Different countries, different approaches to teaching and learning?

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List of Abbreviations

ATL ....Approaches to Teaching and Learning

CAST ....Center for Applied Special Technology

FOA ....Further Oral Activity

HL .... Higher Level (IBDP)

IB ....International Baccalaureate

IBDP ....International Baccalaureate (Diploma Programme)

IBO ....International Baccalaureate Organisation

IOC ....Individual Oral Commentary

SES .... Socioeconomic status

SL ....Standard Level (IBDP)

SPSS ....Statistical Package for the Social Sciences

UD ....Universal Design

UDL ....Universal Design for Learning

1   Introduction

Different countries, different approaches to teaching and learning sought to investigate the ways teachers in International Baccalaureate Diploma Programme [IBDP] classrooms used differentiation to support student learning. Targeting teaching and learning to diverse groups of students is often challenging for teachers, and the project also sought to identify barriers to differentiation as well as factors that made it easier for teachers to structure lessons and assessments to suit differing student needs. Crucially, the findings of this research highlight a range of 'promising pedagogies' in the IBDP subjects, with teachers demonstrating creative and thoughtful approaches to supporting the learning of students in their classes. The teachers who participated in this research also often expressed or demonstrated confusion about what constituted 'differentiation' in the IBDP, indicating a need for more professional learning in this space. This report summarises the research methodology and approach, details the key findings of the project, and provides recommendations for the strengthening of differentiated teaching in IBDP classrooms. In addition, a range of examples of practice observed by the researchers are described in 'promising pedagogy' vignettes throughout the report; these illustrate that even with significant challenges in implementing differentiation, teachers found ways to support diverse groups of students in the contexts they worked in.

1.1   Rationale

Despite the universal provision of primary and secondary schooling in modern OECD nations and the rapid growth in participation which has accompanied this, inequality has continued to characterise many aspects of educational outcomes. In the field of educational sociology, these inequalities have been attributed to a range of sociological constructs such as society, family, and race. Educational psychology, on the other hand, has focussed more on what can be achieved in the cognitive arena, and more specifically in the classroom. Within this body of research, 'quality pedagogy' has been identified as one possible way of ameliorating these unequal outcomes. However, 'quality pedagogy' has been difficult to define, in part due to the wide-ranging needs of students. Notwithstanding the difficulties of defining quality pedagogy, there has been one concept that has continually been identified as supporting students with differing learning needs, interests, abilities and levels of 'readiness'. That is, the concept of differentiated instruction.

Prior research in differentiated instruction has demonstrated that it can be interpreted in quite different ways. Tomlinson and Javius (2012) have advocated the idea that differentiation is about varied levels of support or inputs. Conversely, in their recent Australian study, Fenwick and Cooper (2012) found that many teachers believe differentiation is really about different expectations or outcomes for students. When discussing inclusive practices in the classroom, Graham and colleagues state that differentiation can be pre-planned or ad-hoc (Graham, Berman & Bellert, 2015). Whilst ad-hoc differentiation and point-of-need scaffolding are useful, Graham and colleagues suggest that pre-planned differentiation allows teachers to reflect on students' prior learning and provide interventions in an informed and thoughtful way.

In a recent study undertaken in Melbourne, Dulfer (2015) found that school contextual factors impacted on the implementation of differentiation in the classroom. Dulfer found some planned and point-of need differentiation took place in a high SES secondary school, but that ad-hoc differentiation was the only type of differentiation taking place in a low SES secondary school. Dulfer's findings have also supported the idea that it is difficult to differentiate in communalised classrooms or when undertaking direct instruction (Hoadley and Ensor, 2009; Pedro, 1981). In

essence, differentiation is not always clearly understood or enacted. This is particularly the case in low SES classrooms where it is arguably needed the most.

There is a great deal of support for the use of differentiated instruction to support diverse student needs, with research stating that it can meaningfully impact on individual student learning, mastery of course objectives, and individual student success (Goddard, Goddard & Kim, 2015; Santangelo & Tomlinson, 2009; Subban & Round, 2015; Williams et al., 2013). Utilising differentiated approaches has also been associated with providing appropriate support for struggling learners and gifted students who are members of a mainstream classroom (Lawrence-Brown, 2004; Santangelo & Tomlinson, 2009; Subban & Round, 2015; Van Tassel-Baska, Quek, & Feng, 2006). This in turn makes providing differentiated learning activities crucial for allowing all students access to the curriculum and the opportunity to grow within the classroom (Lawrence-Brown, 2004; Santangelo & Tomlinson, 2009).

In addition to the possible benefits to student progress in learning, the underlying dimensions of differentiated learning in the classroom are by nature supportive of individual student interests (Kyburg, Hertberg-Davis, & Callahan, 2007; Santangelo & Tomlinson, 2009; Tricarico & Yendol-Hoppey, 2012). Differentiated instruction is closely aligned with student-centred approaches to teaching and supports student agency in their own learning, encourages student choice and consequently promotes student engagement (Santangelo & Tomlinson, 2009; Subban & Round, 2015). A differentiated approach to learning can also provide a foundation for culturally, socially, and linguistically sensitive educational opportunities (Jackson, 2005; Subban & Round, 2015), which is partially why differentiated instruction is often considered to be an essential element to success in contemporary classrooms (Subban & Round, 2015; Tomlinson, 2001; 2003).

While differentiation is widely supported in the literature (Goddard, Goddard & Kim, 2015), it can be problematic to simply note its desirability in education contexts that increasingly emphasise standardisation; rather, there is a need to carefully consider the complexities of differentiation in educational settings where there are curriculum and achievement standards that apply to all students. Many teachers know that standardised approaches simply do not work for some students, but the arguments for standardising education will persist in neoliberal cultures of comparison and competition. However, we argue – with the support of the research literature (Heacox, 2009; 2012; Tomlinson, 2005) – that such approaches to education do not necessarily preclude the use of differentiated instruction, and in fact make it even more important. Students may be expected to reach similar goals, but they will almost certainly take a range of different pathways to get there. Differentiation acknowledges this and works to ensure that alternate pathways are always available to students (Heacox, 2009).

To date, research in this space has been dominated by a focus on systemic contexts which do not mandate particular approaches to pedagogy, but this is not the case for schools offering the International Baccalaureate Diploma Programme (IBDP). The International Baccalaureate policy regarding approaches to teaching and learning in the Diploma Programme focuses on pedagogy and recommends that teaching needs be 'differentiated to meet the needs of all learners' (IBO, n.d., p21). This context offered an opportunity to research a system that mandates teaching approaches, and to examine if and how the results around differentiation may differ. Given that the International Baccalaureate is one of the fastest growing international education providers in

the world, with 6,068 programmes being offered worldwide, across 4,655 schools, it is an ideal context in which to explore differentiated instruction.

1.2   Purpose

This research was designed to investigate how differentiation (adaption of content, process, product and environment, according to Tomlinson, 2001) takes place in diverse International Baccalaureate (IB) classrooms in two countries. Of particular interest was how teachers differentiate, the factors that inhibited or enabled differentiation and the ways in which teachers adapt an international curriculum to respond to localised needs and contexts.

Within the report there are a range of promising pedagogical practices presented as vignettes. These are observed examples of teaching and learning strategies which may provide practical inspiration for teachers seeking possible ways of differentiating instruction.

1.3   Background

The IB has had a focus on both Universal Design for Learning [UDL] and differentiation within its Primary Years and Middle Years programmes for a number of years. However, in 2013 the IB developed a new *Approaches to Teaching and Learning* framework designed to guide and support teachers' pedagogical decisions in all of its educational programmes. Within this framework six key pedagogical principles that underpin all IB Programmes were identified. Teaching in the IB needs to be:

- based on **inquiry;**
- focused on **conceptual understanding;**
- developed in local and global **contexts;**
- focused on effective teamwork and **collaboration;**
- **differentiated** to meet the needs of all learners; and
- informed by **assessment** (formative and summative) (IBO, n.d.).

The IBO ATL highlights the importance of four principles to promote equal access to the curriculum, which are; affirm identity, value prior knowledge, scaffold learning, and extend learning (IBO, n.d.).

Table 1 below, outlines the four principles and identifies some of their key features.

Table 1: Approaches to Differentiation (ATL) (IBO, n.d. p21)

Affirm identity—build self-esteem	Promote environments that welcome and embrace learners. Foster high but realistic expectations. Value and use the diversity of cultural perspectives. Liaise and collaborate with parents. Understand student learning preferences and interests. Identify and teach through student strengths.
Value prior knowledge	Identify prior knowledge and activate prior learning, including that learned in other languages. Map language and learning profiles. Build new knowledge onto existing knowledge.
Scaffold learning	Support new learning through the use of graphic organizers (writing frames, Mind Maps®), which are pictorial forms of promoting, organizing and constructing knowledge; visual aids, drama, demonstrations, etc. Encourage collaborative learning groups/peer support. Scaffold tasks through use of strongest language where appropriate.
Extend learning	Combine high expectations with opportunities for learner-centred, experiential practice and interaction with cognitively rich materials, experiences and environments. Use technology and assistive technologies to enrich learning and to ensure that all learners have the same opportunities.

Particular attention is paid to teachers having a strong understanding of their students' learning needs, cultural backgrounds, learning preferences, readiness, and individual interests (IBO, n.d.). A strong understanding of the curriculum is also required in order to support students in their learning. Within the IB, teachers need to exhibit the ability to transfer and discriminate between content and concepts. They need to extend a student's conceptual understanding, and make inferences to real world application.

The IB also stipulates that differentiated instruction should be informed by assessment and that teachers must have a strong understanding of how to design learning objectives that allow for flexibility and student choice (IBO, n.d.). Finally, the IBO (n.d.) proposes that effective differentiation should be embedded in school culture, and planned and put into practice in a team context. Many of the factors relating to differentiation that are highlighted in the ATL mirror those emerging from the broader literature considered in this report.

In a broader literature context, differentiation refers to the strategies and pedagogical approaches teachers use to respond to student difference. Much of the literature argues that to be successful in education settings, teachers must acknowledge that students vary in the way they learn and the speed at which they acquire skills and knowledge (Tomlinson, 2001). Differentiated instruction is seen as an important strategy in creating flexible teaching to meet the individual learning needs of students (Allcock & Hulme, 2010; Moon, 2005; Santangelo & Tomlinson, 2009; Subban & Round, 2015; Tomlinson, 2001).

Differentiated instruction is thought to create learning environments where students are able to acquire knowledge and an understanding of content, critically analyse and synthesize information, and make connections to global issues (Moon, 2005). Teachers take into account students' varying background knowledge, readiness, language, and preferences in learning and interests, and then to act on that knowledge responsively in planning content dimensions, process dimensions, and product dimensions' (Dixon et. al, 2014, p. 113). There is no one way to differentiate – 'no clearly established rules or steps,' as Brimijoin (2005, p. 255) notes – and there is an overwhelming number of possible approaches outlined in the literature.

Tomlinson's (2001, 2005) conceptual framework for differentiation based on content, process, product, and environment informs many approaches to differentiation in the classroom. The model is broken down into four key components;

- *Content differentiation* refers to the lesson content which can be adapted. Some examples of content differentiation include using teaching and learning strategies that allow students to access content in different ways or adapting the content itself so that it is relevant to the student's interests, backgrounds, or learner profiles.
- *Process differentiation* refers to methods used by teachers and students to support the learning, such as through feedback, flexible pacing, and using multiple modes of presenting the curriculum.
- *Product differentiation* refers to the way students demonstrate their understanding which can be achieved through setting tasks that vary in their level of sophistication, allowing students to demonstrate their learning through a range of products, and designing tasks to allow the students to work at different speeds.
- *Environment differentiation* refers to how the learning environment can be used to enhance learning, such as through the use of the classroom space to create a flexible learning environment or to meet the individual needs of the students.

Within the Tomlinson model, differentiated instruction is seen as dynamic and is more complex than simply giving students additional or fewer classroom assignments and tasks (Santangelo & Tomlinson, 2009; Tomlinson, 2001; Williams et al., 2013).

The Universal Design for Learning [UDL] framework has also been proposed as a suitable method for approaching the diverse learning needs of classrooms (Al-Azawei, Serenelli, & Lundqvist, 2016). The UDL framework was formed based on the Universal Design [UD] principles (Rose & Meyer, 2002), which initially focused on using architecture to assist people with additional needs to access buildings through flexible and equitable design (Al-Azawei et al., 2016; King-Sears, 2009; Mitchell, 2014; Sokal & Katz, 2015). These principles were extended to an education setting and consequently focus on addressing the limitations of the learning environment rather than focusing on the limitations of the students (Rose, et al., 2006) to support the learning experience. An assumption that underpins this framework is that altering the learning environment can meet the needs of all learners and that this framework will have universal benefits for all students (Al-Azawei et al., 2016; Black, Weinberg, & Brodwin, 2015; Dinmore & Stokes, 2015).

Three key UDL principles have been identified by CAST (2012) to assist with the learning process. These principles are; (1) providing multiple means of representation, (2) providing multiple opportunities for action and expression, and (3) providing alternative means of engagement (Al-Azawei et al., 2016; Basham, Smith, & Satter, 2016; Rose et al., 2006; Dinmore & Stokes, 2015). To achieve these principles, educators must provide multiple means of content delivery,

alterative learning processes, methods of expression, multiple methods of assessment and facilitate student engagement (Al-Azawei et al., 2016; Basham et al., 2016).

Table 2 below demonstrates some of the similarities and differences within each of the frameworks. As Brimijoin (2005) stated there is no one size fits all approach to catering for the needs of diverse groups of students. Each of the differentiation models we looked at contained aspects that may have been useful in answering our key research questions. However, for the purposes of this research we have drawn heavily on the conceptual framework developed by Tomlinson.

Table 2: Comparison of differentiation, UDL and ATL frameworks

Differentiated Instruction Characteristics	Universal Design for Learning Characteristics	Approaches to Teaching and Learning
Making learning accessible for all students through content, process, product, environment	Multiple means of representation, action, expression and engagement.	Aligns with both, with some concerns expressed regarding high stakes exams
Can happen in design or as teaching occurs (planned and ad-hoc)	Needs to happen in the design stage (planned)	Aligns with both, with preference for conceptual framework to support curriculum design
Student focus	Curricular focus	Aligns with both
Tends to be amorphous	Conceptual Framework	Aligns with both, but tends to focus on particular elements of each

This table draws on the work of CAST (2012); Rao et al (2016)

1.4   The Research Questions

The research *Different Countries, Different Approaches to Teaching and Learning* was intended to consider multiple sources of data addressing the following key questions:

- How do teachers employ differentiation in their approaches to teaching in International Baccalaureate environments?
- What factors inhibit or enable differentiation in their classrooms?
- In what ways do teachers adapt to their local/global context?

