the purpose of participating in these external assessments was more of a requirement of the external government curriculum bodies rather than what drives the schools’ assessment policies and beliefs. Furthermore, many of the more formal assessments are only used at the beginning of a school year to assist with teacher planning for student learning. For example, at Agate School one teacher stated that the ‘more formal testing things that we do at the start of the year and the end of the year ... we use solely for planning. We’re trying to make a picture of the class [and] of what’s happening.’

The final theme that emerged from the interview data corresponded to the themes identified during an inspection of the assessment policies related to the wide range of assessment strategies employed at each school. Similarities and differences across all eight schools are evident and are further discussed in the following section (with reference to Research Question 2).

<i>Research Question 2</i>	<i>Proposition 2</i>
<i>2. How do IB PYP schools and the teachers in these schools implement assessment design that reflects the diversity of purposes of assessment (assessment of, for and as learning)?</i>	<i>Teachers in IB PYP schools use and design assessment for a range of purposes</i>

Cross-case analysis – research question 2

Holistic approach to assessment

The teachers’ belief that they are implementing a holistic approach to assessment, which involves both formative and summative assessment strategies, is strongly represented across the case studies. Teachers communicated passionately about the connection

between learning, teaching and assessment and their practices of implementing diversity in assessment design and strategies in an attempt to capture, and make visible, students' learning in a variety of modes. The integrated nature of learning and assessment is often expressed across the schools, and can be represented by the thoughts of Debbie, who finds it difficult to separate assessment and learning.

So assessment is just another part of teaching and learning. I find it hard to put it in a box, it's all just what we do every day. (Debbie, Diamond School)

Staff at some schools speak of cycles of assessment, with one school (Agate) articulating the spiral nature of assessment cycles as one level informs the learning, teaching and assessment of the next level. Anna, the PYP Coordinator at Agate School, explored this, saying '... so we're always in an action cycle of assessment.'

This analysis across the case study schools suggests that the IB PYP schools are grappling with balancing the three key purposes of assessment as articulated by Lorna Earl (2003): Assessment of Learning, Assessment for Learning, and Assessment as Learning. Our study used Lorna Earl's (2003) three purposes because she has created the Assessment as Learning as a separate category, which focuses on students reflecting and monitoring their progress to inform their future learning goals. Thus, Earl (2003) argued, Assessment for Learning focuses on the student co-constructing their learning as well as being a 'critical connector' between learning and assessment (2003, p. 25). This approach to defining assessment purposes is counter to the approach taken by Black & William (1998) in their seminal work *Assessment and Classroom Learning*. According to their framework, the principles and practices associated with Assessment as Learning is a subset of Assessment for Learning; there is sense in bringing the two purposes together as they support and inform each other. In fact, Earl (2003) argued that Assessment as Learning 'reinforce[s] and extend[s] the role of formative assessment for learning' (2003, p. 25). However, implementing the student-centred assessment approaches and self-monitoring (Assessment as Learning) is challenging for teachers, as it requires rethinking assessment principles and practices. Using empirical evidence, our study continues to illustrate a consistent finding in the literature: that Assessment as Learning is most challenging for teachers to implement. For this reason, while it might feel arbitrary at times, it is important to make Assessment as Learning distinct from Assessment for Learning. Making Assessment as Learning distinct enables us to highlight an aspect of assessment that is troubling many school communities in implementation.

Assessment of learning

Assessment of learning is one of the purposes of assessment, in which evidence is used (often by teachers) to make a judgement on student achievements against goals and standards. It is often represented by summative assessment. Characteristics of summative assessment include that it:

- relates to achievement of broad goals expressed in general terms rather than the goals of particular learning activities;
- involves results being reported at certain times, not as an everyday part of learning; and
- uses evidence obtained when students are involved in special tasks or tests as part of, or in addition to, regular work. (Harlen & Johnson, pp. 12–13)

Analysis across the case studies reveals that there is a strong presence and use of external, standardised tests within IB PYP schools. These standardised tests have characteristics of summative assessment and have the purpose of making a judgement of student achievement at a particular point in time. The standardised tests have two major functions within the IB PYP schools:

- diagnostic testing – to identify what students know at the beginning of the school year (e.g., DRA at Topaz School; PAT at Pearl School); or
- comparative or benchmarking purposes – where students’ performance is judged with another, often international, system (e.g., Cambridge Achievement Test at Opal School) or for comparing students in national standardised testing of literacy and numeracy (e.g., Pearl, Ruby and Emerald schools).

Frequently, schools found diagnostic testing using external, standardised tests was a critical phase of the commencement of the school year and assisted teachers to ‘profile’ each of their students and their learning needs in order to inform their curriculum and assessment planning. As teachers discussed the use of this category of standardised tests as having a diagnostic function, it appears this is an illustration of how the teachers are blurring the boundaries between the purposes of assessment or, as teachers sometimes mentioned, ‘balancing’ assessment practices. In this case, the use of standardised tests for diagnostic purposes indicates not only a summative function but also an Assessment for Learning role, since the assessment data is also used for curriculum planning purposes.

In contrast, the use of standardised tests for comparative or benchmarking purposes has a robust summative assessment approach. It is also where the ‘testing culture’ is nurtured and competitive rather than collaborative principles of learning emerge. This is often when the discourse of accountability is engaged across the schools in the study, despite research participants from several schools voicing their beliefs that such tests were not drivers of assessment within their respective communities (e.g., Topaz). Participants from a few schools (e.g., Ruby and Diamond) were able to articulate the tensions or challenges that this competitive nature of the assessment of learning purpose through external and often high-stakes, standardised tests can enculturate within the school community. Such schools are thinking and acting on how they might disrupt the hegemonic dominance and associated negative impacts of a testing culture. As an illustration, using a whole of community-based

approach, Ruby School's principal leads a series of workshops with parents to help them understand the value of formative assessment, and it is a priority for ongoing professional learning and development for her teaching teams. Meanwhile, many schools don't problematise the tensions or challenges between the practices of high-stakes standardised testing with the IB philosophy of assessment principles, and some schools rationalise the practice for external standardised testing as important to build a positive reputation for high-quality learning and achievement in the school within their region (e.g., Opal).

The remaining assessment type within Assessment of Learning is teacher-designed summative assessment tasks. Our focus groups provided many examples of such tasks, which are often assessed using a rubric tool. The divergence of assessment design from the practice of using standardised testing is significant. Here, the teachers spoke passionately of assessment design that is rich and open-ended, creating opportunities for students to represent their learning using a variety of modes to show the depth of their knowledge, skills and even (at times) values (such as through IB LP attributes and IB attitudes). Often these teacher-designed summative assessment tasks are seen as the culmination of a student's learning and assessment journey that follows a purposeful Assessment for Learning approach. This is another illustration of how boundaries are blurred between assessment purposes such as Assessment of Learning with Assessment for Learning. This approach to summative assessment and Assessment of Learning is aligned to the IB PYP assessment philosophy. A further example of this intricacy came from a Diamond School teacher who shared her understanding of assessment as a complex act that involves all three purposes of assessment (of, for and as learning) over the learning experience.

Grade 2 students learned about actions/verbs and had to create a comic. It involved a checklist for self-assessment throughout the process, rubrics for summative peer assessment, written feedback from teacher to improve understanding and teacher and self-reflection at the end. [I describe this as] 'scaffolded learning with assessment.' (Diamond School teacher's survey response)

Some school staff members discussed their strategies to develop assessment reliability and validity in their summative assessment tasks by designing assessments in teaching teams, as well as engaging with moderation practices when marking summative assessments (e.g., Opal). A few schools also engaged parents within assessment cycles (e.g., Sapphire, Opal, Topaz). The teachers at Opal School shared their strategy of including parental reflection and feedback on their child's summative assessment tasks (See Figure 12 in the following section).

Assessment for Learning

Assessment for Learning is often represented by formative assessment practices. Across the schools, the teachers most often discussed formative assessment in relation to the teaching

of the inquiry units within the IB PYP. This observation within the study suggests that formative assessment correlates with demonstrating the complexity of learning facilitated by the PYP Inquiry units.

All schools in the study passionately valued the role of formative assessment, rather than summative assessment, to improve student learning. This is clearly linked to their beliefs that through formative assessment teachers gain insights into the students' thinking and learning processes and was often articulated by most teachers. Pina illustrated the type of insights that can be gained from formative assessment by both teachers and students.

... it [formative assessment] gave them [students] an insight into their thinking ... some of them, you know, their thinking was quite shallow ... some of them came up with some good open-ended questions or whether they still had closed questions. (Pina, Pearl School)

Furthermore, there is a vigorous understanding amongst the teachers across the case studies that student results from formative assessment are integral to inform curriculum planning and improve student learning processes as well as learning outcomes. The case studies have several implications for curriculum planning. Some schools identified how formative assessment is used to inform curriculum planning for differentiation in order to meet the learning needs of the students (e.g., Diamond). The teachers at Emerald School talked about how to use formative assessment to gain better understanding of the children in their classrooms; to 'see' the whole child with their learning interests as well as learning needs. With such insights, teachers could make stronger links between assessment tasks and the learning goals of students. Offering another perspective, teachers at Sapphire and Topaz schools discussed the significance of a team approach to planning and assessment design to promote consistency and innovation in assessment design. In addition, teachers from Agate School deliberated on the importance of teachers giving quality feedback to students in formative assessment. This includes that feedback needs to address the assessment criteria; be specific; focus on what the student is doing; and provide advice for future learning or area for improvement (i.e., feedforward).

The prodigious use of formative assessment practices across the schools, particularly in Assessment for Learning, means that teachers are collecting and managing huge amounts of assessment data. For example, Saskia (Grade 2 teacher, Sapphire School) reflected, 'we tend to use a lot of formative assessments for my children and every time I mark their work I'm looking for things... [about their learning].' A key question is, how are the teachers recording, managing and making meaningful interpretations of these large datasets? This is where a team approach to curriculum planning and assessment moderation can support assessment interpretation. Staff at some schools (e.g., Diamond, Sapphire and Ruby) suggested they could work on improving their practices in assessment data interpretation and evaluation of learning outcomes and how to act on their findings.

Assessment as Learning

In the survey, many teachers revealed that they believe involving students in assessment improves student learning. A variety of practices demonstrate how this belief can be achieved, yet this assessment dimension holds the most challenge for teachers across the schools in the study, particularly related to peer assessment practices. As argued earlier in this section, Assessment as Learning often encompasses formative assessment and is an extension of Assessment for Learning. Hence, Assessment as Learning relies on student-centred learning pedagogies integrating self-assessment and peer assessment strategies.