2   Methodology

2.1   Overview

The focus of this research was teacher pedagogy and whether teacher practices of differentiation are inhibited or enabled by their contexts. As the teacher was the central focus of the study we conducted a series of case studies, one for each teacher. This multiple case study approach has been recommended when research is aimed at understanding "diverse experiences of the program, or unique variations from one program setting to another" (Patton, 2002, p. 55). The multiple case study approach is also suggested when the research needs to take place in a real life context. In the words of Yin (1994, p13), "A case study is an empirical inquiry that investigates a contemporary phenomenon within its real life context, especially when the boundaries between

phenomenon and context are not clearly evident". In order to examine the pedagogy of particular teachers it was necessary to observe them with their own classes in their real life context.

The small scale of this project made it highly suited to a case study approach (Atkins & Wallace, 2012). As Yin (1994) notes, case study research pays close attention to context, and the International Baccalaureate context was a major focus for this project due to its emphasis on differentiation. As such, data collection instruments were designed to examine a range of questions relating to the context that surrounded the teaching and learning taking place in the classroom (Atkins & Wallace, 2012). As is characteristic of case study research, a number of sources of data were collected in order to gain a clear understanding of the context and the practices of teachers (Gillham, 2000).

Following the guidelines of assessment for teaching set out by Griffin and Care (2014) this research was based on directly observable evidence (what teachers do, say, make or write). This reduced the need for researchers to make inferences in order to observe teacher pedagogy. It also allowed for triangulation of findings based on multiple sources of data about the same phenomenon.

Figure 1: Observable evidence sources
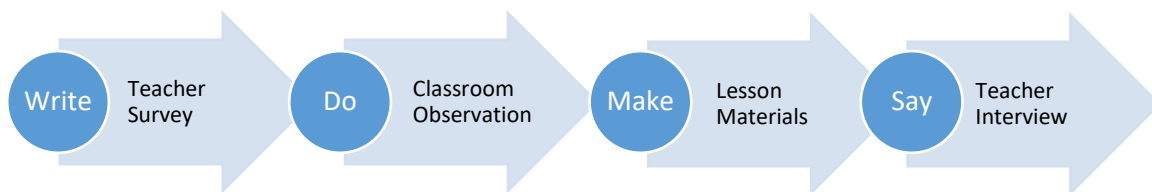
The participating teachers were:
- required to complete an online survey concerning differentiated instruction (approximately 20 minutes in duration);
- observed teaching three or four IBDP lessons using a guided observation instrument and in accordance with accepted practice for non-intrusive observations. (During lesson observations relevant lesson plans or instructional materials were collected.); and
- asked to discuss their pedagogical choices in a semi-structured interview (approximately 30 minutes in duration).

The generated data was analysed using the Statistical Package for the Social Sciences [SPSS] version 19 and thematic framework analysis (Huberman & Miles, 2002).

The research project took part in three distinct phases.

- **Phase 1** - Literature review and instrument design/development: The literature review focused on the way differentiation may or may not be measured within the classroom situation. Attention was paid to IB documentation, the creation of lesson observation tools and guided interview.
- **Phase 2** - Data collection in three Hong Kong schools and three Victorian schools. These schools were chosen using purposive sampling based on available data. In each school three teachers took part in the study. Participating teachers taught one IBDP subject.
- **Phase 3** - Data analysis and Report Writing.

2.2 Sample

Six schools were chosen to take part in the study, three schools in Hong Kong and three in Victoria. Table 3 provides an overview of the sample schools' demographic information. In addition to the data included in the table it is important to note that all of the schools who took part in the study were high socio-economic status schools. Additionally, they were all co-educational.

Table 3: School demographics

School	Type	IB Programmes	Ages	Student numbers	Country
Red School Hong Kong	Private - International	MYP, DP	P - 12	1650	Hong Kong
Yellow School Hong Kong	Private - International	DP	Secondary	1200	Hong Kong
Green School Hong Kong	Private - International	PYP, MYP, DP	P - 12	620	Hong Kong
Blue School Australia	Private - National	PYP, DP	P - 12	1450	Australia
Purple School Australia	Private - National	DP	P - 12	2000	Australia
Pink School Australia	Private - National	DP	P - 12	787	Australia

Three teachers from each school voluntarily participated in the research (n = 18). Participating teachers were required to be teaching one IBDP subject area. The teachers were asked to provide some background information which is displayed in Table 4.

The majority of the Hong Kong teachers reported being educated in the United Kingdom and they had all taught in at least one other international setting (e.g., Israel, Japan, China, Australia, Thailand, South Korea, Ireland). The majority of the Hong Kong participants in the study were female (approximately eighty per cent), and aged between 35-44 years of age (approximately seventy per cent). The number of years each respondent reported being employed as a teacher varied from 9 years to 21 years. Variation was also found in the Hong Kong respondents' experience of teaching the IBDP as the respondents' involvement ranged from two years to ten years.

The majority of Australian teachers participating were educated in Australia. Six of these teachers had taught in at least one other country, including the United States, Zimbabwe, the United Kingdom and Japan. Four of the Australian participants were female and five were male, and their ages varied – three were aged 55 or older, three aged between 45 and 54, one aged between 35 and 44, and two aged 25 to 34. Their teaching experience was similarly varied, from three years to 43 years teaching in general, and between one and 21 years teaching the IBDP.

Table 4: Teacher demographics

School	Teacher	Gender	DP Subjects observed	Age	Years Teach IBDP	Years Teach	International Teach Experience
	Edith	F	English Literature	35-44	2	20	Yes
	Michael	M	History	25-34	2	9	Yes

Red School Hong Kong	Lucy	F	Bus Management	35-44	10	13	Yes
Yellow School Hong Kong	Maria	F	Psychology	25-34	3	10	Yes
	Abby	F	English B	35-44	7	16	Yes
	Martin	M	Economics	35-44	9	21	Yes
Green School Hong Kong	Jessica	F	Theatre	35-44	8	16	Yes
	Julie	F	Lang & Lit	45-54	3	8	Yes
	Emma	F	History / CAS	35-44	5	15	Yes
Blue School Australia	Tyler	M	Economics	25-34	3	3	No
	Jane	F	Biology	55-	1	27	No
	Paul	M	Mathematics SL	45-54	15	20	Yes
Purple School Australia	Adam	M	Mathematics SL	25-34	6	8	Yes
	Scott	M	Japanese B	45-54	3	16	Yes
	Phillip	M	Mathematics HL	55-	21	26	Yes
Pink School Australia	Natalie	F	Economics	35-44	6	13	No
	Celia	F	English	55-	16	30	Yes
	Meredith	F	English Literature	55-	15	43	Yes

A wide variety of curriculum areas were viewed (13 individual subjects) with both Higher Level and Standard Level subjects included in the study.

2.3 Instruments

2.3.1 The Survey

A self-report instrument (Appendix 1) was developed by the researchers and informed by the research literature and Tomlinson's (2001) framing of differentiation. The survey explored participants' views and knowledge about differentiated instruction. Teachers were asked to identify differentiation strategies from a range of examples. They were then asked to consider their own teaching practices in terms of frequency and importance or particular strategies. Questions were grouped according to the four sub-headings; content differentiation, process differentiation, product differentiation, and environment differentiation. Grouping questions under each of these subheadings was intended to structure the questionnaire within a framework informed by the literature and to facilitate the participants' completion of the survey (Beaudry & Miller, 2016). The response set consists of importance categories such as; not at all important, slightly important, important, and very important and frequency categories such as; rarely, occasionally, usually, and frequently.

2.3.2 The Observation Instrument

Much of the previous research measuring differentiated instruction focusses on teacher self-reflection (Strickland, 2009; Heacox, 2012). However, this research aimed to observe teaching and learning in the classroom in order to establish what elements of differentiated instruction were being used (Garrett & Steinberg, 2014; McCaffrey, et al., 2015; Whitehurst, et al., 2015). In response to this need, a structured qualitative data collection tool (Appendix 2) was developed by the researchers in conjunction with the Assessment Research Centre (ARC) of the University of Melbourne. Guided again by Tomlinson's (2001) framework the instrument was organised into four headings, with a number of indicators listed under each heading. Criteria for each of these indicators described the different levels of achievement, however it should be noted that the instrument was used qualitatively rather than quantitatively; that is, the results indicated what teachers were doing in the lessons observed, and this formed the basis for a qualitative analysis

also informed by interview and survey data. It did not result in a simple 'score' for differentiation. The instrument is included in Appendix 2.

Figure 2: Observation Instrument categories

Content	Process	Product	Environment
Learning goals	Structure of learning	Task sophistication	Supports learning
Access	Teacher Pacing	Student choice	Safe and inclusive
Presentation	Feedback	Student pacing	Flexible spaces
	Individual responses		
	Self reflection		
	Student instruction		
	Communication		
	Grouping		
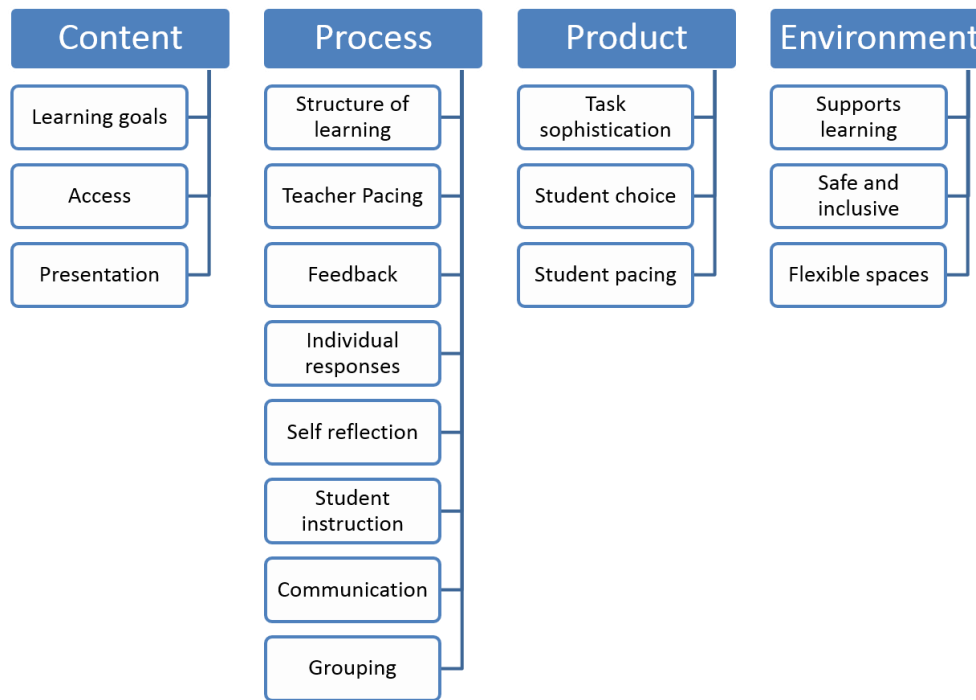
The Differentiation Observation Instrument was designed to minimise the problems of inconsistency, observer error and/or bias highlighted by previous research (O'Leary, 2013; Casabianca, Lockwood, & McCaffrey, 2015; McCaffrey et al., 2015; Whitehurst et al., 2015). A pilot test for the instrument was undertaken by the researchers and found this instrument to be ready for utilisation, with multiple observers achieving identical results. The Differentiation Observation Instrument was used to guide a series of lesson observations for each teacher, reflecting the fact that differentiation may not always be apparent within one lesson (Kaiser, 1999, cited in Tomlinson & Allan, 2000).

2.3.3   The Teacher Interview

Following the series of classroom observations, each teacher participated in a semi-structured interview including questions linked to both the questionnaire and observation instrument (Shank & Brown, 2007). A series of guiding questions were developed to ensure that all the participants had 'the same data-gathering experiences' (Shank & Brown, 2007, p.192). The content of this interview focused on identifying student needs, the learning and teaching strategies used to cater for student differences, the process used to design tasks to meet student needs, inhibitors and facilitating factors surrounding differentiated instruction, and how the teacher adapts the learning experience to meet the local and global contexts. An audio recording device was used to document the participant's responses during the semi-structured interviews.

2.4   Analysis

According to Huberman and Miles a thematic framework analysis "involves a systematic process of sifting, charting and sorting material according to key issues and themes" (Huberman & Miles, 2002, p310). Thus a thematic framework analysis was the preferred analytic approach. Working from recommendations in the literature, the basic concept of pedagogy was analysed in terms of four key themes. These were, as previously discussed, content, process, product and

environment. Each of these four themes was defined by several elements for the purpose of analysis. Each of the three sources of data (teacher survey, lesson observation (and materials) and teacher interview) was analysed and findings assembled according to these themes and elements.

Surveys were checked for errors and the data were entered into SPSS format. All data were then analysed using a range of SPSS tools including descriptive statistics such as frequencies and cross tabulations, as well as multivariate statistical procedures including correlations and ANOVA. ANOVA was an appropriate statistical procedure for examining differences between the Hong Kong and Australian respondent teachers in there implementation of differentiated instruction as it allows the researchers to examine the influence of multiple dependent variables (Tabachnick & Fidell, 2013).

In a two-stage process, interviews were initially transcribed by the researcher to enable the researcher to interact with the data and begin the process of analysis and interpretation. The second stage of this process was to begin to code and reduce the interviews into the key themes and clusters that were operationalised across all three data sources.

2.5   Limitations & Significance

Case study approaches carry particular advantages in educational research, where the complexity of approaches to teaching and learning are such that close study of sites, individuals or institutions is beneficial. This approach does, however, mean that the sample size is too small for generalizability. This type of study is "aimed at insight about the phenomenon" (Patton, 2002, p.41), rather than more general understandings across larger contexts. Schools and classrooms are complex places. They rely on more than simply the sum of their parts to create their environments. They are social, structural, places of learning and as such every classroom and school is slightly different from the previous one. What a case study approach such as this one offers is an opportunity to look deeply into situations that provide insight into the focus questions; in this instance, the participating teachers were able to share detailed information on their practice that can inform understandings of the ways differentiation takes place 'on the ground'. Such detailed insights could not be obtained from methodologies that can be implemented on a much larger scale, although there are strong arguments for developing further research that does provide the 'bigger picture' in order to further support knowledge in this field.

There is also the potential that the sample has been biased by allowing teachers to self-select. Self-selection runs the risk of teachers offering to take part in the study for their own reasons. It may be that certain teachers were encouraged to take part in the study as a professional development opportunity, or in order to make the school 'good'. This is a limitation common to educational research, as teachers and students cannot be coerced into participating. In this instance, however, it has meant the recruitment of a number of teachers who place emphasis on differentiation in their practice; as such, the findings demonstrate some valuable examples of promising pedagogy that could inform teaching in various subjects in the IBDP.

A final word of caution about the sample is that even though schools may look the same on paper, there can be significant differences hidden within the individual schools' contexts. It is not the intention of this study to evaluate teaching or argue that schools from certain contexts can all be treated in a similar manner; rather, the case study approach allows for these differences and provides suggestive examples of practice, instead of prescriptive or general guidelines.