Compared to peer assessment, student self-assessment practices are highly represented in all the schools within the study, providing evidence of Assessment as Learning. Commonly, self-assessment is used to support student development of their metacognitive abilities in order to lead to a better understanding of their own learning and how to improve it. Research participants reported that self-assessment encompasses written (e.g., responses on a reflective worksheet; checklists; entry or exit cards) or visual (e.g., thumbs up/down; traffic lights) or dialogic (e.g., students unpacking their understanding of the assessment task/criteria with peers) techniques within the primary classroom. Students often use rubrics to self-monitor their progress on an assessment task, whether they are formative or summative.

Another dimension of Assessment as Learning is to build metacognitive skills for lifelong learning, and this principle is embodied in Sapphire School's mission, which includes 'development of students ... who will strive for excellence and cherish lifelong learning.'

Teachers at the Opal School described a strategy they call Think 1 and Think 2 student statements. Written at the beginning of the unit, Think 1 statements outline students' prior knowledge of the topic, which also informs the teacher's planning of the unit. At the end of the unit, in their Think 2 statements, students reflect on how their thinking has changed and what they have learned. Such a strategy models lifelong learning to students and challenges students to analyse their thinking and address their own misconceptions. Other schools in the study reported modelling self-assessment, and at times peer assessment, strategies to build on their lifelong learning skills (e.g., Pearl School). Several teachers at Diamond School shared their ICT-based, innovative self-assessment strategies to encourage students to make their thinking and learning visible (e.g., use of software like Cam Studio, Doodlecast, Voice Thread, Easy Blog Junior), which can be reviewed by the student later in their assessment journey to reflect on their changes in thinking and learning.

Teachers also acknowledge that peer and self-assessment are not innate and need to be learned. In particular, participants from several schools mentioned challenges with Assessment as Learning and cautioned the sophistication and maturity required for peer assessment (e.g., Ruby, Emerald, Agate). These schools were anxious that implementation might harm students. Consequently, such schools elucidate the need for student 'training' in

self- assessment and, above all, peer assessment. Use of role play (e.g., Ruby School) and modelling (e.g., Pearl School) assists students to build their skills in giving and receiving feedback in a supportive and constructive environment.

<i>Research Question 3</i>	<i>Proposition 3</i>
<i>How do IB PYP teachers understand the role of evidence in assessment and provide documentation of student growth of knowledge, understanding and skills?</i>	<i>Teachers in IB PYP schools understand the role of evidence in assessment and its impact for student learning</i>

Cross-case analysis – research question 3

The role of evidence in assessment focuses on how teachers document and report on student achievements in learning across the IB regions, which is frequently associated with accountability. That is, accountability to parents, the IBO, local education authorities (in most but not all cases) and students as evidence of learning through diverse strategies integrated in Assessment of, for and as Learning. Researchers argue that evidence needs to be ‘directly observable’ and it is ‘what [students] do, say, make or write’ (Griffin 2014, p. 3) that can form the evidence of learning within assessment practices in the classroom. This premise implies the need for teachers to consider diverse assessment strategies to capture student learning achievement, which can also inform the curriculum and assessment of the work of teachers. Such assessment practices align with principle nine of quality assessment practice, as outlined by Wynne Harlen:

{Principle} 9: Assessment should combine information of different kinds, including students’ self-assessments, to inform decisions about students’ learning and achievements. (Harlen 2010, p. 31)

Diverse assessment strategies challenge teachers to be deliberate at the outset of curriculum design about what evidence of student learning and achievement will be collected (and when), monitored, and analysed (e.g., Headington 2003; Klenowski & Wyatt-Smith 2014). Some IB PYP teachers reflected this disposition when they noted that their curriculum practice has shifted to Wiggins and McTighe’s (2005) backward curriculum design framework, with the focus on assessment (and thus, the evidence they were aiming to collect) as the starting point (e.g., Diamond School). This also contributes to the challenge of managing these large amounts of diverse data and meaningfully interpreting student achievement for curriculum planning. This raises the issue of building teacher assessment literacy and the need for ongoing professional learning and development (e.g., Gardner et al 2010; Klenowski & Wyatt-Smith 2014), and the need for a collaborative approach among

teaching teams to working with assessment evidence and its analysis (Cochran-Smith & Lytle 2009; Griffin 2014; Klenowski & Wyatt-Smith 2014; Timperley 2014).

Schools provided a range of artefacts to demonstrate the way they use evidence of student learning as both formative and summative assessment. Examples of these are presented at the end of this section under the headings summative (Assessment of Learning) and formative assessment (Assessment for Learning and as Learning).

During the focus groups, teachers at each school described their use of a variety of assessment tools such as portfolios, e-portfolios, rubrics, on-line blogs, checklists, anecdotal records, running records, observation notes and conversations, and dialogue between teacher, student and parents. Examples of each were provided, all of which constitutes evidence of learning and its assessment. (Anecdotal records were mentioned frequently, but no examples of this type of assessment tool were provided.)

Portfolios as evidence of student learning

Sapphire School identified portfolios as one of their key assessment tools. Portfolios were also significant for Diamond School with one teacher explaining her use of writing samples within the portfolio as a self-assessment tool which enabled her to work with each student to set their own learning goals. Nevertheless, there are mixed views about the value of portfolios. Although portfolios (including digital portfolios) are increasingly in common use as assessment evidence, the observed tension in the use and value of portfolios across the school cases is mirrored in the literature (e.g., Bures et al 2013; Metin 2012). Diamond School also used e-portfolios to highlight student progress; these portfolios included audiotaped self-reflections, which one teacher elaborated on as ‘what I am looking for is growth in their ability to talk about their thinking and to express their strategies in maths.’ Opal School uses paper-based portfolios except in upper primary years for mathematics and English. E-portfolios appear to be a developing trend and in some cases are controversial, with Agate putting this tool on hold due to the staffing demands of this shift into ICT-supported assessment tools. Opal School responded to a student backlash by reverting to a paper version of the portfolio; students had commented that the ePortfolio was not reflecting their learning effectively. ‘The students started complaining that they were just putting in material to make the e-portfolio look “pretty and big”’ (Teacher at Opal School). The students wanted to have subjects in which they felt they were not doing well included in their e-portfolio, so that they would get feedback on their work, and thus improve. The teachers have responded to the students’ feedback.

Teachers at Ruby School described another form of portfolio, which they called the Orange Book – an individual’s collection of work based on their formative assessment. The teachers used this strategy to redress the conception among both students and parents that assessment is only summative. In fact, in the course of the discussion the teachers decided they would like to re-name the Orange Book to the What I Know ... Book, in order to

emphasise the focus on formative assessment and that learning is part of a journey.

These findings from across the case study schools suggest that both the type of portfolio and the purpose of the portfolio can be contentious in IB PYP schools. It appears to be viewed by teachers as both a formative and summative assessment tool. In an electronic form, the opportunity to include audio annotations and record student thinking is highly valued and provides excellent evidence of how IB PYP teachers use assessment for and as learning. Tensions between students and teachers in relation to the portfolio suggest its role in supporting learning may need to be more explicit. Teacher survey data supported this finding, showing that the use of portfolios to support learner autonomy is unlikely to be established or embedded in teacher practice for the whole teacher group.

Rubrics

Rubrics were widely used across the cases study school; sometimes they were co-constructed with students. A teacher from Sapphire School described how students engaged in this at the commencement of an inquiry unit, thus helping to collaboratively set learning goals. At Topaz School, one teacher involves her students in describing what they would consider constituted an 'A' result. At Ruby School, teachers reported that rubrics were used frequently to develop students' metacognitive skills, although what constitutes those skills was not elaborated.

Opal teachers make use of Google Forms for individual assessment (these forms are a way to create forms and surveys and analyse data). Another ICT-based tool that students enjoyed was Flubaroo (a free tool that helps users to quickly grade multiple-choice or fill-in-blank assignments – <http://www.flubaroo.com/>). Teachers saw limitations with this ICT tool due to difficulties encountered with coming up with closed-answer questions.


It was clear that all teachers in the IB PYP case study schools understand the role of evidence in assessment and its impact for student learning. The following examples (Figure 7– 12) show the range of ways this is done.


Examples of assessment evidence


Figure 7: Portfolio parent feedback tool, Emerald School

Portfolio Response Sheet Prep-Year 2
Two Stars and A Wish

At the conclusion of sharing your child's learning through their portfolio, please complete this page with your child, reflecting on his/her learning. Choose two positive aspects or highlights (Stars) of your child's learning this term. Then set a goal for attention or improvement (Wish) for the following term.

 _____

 _____

 _____

If there are any other important reflections you wish to share with your child or their teacher, please write them in the space below.

Additional Reflections

Parent signature.....Student signature.....

Figure 8: Rubric and summative assessment task, Topaz School

2nd Grade Sharing the Planet Summative

Central Idea: Ecosystems are fragile and require care to maintain balance.

Student Name: _____ Biome/Habitat: _____
 _____ May 2015

Circle the problem/scenario presented by teacher that affects the balance of the student's chosen biome/habitat/ecosystem:

Biome	Potential Events that Change the Biome
Desert	Flooding, littering, recreational vehicle use, disease, introduction of a new species,
Tundra/Polar/Arctic	Introduction of a new species, oil drilling, global warming (iceberg melting)
Forest	Deforestation, wildfire
Rainforest	Deforestation, wildfire
Ocean	Overfishing, oil spill, pollution,
Freshwater	Invasive species, pollution, algae, construction (building over wetlands), hurricanes in costal estuaries
Grasslands	Wildfire, flooding, pollution, invasive species, hunting,

Student's oral solution/response to the presented problem/scenario (teacher notes):

Exceeding	Satisfactory	Not Satisfactory	Emergent
The student addressed the scenario presented by discussing, in depth, possible consequences that may arise as a result of the changing biome/habitat/environment. The student's response highlighted his or her in depth understanding of the ecosystem, its inhabitants, and the balance of life in his/her chosen ecosystem/habitat/biome.	The student addressed the scenario presented by discussing or listing possible consequences that may arise as a result of the changing biome/habitat/environment. The student's response highlighted his or her sufficient knowledge of the ecosystem, its inhabitants, and the balance of life in his/her chosen ecosystem/habitat/biome.	The student did not address the scenario presented by discussing or listing possible consequences that may arise as a result of the changing biome/habitat/environment. The student's response showed that he /she lacked knowledge about the ecosystem, its inhabitants, and balance of life in his/her chosen ecosystem/habitat/biome.	The student did not respond to the presented scenario Or his/ her response was so limited that it was evident that he/she did not have any background knowledge about the ecosystem/biome/habitat, its inhabitants, and balance of life in his/her chosen ecosystem/habitat/biome.

Figure 9: Summative assessment task, Sapphire School

Central Idea

Changes people experience at different stages of their lives affect their evolving sense of self.

What lines of inquiry will define the scope of the inquiry into the central idea?

The physical, social, emotional and intellectual changes that occur throughout life.

Factors that contribute to well-being during adolescence.

How relationships contribute to our self-esteem.

Product and purpose:

You need to produce a guide with information about:

* the physical, the emotional and the social changes you (might) go through during puberty.

Explain how these changes occur during puberty, which body systems are responsible for these changes and how? (*Function and change*)

* Explain to your parents that you understand that the choices you make now can be of influence on the rest of your life. Show this by including 2 fictional interviews in your guide. One with a person who made unwise choices during puberty and one with a person who made wise choices. Make sure cause and effect are clear in these interviews. (*responsibility*)

Figure 10: Example of self-assessment of the Learner Profile, Emerald School

▪ Name: → _____ ¶

▪ **Student Self-Assessment** ¶

¶

★ → Do I ask questions to find out and learn? (Inquirer) ¶

→ ☺ → ☹ → ☞ ¶

¶

★ → Am I a good thinker? Do I help make decisions? (Thinker) ¶

→ ☺ → ☹ → ☞ ¶

¶

★ → Do I share my ideas and what I think? (Communicator) ¶

→ ☺ → ☹ → ☞ ¶

¶

★ → Am I a risk-taker? (Risk-taker) ¶

→ ☺ → ☹ → ☞ ¶

¶

★ → Do I share what I know about the world? (Knowledgeable) ¶

→ ☺ → ☹ → ☞ ¶

¶

★ → Do I take turns? (Principled) ¶

→ ☺ → ☹ → ☞ ¶

¶

★ → Am I caring towards others? (Caring) ¶

→ ☺ → ☹ → ☞ ¶

¶

★ → Am I a good listener? (Open-minded) ¶

→ ☺ → ☹ → ☞ ¶

¶

★ → Do I participate in all activities? (Balanced) ¶

→ ☺ → ☹ → ☞ ¶

¶

★ → Do I think about what I am good at and what I need to try hard at? (Reflective) ¶

→ ☺ → ☹ → ☞ ¶

Figure 11: Self-assessment, Topaz School

Name: _____ Date: May 2015

2nd Grade Sharing the Planet – Student Self-Assessment
Central Idea: Ecosystems are fragile and require care to maintain balance

- Role of Insects in the world (Related Concept: Role)
- Relationships within an ecosystem (Related Concept: Interdependence)
- Environmental and human Impact on ecosystems (Related Concept: Value)

What is an ecosystem?

Tell three things you learned about insects:

1. _____

2. _____

3. _____

List an example of a human action that affects an ecosystem.

List an example of an environmental action that affects an ecosystem.

I liked building a diorama about an ecosystems and habitats. 😊 😐 😞

Why? _____

Which was the most interesting insect life cycle you observed or learned about?

What did you like most about this unit of inquiry?

What do you still want to know? or What would you still like to do?

Figure 12: Parent feedback, Opal School

Opal school email to parents
Dear Parents

How can you get more involved in your child’s work?
Well, other than the usual goodies, we continue the action of POSITIVE FEEDBACK! On the first page of each Maths and formal Language Arts book, you will find a **‘PARENTS REFLECTING ON PROGRESS’** page.

Our aim this year is to make sure that parents are up to date with what the students are doing in class. **One** of the ways in which we can ensure this, is by sending their workbooks home for you to see **and** for you to give your child WRITTEN positive feedback. You might even want to add what you think they could do to improve on their work.

Please note, this is not to look at how many pages have been done in a book or to compare classes, as you know, students use a variety of resources to record their thoughts/actions and knowledge gained within a lesson. This really is a case of QUALITY (progress), not QUANTITY.

The class workbook that you will receive, will also have notes made by the teacher, so you can see what ‘next step’ advice the teacher has given your child. The class assessments, **only when done on paper**, will also be pasted into this book, so that you can view your child’s progress.

Again, parents are reminded that class workbooks are just a **SNAP SHOT** of what is covered in class.

Research Question 4	Proposition 4
<i>How do IB PYP teachers identify students’ current level of development and use it to plan for depth and rigour of teaching and learning?</i>	<p><i>Teachers in IB PYP schools use work samples and other evidence to identify students’ levels of development</i></p> <p><i>This evidence is then used to plan for depth and rigour or student learning</i></p>

Cross-case analysis – research question 4

Several common themes emerged from the cross-case analysis in relation to the identification of current levels of development and how this information is used.

As has already been highlighted, all eight case study schools displayed a strong focus on formative assessment; much of this is based on the use of a variety of assessment tools to identify students’ current level of learning. Participants from Agate, Sapphire, Diamond, Pearl and Opal Schools referred to the way they assess students at the commencement of

the year or the commencement of a unit of work to ascertain their current level of skills or knowledge. This information is used to help plan learning activities and monitor progress over the year of school or the unit of work. Tools such as portfolios are seen as valuable because they provide 'a year-long summary over time that shows evidence that a child has made good progress' (Denise, Diamond School).

Many schools identified a continuum as a useful tool for finding out what a child can do and used this to determine where to go next with their learning. In broad terms, they appeared to have adopted a developmental model of 'assessment for teaching' (Griffin 2014). They cited a range of evidence that they collected to identify each student's current level of skills and understanding. As an example, David at Diamond School said that teachers selected appropriate learning activities for an individual learner that were just right for their level – 'it's whatever they are ready for' – suggesting that the Zone of Proximal Development (Vygotsky 1978) was a guiding concept at his school.

Despite their adoption of an 'assessment for teaching' model, the schools struggled with selecting a useful framework or continuum on which to place students in order to judge their learning needs and assess their progress. Griffin (2014) identified a wide range of possible continuums and the case study schools did likewise. Useful continuums appeared to be drawn from a variety of sources. Some schools reported that they really only applied this concept to mathematics and literacy. Edward at Emerald School noted that these continuums were very valuable for moderation purposes as a way of ensuring some consistency across teachers.

Several schools (Sapphire, Agate and Diamond) indicated that the developmental continuum was conceptualised as a series of bandwidths in the school. Pre-assessment tasks were used at the beginning of the school year to assess where students were within these bandwidths. Sophia at Sapphire School said that 'in the PYP we have a bandwidth in which we allow our students to be'; support is then offered to students who need additional intervention with their learning to help them to attain the expected bandwidth for their year level. Staff at Diamond School also made it clear that a key assessment driver was to place every child along a continuum and to take every child to his or her highest potential. Other schools were not quite so specific about how they used pre-assessment tasks, but alluded to their value for monitoring development. At Agate School, teachers did 'a lot of diagnostic stuff at the beginning of the year which helps guide our teaching'; this was highly valued: 'to me that's one of the most important assessments at the start ... it's kind of a bigger picture assessment' (Anna). Use of 'age or grade norms' was referred to, while other schools described the use of a scale or ladder as valuable for monitoring learning progress.

At Topaz School assessment and curriculum were conceptualised differently, with a focus on a spiral curriculum where learning is seen as a whole school experience from Years 1 through to 5. Learning topics could be revisited over the year and over different grades in order to drill down deeper and deeper into various key concepts. This idea helped teachers

to move away from what should be taught and known within a particular year level and move toward conceptualising learning as building on prior knowledge and understanding at an increasingly sophisticated level.

The case study schools in this project were often vague or eclectic when describing the exact continuums teachers use for the purpose of identifying current levels of development. Some schools reported that they call on a wide variety of documents for this purpose, including the IB PYP Scope and Sequence documents, the Australian Curriculum (not necessarily only Australian schools), and the Cambridge Benchmarks. Others identified curriculum-specific tools that assisted in establishing levels in regard to aspects of numeracy or literacy, such as PM Benchmarks for reading comprehension. Analysis of the eight case studies revealed a consistent reluctance to identify the continuums, benchmarks or bandwidths used within the school, even though all participants acknowledged their value.

Two schools identified some tensions within the system in regard to identifying each student's current level of development. David at Diamond School described a difficulty for IB PYP teachers in relation to curriculum or scoping documents that represent expectations at grade level. He reported that teachers were not always sure whether to report on student progress according to the developmental continuum or to show where they sit in terms of grade level. This challenge was further highlighted in the survey results for Diamond School, which showed that only 17 out of 37 teachers considered the practice of placing students on a developmental continuum to be embedded or established in their teaching practice. This issue appears to be further exacerbated for early years teachers, who described themselves as torn between following the interests of the child and adhering to the benchmarks imposed by the curriculum in areas such as phonics and mathematics. Emerald School teachers said there were competing challenges around mapping against either national continuums in place in the school's local geographical location or alternatively against IB PYP outcomes. These remarks highlight a current significant challenge for IB PYP schools in this study. Schools and their teachers struggled to define the concept of a developmental continuum. They find the concept valuable as it reflects their commitment to formative assessment practices in which each student's current level of understanding and learning is established and used to plan for their next stage of learning, but they are unclear as to what a continuum might look like and how it relates to the many tools currently available to them nationally and internationally (including from within the IBO).

<i>Research Question 5</i>	<i>Proposition 5</i>
<i>How do IB PYP teachers provide evidence of students' progress in demonstrating the IB Learner Profile and use this evidence to support future learning?</i>	<p><i>Teachers and schools can identify student progress in demonstrating the IB Learner Profile</i></p> <p><i>Evidence of student progress on the Learner Profile is used to plan for further development of these attributes</i></p>

Cross-case analysis – research question 5

This section of the cross-case analysis focuses on how IB PYP teachers provide evidence of students' progress in demonstrating the IB LP (IBO 2014), and how they use such evidence to support future learning. Teachers in the case study schools highlighted some challenges and suggestions of using the LP in their teaching and learning practices.

Provision of evidence in demonstrating the IB Learner Profile

The cross-case analysis showed that participants used four major strategies to provide evidence of students' progress in demonstrating the IB LP. They are: i) self-assessment; ii) peer assessment; iii) anecdotal records and journals; and iv) portfolios.

i. Self-assessment

Participants consistently mentioned the use of self-assessment to collect both formal and informal evidence of the IB LP. A teacher at Emerald School, for example, highlighted an example of formal evidence by asking students to provide a written reflection on the aspects and the degree of the LP that they are demonstrating. A teacher at Diamond School shared an example of informal evidence: activities such as 'Turn to a friend if you've shared an idea today' or 'who thinks they could do better, what do you think?' were used to invite students to reflect on LP attributes informally. This view of informal self-assessment was shared by teachers at Topaz School. When discussing the assessment of the LP, participants commonly mentioned the term 'reflective' across all case studies. Such reflective self-assessment practices were reported to be used either on a daily (e.g., Diamond & Pearl Schools) or weekly basis (e.g., Agate School).

ii. Peer assessment

Peer assessment was another strategy case study school teachers reported using to collect evidence of the IB LP. The teacher survey at Opal School, for example, showed that teachers most commonly used peer assessment to place students onto the LP. In Pearl School, nine of the 10 teachers who responded to the survey item *range of strategies to assess student*

progress on the learner profile used peer assessment in 25%–50% of their teaching time. Similar data relating to the use of peer assessment to collect evidence of the IB LP was found in other case studies, such as those of Agate School and Ruby School.

iii. Anecdotal records and journals

Anecdotal records were another popular strategy for providing evidence of LP attributes. At Sapphire School, this strategy was used by the majority of teachers who participated in the survey (six of eight). Similar comments about using anecdotal records to assess student progress on the LP were captured in the teacher survey at Agate School.