3 How do Teachers Differentiate?

Looking through the lenses of content, process, product and environment, the following sections detail the findings from the lesson observations, questionnaires and interviews. For the most part, teachers indicated that they felt differentiated instruction was important, but that they did not always achieve it through their teaching. For example, the questionnaire results reveal that for all but one category (discussed in section 3.2), teachers scored the importance of differentiation higher than they did the frequency of use in the classroom. There are important implications of this finding for differentiation in IBDP classrooms; clearly, teachers in this study indicated they wanted to differentiate more than they felt they did.

3.1 Content

For most teachers in the study, curriculum had an impact on the way they were able to differentiate content. However, many found ways of ensuring that students had opportunities to access key concepts through varied material, or to access the same material in different ways (Tomlinson, 2001). Items dealing with content in the questionnaire examined teachers' adaptation of content in relation to students' ability levels, the learning goals, students' access to content, and the connections between content and 'real world issues'. In observations, the research focused on the ways teachers presented and used learning goals in the classroom, the provision of access to content, and the presentation of content.

Tomlinson (2001) emphasises the need to consider content differentiation in terms of both the adaption of the material presented to students and the way the students are able to access that content. She argues that it is in fact preferable to focus differentiation strategies upon the provision of different points of access or modes of accessing content, rather than giving different students different content. This is a key focus for the observation instrument, and is particularly important in the context of the courses with high stakes examinations like the IBDP, where content demands can be perceived as a barrier to differentiation. A focus on learning goals was also an essential foundation for understanding differentiation in the classroom; differentiation is dependent upon an identification of what it is students need to know, understand and be able to do (Tomlinson, 2001). Brimijoin (2005, p. 255) further argues that 'Generating explicit definitions of the knowledge, understandings, and skills that students will gain from a learning experience is a starting point for teachers who differentiate well'.

3.1.1 Learning Goals

When the survey asked teachers if it was important to have clear learning goals, which were articulated and used as a tool within the learning environment 88 per cent of them felt that this was important or very important. Additionally, approximately half of the sample believed that learning goals were frequently used as a tool in their classrooms. The example of promising pedagogy below demonstrates the ways one teacher used learning goals as a tool within her history classroom.

Learning goal practices that were able to be identified within the observed lessons fell into four categories:

- Insufficient evidence
- Makes learning goals visible
- Draws attention to the learning goals
- Uses the learning goals as a tool within the classroom

The first descriptor of every observation category was 'insufficient evidence'. In this study it was important that 'insufficient evidence' was not viewed as being a negative result. There are times when it is not possible to make the learning goals visible, or where the learning goals have been stated at the beginning and end of a unit of learning, rather than in an individual lesson. Essentially, 'insufficient evidence' simply states that in the lesson being observed there was no evidence of this particular behaviour or teaching technique.

Within the 59 lessons observed approximately a third of them had no evidence of learning goals and ten per cent had learning goals that were visible to the class but not referred to in anyway. Approximately a quarter of the teachers had the learning goals visible and drew the students' attention to them, and another third of the teachers used the learning goals as a tool within the classroom. In the example below, one teacher used the learning goals as a feedback tool, as well as to direct the lesson. Whilst there were two teachers who had very consistent results, with one teacher never using learning goals and another teacher always using learning goals as tools within the classroom, there does not appear to be a pattern in the year level, subject, school or country contexts in which the teaching takes place. A tentative conclusion, however, is that the data from the lesson observations suggests that actual use of learning goals in classrooms does not occur as frequently as teachers believe.

Vignette 1: Learning Goals

Promising pedagogy: Learning goals

Emma, a history teacher at Green School Hong Kong, wrote learning goals for each lesson on the whiteboard. With a class of only four students, she was able to note the progress each student had made and what they needed to focus on. Through discussion in the series of lessons on Mao and the history of China, she linked the lesson goals to the students' prior learning on other dictators; identifying, for instance, some of the common features of dictatorships through previous study on Hitler's Germany. The learning goals, which included both knowledge and skills requirements for the course, were foundational to the development of lesson content, process, and products.

3.1.2   Access

In their teacher survey responses, the participants in the study were asked a series of questions related to content access. Approximately half of the participants believed it was very important to ensure that all students could access the same material, although students may access it in different ways according to their needs. Half the group also felt that they frequently enacted this practice. Seventy percent of the teachers also believed that it was very import to take into account students' learning needs. However, only half of them felt they managed to do this frequently.

Access practices that were identified within the observed lessons fell into four categories:

- Insufficient evidence
- Delivers the same content to all students
- Delivers different content to selected students/groups of students
- All students have access to the same content but can access it at different levels or in different ways

In forty percent of all the classes observed, teachers were delivering the same content to all students. For almost half of the teachers the majority of their observed lessons took this format.

This style of teaching took place in a range of subjects, with mathematics appearing to be the most affected. Half of the schools had more than fifty percent of the observed classes taught in this way, with two of the three schools based in Australia. Indeed, in one of the Australian schools eighty percent of the classes observed involved the delivery of the same content to all students.

Approximately one quarter of all lessons observed delivered different content to selected students or groups of students, with one teacher always adopting this approach to content delivery. One school in Hong Kong had over fifty per cent of its observed lessons taught in this way.

One third of the observed classes involved all students having access to the same content, but being able to access it at different levels or in different ways. This approach formed the majority of the practice undertaken in one of the Australian schools. Accessing the same content in different ways appears to work across a range of subjects with seven subjects (Biology, Economics, English, Literature, History, Mathematics, Psychology) using this approach in the majority of their classes. Six teachers appeared to prefer this method of providing access as they used it more than half of the time. In a number of lessons, students were provided with additional work for extension or if they finished early.

One of the consequences of teachers choosing to deliver the same content to each student is that it can reduce the teacher's ability to take account of students' prior knowledge, interests and learning needs. In a literature class in Hong Kong students were studying the poetry of Carol Ann Duffy. The teacher could have asked them all to study the same poem, analyse it, write about it and then moved onto the next poem. However, she chose not to do this. Instead she recognised that the key skills, techniques, themes and content could be learnt and understood in a range of Carol Ann Duffy poems. She therefore allowed students to choose their own poem, from a pre-selected group of poems. Students then analysed their poem and presented it to the rest of the class who provided feedback and noted the similarities and differences between the poems. Thus, students were able to access the same content, in different ways, or with different levels of understanding. Additionally it enables the teacher to consider individual learning needs, interests and knowledge.

3.1.3 Presentation

Within the lesson observations the following three categories were used to identify ways that teachers presented content:

- Insufficient evidence
- Delivers content
- Problematises content

There was a relatively even split with teachers in half of the lessons observed 'delivering content' and the other half 'problematising' content. There was only one example of insufficient evidence where the students were working entirely independently of the teacher. One of the Australian schools was particularly notable as ninety per cent of the observed teaching problematized content. There were four teachers who were only observed delivering content, and a further four teachers who were only observed problematizing content. The country breakdown of this data was also very evenly dispersed. Moreover, the way that teachers present content does not appear to be impacted by the subject being taught.

The problematisation of content supported differentiated instruction by enabling students to critically engage with what was being taught; they were able to develop and express varied understandings of core ideas, and to consider the nature of knowledge in the different disciplines. The problematisation of content is particularly important to the IB who support the idea that teachers need to shift from being "sage-on-the-stage" to "meddler-in-the-middle" (McWilliam 2005, 2008). Problematising the curriculum is one way for teachers to become "meddler(s)-in-the-middle". The vignette below provides one example of the way problematisation can take place in mathematics.

Vignette 2: Problematising content

> **Promising pedagogy: Problematising Content**
>
> One notable example of content problematisation took place in a Mathematics HL class at Purple School Australia. The teacher, Phillip, spent a lot of time in one observed lesson discussing issues around standard deviation with the class, using a range of examples designed to make students think critically about the way in which this mathematical concept is used in broader society. Students were encouraged to consider the work of Carl Gauss from a historical perspective, and the work of Nassim Taleb, who postulates the 'black swan' (once in a century) event. These examples were used as a basis for critical engagement with the concept of the bell curve.

A theme that emerged during interviews related to the accumulation of content over the two years that students undertake DP subjects – with a solid foundation of content knowledge came a greater capacity for students to engage with problematisation of course content. For instance, Meredith, an English teacher in Melbourne, noted that the cohesion of the Literature course meant that students built knowledge over time; having the same class over two years – the usual practice at this school – also meant the development of a culture of trust and respect that was foundational to questioning and discussion.

3.2   Process

Process relates to the teaching and learning strategies teachers use in the classroom; process differentiation requires that teachers provide a range of activities and modes of instruction to suit varied student needs, preferences, and learning profiles. Teachers must acknowledge that students differ in the ways they learn (Tomlinson, 2001), and differentiation of the learning process is an important strategy in creating flexible teaching to meet the individual learning needs of students (Allcock & Hulme, 2010; Moon, 2005; Santangelo & Tomlinson, 2009; Subban & Round, 2015; Tomlinson, 2001). In differentiating process, teachers provide instruction and opportunities that are based on constructive and proactive responses to the needs of their students (Moon, 2005; Santangelo & Tomlinson, 2009; Subban & Round, 2015; Tomlinson, 2001; Trinter, Brighton, & Moon, 2015; Tricarico & Yendol-Hoppey, 2012; Williams et al., 2013), in order to create a classroom where students are able to acquire knowledge and an understanding of content, critically analyse and synthesize information, and make connections to global issues (Moon, 2005).

In lesson observations, the collection of data on process differentiation focused on a number of different factors based on findings from the literature. Variety was seen as a key component of process differentiation, with the provision of differentiated learning activities considered crucial in order to allow all students to learn (Lawrence-Brown, 2004; Santangelo & Tomlinson, 2009). The literature also suggests that differentiated instructed required that teachers be facilitators and collaborators (Heacox, 2012), indicating that this approach is most at home in classrooms

underpinned by constructivist theory. The criteria for process differentiation in the observation instrument reflected this emphasis on constructivist learning, for instance through considering the ways teachers encouraged or enabled questioning, the provision of feedback and opportunity for reflection, and the use of multimodal instruction and discussion. Some of the observed examples of variety in process included the use of individual whiteboards so that students did not feel reluctance to writing down their mathematical process; jigsaw techniques; hands-on activities undertaken in small groups; and group note-taking using google docs.

3.2.1   Structure of Learning

Almost ninety per cent of the teachers surveyed indicated that it was either important or very important to include different modes of instruction in response to students' needs or preferences, with a further eighty per cent indicating that they usually or frequently managed to do this in the classroom. Eighty per cent of the teachers felt that it was important or very important to give all students the opportunity to learn in different ways, but just over half felt that they managed to do this either usually or frequently.

Within the lesson observation tool there were only two choices for the structure of learning:

- insufficient evidence
- the learning activities and strategies were varied.

Like the learning goals, a return of 'insufficient evidence' is not a negative. It may be that the particular learning being undertaken requires no variation in strategies or learning activities. There was one Australian school with around half of the classes classified as having varied strategies and activities, and two teachers with the majority of their teaching classified as insufficient evidence. However, overall, just over eighty percent of the observed classes there was variation in the activities and strategies that students undertook. This was the pattern in both countries. Interestingly when comparing the lesson observation data to the teacher survey responses, it does appear that in this instance teachers may be underestimating their own practices in regard to activity variation.

The vignette below provides one example of the way a teacher structured learning in a literature classroom to allow multiple points of access.

Vignette 3: Structure of Learning

Promising pedagogy: Structure of Learning

Experienced English Teacher Meredith used a number of varied teaching and learning strategies to introduce her Year 2 Literature class to the Shakespearean tragedy *Macbeth*. Activities including putting together the lines of a speech in order, guessing the order of a storyboard of the play, and a '32-second version' of the play in which students read out key lines throughout the play and acted out the deaths. These activities gave students multiple points of access to the narrative of the drama; by the time they actually came to read the opening scene, they had a sense of where the action would lead and were excited to learn more about how the events unfolded.

3.2.2   Teacher Pacing

When asked how important it was to give all students the opportunity to learn at their own pace, three quarters of the teachers responded it was important or very important. However, when this is compared to the frequency that teachers believed they gave students to opportunity to learn at

their own pace, just over half of the teachers felt they managed flexible pacing usually or frequently. This concurred with the lesson observation data.

Flexible lesson pacing was measured during the lesson observations when it was commented on or students asked for more time, as there was no way of knowing if a teacher was pacing things in a slower or faster way than expected. Thus within the lesson observations the two options were:

- insufficient evidence, or
- pacing is flexible.

Where the class is deemed to have flexible pacing this usually means that either the students had some say in the pace of the class, in many cases this takes the form of "do you need a bit more time to finish that example?" or individual students or groups of students were given varying amounts of time to complete activities.

Flexible lesson pacing was another criterion that returned very even results with half of the lessons observed demonstrating flexible pacing, and the other half providing insufficient evidence. There is little variation between the two countries, or in four of the six schools. However, one Australian school had eighty percent of its classes exhibiting flexible pacing, and one Hong Kong school had eighty percent of its classes providing insufficient evidence. There was no obvious pattern in the subjects that pacing was varied in, but there were two teachers who did not demonstrate flexible pacing in their classrooms.

Flexible pacing is an area where teachers are able to get instant feedback from their students regarding their individual process. It is also one way of the teacher loosening the 'framing' of the classroom which enables students some autonomy, control and voice within the room.

One teacher – Martin at Yellow School Hong Kong – noted that occasionally combining classes with another teacher enabled more flexible pacing and differentiation in terms of the work students complete. He stated that combining classes meant 'that we can accelerate some students and support other students' with each teacher taking a group streamed according to their needs. A number of teachers also spoke about their expectations of the speed at which students would work and the need to reconsider at times; in reflecting on one of his lessons, Michael – a history teacher in Hong Kong – stated 'ideally it might have been a little quicker, but that's perhaps me being unrealistic to start with', and noted that he saw it as better to allow 'as much time as it took'.

3.2.3   Feedback

Teachers were asked a range of questions about feedback in the survey including the importance and frequency of feedback that:

- Is formative and student-specific
- Is formative and applied to the whole class
- Is summative and student-specific
- Includes student specific scaffolds to support students to get to the next level
- Supports student reflection

Figure 3: Feedback importance (survey)
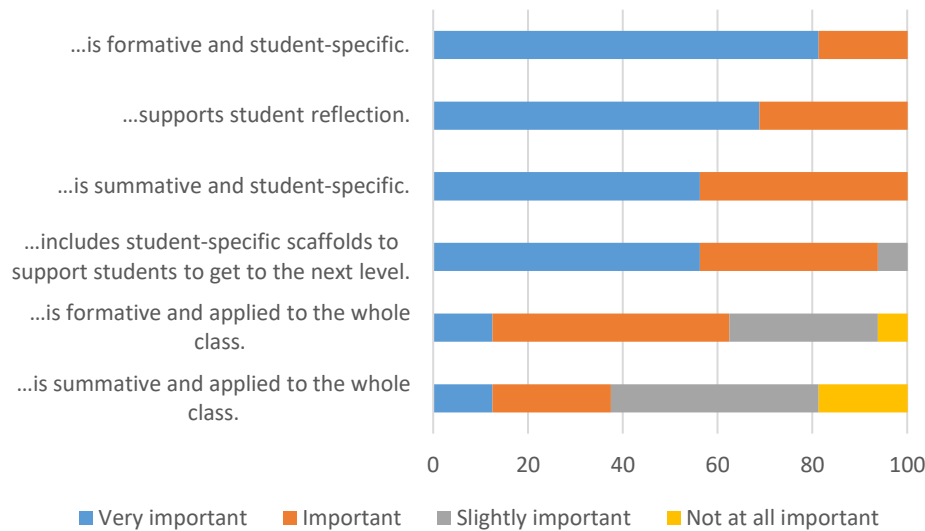
All of the teachers who responded to the surveys believed it was either very important or important to provide both formative and summative feedback to individual students (see Figure 3, above). Likewise, they all noted the importance of feedback that enables students to reflect on their own learning. Just over ninety per cent of the teachers felt that it was important or very important to include scaffolding to support students when they gave feedback. It should be noted that as part of this study we did not collect any samples of teachers' feedback, and our analysis is constrained to only what was documented in the observed lessons. Indeed, it may be the case that written feedback provided to students on individual pieces of work may provide scaffolding and student specific feedback. Having provided this caveat, the lesson observation data suggests that teachers may not be using student specific feedback extensively in practice.