Teachers at Sapphire School highlighted the use of a journal to collect evidence of the IB LP. Students in that school are asked to identify attributes of the LP that they have shown during the year as part of the lead-up to the final exhibition.

iv. Portfolios

Several schools identified the Portfolios as a useful assessment tool for collecting evidence of progress on the IB LP. A teacher from Sapphire School stated that the LP features on each student's report card, and is also included in his or her portfolio. However, teachers at most schools did not elaborate on how these tools were able to show progress on the LP or identify if a student needed additional intervention to support the development of LP attributes. At Diamond School, a teacher emphasised the importance of reinforcing the LP vocabulary and how her Grade Four students use LP vocabulary in their reflections in their digital portfolios. The description of the tools used to reflect on LP attributes indicates that this important element of the PYP is certainly included in planning for teaching and reflecting on learning, but the parameters associated with its assessment remain unclear. The paucity of explicit practice demonstrating how to build assessment evidence in these areas may imply cause for renewed examination of the role criteria and standards in assessment and how they might foster assessment of qualities such as those outlined in the IB LP. For example, Colbert and Cumming (2014) provided a deeper engagement with the use of assessment criteria when engaging students in the process.

Use of evidence to support future learning

The cross-case analysis showed that participants used the evidence of the IB LP in three major ways: i) to strengthen everyday teaching and learning practices; ii) to enhance consistency across year levels; and iii) to support the reporting mechanism.

i. Everyday teaching & learning practices

Participants consistently stated that they embedded the language of the LP in their everyday teaching practices in order to improve students' learning. At Diamond School such language was written into every unit plan, with some units purposefully highlighting particular qualities. Similarly, participants from Emerald School and Agate School stated that

the language of the LP was purposefully distributed and embedded, particularly across each of their inquiry units. A teacher from Ruby School also emphasised that the LP evidence supported the development of lessons, reflections and assessments. Teachers at Pearl School reported that attributes of the LP were integrated in their planning of inquiry units but it was not a common practice to formally assess it.

ii. Consistency across year levels

Participants generally agreed that the evidence of the LP enhanced consistency of teaching and learning across year levels of the school. The IB PYP coordinator of Pearl School, for example, highlighted that the LP was used more 'to link together what we're doing vertically ... across year levels and ... other aspects of our school.' The IB PYP coordinator of Sapphire School confirmed how deeply embedded the LP was in the school's philosophy, that it was well supported by their parent community and the language of the LP was regularly heard. Indeed, the IB LP was prominently displayed on most case study schools' websites. Emerald School teachers indicated that the IB PYP coordinator kept a spreadsheet to ensure that each area was covered and consistency enhanced across all year levels.

iii. Reporting on the Learner Profile

The LP was often featured in case study school reports. A teacher of the Sapphire School indicated that she reported students' learning progress by using appropriate LP language, and the LP featured on each student's report card. Teachers of the Emerald School made similar comments. They indicated that all teachers are instructed to refer to the LP in their reporting to parents and to use the language of the LP in their reports.

Challenges associated with assessing the Learner Profile

Participants across all case studies were aware of and acknowledged the role of the IB LP. However, the data showed that participants consistently highlighted the difficulty of assessing the LP. Participants of the survey generally agreed with the survey statement *It is difficult to assess student progress on the Learner Profile*. The IB PYP coordinator of Agate School further highlighted that the school did not use self-assessment effectively in regard to the LP; similarly, the coordinator of Topaz School indicated that the school did not really assess the LP. The IB PYP coordinator of Diamond School opined that the difficulties of assessment might be due to the fact that the IB LP was embraced as a concept but viewed by many of this school's teachers as a challenge for assessment.

The IB PYP coordinator of Diamond School suggested that a continuum for the LP would be of value to all teachers, and he would like to see this come from the IBO. He said 'if it is important to every child in the school in every context then yes, it is something that we could be given and use.' Several participants across the case studies valued the idea of a continuum to support the assessment of the LP, while individual teachers appeared to feel comfortable with a more informal approach to the self-assessment of the values of the IB

LP. The IB PYP Coordinator of Ruby School pointed out that although her teachers were aware of the IB LP, they could use it more effectively to inform teaching and learning practices. She suggested that it be a priority area for professional learning in order to improve the effectiveness of assessing students’ learning in this very important domain.

<i>Research Question 6</i>	<i>Proposition 6</i>
<i>How do IB PYP teachers integrate the role of formative feedback and formative assessment in learning?</i>	<i>Schools and teachers review their school assessment policies and practices to align with the IB PYP guidelines, which incorporates planning for student learning, and growth along a developmental continuum</i>

Cross-case analysis – research question 6

The way formative feedback was used and its many representations was a key finding of the cross-case analysis. This section focuses on the role of formative feedback in formative assessment and how this contributes to student growth along a developmental continuum. Most participants in this study discussed the role of formative feedback in tandem with formative assessment, seeing feedback as an opportunity for supporting learners to reflect on their current understanding or skills and set goals for the next stage of their learning.

Teacher feedback

Similarly to the literature, IB PYP schools within the study signified the critical role that teacher feedback plays in student learning; yet it is the focus on the quality of the feedback that is critical to the learning process (e.g., Hargreaves 2013; Wiliam 2011). Survey results suggest that teachers support the use of feedback, as evidenced by general agreement with the statement that *feedback is the most important component of the assessment process*. In terms of practices, *Feedback was given throughout each learning activity and During learning rather than after the learning process* was reported to be either embedded (90%) or established (75%) by the majority of teachers at Emerald School. Teachers said that formative feedback was provided continuously, with one describing it as ‘provided on a day-to-day, minute-by-minute and lesson by lesson basis. It might be through oral feedback or a comment on a page.’

At Ruby School, a different kind of portfolio had been developed as a formative feedback and assessment tool. Currently known as the Orange Book or What I Know Book, it is collection of formative assessment tasks that teachers, students and parents can use to

record a snapshot of a student's learning. The teachers at Ruby School hope that this book will help to disrupt the idea that assessment is only a summative tool and encourage everyone to view learning as a journey rather than a destination.

Case study school teachers working in an early years context described the formative feedback process as informal. Teachers might photograph what a child has been doing in the classroom and then add his or her written observations to the photograph. This artefact would be used for a discussion between the child and the teacher. At Year 2, formative feedback might be verbal, pointing out what they want to get better and what might be missing. This approach is purposeful. It is described as a planned discussion of progress in an area of learning with the aim of leading the student to a point where they can do this for themselves. These comments suggest that teachers in the case study schools conceptualise the role of formative feedback as a tool for building reflective skills and metacognition in their young students. In this context, teachers in the eight case study schools appear to value self-assessment and the role it plays in formative feedback highly, thus placing learners firmly at the centre of the formative assessment cycle.

Self-assessment

The concept of 'feedback to self' featured across many of the case study schools. The use of self-assessment as a tool to encourage students to reflect on their own learning was identified as a common practice in five of the eight case study schools (Emerald, Topaz, Agate, Ruby & Diamond). At Diamond School, ICT is viewed as a great enabler of self-assessment and formative feedback. Audiotaped blogging, using iPads, supports students to provide a commentary on their own work. Other tools such Book Creator, Voice Thread and Doodlecast allow students to explain their strategies and understandings as they tackle literacy tasks and mathematical problems.

Self-assessment methods in use include exit cards to encourage reflective thinking at the end of a lesson, and simple visual tools (such as the shapes of a star or a diamond or thumbs up and thumbs down) at the end of a lesson to help younger students to evaluate their levels of understanding. As students moved toward upper primary levels, self-assessment involves more sophisticated tools such as the use of co-constructed rubrics that can be completed by both teachers and the students themselves. Each tool was reported not only as a vehicle for reflection but as a formative tool, supporting students' personal goal setting. Anna (Agate School) summed this up well: 'we try to make it very much a dialogue and quite an emphasis on self-assessment and reflection by the students.'

Peer assessment

In this study, practices associated with peer assessment emerged more as a goal than as an established practice in many of the case study schools. Survey data from individual schools supports this finding, as this practice was most likely to be identified as emerging or

sporadically used by teachers in each of the eight case study schools. In terms of beliefs, teachers indicated a wide range of views on the question of whether peer assessment was a poor strategy for evaluating student learning. Peer assessment was mentioned in passing by two schools (Opal and Agate) as just one of the many assessment tools in place, but the role of peer feedback was not elaborated upon. At Topaz school, the IB PYP coordinator suggested that it was only used at a very informal level, such as using a symbol to indicate something they liked and something they would do differently next time; it was not used as a formal assessment tool. This perspective was echoed by participants from Diamond School, none of whom identified it in their practices, and the PYP coordinator suggested that while the school supported this practice it was only informally used at best.

In contrast, three schools articulated the way that peer assessment was used as a formative feedback tool. Sophia (Sapphire School) described the way peer assessment was integrated into the formative feedback/assessment cycle through peer interviews, 'hot seating' with peer questions, and co-constructed rubrics. All of these tools were used both as Assessment for Learning and Assessment as Learning, whereby students used peer input to help set their own goals and to modify them throughout the learning process. Teachers in the focus group at Emerald School reported that while peer assessment was not used often, they saw it as an important part of teaching and learning. A Year 5 teacher, Erica-May, identified a neat cycle of peer feedback and formative assessment in which students were asked to note down three areas of a writing sample which they would like a peer to assess; the peer feedback was then discussed with the teacher. Erica-May commented that peer assessment worked really well in Year 5, because while they are looking at someone else's work it draws attention to what they need to focus on in their own work. Eva supported this view with her comment that her Year 2 students 'don't see the mistakes in their own work but they do see areas for improvement in other people's work that they then put in their own work.' Emerald School participants preferred the term 'peer feedback' rather than peer assessment, claiming that peer assessment places too much responsibility on children.

The development of peer assessment and peer feedback at Ruby School needs to be viewed in the context of the substantial change that has been taking place at this school in terms of assessment practices. The school principal has been actively supporting a big shift in the parent and school community from viewing assessment solely as a summative practice to a much more holistic view in which formative assessment practices can be embraced. In this context, teachers were taking time to prepare students for peer assessment. They were using activities such as role-plays so that students would understand that it was fine to provide constructive suggestions with feedback about how to improve their learning without jeopardising their friendships. Stories from this school highlight the importance of scaffolding students to develop their peer assessment skills if they are to provide valuable formative feedback to peers and support their growth along a developmental continuum.

Parent feedback

Although no specific questions were asked in the interviews about parent feedback and its role in supporting learning, it emerged spontaneously in data collection at two schools as a new approach to assessment. At Emerald School, parents are now being encouraged to provide feedback on student assessment results. This is seen as an important way of building an understanding of the link between assessment and learning across the whole school community. At Topaz School, at the end of each inquiry unit, parents are invited to share their observations of their child in relation to the unit focus. In this way parents can give feedback about how the unit resulted in any changes in the actions of the child. Where no feedback is received, teachers might wonder about the impact of the unit on student learning as evidenced outside the classroom.

Key Findings and Recommendations

Research Question 1: How do IB PYP schools articulate their approach to assessment and the way it is used for supporting student learning?

Our investigation of both school policy documents and data collected through surveys and interviews with teachers identified four key themes. Assessment in IB PYP case study schools was described as holistic, comprised of both formative and summative assessments, ongoing, and adopting a wide range of assessment strategies. The commitment to both formative and summative assessment is evident on school websites and in their publicly available documents, and is articulated clearly by PYP teachers and coordinators.

Some tensions emerged around the way that standardised tests and high-stakes tests were valued. These were frequently listed as part of schools' assessment regimes, but some teachers were ambivalent about their value. Some of these tools are government-mandated, while others are viewed by school teaching staff as useful for gathering data to monitor student progress and plan for learning. Several schools view them as a necessary requirement rather than a driver of their approach to assessment. Tensions can emerge when parents place high value upon these test results. Several schools articulated the importance of educating the whole school community about the value of both formative and summative assessment. Such a collaborative community-focused approach provides a way forward, with IB schools modelling discussion with parents and the wider community about the value of both formative and summative assessment.

Recommendation 1

Schools caught between jurisdiction-mandated testing and school-based assessment should receive additional support from the IBO to develop strategies for educating whole school communities about the value of a rich and balanced approach to formative and summative assessment.

Research Question 2: How do IB PYP schools and the teachers in these schools implement assessment design that reflects the diversity of purposes of assessment (assessment of, for and as learning)?

Teachers in this study support the theme of a holistic approach to assessment, describing it as a cycle and well integrated with teaching. The diverse purposes of assessment are evident in IB PYP schools; that is, Assessment of Learning, Assessment for Learning and Assessment as Learning, although some of these assessment foci are more embedded than

others. Assessment of Learning took several forms. It included external standardised tests that might be used for external benchmarking or for gathering evidence at the beginning of a school year. These assessment tools can create tensions as schools do not want to see their assessment practices defined by them, but this type of testing is often valued by parents or seen as bringing prestige to the school. Teachers were passionate about the summative assessments they had developed. They provided excellent evidence of how they developed rich open-ended tasks that invited learners to demonstrate how they could apply their learning to new contexts.

The schools in this study embraced a variety of aspects of Assessment for Learning. Innovative and diverse forms of this type of formative assessment were used to plan for personalised learning, develop and customise curricula, and provide a student-centred focus for inquiry units. It was seen as a daily process, fully integrated with teaching, and involving a wide range of strategies including anecdotal observations, checklists, rubrics and portfolios.

Assessment as Learning emerged as an approach still in development in PYP schools. The case study schools reported on their use of a wide range of self-assessment tools. While some focus group teachers were able to articulate the value of self-assessment for building metacognitive skills in learners, this focus was not well embedded for all teachers. Teachers in this study used peer assessment sporadically; it was viewed as challenging and some teachers were dubious about its value. Several schools felt that such an approach needed to be introduced carefully through modelling to ensure it did not have undesirable social consequences.

Recommendation 2

The IBO should publish a guide to assessment that supports staff in PYP schools in their use of a range of assessment strategies. The aim of such guidance would be to give teachers confidence in their current practices, and to suggest further options for their consideration, particularly in the area of Assessment as Learning, outlining not only a range of strategies with this purpose but clearly articulating how these strategies can build metacognitive skills and support students to become lifelong learners.

Research Question 3: How do IB PYP teachers understand the role of evidence in assessment and provide documentation of student growth of knowledge, understanding and skills?

Teachers in the case study schools provided and described a rich array of activities, strategies and assessment artefacts to demonstrate a strong grasp of the evidence required

to assess student growth of knowledge, understanding and skills. They were able to articulate how assessment tools were used to gain insight into student understanding and to compare learning across progression points. Many teachers were deeply reflective; they understood the purpose of the task they had designed and were able to reflect on both student learning and their own learning as a teacher. Rubrics were widely used in schools for all assessment purposes. Some were co-constructed with students and used for forward planning, while other rubrics had a more summative purpose.

Portfolios were widely used for all assessment purposes, for, as and of learning, manifesting the cycle of assessment that schools embraced, but their form and value was contentious for many teachers. Some schools embraced digital portfolios for their ability to involve students in reflection on artefacts through digital audio recording and to record learning as it happened. Other schools had rejected this format, opting for paper portfolios to limit the proliferation of artefacts.

The affordances of ICT have been enthusiastically adopted in several case study schools and these tools appeared to enhance many aspects of their assessment practices.

Recommendation 3

Portfolios have spread rapidly across all education sectors, increasing their affordance as an assessment and reflection tool, particularly in digital formats. Teachers in IB PYP schools would benefit from professional learning and development around the concept of portfolios and how to better manage the evidence for, of and as learning that portfolios, particularly digital portfolios, provide to teachers, students, parents and other stakeholders. This would include how to maximise their potential as both a formative and summative assessment tool that reflects assessment validity and reliability, and incorporates the role of moderation to assist in making professional judgements. The affordances of ICT for assessment need further promotion, as ICT allows schools to showcase their practices to benefit the IB world school community.

Research Question 4: How do IB PYP teachers identify students' current level of development and use it to plan for depth and rigour of teaching and learning?

The case study schools and their teachers used a wide range of evidence to establish current levels of development and knowledge. They reported that this evidence was used to plan for personalised learning, ensuring that students were working and learning at their level, with clear goals for the next stage of their learning. The early childhood teachers in this study articulated the importance of close observation of children and gearing learning opportunities and experiences to each child's level. Schools embraced the concept of a developmental continuum, but they found it very difficult to articulate which framework

they currently used or should use. Some schools expressed concern about the perceived conflict between progression points that might be specified in curriculum documents and child development models that focused on a range of attributes such as communication, social skills, physical and cognitive development.

Recommendation 4

Teachers need guidance to support a developmental approach to assessment. A framework or continuum document would assist teachers to position students on some common continuums and support their learning with greater confidence. These continuums would relate to academic areas of development but should include other areas such as social and emotional learning.

Research Question 5: How do IB PYP teachers provide evidence of students' progress in demonstrating the IB Learner Profile and use this evidence to support future learning?

Teachers in the eight case study schools in this project enthusiastically supported the LP. They planned for it in their teaching, in units of work, and took advantage of everyday opportunities to build the profile with their students. Their approach to assessment of the LP attributes was informal, with a range of tools such as broad self-assessments (symbols, thumbs up and turn & talk), checklists and anecdotal records. It was referenced in portfolios and included on report cards. Assessing progress in any attribute on the LP was regarded as much more challenging. Most teachers found it difficult to conceptualise progress and there were no continuums available for guidance. Several teachers and coordinators supported the idea of a continuum to guide them with assessment on the LP.

Recommendation 5

The IBO should develop a continuum of development for each of the Learner Profile attributes to support the development of more effective assessment for learning in this important domain of student learning and personal growth.

Research Question 6: How do IB PYP teachers integrate the role of formative feedback and formative assessment in learning?

Teachers in this project recognised the critical role of feedback, its role in formative assessment and its potential for supporting student learning. They articulated how they provided feedback in all of its forms, rejecting the concept of personal praise in favour of process praise. They advocated moving towards process feedback that is specific, informative and focuses on facilitating children to evaluate their own learning performances to gain mastery. They viewed formative feedback as a tool that placed learners firmly at the centre of the assessment cycle. Teachers described the types of feedback in place in their schools. Self-assessment was highly valued for its ability to build reflective lifelong learners. Teachers were more equivocal about peer assessment, expressing doubts about its value as a valid assessment tool and caution about the risks of using peer assessment or peer feedback in the absence of strong modelling for their student body. Several schools in this study had introduced parent feedback, inviting parents to contribute assessments of how inquiry units had resulted in home-based action or inviting written feedback on summative assessment pieces.

Recommendation 6

Teachers in IB PYP schools should be given additional support in implementing peer assessment and peer feedback in their schools. This could take the form of well-constructed videos or online professional learning and development resources that address the how and why of peer feedback and the role it can play in supporting student learning. The concept of parent feedback deserves further investigation. This approach has great potential to build stronger parent-school relationships and bring parents into the assessment cycle in a purposeful way.

Recommendations for Future Research

Our study indicates the existence of diverse Assessment for Learning practices within IB PYP schools worldwide. However, as is shown in the Findings and Recommendations section, there is room for improvement and/or to deepen engagement with Assessment for Learning. This affirms the findings Black's (2015) and Black and Wiliam's (1998) analyses of literature in the area of Assessment for Learning over the past 17 years. Black's analysis incorporates the recognition that challenges are often locally contextualised, which leads to a spectrum of implementation in the area of Assessment for (and as) Learning. Our study suggests some opportunities for further investigation of new and emerging theoretical perspectives in this field, as outlined below.

The literature review undertaken as part of this study found a paucity of research on developmental approaches to assessment. Teachers in this study were committed to a developmental approach, but it requires further articulation in order to support their practice. A developmental approach to teaching and assessment has been clearly articulated by Griffin (2014). Further research needs to be undertaken in schools, working with teachers as they implement a developmental assessment approach, evaluating the affordances of different continuums for this purpose and building a culture of effective collaboration. This applied research would provide invaluable guidance for the decision-making process and ease tensions between current levels of development and age- or grade-related benchmarks.

The connections between neuroscience and learning and its potential for guiding assessment is another area in need of further investigation. Schools are keen to adopt approaches aligned with neuro-scientific research but, as yet, there is little classroom research available to evaluate its efficacy. Emerging anecdotal reports suggest that neuroscience provides some direction for teachers when they are making pedagogical and curriculum decisions; we need to bring assessment into this discussion.