Feedback practices that were identified within the observed lessons fell into four categories:

- Insufficient evidence
- Feedback is on product
- Feedback is on process
- Feedback includes scaffolds to support students' next steps

In two thirds of the lessons that were observed feedback given to students included scaffolding to support students' next steps. This finding was more prominent in Hong Kong schools (80 per cent) than in Australian schools (60 per cent). Whilst there was one Australian school where there was less feedback which included scaffolds (33 per cent), 68 per cent of schools tended to give feedback which included scaffolding. Almost 20 per cent of lessons contained evidence of feedback on process, with only seven per cent providing feedback on product.

Edith, an English Literature teacher in Hong Kong, spoke about the importance of individual attention when it comes to feedback, noting that meeting with students one-on-one allows her to support them in what they need to focus on next.

Seven of the teachers taking part in the study always provided feedback that included scaffolding to support future steps. This may indicate that once a teacher begins to use this practice it becomes a teaching habit. If this is the case, the literature suggests it would be a very good habit to acquire (Wood, Bruner & Ross; 1976). Additionally, the work of Hattie (2009) suggests that

feedback can be most effective when the teacher seeks feedback from the students in order to check for understanding and misconceptions. An example of this practice can be seen in vignette four.

Promising pedagogy: Feedback

English teacher Celia, at Pink School Australia, noted the importance of making sure students understood feedback and had an opportunity to reflect on what they needed to work on. She described this as a central strategy in her approach to differentiation; she asked students to summarise her feedback, taking one thing they did well and one thing they need to work on. 'If [they] can't work it out,' she said, 'I'm not doing my job properly.' Students and teacher could then see patterns across multiple assessments, and consider areas for the students to focus on in future assessments.

3.2.4   Individual responses

Within the lesson observations data was collected on the way that teachers responded to individual questions. Their practices fell into one of the following four categories:

- Insufficient evidence
- Responds using absolute language (yes, no, that's correct)
- Responds with information and ideas
- Response encourages further questioning

The majority of teachers in this study (56 per cent) responded to individual student questions in a way that encouraged students to find the answer themselves, think more deeply about an issue or ask further questions. Forty per cent of teachers responded with information and ideas for the student, and a very small number (3 per cent) just answered using absolute language. In terms of the differences between the two countries Australian teachers were more likely to encourage further questioning (65 per cent) than those in Hong Kong, whereas Hong Kong Teachers were more likely to respond with information or ideas for the student (53 per cent). Six of the teachers involved in the study always responded to student questions in a way that encouraged further questioning by the student. Potentially, like the scaffolded feedback this behaviour may be habitual. The types of responses that teachers make do not appear to be bound by subject.

3.2.5   Self-reflection

When asked about the importance and frequency of supporting student reflection within their teaching, every respondent felt that it was either important or very important to do this. However, teachers were more cautious in the responses regarding the frequency of this teaching practice with one quarter responding that they only managed to do this occasionally, one quarter suggesting that they usually did this, and a half saying that they frequently support student reflection.

Within lesson observations data was collected about how teachers encourage self-reflection. In this case there were three categories;

- Insufficient evidence
- Encourages reflection on the learning process
- Enables reflection on the learning process

In just over forty percent of the classes there was insufficient evidence within this category. In one third of the classes teachers encouraged reflection on the learning process, and in one quarter of the classes, teachers actually enabled students to reflect on the learning process within the classroom. There were some country differences when it comes to the self-reflection data with schools in Hong Kong thirty per cent more likely to enable students to reflect on the learning process within their classrooms. Seven of the eighteen teachers had insufficient evidence of this practice in the more than two-thirds of their classes.

Reflection was linked to the examples of feedback noted above, with several teachers noting that they met individually with students in order to ensure they understood feedback and reflected on their learning. Overall though, teachers spoke little about scaffolding students' reflection on the learning process in interviews.

3.2.6 Student Instruction

In the survey teachers were asked to identify student attributes that they believed had an impact on the teaching and learning strategies they employed. As can be seen in Figure 4 below teachers believed that the three categories of students' learning needs, students' prior knowledge and students' abilities were the most important attributes for informing teaching and learning strategies.

Figure 4: Student instruction importance (survey)
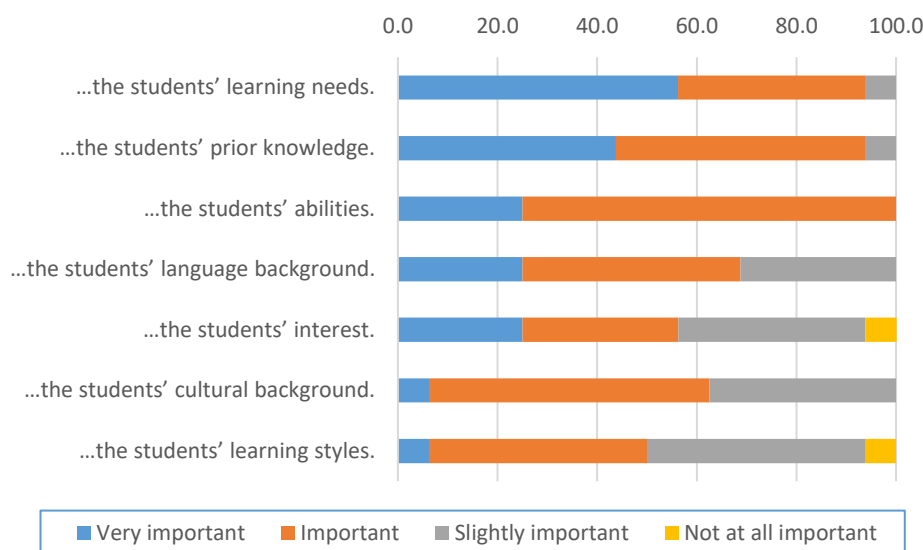
When teachers were asked how often they managed to take into account some of these attributes the results were very similar, with teachers still usually and frequently adapting according to learning need, prior knowledge and student ability. The only minor difference was that teachers were more likely to try to adapt their instructional strategies to take into account student interest, than the importance scale indicated.

When teachers were observed their teaching instructional strategies were categorised as

- Insufficient evidence
- Uses a range of multimodal materials when instructing
- Alters modes of instruction for individual or small groups of students

Of the 59 lessons observed, seven did not have sufficient evidence, 28 classes used a range of multimodal materials, and in 24 classes teachers altered the mode of instruction for individual or small groups of students. There is no particular pattern within country or within subject. There were three schools where the majority of the classes observed had different instructional strategies for different groups of students or individuals. It appears that teachers are frequently using a range of materials or instructional modalities within their classrooms.

3.2.7 Communication

All of the survey responses indicated that teachers believed it was either important or very important to enable multiple voices in the learning space, and sometimes allow students to facilitate discussion. Additionally, the data suggests that two-thirds of the teachers believe that they frequently enable this communication pattern within the classroom.

Within the lesson observations there were four categories to indicate the communication patterns within the classroom.

- Controls the majority of communication
- Controls the majority of communication but allows students to ask questions to clarify tasks
- Facilitates class discussion
- Enables students to facilitate their own classroom discussions

This is another area where teachers seem to have very strong habitual tendencies. For example, if a teacher tends to facilitate or enable classroom discussions that appears to be the way they communicate in all of their classes. Indeed, only two teachers had more than two communication strategies observed during their lessons.

In terms of classroom communication, teachers generally controlled the majority of the communication and students were able to ask questions to clarify tasks. This accounted for forty per cent of the observed classes. One third of the classes involved the facilitation of class discussion, and a further one quarter of the lessons observed demonstrated teachers enabling students to facilitate their own classroom discussions. There was only one class observed where the majority of the communication was controlled by the teacher.

This criterion returned no obvious differences between the two countries, but there was one Australian school in which the majority of the communication was controlled by the teachers with students being able to ask questions to clarify tasks (73 per cent). This is an area that appears to be determined more by teacher, than by subject.

3.2.8 Grouping

Survey results suggest that allowing students to work either individually, in pairs, in small groups or as a whole class in order to suit their needs and to enable variety in lesson activities is highly regarded by teachers. All teachers noted it was important or very important, and that it was a technique they usually or frequently used.

In 95 per cent of the classes observed at least some of the class time was spent working as a whole class. In sixty per cent of classes teachers used smaller groupings, and in sixty per cent of the classes observed students were asked to work individually. These patterns were largely the same in both countries and in all six schools. Indeed, even where there were very small class sizes, teachers tried to get students to work individually or in pairs as a way of 'mixing things up', and noted that they missed the ability to re-group students in different ways.

3.3   Product

Product differentiation focuses on the ways students demonstrate their learning – in Griffin and Care's (2014) framework, what they say, do, make and write - to show what they have learned. The development of good differentiated products – or assignments – according to Tomlinson (2001), in fact begins with identifying the 'essentials' of what students need to know, understand and be able to do as a result of the unit of study.

The tasks students complete in lessons are an essential part of an ongoing approach to adapting learning and teaching to suit students' needs. In a differentiated classroom, assessment processes are used consistently and productively to assist with evaluating the changing individual profiles of the students (Brimijoin, Marquissee & Tomlinson, 2003; Moon, 2005; Subban & Round, 2015; Tomlinson, 2001). As Brimijoin (2005, 256) notes, 'when beginning their backward design for a unit of study, effective differentiators use every available piece of data on what and how students understand content'. Tasks need to be adapted to students' ability and prior knowledge through level of sophistication, their interests and preferences through student choice, and the pace at which they can work. For teachers in our study, product differentiation often focused on preparing students for formal assessments, and even within the requirements of these assessments, teachers were able to develop tasks that suited the specific skills and knowledge their students most needed to learn or practice.

Vignette 5: Product differentiation

> **Promising pedagogy: Product differentiation**
>
> Julie was an English Language and Literature teacher at Green School Hong Kong. Two of her class groups were observed across three English Language and Literature lessons (two lessons of a Year 2 class and one lesson of a Year 1 class). The teaching strategies observed in Julie's lessons focused on assessment; in the Year 1 class, students were presenting a Further Oral Activity [FOA] and in the Year 2 class they were preparing for the Individual Oral Commentary [IOC].
>
> Both the enactment of the FOA and the scaffolding strategies used in preparing students for the IOC are of interest in terms of the ways Julie differentiated for her students. In their internal assessment, students in Year 1 were allowed to choose whether or not to work in groups, who they worked with and how many people were in a group, as well as the texts they analysed and the format of their presentations, a kind of 'differentiation through choice,' as Julie described it. In order to ensure students were meeting the requirements of the task, Julie met with each individually, but she felt that by Year 1 students were mature enough to have a significant amount of agency in their classroom and learning – 'they make pretty good choices for themselves [and] it is part of the feeling of the classroom that I like to encourage'.
>
> Of her focus on assessment in the lessons observed, Julie said, 'I wind up teaching to the test a whole lot more than I would really like to'. Her use of strategies to prepare students for the IOC in the Year 2 class was perhaps illustrative of the ways she 'taught to the test', however her strategies for supporting students to develop the skills for literary analysis were effective and demonstrated her capacity to differentiate for a diverse group. She described the thinking behind her assignment of the students into pairs or small groups, linking a mixture of factors such as ability (and the use of a more knowledgeable other), personality, and learning needs. She also used technology to enable students to share what they knew and could do with each other, drawing together the perspectives and knowledge of the students in the class to ensure that all contributed to and had access to content.

3.3.1   Task sophistication

In their survey responses 94 per cent of the teachers indicated that they usually or frequently allowed students to work at different levels of sophistication, and 81 per cent felt that it was important or very important to do this within the classroom. This sits at a slight juxtaposition when compared to the lessons observed where there was a roughly half and half split in this area, with half of the teachers designing tasks that allowed students to work at different levels of sophistication, and half of the teachers lacking sufficient evidence to make this judgement. However, when this idea is analysed according to country 75 percent of the lessons observed in Hong Kong had evidence of differing levels of task sophistication, whereas in Australia only 20 per cent of classes demonstrated divergent task sophistication levels. Within the mathematics subject area all of the classes viewed provided insufficient evidence of this product differentiation approach.

3.3.2   Student Choice

Teachers' responses to the survey suggest that the notion of allowing students to make choices about how they complete a task or assignment was not seen as particularly important, with six per cent of teachers stating it was not at all important, or fifty per cent noting that it was slightly important. When compared to the lesson observations where the majority of the classes seen had insufficient evidence regarding student choice, it seems that this may not be a strategy that is highly valued by teachers.

Within the lesson observations the three classification categories were;

- Insufficient evidence
- Provides a selection of production options
- Allows/enables a selection of product options that support the learning

Two-thirds of the 59 classes had insufficient evidence of any student choice when it comes to product. Of the third of classes that designed tasks to allow student choice, twelve per cent provided a selection of product options, and 22 per cent allowed and enabled students to choose product options that supported their learning. There were no noteworthy differences between teachers in Hong and those in Australia, but there were two schools in Australia who recorded observations with insufficient evidence at very high rates (82 per cent and 89 per cent).

Vignette 6: Student Choice

had only taught the IB Diploma Programme for one year, her extensive subject knowledge and teaching skill made her well-equipped to manage the course.

Jane's practice was an exemplar of differentiated instruction in Biology, but she was most consciously focused on student agency and choice. During the period of observation, students were working on Internal Assessments [IAs] and a class presentation in pairs, addressing an aspect of study on immunology and disease. For their IAs, students were allowed to choose to undertake an experiment of their choice, 'and so they get a lot more input into what goes on,' as Jane noted. Students found topics they were interested in exploring, tested out the feasibility of their experiments, and changed direction as they needed to, all with the guidance of their teacher. In some cases, the students' original ideas were not feasible – 'one of [the] boys was interested in looking at how they got hair out of pigs [after slaughtering them]', she stated – and Jane provided suggestions where appropriate and closely supervised the students' progress. All of the students were, as a result, very engaged in their work, and often keen to come to class to check on, for example, the kimchi they had fermenting in the Biology classroom's water baths.

For their presentations in class, students worked in pairs to address different scenarios relating to immunology (for example, the testing of a vaccine on horses, a school accident resulting in a need for a blood transfusion, and so on), which highlighted concepts the students had learned about in previous lessons. In her interview, Jane explained that she had written most of the scenarios to connect them to the students' experiences and interests. She then assigned pairs based on ability and capacity to work together, choosing scenarios according to what she felt each pair would be interested in and capable of addressing in their presentations. She also drew on ethical issues relating to Biology, bringing in issues from science television programmes and newspapers – 'sometimes just a lesson starter if I've found a twenty second something…just let's get interested in this topic'.

These activities demonstrated a commitment to both student choice and differentiation on Jane's part. The value of this teacher's knowledge of her students was also very evident. As Jane noted, because this was a boarding school, 'we are a community so I know them well'. For example, she offered one student additional support outside of class partly because he needed help with some of the concepts, but also because she understood that he was uncomfortable asking questions in front of his peers. This knowledge also meant that she was able to select pairings in the class that would produce the best outcomes for the maximum number of students; sometimes placing students with others of similar ability and sometimes mixing more and less capable students, depending on the way the students would work together.

3.3.3 Student pacing

When discussing student pacing within the product area, particular attention was paid to the idea that a task may be designed to support flexible pacing for individual students. Examining this in our classroom observations demonstrated that teachers are slightly divided about the importance of this idea. For nineteen per cent of teachers it was seen as very important, and a further fifty per cent of teachers felt it was important and 32 per cent thought it was only slightly important. When asked about the frequency of this strategy approximately two thirds of the teachers believed that they usually do this, with a further 19 per cent believing that they use this strategy frequently. This finding is slightly at odds with the lesson observation data.

Roughly two thirds of the classes observed had insufficient evidence of tasks being designed to allow students to work at different speeds, with the other third demonstrating tasks that supported flexible pacing. Only four of the teachers taking part in the study had evidence of

flexible student pacing in the majority of their classes. There were no notable differences between teachers in the two countries. There was one school in Hong Kong where the majority of the classes had evidence of tasks that allowed students to work at their own pace.

Vignette 7: Student pacing

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Promising pedagogy: Student pacing

A number of teachers used strategies to 'chunk' assessments – break larger tasks into smaller sections – in order to render them more accessible to students. Jessica, a drama teacher in Hong Kong, had students work on each section of a larger assessment task over a specific period before moving onto the next. After describing the way she broke down the portfolio for students, Jessica said, 'otherwise, you've just got this massive task and all this information and feedback and it's just like [*groan*], where do I start?'

</div>

3.4   Environment

3.4.1   Supports learning

When observing lessons it is always important to note the context in which they take place. In many cases, there are elements of every environment that are out of the control of the teacher, and there are some that may fall within the teachers' control. There were four elements that are almost entirely outside teachers' control in the study; the furniture, the technology facilities, the lighting and the flexibility of the space. Figure 5 demonstrates that in almost all of the classrooms that teachers were working in the furniture could be moved to allow students' to work in different groupings. In the majority of the classrooms there were technological facilities such as whiteboard projectors, and light could be adjusted for different purposes.

Figure 5: Environment factors external (observation)
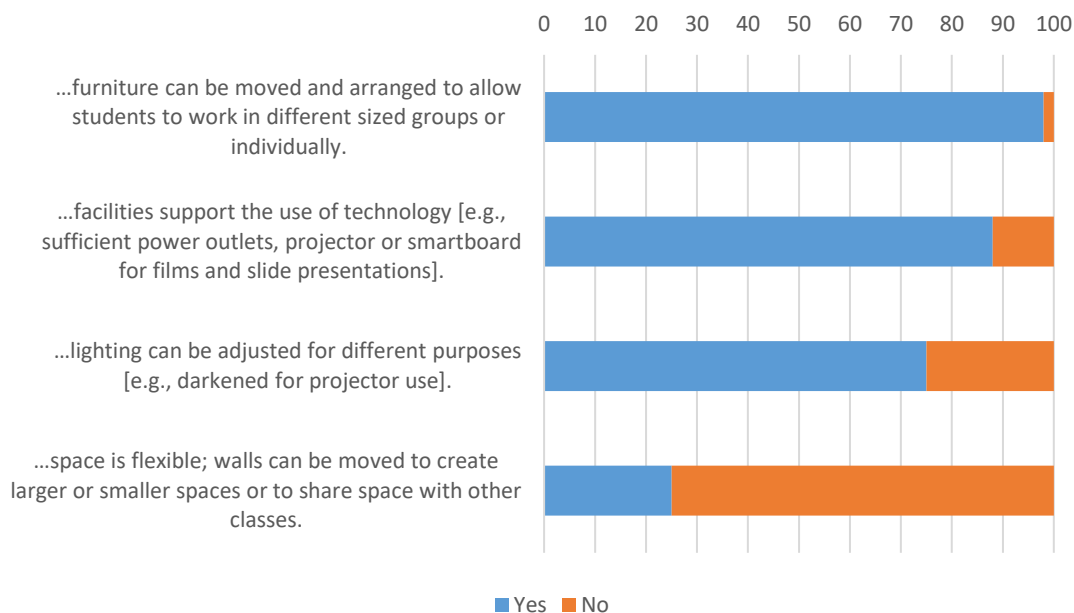
Teachers are able to change their class environments by displaying student work and providing visible learning aids. However these two aspects of the class environment were generally under-utilised. In just over half of the classrooms, student work was displayed and in thirty-nine percent of classrooms there was no evidence of supports in place for students with additional needs

(Figure 6). Some of these supports are out of the teachers' control, such as ramps, but others, such as vocabulary charts for second language learners, or IB command term definitions could have been utilised and often were not. Interestingly there were two schools where students' work was always displayed, one in Hong Kong and one in Australia. This may indicate that there was a school wide policy in place to support this strategy.

Figure 6: Environmental factors within teacher scope (observation)
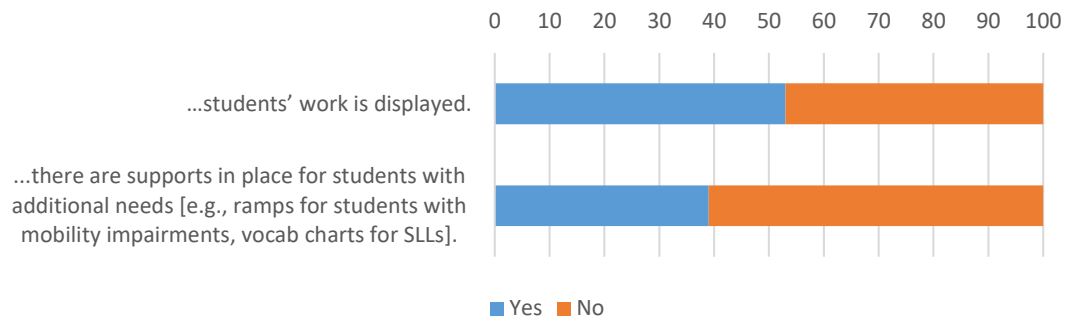
There were significant differences between the two countries when it came to the supports in place for students with additional needs, with two thirds of the facilities in Hong Kong having some supports in place, and only 13 per cent of the Australian schools providing these supports. In fact across all of the indicators in this section, schools in Hong Kong generally performed better than their Australian counterparts.

3.4.2   Safe and Inclusive

One aspect of providing a safe and inclusive classroom is to identify if the teacher established a learning environment that enabled students to show what they do or don't know. Essentially a space where they are not afraid to make mistakes. In almost all of the classes observed (97 per cent), this was found to be the case. In essence there was only one teacher whose teaching strategies meant that students did not always feel comfortable demonstrating their knowledge, or lack of it.

Within the surveys teachers were asked if they took into account any of the student attributes noted in Figure 7 thinking about the classroom environment. The majority of teachers believed that it was very important to take into account the students' learning needs, but all of the other attributes, whilst seen as important, were not given the same emphasis.

Figure 7: Student attribute environment importance (survey)
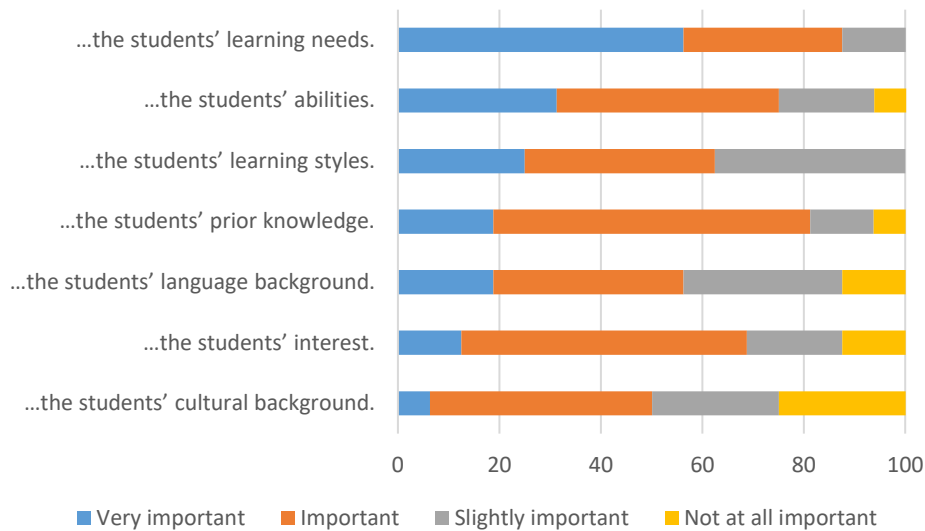
When asked how frequently they were able consider the environmental aspects of students attributes the majority of teachers felt that attributes like students' language background, cultural background, learning style or interest were only taken into account occasionally or rarely.

3.4.3 Flexible spaces

Teachers were asked to indicate the importance and frequency of a range of teaching strategies regarding the use of space. In general the results of both importance and frequency were very similar. As can be seen in Figure 8, the majority of teachers tend to be fairly relaxed about their students moving around the classrooms at some points in the lesson. However, not all teachers were as convinced that it is very important for students to have some agency in the classroom rules or guidelines, with ten percent of the survey participants stating it was not at all important.

Figure 8: Environment importance (survey)
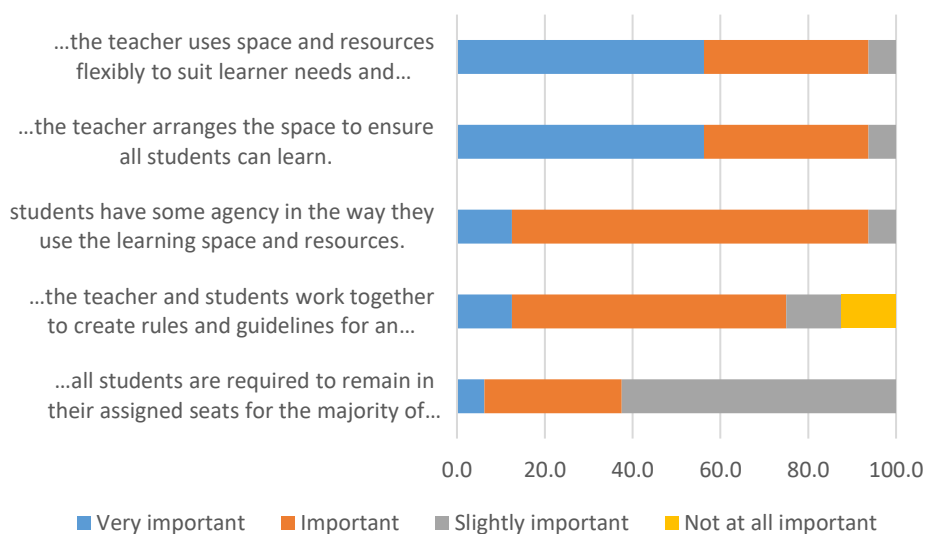
Allowing students agency in the way they use the classroom space and resources is one way of enabling students and supporting their learning needs. Within 59 observed classes, approximately three quarters of the teachers did use this approach.

Vignette 8: Flexible learning environments

> ### Promising pedagogy: Flexible learning environments
>
> Mathematics SL teacher Paul had 'flipped' his classes at Blue School Australia to enable students to access core content in the ways that best suited their learning needs and prior knowledge. He used video recording software purchased by the school to prepare short lecture-style demonstrations, which the students accessed online in their own time. In the lessons observed, students in the class worked on a range of activities and problems with the support of the teacher; although Paul stated the activities students should be working on, he allowed more and less advanced students to work on previous or future activities, or provided extension questions.
>
> Where Paul identified a common problem students were facing, he moved to the whiteboard to provide demonstrations and further explanations. The scaffolding observed in lessons was generally ad hoc or point of need. Reflecting on his differentiation in lessons, Paul noted the 'intuition' involved in ensuring his teaching was effective for all students, but said he generally felt he did not 'necessarily [have] the language' to identify what he did as differentiated instruction.
>
> Part of the rationale for Paul's flipped approach was to allow students to access content at a pace that suited them, making it easier for them to stop and go over material. Paul noted that 'if it's [online] they can stop me without making it obvious, and then they can rewind, they can look at other resources, they can practice a question and go back'. He also noted that the more advanced students in the class could watch in 'double speed'. These resources were also highly valuable for students when it came to revise for assessments.
>
> As a tool for differentiated instruction these videos were very helpful, and could be used both in and out of the classroom; they were time consuming to prepare, but a worthwhile investment where they could be reused over multiple years. Like anything, Paul pointed out, they became easier to do with practice.

As the above vignette demonstrates, 'environment' can mean something beyond the four walls of the classroom. Virtual environments for learning open up a range of considerations for teachers and carry specific affordances (and limitations) that must be taken into account. Paul's approach, described above, demonstrated both student agency and forward thinking in relation to student difference. Students made choices about their learning that suited them, and built into Paul's flipped approach to teaching and learning was the capacity for students to work at different speeds and levels of sophistication.

4   Discussion

Underpinning this study was the development view that teachers can make a difference to the students that they teach, and that they can do this by implementing effective differentiated instruction. We explored the ways that teachers adapt their teaching and learning strategies in IBDP classrooms in two different countries. This involved breaking down the bigger, and relatively amorphous, idea of differentiated instruction into smaller observable actions. The use of different dimensions of the core concept of differentiation has enabled us to investigate external factors that may inhibit or enhance differentiated instruction; that is, taking Tomlinson's (2001) four facets of differentiation – content, process, product and environment – has helped to give direction to the collection of data in this research. Within these four broader 'headings', literature identified a range of features of teaching and learning that were observable. Additionally, exploring the significance of and adaption to context within the IBDP has raised important considerations about how teachers respond to the challenges of the local and global in the classroom.