One of the most important findings of our study is the need for further support for schools and teachers in regard to the assessment of attributes in the LP. The surveyed teachers could clearly articulate the way they incorporated the LP in their planning, teaching and reporting, but assessing progress on the attributes in the LP was a challenge for all schools and teachers in this study. Although assessment of social, emotional, and cognitive skills has lagged behind academic assessment in the past, these areas have developmental continuums and there is clear potential to develop a framework for LP assessment. Research aimed at the development of an LP attribute continuum is an important recommendation from this study.

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APPENDICES



PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: [IB PYP coordinators](#)

Plain Language Statement

Date: 07/02/2015

Full Project Title: **Assessment of Development and Learning in IB PYP Schools**

Principal Researcher: **Associate Professor Dianne Toe**

Associate Researchers: **Dr Josephine Lang, Dr Louise Paatsch, Associate Professor Bonnie Yim, Dr Wendy Jobling, Dr Brian Doig, and Dr George Aranda**

Dear IB Coordinator,

Your principal has consented to the participation of your school as a case study school in a research project with a focus on assessment practices. This project is fully funded by the IBO Research Office, The Hague. This project will investigate how IB PYP schools define educational assessment, how their teachers see the purpose of assessment, and how they use assessment to plan for depth and rigour of learning.

This study aims to investigate how teachers and IB programme coordinators in PYP schools:

1. document student growth of knowledge, understanding and skills,
2. view the role of assessment for the purpose of gathering evidence based on a developmental model of teaching, and
3. investigate how they use this evidence to identify and provide learning pathways for students with respect to developmental outcomes.

The findings from this project will be used to develop a set of practical

recommendations to inform innovation in assessment in the PYP.

The participants in this study will be nine case study schools, their teachers and IB PYP coordinators. We are seeking your consent to participate in an interview *about your school's assessment practices*.

We are based in Australia and as a consequence, the 45 minute interview will be conducted via videolink (Skype, Facetime, Microsoft Lync, Go to Meeting etc.) or by telephone. One of the researchers named below in this statement will contact you once you have agreed to organise a convenient time to participate in the interview.

This study will provide significant insight into the way teachers view and use assessment to plan for learning and teaching. It will assist the IBO to enhance the way assessment is used in IB PYP schools with a view to improving learning outcomes for students. More broadly, the study will benefit all teachers, providing deep insights into how schools view and use assessment, and how the role of a developmental approach to assessment is understood. This is a low risk project, in the sense that the focus is on professional issues related to the use of assessment for teaching and learning. As a consequence, we do not anticipate that any participants will be adversely affected by participation in this project.

We will protect your privacy and the privacy of your school. In the final report for the IBO, each school, IB coordinator, and focus group teacher participants will be given a pseudonym. The findings from this project will be published as a report on the IBO website, presented at IB conferences, and published in international journals. Pseudonyms will be used and no geographical location data will be shared.

Participation in this research is voluntary and participants may withdraw at any time. Associate Professor Dianne Toe will closely monitor data collection throughout the initial training for data collection and will conduct regular group meetings. If you have any queries about the data collection process please email Dianne at dtoe@deakin.edu.au or telephone +61352271455.

Complaints

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

The Manager, Ethics and Biosafety, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: 9251 7129, research-ethics@deakin.edu.au

Please quote project number [201X-XXX].

Thanks very much for taking the time to read this plain language statement. If you are willing to take part in this project please sign and return the attached Consent form

Yours sincerely

Dianne Toe, Josephine Lang, Louise Paatsch, Bonnie Yim, Wendy Jobling, Brian Doig,
and George Aranda



PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: IB Coordinators

Consent Form

Date:

Full Project Title: **Assessment of Development and Learning in IB PYP Schools**

Reference Number:

I have read and I understand the attached Plain Language Statement.

I freely give my consent participate in this project according to the conditions in the Plain Language Statement.

I have been given a copy of the Plain Language Statement and Consent Form to keep.

The researcher has agreed not to reveal my identity or the identity of my school, in any public forum.

Participant's Name (printed)

School Name.....

Signature Date

Please return this form

by email to

Dianne Toe at

dtoe@deakin.edu.au

PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: IB Coordinators

Withdrawal of Consent Form

(To be used for participants who wish to withdraw from the project)

Date:

Full Project Title: **Assessment of Development and Learning in IB PYP Schools**

Reference Number:

I hereby wish to WITHDRAW my consent to participate in the above research project and understand that such withdrawal WILL NOT jeopardise my relationship with Deakin University or the International Baccalaureate Organisation.

Participant's Name (printed)

Signature Date

Please email this form to: Associate Professor Dianne Toe at dtoe@deakin.edu.au or phone me at +61352271455.



PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: Parent and Child: Permission to use work sample

Plain Language Statement

Date: 07/02/2015

Full Project Title: Assessment of Development and Learning in IB PYP Schools

Principal Researcher: Associate Professor Dianne Toe

Associate Researchers: Dr Josephine Lang, Dr Louise Paatsch, Associate Professor Bonnie Yim, Dr Wendy Jobling, Dr Brian Doig, and Dr George Aranda

Dear Parent,

Your child's school has agreed to be a case study school in a research project with a focus on assessment practices. This project is fully funded by the IBO Research Office, The Hague. This project will investigate how IB PYP schools define educational assessment, how their teachers see the purpose of assessment, and how they use assessment to plan for depth and rigour of learning.

The findings from this project will be used to develop a set of practical recommendations to inform innovation in assessment in the PYP.

The participants in this study will be nine case study schools, their teachers and IB PYP coordinators. We will invite three teachers from each school to participate in a focus group. They will each select up to three examples of assessment that they have used with their class, and then scan or photograph these assessment artefacts and email them to the research team.

One of the focus group teachers has elected to use a sample of your child's work. Your child's name has been removed from work sample. We are seeking your permission to use this anonymous sample of work for discussion during the focus group. A copy or photograph of the anonymous work sample will be supplied to the research team by your child's teacher.

This study will provide significant insight into the way teachers view and use assessment to

plan for learning and teaching. It will assist the IBO to enhance the way assessment is used in IB PYP schools with a view to improving learning outcomes for students. More broadly, the study will benefit all teachers, providing deep insights into how schools view and use assessment and how the role of a developmental approach to assessment is understood.

We will protect your privacy and the privacy of your school. In the final report for the IBO, each school, IB coordinator, and focus group teacher participants and all student work samples will either be completely anonymous or be referred to using a pseudonym. The findings from this project will be published as a report on the IBO website, presented at IB conferences and published in international journals. Pseudonyms will be used and no geographical location data will be shared.

Participation in this research is voluntary and participants may withdraw at any time. Associate Professor Dianne Toe will closely monitor data collection through initial training for data collection and will conduct regular group meetings. If you have any queries about the data collection process please email Dianne at dtoe@deakin.edu.au or telephone +61352271455.

Complaints

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

The Manager, Ethics and Biosafety, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: 9251 7129, research-ethics@deakin.edu.au

Please quote project number [201X-XXX].

Thanks very much for taking the time to read this plain language statement. If you and your child are willing for your child's work sample to be used as part of this project please sign and return the attached Consent form

Yours sincerely

Dianne Toe, Josephine Lang, Louise Paatsch, Bonnie Yim, Wendy Jobling, Brian Doig, and George Aranda



PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: Parents and Students

Consent Form

Date:

Full Project Title: **Assessment of Development and Learning in IB PYP Schools**

Reference Number:

I have read and I understand the attached Plain Language Statement.

I freely give my consent for the nominated work sample to be used according to the conditions in the Plain Language Statement.

I have been given a copy of the Plain Language Statement and Consent Form to keep.

The researcher has agreed not to reveal my identity or the identity of my child, in any public forum.

Child's Name (printed)

Child's Signature

Parent's Name (Printed)

Parent's Signature.....

School Name.....

Date

Please return this form

by email to

Associate Professor Dianne Toe at

dtoe@deakin.edu.au



PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: Parents and Students

Withdrawal of Consent Form

(To be used for participants who wish to withdraw from the project)

Date:

Full Project Title: **Assessment of Development and Learning in IB PYP Schools**

Reference Number:

I hereby wish to WITHDRAW my consent for my child's work sample to be used in the above research project and understand that such withdrawal WILL NOT jeopardise my relationship with my child's school, Deakin University or the International Baccalaureate Organisation.

Parent's Name (printed)

Signature Date

Child's Name (printed)

Child's Signature Date

Please email this form to: Associate Professor Dianne Toe at dtoe@deakin.edu.au or phone me at +61 352271455.



PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: **School Principals**

Plain Language Statement

Date: 01/12/2014

Full Project Title: Assessment of Development and Learning in IB PYP Schools

Principal Researcher: Associate Professor Dianne Toe

Associate Researchers: Dr Josephine Lang, Dr Louise Paatsch, Associate Professor Bonnie Yim, Dr Wendy Jobling, Dr Brian Doig, and Dr George Aranda

Dear principal,

Together with the International Baccalaureate Organization (IBO), we have identified your school as a potential case study school for a research project with a focus on assessment practices. This project will investigate how IB PYP schools define educational assessment, how their teachers see the purpose of assessment, and how they use assessment to plan for depth and rigour of learning. This project is fully funded by the IBO Research Office, The Hague.

This study aims to investigate how teachers and programme coordinators in PYP schools:

- document student growth of knowledge, understanding and skills,
- view the role of assessment for the purpose of gathering evidence based on a developmental model of teaching, and
- investigate how they use this evidence to identify and provide learning pathways for students with respect to developmental outcomes.

The findings from this project will be used to develop a set of practical recommendations to inform innovation in assessment in the PYP.

The participants in this study will be nine case study schools, their teachers and IB PYP coordinators. We are seeking your consent to involve your school in this project and collect the following data:

1. *An anonymous online survey completed by the teachers in your school*
2. *An Interview with your IB PYP Coordinator about the school assessment practices.*
3. *Copies of any Assessment policy documents from your school.*

4. *A focus group with three teachers (as selected by you) representing a range of year levels to discuss samples of work, unit plans, inquiry plans, portfolio etc. that illustrate the way assessment is used by these teachers*

We are based in Australia and as a consequence interviews and the focus group will be conducted via videolink (Skype, Facetime, Microsoft Lync, Go to Meeting) or by telephone. We will ask the focus group participants to photograph or scan their work samples and to ensure that no student names are included on any artefact. The focus group will take approximately 60 minutes. It will be conducted at a mutually convenient time for your teachers that does not impact on classroom teaching time. The 45-minute interview with the IB PYP coordinator will also be conducted via videolink (Skype, Facetime, Microsoft Lync, Go to Meeting etc) or by telephone.

This study will provide significant insight into the way teachers view and use assessment to plan for learning and teaching. It will assist the IBO to enhance the way assessment is used in IB PYP schools with a view to improving learning outcomes for students. More broadly, the study will benefit all teachers, providing deep insights into how schools view and use assessment, and the role of a developmental approach to assessment. This is a low risk project, in the sense that the focus is on professional issues related to the use of assessment for teaching and learning. As a consequence, we do not anticipate that any participants will be adversely affected by participation in this project.

We will protect the privacy of your teachers and your school. In the final report for the IBO, each school, IB PYP coordinator, and focus group teacher participant will be given a pseudonym. The findings from this project will be published as a report on the IBO website, presented at IB conferences and published in international journals. Pseudonyms will be used and no geographical location data will be shared.

Participation in this research is voluntary and participants may withdraw at any time. Associate Professor Dianne Toe will closely monitor data collection throughout initial training for data collection and regular group meetings. If you have any queries about the data collection process please email Dianne at dtoe@deakin.edu.au or telephone +61352271455.

Complaints

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

The Manager, Ethics and Biosafety, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: 9251 7129, research-ethics@deakin.edu.au

Please quote project number [201X-XXX].

Thanks very much for taking the time to read this plain language statement. If you are willing for your school to take part in this project please sign and return the attached Consent form

Yours sincerely

Dianne Toe, Josephine Lang, Louise Paatsch, Bonnie Yim, Wendy Jobling, Brian Doig, and George Aranda



PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: School Principals

Consent Form

Date:

Full Project Title: Assessment of Development and Learning in IB PYP Schools

Reference Number:

I have read and I understand the attached Plain Language Statement.

I freely give permission for teachers at this school to participate in this project according to the conditions in the Plain Language Statement.

I have been given a copy of the Plain Language Statement and Consent Form to keep.

The researcher has agreed not to reveal my identity and personal details, or the name of my school in any public form.

Participant's Name (printed)

School Name.....

Signature Date

Please return this form
by email to
Dianne Toe at
dtoe@deakin.edu.au



PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: School Principals

Withdrawal of Consent Form

(To be used for participants who wish to withdraw from the project)

Date:

Full Project Title: Assessment of Development and Learning in IB PYP Schools

Reference Number:

I hereby wish to WITHDRAW my consent for my school to participate in the above research project and understand that such withdrawal WILL NOT jeopardise my relationship with Deakin University and/or the international Baccalaureate Organisation

Participant's Name (printed)

School Name.....

SignatureDate

Please return this form

by email to

Dianne Toe at

dtoe@deakin.edu.au



PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: [Teacher: Focus Group](#)

Plain Language Statement

Date: 07/02/2015

Full Project Title: Assessment of Development and Learning in IB PYP Schools

Principal Researcher: Associate professor Dianne Toe

Associate Researchers: Dr Josephine Lang, Dr Louise Paatsch, Associate Professor Bonnie Yim, Dr Wendy Jobling, Dr Brian Doig, and Dr George Aranda

Dear Teacher,

Your principal has consented to the participation of your school as a case study school in a research project with a focus on assessment practices. This project is fully funded by the IBO Research Office, The Hague. This project will investigate how IB PYP schools define educational assessment, how their teachers see the purpose of assessment, and how they use assessment to plan for depth and rigour of learning.

This study aims to investigate how teachers and IB programme coordinators in PYP schools:

4. document student growth of knowledge, understanding and skills,
5. view the role of assessment for the purpose of gathering evidence based on a developmental model of teaching, and
6. explore how they use this evidence to identify and provide learning pathways for students with respect to developmental outcomes.

The findings from this project will be used to develop a set of practical recommendations to inform innovation in assessment in the PYP.

The participants in this study will be nine case study schools, their teachers and IB PYP coordinators. We are seeking your consent to participate in a teacher focus group along with two other teachers. The focus group will last for approximately 60 minutes. Prior to the focus group we invite you to select three examples of assessment that you have used with your class, then scan or photograph these assessment artefacts and email them to (nominated research team member). The focus group will centre on these artefacts and

how you have used them with your students to support teaching and learning.

We are based in Australia and as a consequence the focus group will be conducted via videolink (Skype, Facetime, Microsoft Lync, Go to Meeting) or by telephone. The focus group will take approximately 60 minutes. It will be conducted at a mutually convenient time for you and your colleagues.

This study will provide significant insight into the way teachers view and use assessment to plan for learning and teaching. It will assist the IBO to enhance the way assessment is used in IB PYP schools with a view to improving learning outcomes for students. More broadly, the study will benefit all teachers, providing deep insights into how schools view and use assessment and how the role of a developmental approach to assessment is understood. This is a low risk project, in the sense that the focus is on professional issues related to the use of assessment for teaching and learning. As a consequence we do not anticipate that any participants will be adversely affected by participation in this project.

We will protect your privacy and the privacy of your school. In the final report for the IBO, each school, IB coordinator, and focus group teacher participants will be given a pseudonym. The findings from this project will be published as a report on the IBO website, presented at IB conferences and published in international journals. Pseudonyms will be used and no geographical location data will be shared.

Participation in this research is voluntary and participants may withdraw at any time. Associate Professor Dianne Toe will closely monitor data collection through initial training for data collection and will conduct regular group meetings. If you have any queries about the data collection process please email Dianne at dtoe@deakin.edu.au or telephone +61352271455.

Complaints

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact: The Manager, Ethics and Biosafety, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: 9251 7129, research-ethics@deakin.edu.au
Please quote project number [201X-XXX].

Thanks very much for taking the time to read this plain language statement. If you are willing for your school to take part in this project please sign and return the attached Consent form

Yours sincerely

Dianne Toe, Josephine Lang, Louise Paatsch, Bonnie Yim, Wendy Jobling, Brian Doig, and George Aranda



PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: Focus Group Teachers

Consent Form

Date:

Full Project Title: **Assessment of Development and Learning in IB PYP Schools**

Reference Number:

I have read and I understand the attached Plain Language Statement.

I freely give my consent participate in this project according to the conditions in the Plain Language Statement.

I have been given a copy of the Plain Language Statement and Consent Form to keep.

The researcher has agreed not to reveal my identity or the identity of my school, in any public forum.

Participant's Name (printed)

School Name.....

Signature Date

Please return this form

by email to

Dianne Toe at

dtoe@deakin.edu.au



PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: Focus Group Teachers

Withdrawal of Consent Form

(To be used for participants who wish to withdraw from the project)

Date:

Full Project Title: **Assessment of Development and Learning in IB PYP Schools**

Reference Number:

I hereby wish to WITHDRAW my consent to participate in the above research project and understand that such withdrawal WILL NOT jeopardise my relationship with Deakin University or the International Baccalaureate Organisation.

Participant's Name (printed)

Signature Date

Please email this form to: Associate Professor Dianne Toe at dtoe@deakin.edu.au or phone me at +61 352271455.

Appendix B: Teacher Survey

Teacher background

The first section of this survey invites you to provide information about your teaching background and your school context.

1. What year level are you teaching in 2015?

- | | |
|--|------------------------------------|
| <input type="radio"/> Preschool/Kindergarten | <input type="radio"/> Year/Grade 3 |
| <input type="radio"/> Reception/Foundation | <input type="radio"/> Year/Grade 4 |
| <input type="radio"/> Year/Grade 1 | <input type="radio"/> Year/Grade 5 |
| <input type="radio"/> Year/Grade 2 | <input type="radio"/> Year/Grade 6 |
| <input type="radio"/> Other (please specify) | |

2. How many years of full-time or full-time equivalent teaching experience do you have?

- 0-3
- 4-10
- 11-20
- 21+

3. How many years of experience in IB PYP schools do you have?

- 1-3 years
- 4-10 years
- 11-20 years
- 21+ years

4. How many IB workshops have you attended in the last 3 years?

- 1-3
- 4-6
- 7-10
- 10+

5. Please indicate your age group.

- 20-29
- 30-39
- 40-49
- 50-59
- 60+
- Prefer not to disclose

6. What is your gender?

- Male
- Female
- Other

7. What is your highest academic qualification?

- Bachelor's degree
- Postgraduate Diploma or Certificate
- Master's degree
- Doctorate
- Other (please specify)

8. Have you completed any IB university courses or certificates? (You may select more than one)

None

IB Certificate in Teaching and Learning

IB Advanced Certificate in Teaching and Learning

Other (please specify)

School context

This section asks some questions about your school. No school names will be used in any reports or presentations. All schools will be referred to by pseudonyms.

9. What is the full name of your school?

10. Does your school participate in regional, national or international standardised tests?

- No
- Yes (if yes, please specify by name)

11. Please rank each of the following assessment strategies used in your school from 1 (never used) to 5 (most frequently used).

	1 (never used)	2	3	4	5 (most frequently used)
Observation of students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Performance assessments (e.g., oral presentation; debate; role play)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Process-focused assessments (i.e., how student is learning is recorded through observation, checklists or logs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Selected responses (e.g., single occasion exercises such as tests)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Open-ended tasks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Portfolios	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self-assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Peer assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Please rank each of the following assessment tools used in your school from 1 (never used) to 5 (most frequently used).

	1 (never used)	2	3	4	5 (most frequently used)
Exemplars	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Checklists	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Anecdotal records	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rubrics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Concepts of Assessment

The following section consists of a series of statements about assessment.

13. The following question consists of a series of statements about assessment. Please indicate your agreement or disagreement with the following statements.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Formative assessment is much more valuable to teachers than summative assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the early years, the main focus of assessment should be on identifying each student's current level of development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assessing student levels of prior learning is a key element of planning for effective teaching and learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would describe my approach to assessment as holistic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Evidence from assessment is only valuable if it can be used for planning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student portfolios are effective strategies for assessing student learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students need advance understanding of the criteria for producing a quality product or performance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When students understand the learning intentions for an activity they have improved learning outcomes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The main purpose of assessment is to guide teachers and learners to close the gap between their current level of understanding and their desired learning goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Summative assessment tasks should provide the most valid measure of student learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using assessment evidence to compare students creates competition that leads to improved learning outcomes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is difficult to assess student progress on the Learner Profile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Involving students in their own assessment leads to improved learning outcomes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Awareness of the demands of the final exhibition has an impact on my routine assessment practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Peer assessment is a poor strategy for evaluating student learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effective assessment provides opportunities for students to share their understandings with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self assessment enhances student learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Developing formative assessment tasks is too time consuming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Providing feedback to students is the most important component of the assessment process	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
My approach to assessment is strongly influenced by my understanding of the skills students will need to have in order to successfully complete the final exhibition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Assessment Practices

In this section you are asked to respond to each item in terms of the extent to which these practices are reflected in your current teaching practice using the following scale:

Embedded (Happens 90% of the time)

Established (Happens 75% of the time)

Emerging (Happens 50% of the time)

Sporadic (Happens 25% of the time)

Never (Never used)

Do not understand (I do not understand what this statement means)

14. I use a range of strategies to assess student progress on the learner profile

	Embedded (Happens 90% of the time)	Established (Happens 75% of the time)	Emerging (Happens 50% of the time)	Sporadic (Happens 25% of the time)	Never (Never used)	Do not understand (I do not understand what this statement means)
Performance assessments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self-assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Peer assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Anecdotal records	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. In my classroom, a range of assessment tools are used with students to gather evidence that assists with planning inquiry units

	Embedded (Happens 90% of the time)	Established (Happens 75% of the time)	Emerging (Happens 50% of the time)	Sporadic (Happens 25% of the time)	Never (Never used)	Do not understand (I do not understand what this statement means)
Rubrics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Anecdotal records	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Open-ended tasks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tests or quizzes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. In this question you are asked to respond to each item in terms of the extent to which these practices

are reflected in your current teaching practice.