Over the course of the study teachers informally commented on their ability to differentiate. Whilst some of them felt that they just 'did it' as part of their everyday practices, a number of them claimed that 'you probably won't see much this lesson'. This view was often formed as a result of a particular feature of the lesson, whether it be a revision lesson, an oral presentation lesson, or part of a larger scheme of work. Interestingly, many of the teachers who believed we would not 'see' differentiated instruction were wrong, and some of those who believed they just 'did' it, did not. It seems there may be some very fixed (and possibly incorrect) views about what can be seen as differentiated instruction. The varied notions of what constitutes differentiated instruction were particularly apparent when teachers discussed content differentiation.

According to Tomlinson's conceptual framing of differentiation, content differentiation refers to how the lesson content is adapted. A number of teachers involved in the study felt they had very little control over the subject content. Teachers attributed this lack of control to three explanations. Firstly, there was a sense that many of the subjects were 'content heavy'. With so much content to be covered over the two years of the IBDP, these teachers felt it was a race against time. Teachers who stressed this issue believed that the content demands limited opportunities for its adaptation. Secondly, teachers were very aware that they were working in a high stakes assessment environment. They noted that all students needed to be prepared for the same assessments and felt that this inhibited their opportunities to differentiate the content. This is not unexpected given that Allcock & Hulme (2010) found that at higher levels of study, such as in British A-level courses, the possibilities for differentiating summative assessment and content tended to be very limited.

Finally, there was a strong sense of pressure from both schools and parents for students to perform well. This can lead to a reluctance to experiment with content differentiation; teachers were reluctant to take risks, concerned they may negatively impact on student achievement and incur the criticism of parents and school leadership.

In actuality, there were some very strong examples of content differentiation, where teachers were able to actually use the assessments, both internal and external, to plan content differentiation. One of the promising pedagogy examples involved using the learning goals, not as a lesson plan, but as a way of problematizing the curriculum. This enabled students to move from surface level knowledge to the deeper thinking and conceptualising that the IB requires of its

IBDP students. Further research is needed to establish the impacts this has on student achievement.

In another series of examples teachers were able to use the rigid assessment structures of the IB to their advantage. Indeed, in some classes teachers had mapped out the entire year for their students. There were no surprises – students knew what content was to be covered each week of the year, and which assessments the content investigation was supporting. This could then be used to chunk the content, both as a scheme of work, and as a lesson plan. It enabled the students to see what they had already achieved, and what they still needed to achieve. This approach, which draws on UDL, ensures that students are explicitly aware of links between assessments, skills and content.

However, one of the teachers had gone a step further to differentiate content, and moved toward enabling students to investigate content independently. The teacher focussed on student choice and efficacy by asking students to write their own learning goals and structure their own experiments. This problem based learning approach moved the role of the teacher from 'sage on the stage' to 'guide on the side'.

One final element of content differentiation involved the use of technology; many of the participating teachers increasingly used technology as a way of providing access to content. It has become a way of blurring the classroom boundaries, enabling students to access content and instruction both inside and outside of the school walls. Some teachers had 'flipped' their classrooms, others used GoogleDocs or OneNote to create shared content that all students contributed to, some created lessons using technology within the classroom that could be re-visited by students and many referred to content that could be found on the internet in the students' own time.

It seems that whilst the IBDP is quite content heavy, and the high stakes assessment environment can inhibit teachers' ability to differentiate content, there are a range of strategies that have taken advantage of the curriculum structure and design to support content differentiation.

Process differentiation was the area where teachers indicated high levels of confidence. They felt quite capable of providing different activities and modes of instruction to suit the varied needs within their classrooms. Certainly in the observed classes a variety of activities and strategies were observed, and teachers tended to use more than one strategy in any given class. Some promising practices involved: the use of individual whiteboards so that students did not feel reluctance to writing down their mathematical process; jigsaw techniques; hands-on activities undertaken in small groups; and group note-taking using google docs. However, one of the interesting findings within this area was how much of the class activity continues to be in the teachers' control.

Bernstein (2000) conceptualised the relationship between the teacher and students within the classroom in terms of framing. Where there was strong framing the relationship was hierarchical, with the teacher in a position of authority and students lacking choice. Conversely weak framing involved learners having a more democratic relationship with the teacher, characterised by more choice about activities and strategies used in the classroom. Within this study the majority of classes exhibited strong framing. Teachers tended to maintain the pace and sequencing of the classroom. Additionally, the majority of the teachers involved in this study controlled the majority of the communication in the classroom. This finding was somewhat surprising, as previous

research has noted that there is a tendency for teachers in high SES classrooms for teachers to have a weaker framing within their classrooms (Dulfer, 2015).

In the past research has suggested that classrooms with strong framing provide fewer opportunities for differentiation (Pedro, 1981). Whilst this may be true there were still some very promising examples of process differentiation. A number of the teachers involved in the study were expert at providing feedback that included scaffolds to support students' learning. Teachers in Hong Kong were particularly good at this. However, a few teachers had moved one step further by requiring students to then explicitly reflect on the feedback. There were also teachers who required students to provide formal feedback to their peers. Both of these feedback strategies enabled students to take control of their own learning process and further their sense of efficacy in this area.

There was one particular element of the learning environment that appeared to inhibit teachers' ability to differentiate their teaching process, and that was very small class size. Within this study there were no classes viewed with more than twenty students in them, but a number of classes observed had only four, five or six students. Teachers of these very small classes commented that they were difficult to teach; a very small number precluded the opportunities for small group tasks that are implicit in the constructivist focus of the IBDP. Where there are fewer students there are also fewer opportunities to create reciprocal teaching communities and other constructivist pedagogies. Within this study, the lesson observations show that where the classrooms were particularly small the teachers tended to operate a using a strong framing of the classroom.

The ability to create layered tasks that enable students to show their understanding at a variety of levels of sophistication was something that teachers appeared to feel they had little control of. This result is not surprising given that Allcock & Hulme (2010) noted that rigid curriculum frameworks and assessments present challenges for teachers wishing to implementing differentiated instruction within high stakes settings. Nevertheless, there were still some encouraging examples of product differentiation taking place in classrooms, with teachers allowing students agency in their work, or trying to link examples to issues that students had an interest in.

The vignette provided around student choice in the Biology classroom offers a strong insight into how teachers might manage this element more effectively. While it may have been simpler for the teacher to have every student do the same experiment, she felt that by engaging explicitly with student choice and agency in the classroom she could take into account individual student needs, abilities and interests and ensure that students were invested in their own learning.

Differentiation of the environment can be used to enhance learning by using the classroom space to meet the needs of the students. Students need to feel safe in the classroom in order to learn. This means not only physical safety, but emotional and intellectual safety too. Students who feel safe in the classroom are more likely to take risks that help them develop as a learner. The opposite is true when students feel unsafe in the classroom.

The climate of a classroom is a particularly difficult thing to observe. However, we were able to observe that in most lessons there were students who were comfortable demonstrating their knowledge, or lack of it, and to ask questions of the teacher. Many of the teachers appeared to have respectful relationships with their students, and in many cases knew a lot about them.

Teachers were able to use this knowledge to help differentiate content and process according to student needs and preferences.

Conversely, the physical environment is easily observed, and was one of the areas where the teachers involved in this study appeared not to take full advantage of the opportunities available. Every school involved in this study had movable furniture in their classrooms, and yet many of the teachers involved in the study chose not to move the furniture. In some cases teachers stated this was because of the time it would take, in others it was because they were happy with the configuration. Of the teachers who did move the furniture, there were two quite distinct groups. One group changed the layout of the room as a behaviour management approach, but the other group used the flexible furniture as a way of creating small group work opportunities, or enabling whole group discussion. In addition, one teacher allowed the students to decide the layout of the classroom during their Further Oral Activity assessment, entering the room early to help the students set up the desks and chairs in a central rectangle.

In schools where teachers always taught in the same room there were strong examples of using displays to support the students. Examples of these supports included classrooms where subject command terms were explained using displays, the learner profile attributes were in evidence on the walls, or key language supports were visible to support second language learners. In these classrooms there were often also examples of students work displayed around the room to create a sense of a reciprocal learning environment where everyone has something to offer.

Most of the teachers observed did not have one room that they generally used. Indeed, in a couple of the schools the leadership team has intentionally maintained this approach, in order to keep particular groups of students in the one area. In most cases this was done by curriculum grouping, for example one school had an IBDP area, an MYP area, and so on. In these schools there were far fewer displays, if any, of either supports for students or student work. It appears that where teachers do not have 'ownership' of an area, they do not maintain it as a resource for their students.

Data from the lesson observations and the survey, together with findings from the interviews, painted a multifaceted picture of differentiated instruction within the IBDP. While there were many opportunities for differentiation that were not taken up (or not perceived) by teachers, we also observed a broad range of promising examples of teaching practice adapted to students' needs and preferences.

4.1   Adaptation to local/global context

Schools in the two countries that were the focus of this research faced different contextual challenges – although all of the schools were different, Australian sites tended to be more monocultural, while Hong Kong schools were more culturally diverse. This impacted upon language demands in the classrooms observed in particular, with many teachers in Hong Kong demonstrating a keen awareness of the language demands of their subjects for students from non-English speaking backgrounds. In some instances, promising pedagogies emerged in relation to the participating teachers' adaption to local and global contexts. This was, in particular, seen by some teachers as a foundation for connecting students to content in meaningful ways. Addressing local contexts also meant ensuring that schools were meeting community needs and, in Hong Kong in particular, the language needs of diverse students. Adapting to context was often about diversity and about the 'real world', however there were limited adaptations to the local and global evident in the lessons observed for this study, even though a number of teachers suggested that the IBDP curriculum enables this type of teaching and learning.

Addressing the local and global context was, in many instances, seen as essential to making learning meaningful for students; Edith at Red School Hong Kong, for example, provided an example in which she linked British and Chinese culture through an activity involving tea. She noted the importance of valuing local culture as well as the global themes in the IBDP, worrying that the local may be neglected in the course –she stated:

> …my students need to see themselves in the literature every now and then, not all the time because it is the International Baccalaureate so they're also broadening their horizons, but the subliminal text often is that their own culture is not worth reading about or studying or is not in texts, so I worry about that. So I try to find connection points to their personal lives, to their local contexts, and show them how much beauty there is in Chinese culture…even in a teabag if I have to.

The English program at Meredith's school in Melbourne also included excursions to local theatres, even if the performances students attended were not directly related to their studies, noting the value of engaging with local drama to enrich their learning. Another English teacher at the same school, Celia, emphasised the importance of connection to the students' lives. 'Teaching literature successfully,' she argued, 'kids have to be able to relate it to their own experiences…my intention is to find something that relates to them'. Similarly, although in the different subject area of Biology, Jane found that:

> if you can make a link to the real world, the application, it's so much easier to learn…I mean they can see a real reason for actually learning this line on this page…they're talking about this in government at the moment, it's on the TV, you know, it's not just happening in a book, it's real.

The local context was important in a number of ways. In Hong Kong, for instance, Michael noted that Red School Hong Kong included a Chinese stream in order to cater to the local community, in which local history, language and culture were addressed. For Red School, this meant that there was a stronger focus on global contexts in the DP, with a global focus 'part of our school mission'. Abby highlighted that in the context of Hong Kong, the pressure to achieve high grades meant that students were focused on assessment. There were often high amounts for homework; Lucy suggested a need to change parental expectations because 'we give too much homework in Hong Kong, probably for homework's sake, because parents expect [it]'.

Language challenges were noted in the Hong Kong schools, but were less evident in Australian schools. This was perhaps due to the nature of international schools, where a large percentage of the students and teachers come from elsewhere in the world. Teachers in Hong Kong saw a particular need to adapt language and introduce scaffolds to support students with language backgrounds other than the language of instruction (which was English in all participating schools). Michael noted his 'subtle adaptations' and a need to be aware of language barriers as being important in the context of his class, where the majority of students were English language learners.

English language and literature teachers noted the need to include diversity in text selection, with many also raising the need to ensure that both local and international authors and topics were represented within the texts studied over the two year courses. Julie, for instance, noted the need to avoid the "dead white guys' canon", and this was similar to the scope for including diverse performances in theatre, where Jessica stated a focus on exploring eastern and western

approaches to performance. Meredith, an English teacher in Melbourne, noted that the school's option text for their school was always Australian, and that there was emphasis on diversity in the choice of other texts for the literature course. Tyler, an Australian teacher, expressed his awareness of the need to diversify the examples he uses in his economics classes, representing a range of cultural backgrounds and genders.

Language was also seen as important in addressing local and global contexts in Studies in Language and Literature subjects. Julie at Green School Hong Kong described a focus in a Year 1 class on 'how language is expressed in different ways across class systems and social boundaries and ethnic groups'. This links to the importance of understanding different perspectives in the IBDP, and as Maria discussed in her interview, 'that's part of the critical thinking skills…look out for cultural bias and have a critical eye in relation to the content of the area that we cover'. In particular, Maria highlighted questions about Western and non Western cultures and ways of knowing with her students.

Martin at Yellow School Hong Kong noted that the curriculum in business management enables engagement with the local and global context, because 'the more you know about what's going on, the better you'll be'. The assessment project for business management focuses on current affairs, and so students must engage with real world issues in completing their work. Economics also contained considerable scope for the use of real world, local and global examples; in fact, an engagement with current affairs was a requirement in this subject as well. Similarly to other humanities, there was scope in history for including local themes and events, and Emma in Hong Kong had chosen to focus on the history of China in order to support students to understand their local context.

Language classes provided obvious opportunities for content relating to global contexts. The language teacher who participated in this study, Scott, a Japanese teacher, described a focus on a range of aspects of Japanese culture as well as language in his lessons. Including a compulsory language in the DP means there is scope for students to learn about one or a number of other countries or regions where the language is spoken; the engagement with language learning goes beyond the language itself.

Mathematics curriculum appeared to provide limited scope for engagement with local and global contexts. Two of the maths teachers in the study noted this, with Paul (Blue School Australia) stating, 'I guess the subject matter means I'm probably going to deliver this in much the same way wherever I'm teaching'. Conversely, Biology teacher Jane had little trouble bringing the global and local context into her classroom, drawing on examples of biological concepts from current affairs and complex ethical issues.

Students in the international schools that participated in this study tended to be well-travelled, however there were also often opportunities for students in both countries to participate in school trips. A notable example took place in studies of theatre at Green School Hong Kong, where students had the opportunity to participate in gatherings organised by the International Schools Theatre Association, which were aimed specifically at IB students. Jessica noted that participating in these events meant that students worked with others from all over the world, and encountered many different perspectives on what they were studying.

There was, overall, some engagement with the local and global contexts in the lessons observed in this study, and teachers were able to articulate the ways they draw the 'real world' into their classrooms and the tasks they set for students. Adaptions to the local and global context were

less evident than expected though, and teachers did often express a desire to achieve a more meaningful engagement with the contexts in which they work. The most common ways teachers included attention to the local and global were through texts and examples; there were few deeper explorations of, for instance, Western and non-Western approaches to knowledge. These connections may have been more evident in lessons that directly addressed Theory of Knowledge, but this study has raised the question of whether a deeper, more sophisticated exploration of concept and disciplinary knowledge can find a more prominent place in subject area practice in the IBDP.