	Embedded (Happens 90% of the time)	Established (Happens 75% of the time)	Emerging (Happens 50% of the time)	Sporadic (Happens 25% of the time)	Never (Never used)	Do not understand (I do not understand what this statement means)
I use evidence from assessment of my students to plan for teaching and learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I call on my knowledge of brain development, and its relationship with learning, to develop my assessment approach.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use evidence of student learning to place each student on a developmental continuum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students have a clear idea of the purpose of the learning tasks they undertake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students demonstrate a strong understanding of their learner profile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students use self-assessment to support their metacognitive development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use peer assessment in a way that enhances student learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I give students specific feedback throughout each learning activity to support their learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use on-line self-assessment tools to support improved learning outcomes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My feedback takes the form of general praise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Embedded (Happens 90% of the time)	Established (Happens 75% of the time)	Emerging (Happens 50% of the time)	Sporadic (Happens 25% of the time)	Never (Never used)	Do not understand (I do not understand what this statement means)
I provide feedback during learning rather than after the learning process	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use feedback to help focus each student on the next step in their learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use talk-based assessment (such as discussion, conferencing and questioning) as a formative assessment strategy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use rubrics as an assessment tool with my students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my classroom, portfolios are used to highlight the learning process	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Portfolios are used to develop learner autonomy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I work collaboratively with other teachers to moderate assessment judgements across the teaching team	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students view assessment feedback as a valuable means of gaining information about their own progress	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Open questions

These open questions invite you to share some examples of your practice with us and explain why you think these examples are valuable. Please take a few minutes to complete the following two questions

17. Please describe a recent example of how you have used assessment to enhance student learning. Please explain why you think this enhanced student learning.

18. What is the most innovative way you have used assessment in your classroom in the past six months? Why is this example innovative?

Appendix C: PYP Coordinator Questions

Interview questions for IB PYP Coordinator

The interview will take place using one of the following video link applications, depending on your school's hardware, software and Internet access.

- Skype
- Facetime
- Microsoft Lync
- Go to Meeting

The interview will be recorded and transcribed. A transcription will be provided to each participant to check for accuracies.

Questions

1. Can you please describe the features of your school's approach to assessment of student learning?
2. Can you give me some examples of what assessment for learning might look like?
3. How does your school support your assessment policy and monitor individual teachers' use of this policy in the classroom?
4. Can you please describe some of the assessment strategies that are used in your school?
5. Can you give me one or two examples of those strategies?
6. Can you please name and briefly describe the assessment tools that are used in your school?
7. How is student progress on the learner profile assessed in your school?
8. Describe how assessment of the learner profile might be used to support further development of learner profile attributes
9. Can you describe the way that feedback is used to support learning here at.....school?
10. Can you please tell me a little about how the following strategies are used in your school?
 - Peer assessment
 - Self-assessment
 - Learning intentions and success criteria
 - Rubrics
12. How is the concept of a developmental continuum understood in your school and how does it relate to assessment practices?

Appendix D: Focus Group Questions

Focus Group Protocol and Questions

Instructions for teacher to assist with preparation for the focus group.

The purpose of this discussion session is to explore the way that you and two of your colleagues use assessment in your IB PYP programme for teaching and learning.

Please select three examples of your assessment practice to bring to the focus group discussion.

1. Before the session please photograph and/or scan the artefacts and email them to (name of designated research interviewer)
2. Using a mobile phone or tablet, record your commentary on the assessment sample and send this recording to (name of designated research interviewer)
3. On the day of the focus group discussion please bring your assessment samples with you.
4. The focus group will take place using one of the following videolink application, depending on your schools hardware, software and internet access.
 - Skype
 - Facetime
 - Microsoft Lync
 - Go to Meeting

Questions for Focus Group Session (approximately 45 minutes)

Focus groups will be recorded

1. Please tell us about your first assessment artefact
2. Why did you select it?
3. What do you think it reveals about the way assessment is used in your classroom?
4. How might this artefact be useful for positioning this learner upon a developmental continuum?
5. How would you use this assessment artefact for planning?
6. What role does it have, if any, in building the learners own learning/knowledge????
7. Can this assessment artefact be used to assess aspects of the learner profile? Why or why not? If not, what would be useful for this purpose?

Each teacher shares one artefact and discussion of each is encouraged.

The questions are then recycled for the next artefact and so on. All three artefacts might not be shared depending upon the complexity of each item.

Case Study Protocol for IB PYP Assessment Project

Background

A case study research design is valuable when the focus of the study is to answer 'how' and 'why' questions; the behavior of those involved in the study cannot be manipulated or the aim is to uncover contextual conditions that are believed to be relevant to the phenomenon under study (Yin, 1993).

Yin (1993) offers five basic components of a case study research design:

1. A study's questions.
2. A study's propositions (if any).
3. A study's units of analysis.
4. The logic linking of the data to the propositions.
5. The criteria for interpreting the findings.

Structure of the IB PYP Assessment project case studies

Purpose and approach

The purpose of a case study approach is to understand how IBPYP school communities assess the progress of student learning. The aim of the IBPYP Assessment project case studies is show how IBPYP schools understand the role of evidence and use it to document student growth of knowledge, understanding and skills. In addition, the way they do this in regard to the IB learner profile will be explored. To examine this proposition, the IBPYP Assessment Project employed a multiple case study approach or what Stake (1995) calls a collective case study method. The purpose of a multiple case study approach is to explore and explain similarities and differences between cases. The aim is to identify replication across different cases in order to predict similar or contrasting findings based on what emerges from the analysis (Baxter & Jack, 2008, p. 548). As Yin (2003, p. 47) describes, multiple case studies can be used to either '(a) predicts 'similar results (a literal replication) or (b) predict contrasting results but for predictable reasons (a theoretical replication)'

Research questions

Specifically, the project will examine how IB PYP schools across the world:

1. Understand the role of evidence in assessment and provide documentation of student growth of knowledge, understanding and skills,
2. Provide evidence of students' progress in demonstrating the IB Learner Profile, and
3. Understand the role of assessment for the purpose of gathering evidence based on a developmental model of teaching, and use this to identify and provide learning pathways for students with respect to developmental outcomes.

As such, the following research questions will be investigated as the focus of this study:

1. *How do PYP schools define educational assessment?*
2. *How do teachers in PYP schools see the purpose of assessment?*

3. How do teachers in PYP schools use assessment to plan for depth and rigour of learning?

<i>Research questions</i>	<i>Propositions</i>
<i>1. How do IB PYP schools articulate their approach to assessment and the way it is used for supporting student learning?</i>	<i>There are differences between IB PYP schools in the way assessment is used to support student learning</i>
<i>2. How do IB PYP schools and the teachers in these schools implement assessment design that reflects the diversity of purposes of assessment (assessment of, for and as learning)?</i>	<i>Teachers in IB PYP schools use and design assessment for a range of purposes</i>
<i>3. How do IB PYP teachers understand the role of evidence in assessment and provide documentation of student growth of knowledge, understanding and skills?</i>	<i>Teachers in IB PYP schools understand the role of evidence in assessment and its impact for student learning.</i>
<i>4. How do IB PYP teachers identify students' current level of development and use it to plan for depth and rigour of teaching and learning?</i>	<i>Teachers in IB PYP schools use work samples and other evidence to identify students' levels of development This evidence is then used to plan for depth and rigour of student learning</i>
<i>5. How do IB PYP teachers provide evidence of students' progress in demonstrating the IB Learner Profile and use this evidence to support future learning?</i>	<i>Teachers and schools can identify student progress in demonstrating the IB Learner Profile Evidence of student progress on the Learner Profile is used to plan for further development of these attributes</i>
<i>6. How do IB PYP teachers integrate the role of formative feedback and formative assessment in learning?</i>	<i>Schools and teachers review their school assessment policies and practices to align with the IB PYP guidelines, which incorporates planning for student learning, and growth along a developmental continuum.</i>

Data sources

1. Survey completed by all IB PYP teachers in each school using Survey Monkey (online survey instrument accessible via email or website). A 15 minute online survey to investigate teacher knowledge of assessment (definitions), understandings and practices relating to assessment. The survey tool which is currently under development includes both open ended and also closed ended items that utilise a Likert scale.
2. Interviews with each school's IB PYP Coordinator about assessment practices and

culture. This will involve a 30 minute interview to explore the school wide assessment philosophy, the level of understanding in regard to the IB philosophy relating to assessment, the role of evidence in assessment; and the intersection between national assessment requirement and policies and the IB PYP school approach.

3. Assessment policy documents from school will be requested and audited.

The IB PYP Coordinator will be invited to identify three teachers from within each school across different year levels and levels of experience to participate in a focus group. Their permission to participate will be sought and once obtained they will be invited to select unit plans and de-identified samples of work that illustrate the way assessment is used in the school. A one hour focus group will explore these teachers' use of evidence to identify student knowledge, skills and understanding; the ways they use this evidence to plan for teaching and learning. In addition, the focus group will explore what evidence is used to identify student progress on the IB Learner Profile; and their understanding of a developmental approach to teaching and the implications for assessment to support such an approach.

Structure of Case studies

Section Heading		Data sources
About the School	School demographics	Desk Audit
Purposes of Assessment	Types of assessment Aims of assessment practices	Survey data for individual teachers Examples from focus groups Examples from PYP coordinator
How assessment is used to support student learning	Examples of assessment	Teacher survey Focus groups PYP coordinator
The connection between assessment and student learning	Beliefs	Teacher survey Focus Groups PYP coordinator
Using assessment to identify current level of student development and plan for learning	Practices	Teacher survey Focus groups PYP coordinator Policy documents
The Learner Profile and assessment	Examples Interview data from PYP C	Teacher survey Focus groups PYP coordinator
The role of formative feedback and formative assessment	Beliefs Practices and examples of practice	
Identified dilemmas and challenges	Interview data	Focus groups PYP coordinator