4.2 What are the opportunities and challenges of differentiation?

As well as evidence of the types of differentiation being implemented in schools, this study explored the reasons why teachers do not always take up opportunities to differentiate, as well as considering the factors that make it easier for teachers to use differentiation. Interview data in particular provided a rich source of information about the opportunities and challenges in differentiating the IBDP. All of the teachers interviewed expressed their belief in the importance of adapting their lessons to suit the range of learners in their classes, and were cognisant of what made it easier or more difficult for them to achieve this. The inflexibility of curriculum and the demands of the IBDP were seen as challenges, as were a lack of time to prepare or cover content, maintaining student engagement, measuring the success of differentiated instruction, and less than optimal class sizes. Conversely, preparation time, optimal class sizes, the availability of resources, technology professional development and knowledge-sharing amongst teachers were seen as positive factors supporting differentiated instruction.

As noted above, the demands of the IBDP curriculum were raised a number of times in interviews as a barrier to differentiated instruction. Many teachers raised the issue of content demands in their respective courses; for these teachers, the need to cover a large amount of content trumped the need to provide varied learning opportunities targeted to students' needs and profiles. As Abby, a Mathematics teacher in Hong Kong, described, 'we are hamstrung…by the…amount of content you have to deliver across the two year course'. Content demands were raised across many subject areas and subject groups, including Economics, History, and Studies in Language and Literature. A number of teachers also cited the demands students faced outside of classes; two scheduled observations with Jane, for instance, were not able to be carried out due to classes being cancelled for an Extended Essay day and a scheduled school photograph session. In addition, the IBDP's core was occasionally referred to in reference to the demands placed on students, however it was viewed as a positive component of the course – something to acknowledge and work around, rather than something needing change.

Two teachers in two of the international schools in Hong Kong seemed to have more time available for preparing lessons, and this was cited as a factor enabling differentiation, while teachers at other participating schools struggled to find time to adequately prepare differentiated lessons. Maria at Yellow School Hong Kong, for example, noted that while it was challenging for her to find time for planning throughout the week, she did have time on Wednesdays to prepare for coming lessons. At Red School Hong Kong, Michael noted that 'as a school our timetables are very light, and there's time for collaboration with other teachers'. A number of interview participants noted that the differentiation strategies they used tended to be time consuming to prepare. Paul at Blue School Australia, for example, noted that recording and editing videos of his mathematics instruction was very time-consuming, although there was potential to reuse these resources in coming years.

Maintaining student engagement was a challenge for some teachers, and this could have an impact on teachers' capacity for differentiating lesson content in particular. While some teachers, such as Jessica, a Drama teacher in Hong Kong, noted that she benefited from the fact that students really wanted 'to be there', while Lucy, a Business Management teacher in Hong Kong, faced challenges in engaging students with her subject. Lucy noted that the cultural context meant that students were very focused on academic achievement, and had few interests outside of school. The students' limited knowledge of or interest in current affairs had an impact on her teaching in business studies, where real world examples are an essential part of curriculum. Students were 'not very interested in a specific business', and a focus on specific businesses was part of the curriculum.

This focus on academic achievement – and in particular on the examinations for each subject – was often raised as a barrier to differentiated instruction; as noted earlier in this section, teachers worried they risked parents' and school leaders' criticism if their experiments with differentiation failed to raise student outcomes. Scott, a teacher in Victoria, wondered if the school was 'too exam-focused', noting the 'push' to deliver the content students needed to do well in assessments. Abby, in Hong Kong, noted that while 'there were so many other things' that she would love to do with students, 'every single thing is for the exam'. Abby noted that not every assessment suits every student, and Julie stated that standardised assessments can limit differentiation, noting that:

> I wind up teaching to the test a whole lot more than I would really like to, and
> that inhibits some of what I can do…given that we have a really diverse body
> of students here…

Julie and other teachers also explained the ways they break down assessment tasks and create activities to ensure the students have the skills and knowledge to demonstrate their learning in summative assessment. While the assessments appeared to direct their development of teaching and learning strategies, we observed many teachers differentiating the ways they prepared students for common assessment tasks.

Class sizes were raised by a number of teachers as both an enabling factor for differentiation and something that made it more difficult. There was variation in the teachers' preferences for class numbers; some preferred smaller classes, while others saw smaller classes as more difficult to differentiate in. Maria, Adam, Abby and Jessica all identified small class sizes as a benefit in differentiated instruction, while Scott noted that classes can be too small – as discussed above – and can change the dynamic between teacher and students. At Red School Hong Kong, Michael agreed that small class sizes can be a barrier to differentiation strategies – in particular making small group activities challenging – but the benefits outweighed the disadvantages with his class of six students.

There were a number of other factors that participating teachers identified as supporting their use of differentiation in the classroom. The availability of extensive resources to support classroom teaching and assessment was noted by many teachers as helpful, allow them to provide materials and activities that best suited the students they were teaching. Phillip, at Purple School Australia, noted that the resources available for IBDP teaching in Mathematics are far more extensive today than they were in past decades. Another Mathematics teacher, Paul from Blue School Australia, also noted that there were extensive resources available to students online, and it was a challenge for teachers to assist students in developing the skills to find what was useful to them. Language and literature teachers also noted the importance of being able to

select texts for their students, highlighting the need to include local as well as international authors and subjects.

Related to the use of teaching and learning materials was the teachers' use of technology. Technologies available within schools – such as the use of one to one laptop programs – were generally identified as positives, although one teacher did note that the laptops could be a distraction and limited their use. Observations revealed a number of uses for technology in supporting collaborative learning, for instance through the online development of a glossary of key terms in Jane's Biology class at Blue School Australia. Students were able to input information into the class glossary via an online document, which was shown on the projector screen as students worked. Other teachers also implemented similar activities; often, this allowed stronger students to complete a task with more sophistication, but ensured all students had access to the same content and understanding.

Opportunities to undertake professional development were also seen as supports for implementing differentiation. Schools in Hong Kong had shorter days on Wednesdays, with the afternoons allocated to professional development or planning, while students undertook other activities such as sports or tutoring. Emma, at Green School Hong Kong, noted that being able to spend this time learning with colleagues was very valuable, although the school's recent professional development had not focused on differentiation. Two of the teachers at Yellow School Hong Kong also noted the value of having time scheduled for planning, collaboration and professional development was very useful and supported them to implement varied teaching and learning strategies.

Having professional knowledge and experience was essential in achieving effective differentiation. One teacher, Celia at Pink School Australia, demonstrated a wide range of skills in scaffolding students' language development in relation to studying literature; she later revealed in her interview that this had been a particular focus for her throughout her career, and she had written a book about the subject. The commitment to professional development was notable amongst the teachers interviewed for this study, as was their desire to implement the best practices to support their students. As Paul, at Blue School Australia, described, as a teacher 'you spend almost every day thinking and wondering and talking and reflecting on how you can better help your students'. A cumulative effect of all this time committed to improving teaching and student outcomes tended to be a stronger capacity to differentiate, in many cases.

Perhaps the most commonly raised factor that enabled teachers to differentiate was their knowledge of students. There were a couple of instances where teachers were not able to access information they needed about students – for example, where a student had additional needs that were not shared with the teacher – but for the most part teachers expressed confidence in their knowledge of students' backgrounds, preferences, abilities, and ways of learning. Support from others in the school, most notably from disability support personnel, was seen as an important factor in differentiating for student needs.

Although this was a small-scale study, the findings provide useful insight into approaches to differentiation in IBDP classrooms. Additionally, they signpost a need for further development of differentiated approaches in the IBDP. Importantly, these findings demonstrate the need for further research in this area, and highlight some potential directions for further study in terms of both breadth (for example, are these findings reflected more broadly in the contexts explored and further and in other global settings) and depth (for instance in further analysis of teacher's perceptions of differentiation and what it might mean). The data also highlights some barriers to

differentiation that can be addressed, in some instances by better understanding about what constitutes differentiated instruction and why it is an important facet of teaching and learning in the IBDP. Perhaps most significantly, the study has highlighted a range of examples of promising pedagogies in differentiation, highlighting some ways forward for teachers in diverse subject areas and demonstrating that even within the high stakes context of the final years of schooling, differentiated instruction can be used in innovative ways.

5   Recommendations

In order for teachers to professionally develop in the area of differentiated instruction we make the following recommendations.

There continues to be a need for professional development that focuses on communicating the core features of differentiated instruction. This also points to the significance and value of research in this area being communicated in forums teachers can access.

Schools and education organisations (including the IBO) need to communicate clearly about the benefits of differentiation, providing transparency about the ways content differentiation can be implemented in the classroom.

Further advice needs to be provided to teachers regarding the use of learning goals as a way to structure learning. The UDL framework could be further utilised to help teachers draw on the requirements of teaching and assessment in 'backwards design'.

There is a pressing need for teachers to consider the place of student agency and choice in the IBDP classroom; students at this level tend to be motivated and are often mature enough to take responsibility for their own learning.

Teachers need to be given opportunities to continue to consider the ways they might use technology to enable different forms of access to content and to provide different content where appropriate. This involves making sure that teachers have access to the technology and resources that they need.

Schools need to make sure that within their timetable there are opportunities for teachers to plan, not just individually, but collaboratively.

Teachers should continue to use variety within the classroom activities. However, they also need to allow the students choice within that variety. This may involve teachers moving from a strong framing of the classroom, to a weaker one in order to encourage reciprocal learning communities.

Teachers need to provide students with opportunities to both provide feedback to their peers, and reflect on the feedback they have been given. This will involve them empowering students to take control of their own learning.

Teachers need to take full advantage of the spaces and resources available to them. This may mean a cultural shift at the school level to ensure that distributed ownership, does not become no ownership. However, it may also mean that in some circumstances allowing teachers to teach in the one room is one way of improving the use of the environment.

We encourage time for professional development regularly. Professional development opportunities can take many forms. It can involve formal higher education (for example a Masters degree), one day off site, or a planning and collaboration day. Over the past few years there has been a move to encourage teachers to learn from each other through the creation of learning communities. This might involve recording a section of a class and analysing it as a teaching team, allowing colleagues to observe lessons, or using technology to measure the communication patterns in the classroom.

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Appendix 1: Teacher online survey instrument

1. Demographic Questions

1.1. Name:

1.2. What is your gender?

Male	Female	Other
☐	☐	☐

1.3. What is your age?

18-24	25-34	35-44	45-54	55 or older
☐	☐	☐	☐	☐

1.4. In which countries were you educated?

1.5. How many years have you been teaching?

1.6. In which countries have you taught?

1.7. How long have you been teaching in the IB (Diploma Program)?

1.8. What DP subject areas do you teach?

1.9 What is the name of your school?

Differentiated Learning Space Online Questionnaire

2.1. What is differentiated instruction?

Please select any of the following which you think are important aspects of differentiated instruction. You can select as many items as you please.

2.1.1.	Giving each individual student a different task or assignment.	☐
2.1.2.	Giving students some choice in the tasks they complete, usually from a number of predetermined options designed to work towards the same learning goals/elements of curriculum.	☐
2.1.3.	Allowing students to always move freely around the room.	☐
2.1.4.	Allowing students to talk to one another as much as they like.	☐
2.1.5.	Working with students to develop ground rules for classroom behavior, and helping them to behave in line with these ground rules.	☐
2.1.6.	Separating students into level groups at the start of first term, and having them work in those groups periodically throughout the year.	☐
2.1.7.	Grouping students in a number of different ways according to abilities and other learner characteristics.	☐
2.1.8.	Giving some students more or less advanced questions to answer.	☐
2.1.9.	Giving some students more complex or simpler material to read or learn.	☐
2.1.10.	Allowing some students to elect to skip questions on a test, or including 'bonus point' questions for highly able students.	☐
2.1.11.	Proactively planning activities that suit a range of student needs and characteristics.	☐
2.1.12.	Planning learning activities that allow students to work in different ways, at different paces or with different levels of sophistication.	☐
2.1.13.	Using a mixture of whole class, small group and individual activities and instruction.	☐
2.1.14.	Gathering evidence of students' diverse learning needs through assessment and classroom tasks.	☐
2.1.15.	Enabling students to have some agency in their own learning by encouraging self-reflection.	☐
2.1.16.	Allowing students to choose what they want to learn about, even if it's not in the curriculum.	☐
2.1.17.	Having clear learning goals, which students can achieve in different ways.	☐
2.1.18.	Providing 'point of need' or 'ad hoc' unplanned scaffolding that is responsive to students' needs in the lesson.	☐
2.2. Please describe any other central elements of differentiated instruction.		
2.3. Please describe some of the ways you use differentiation in your lessons.		
2.4. What are the difficulties associated with using differentiation in your lessons?		
2.5 Please describe the ways you adapt the learning experience to meet local and global contexts?		

3. Content Differentiation: *What* you teach and students learn.

Instructions: Please read each statement and mark the box which indicates how *IMPORTANT* each statement is and how *OFTEN* you use the strategy. Please do not spend too much time on any statement.

	How important is this to you?				How often do you do this?			
3.1. Teachers adapt the lesson content to…	Not at all important	Slightly important	Important	Very important	Rarely	Occasionally	Usually	Frequently
3.1.1. …allow students to work at or just above their pre-assessed ability level.	☐	☐	☐	☐	☐	☐	☐	☐
3.1.2. …meet clear learning goals, which are articulated and used as a tool within the learning space.	☐	☐	☐	☐	☐	☐	☐	☐
3.1.3. …ensure that all students can access the same material, although they may access it in different ways according to their needs.	☐	☐	☐	☐	☐	☐	☐	☐
3.1.4. …connect to real issues the students are interested in or that are relevant to them.	☐	☐	☐	☐	☐	☐	☐	☐
	How important is this to you?				How often do you do this?			
3.2. Teachers target the lesson content…	Not at all important	Slightly important	Important	Very important	Rarely	Occasionally	Usually	Frequently
3.2.1. …the students' interests.	☐	☐	☐	☐	☐	☐	☐	☐
3.2.2. …the students' prior knowledge.	☐	☐	☐	☐	☐	☐	☐	☐
3.2.3. …the students' abilities.	☐	☐	☐	☐	☐	☐	☐	☐
3.2.4. …the students' learning styles.	☐	☐	☐	☐	☐	☐	☐	☐
3.2.5. …the students' learning needs.	☐	☐	☐	☐	☐	☐	☐	☐
3.2.6. …the students' language background.	☐	☐	☐	☐	☐	☐	☐	☐
3.2.7. …the students' cultural background.	☐	☐	☐	☐	☐	☐	☐	☐

4. Process Differentiation: The teaching and learning strategies used in your lessons, *how* you teach and students learn.

Instructions: Please read each statement and mark the box which indicates how *IMPORTANT* each statement is and how *OFTEN* it occurs in the learning environment. Please do not spend too much time on any statement.

4.1. Teachers adapt learning and teaching **processes** to…	How important is this to you?				How often do you do this?			
	Not at all important	Slightly important	Important	Very important	Rarely	Occasionally	Usually	Frequently
4.1.1. …provide alternative instruction or activities to individuals or groups of students who have additional needs.	☐	☐	☐	☐	☐	☐	☐	☐
4.1.2. …allow students to make choices regarding the ways they learn.	☐	☐	☐	☐	☐	☐	☐	☐
4.1.3. …give all students the opportunity to learn in different ways.	☐	☐	☐	☐	☐	☐	☐	☐
4.1.4. …give all students the opportunity to learn at their own pace.	☐	☐	☐	☐	☐	☐	☐	☐
4.1.5. …provide students with access to different levels of support, with planned scaffolding embedded within the lesson design.	☐	☐	☐	☐	☐	☐	☐	☐
4.1.6. …include different modes of instruction in response to students' needs/preferences.	☐	☐	☐	☐	☐	☐	☐	☐
4.1.7. …enable multiple voices in the learning space, sometimes allowing students to facilitate discussion.	☐	☐	☐	☐	☐	☐	☐	☐
4.1.8 …allow students to work individually, in small groups and/or as a whole class to suit their needs and a variety of lesson activities.	☐	☐	☐	☐	☐	☐	☐	☐
4.2. Students work…	How important is this to you?				How often does this happen?			
	Not At All Important	Slightly Important	Important	Very important	Rarely	Occasionally	Usually	Frequently
4.2.1. …individually as informed by student needs.	☐	☐	☐	☐	☐	☐	☐	☐
4.2.2. …in heterogeneous (mixed) groups informed by student needs.	☐	☐	☐	☐	☐	☐	☐	☐
4.2.3. …in homogenous (similar) groups informed by student needs.	☐	☐	☐	☐	☐	☐	☐	☐

4.2.4. …as a whole class.	☐	☐	☐	☐	☐	☐	☐	☐
	How important is this to you?				**How often do you do this?**			
4.3. Teachers provide **feedback** to students that…	Not At All Important	Slightly Important	Important	Very important	Rarely	Occasionally	Usually	Frequently
4.3.1. …is formative and student-specific.	☐	☐	☐	☐	☐	☐	☐	☐
4.3.2. …is formative and applied to the whole class.	☐	☐	☐	☐	☐	☐	☐	☐
4.3.3. …is summative and student-specific.	☐	☐	☐	☐	☐	☐	☐	☐
4.3.4. …is summative and applied to the whole class.	☐	☐	☐	☐	☐	☐	☐	☐
4.3.5. …includes student-specific scaffolds to support students to get to the next level.	☐	☐	☐	☐	☐	☐	☐	☐
4.3.6. …supports student reflection.	☐	☐	☐	☐	☐	☐	☐	☐
	How important is this to you?				**How often do you do this?**			
4.4. Teachers target lesson **processes** (teaching and learning strategies and activities) to…	Not at all important	Slightly important	Important	Very important	Rarely	Occasionally	Usually	Frequently
4.4.1. …the students' interest.	☐	☐	☐	☐	☐	☐	☐	☐
4.4.2. …the students' prior knowledge.	☐	☐	☐	☐	☐	☐	☐	☐
4.4.3. …the students' abilities.	☐	☐	☐	☐	☐	☐	☐	☐
4.4.4. …the students' learning styles.	☐	☐	☐	☐	☐	☐	☐	☐
4.4.5. …the students' learning needs.	☐	☐	☐	☐	☐	☐	☐	☐
4.4.6. …the students' language background.	☐	☐	☐	☐	☐	☐	☐	☐
4.4.7. …the students' cultural background.	☐	☐	☐	☐	☐	☐	☐	☐

5. Product Differentiation: What students produce to demonstrate their learning.

Instructions: Please read each statement and mark the box which indicates how *IMPORTANT* each statement is and how *OFTEN* it occurs in the learning environment. Please do not spend too much time on any statement.

	How important is this to you?				How often do you do this?			
5.1. Teachers adapt the tasks or assignments students are expected to **produce** to…	Not At All Important	Slightly Important	Important	Very important	Rarely	Occasionally	Usually	Frequently
5.1.1. …allow each student to demonstrate their understanding, although sometimes in different ways.	☐	☐	☐	☐	☐	☐	☐	☐
5.1.2. …allow students with additional needs to work on alternative tasks.	☐	☐	☐	☐	☐	☐	☐	☐
5.1.3. …allow students to work at different levels of sophistication.	☐	☐	☐	☐	☐	☐	☐	☐
5.1.4. …allow students to make choices about how they complete the task/assignment.	☐	☐	☐	☐	☐	☐	☐	☐
5.1.5. …allow students to work at different speeds.	☐	☐	☐	☐	☐	☐	☐	☐
5.1.6. …inform planning for future lessons.	☐	☐	☐	☐	☐	☐	☐	☐
	How important is this to you?				How often do you do this?			
5.3. The teacher targets lesson **products** (tasks and assignments) to…	Not At All Important	Slightly Important	Important	Very important	Rarely	Occasionally	Usually	Frequently
5.3.1. …the students' interest.	☐	☐	☐	☐	☐	☐	☐	☐
5.3.2. …the students' prior knowledge.	☐	☐	☐	☐	☐	☐	☐	☐
5.3.3. …the students' abilities.	☐	☐	☐	☐	☐	☐	☐	☐
5.3.4. …the students' learning styles.	☐	☐	☐	☐	☐	☐	☐	☐
5.4.5. …the students' learning needs.	☐	☐	☐	☐	☐	☐	☐	☐
5.4.6. …the students' language background.	☐	☐	☐	☐	☐	☐	☐	☐
5.4.7. …the students' cultural background.	☐	☐	☐	☐	☐	☐	☐	☐

6. Environment Differentiation: How the classroom or other learning environment is arranged and utilised.

Instructions: Please read each statement and mark the box which indicates how *IMPORTANT* each statement is and how *OFTEN* it occurs in the learning environment. Please do not spend too much time on any statement.

	How important is this to you?				How often do you do this?			
6.1. In the learning environment…	Not At All Important	Slightly Important	Important	Very important	Rarely	Occasionally	Usually	Frequently
6.1.1. …all students are required to remain in their assigned seats for the majority of each lesson.	☐	☐	☐	☐	☐	☐	☐	☐
6.1.2. …the teacher and students work together to create rules and guidelines for an inclusive classroom.	☐	☐	☐	☐	☐	☐	☐	☐
6.1.3. …the teacher arranges the space to ensure all students can learn.	☐	☐	☐	☐	☐	☐	☐	☐
6.1.4. …the teacher uses space and resources flexibly to suit learner needs and preferences.	☐	☐	☐	☐	☐	☐	☐	☐
6.1.6. …students have some agency in the way they use the learning space and resources.	☐	☐	☐	☐	☐	☐	☐	☐
	How important is this to you?				How often do you do this?			
6.2. Teachers arrange and use the learning environment to suit…	Not At All Important	Slightly Important	Important	Very important	Rarely	Occasionally	Usually	Frequently
6.2.1. …the students' interest.	☐	☐	☐	☐	☐	☐	☐	☐
6.2.2. …the students' prior knowledge.	☐	☐	☐	☐	☐	☐	☐	☐
6.2.3. …the students' abilities.	☐	☐	☐	☐	☐	☐	☐	☐
6.2.4. …the students' learning styles.	☐	☐	☐	☐	☐	☐	☐	☐
6.2.5. …the students' learning needs.	☐	☐	☐	☐	☐	☐	☐	☐
6.2.6. …the students' language background.	☐	☐	☐	☐	☐	☐	☐	☐
6.2.7. …the students' cultural background.	☐	☐	☐	☐	☐	☐	☐	☐

Appendix 2: Lesson observation instrument

| Glossary of Terms:	
Content	Content differentiation refers to how the substantive content of the lesson – or *what* students learn – is varied and/or targeted to students' needs or aspects of their learner profiles.
Process	Process differentiation refers to how the teaching and learning strategies and activities are varied and/or targeted to students' needs or aspects of their learner profiles.
Product	Product differentiation refers to how the tasks or assignments students are expected to complete in the observed lesson are varied and/or targeted to their needs or aspects of their learner profile.
Environment	Environment differentiation refers to how the teacher and students use the classroom space and resources to suit a variety of learner needs and preferences.
Problematises content	Problematises content refers to how the teacher connects the curriculum content to broader issues during the observation and enables students' critical engagement with the lesson content.
Pacing	Pacing refers to how the teacher manages the classroom tasks to allow students to complete tasks at varying speeds to meet their learning needs during the observation.
Scaffolding	Scaffolding refers to providing students with support during the learning process to assist students in a step by step manner to achieve learning goals.
Absolute language	Absolute language is use of language such as 'yes' or 'no' responses to questions, which does not facilitate further discussion.
Multiple modes of instruction	Use of multiple modes of instruction refers to the implementation of multimodal learning (such as presenting the curriculum content verbally, using projectors, mind maps and other multimodal means) to provide curriculum content to students in a manner which meets their learning needs.
Divergent	Divergent tasks are designed to allow students to complete them in different ways and to different levels of sophistication while still working towards the same learning goals.
Student agency	Student agency refers to student choice and responsibility for learning.
Learner profile	The learner profile includes aspects of students' backgrounds and learning preferences, styles and needs that inform the way they learn.

1. Lesson information

1.1. Date		1.2. Time/period		1.3. Observer	
1.4. Teacher				1.5. Year Level	
1.6. School				1.7. Subject	

2. Classroom environment

2.1. In the classroom…	✓
…furniture can be moved and arranged to allow students to work in different sized groups or individually.	
…lighting can be adjusted for different purposes [e.g., darkened for projector use].	
…space is flexible; walls can be moved to create larger or smaller spaces or to share space with other classes.	
…facilities support the use of technology [e.g., sufficient power outlets, projector or smartboard for films and slide presentations].	
…students' work is displayed.	
…there are supports in place for students with additional needs [e.g., ramps for students with mobility impairments, vocab charts for SLLs].	
Comments	

2.2. Diagram(s): Please draw the classroom layout with reference to the classroom elements described in 2.1, labelling students' seats and gender as illustrated in the example diagram.

Example Diagram

✓	2.3. What type of grouping was used?	At what stage of the lesson and for how long?
	Whole class	
	Small Groups	
	Individual work	

1
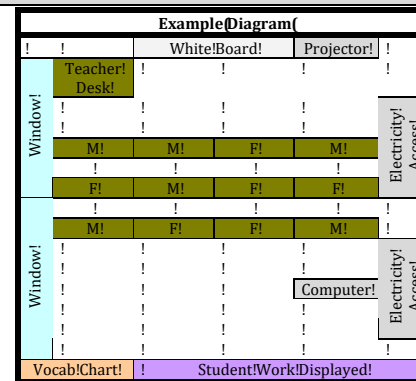
3. Lesson observation

Heading	Indicator	Level		Evidence/rationale for rating/notes
3.1. Content	3.1.1. Articulates learning goals.	0	Insufficient evidence.	
		1	Makes learning goals visible.	
		2	Draws attention to the learning goals.	
		3	Uses learning goals as a tool within the classroom.	
	3.1.2. Provides access to content.	0	Insufficient evidence.	
		1	Delivers the same content to all students.	
		2	Delivers different content to selected students/groups of students.	
		3	All students have access to the same content but can access at different levels or in ways.	
	3.1.3. Presents content.	0	Insufficient evidence.	
		1	Delivers content.	
		2	Problematises content.	
3.2. Process	3.2.1. Structures learning.	0	Insufficient evidence.	
		1	Learning activities/strategies are varied.	
	3.2.2. Uses flexible pacing.	0	Insufficient evidence.	
		1	Pacing is flexible.	
	3.2.3. Provides feedback to students.	0	Insufficient evidence.	
		1	Feedback is on product.	
		2	Feedback is on process.	
		3	Feedback includes scaffolds to support students' next steps.	
	3.2.4. Responds to student questions.	0	Insufficient evidence.	
		1	Responds in absolute language (e.g., yes or no/that's correct, etc).	
		2	Responds with information and ideas.	
		3	Response encourages further questioning.	
	3.2.5. Encourages self-reflection.	0	Insufficient evidence.	
		1	Encourages reflection on the learning process.	

2

Heading	Indicator	Level		Evidence/rationale for rating/notes
		2	Enables reflection on the learning process.	
	3.2.6. Instructs students.	0	Insufficient evidence.	
		1	Uses a range of multimodal materials when instructing.	
		2	Alters modes of instruction for individual or small groups of students.	
	3.2.7. Communicates with students.	0	Insufficient evidence.	
		1	The teacher controls the majority of communication.	
		2	The teacher controls the majority of communication but students ask questions to clarify tasks.	
		3	Facilitates class discussion.	
		4	Enables students to facilitate their own classroom discussions.	
3.3. Product	3.3.1. Designs tasks to allow students to work at different levels of sophistication.	0	Insufficient evidence.	
		1	Sets tasks that can be completed at different levels of sophistication (divergent).	
	3.3.2. Designs tasks that allow student choice.	0	Insufficient evidence.	
		1	Provides a selection of product options.	
		2	Allows/enables a selection of product options that support the learning.	
	3.3.3. Designs tasks to allow students to work at different speeds.	0	Insufficient evidence.	
		1	Tasks are designed to support flexible pacing.	
3.4. Environment	3.4.1. Enables students to use the space to support their learning needs.	0	Insufficient evidence.	
		1	Allows students agency in the way they use the classroom space and resources.	
	3.4.2. Constructs a safe and inclusive learning environment.	0	Insufficient evidence.	
		1	Establishes a learning environment that enables students to show what they know/don't know.	

5. Student characteristics targeted (If Seen)

✓	Student characteristics targeted by content differentiation	Evidence
	Interests	
	Prior knowledge	
	Abilities	
	Learner profile	
	Other_____	

Quotations from Teachers:

Differentiation Observation Instrument: ADDITIONAL NOTES PAGE

Interview Notes

Obs. Notes: Local and Global Context

Appendix 3: Teacher Interview (semi-structured) instrument

1. What are some of the ways the students in this class differ from one another?

2. What are some of the learning and teaching strategies you've used to cater to these differences?

3. Are you able to design tasks to make sure that all students can show what they've learned? If so, how do you do this?

4. What hinders your adaption of your teaching and learning strategies to suit all of the students?

5. What helps your adaptation of your teaching and learning strategies to suit all of the students?

6. What are some of the ways you adapt the learning experience to meet local and global contexts?

Instructions to interviewer:

7. After asking the general questions above, please refer to an example (or examples) of differentiation that you observed in the lesson and invite the participant to reflect on their pedagogical choices. For example, you might ask about:

    7.1 the thinking behind the strategy;

    7.2 why the strategy focused on content, process, product or environment;

    7.3 which students the teacher felt this strategy would suit (all or some), and why;

    7.4 what characteristics of students the teacher was targeting (eg learning needs, language needs, cultural background, interests, abilities, etc); and/or

    7.5 whether the strategy worked/achieved what the teacher hoped.