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The impact of the PYP exhibition on the development of international mindedness, critical thinking and attributes of the IB learner profile

Final Report

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1   Executive summary

This report presents the findings and conclusions of a project to explore the impact of the PYP exhibition on the development of international mindedness, critical thinking and attributes of the IB learner profile.

The PYP exhibition is undertaken towards the end of the PYP, a curriculum for children aged 3-12. The PYP exhibition takes place in the final year of the PYP and is the culmination of a substantial piece of research involving group collaboration, inquiry, social action and presentation to an audience.

This study included both qualitative and quantitative sources of evidence. The study created seven case studies of schools in five countries undertaking the PYP exhibition. In each of the case studies the data set focused on the perceptions of participants: teachers, parents, students, managers, mentors and past students, as well as on an exploration of relevant documentation and of the exhibition processes. In addition, the study included surveys of parents, teachers and students in schools in the five target countries: Russia, China, Mexico, the UK and Kenya. The surveys were completed in one of four languages: English, Russian, Chinese or Spanish.

The key findings of the study, described and discussed in greater detail in later sections, include the following:

- All the participants interviewed, including parents, teachers, students and mentors, said that the exhibition embodied the values of the PYP and gave students the chance to develop and display the attributes of the IB learner profile.

- The PYP exhibition was a key experience in engaging students in developing critical thinking, which was closely linked to critical literacy and inquiry skills.

- Parents, teachers and students all characterised the PYP exhibition as an inquiry-led process. Students emphasised new knowledge more than parents and teachers, who placed more emphasis on inquiry learning skills and cooperative learning skills.

- The action element of the exhibition was seen as a key element in developing international-mindedness, though participants found it difficult to discuss international-mindedness directly.

- The action element of the exhibition was particularly valued by parents, students and teachers.

- Parents spoke about their children's exhibition in terms of pride and wonder. They were impressed by their children's independence and capabilities. They viewed independent learning and competence in presenting, working together and critical thinking as valuable 'real world' attributes.

- Timing and management of the PYP exhibition in each country was influenced by issues such as local curricula, local high stakes assessments and the pattern of the academic year. This meant that PYP exhibition preparation could take anywhere between five weeks and six months. Longer lead allocations of time enabled students to choose more challenging topics, develop inquiry skills and to be critical. Longer time allocations also produced more reflection and action.

- The PYP exhibition was perceived as a whole-school community experience with high status in schools. It involved not only the students and teachers, but also parents, the other students in the school, teachers from other parts of the school and teachers and students from the MYP school. The exhibition was clearly recognised, anticipated, valued and reflected upon by students above and below the exhibition year.

- Nearly all the parents attended the exhibition of their own children and also attended a school briefing towards the start of the process. However, many parents were more closely involved in their child's exhibition through discussion, enabling visits and offering suggestions. Schools managed parent involvement to ensure students remained able to act independently.

- Schools managed the exhibition process carefully to plan inquiry learning skills and group-work skills into the experience. Students and parents valued the structured approach to this sustained activity. However, there was a balance to be struck between structure and student direction and decision-making.

- The choice of topics for the exhibition was important in offering different degrees of inquiry, critical thinking and international mindedness. Well-chosen topics offered engagement with all these attributes.

- Topics were usually selected in cooperation with the students but teacher guidance was important in assuring sufficient depth in the choice, linking lines of inquiry to broad topics and maintaining a focus on action.

- The topics of exhibitions were wide-ranging and student research included visits, interviews and surveys. However, the resulting exhibitions were largely based in a social sciences approach and included a high proportion of literature-led research. Few were science or maths orientated in their methods.

- The way the exhibition engaged children critically with the literature was shaped by local approaches to internet use.

- Schools engaged in reflection upon and improvement of their exhibition processes and the improvements made as a result of this reflection were recognised and valued by teachers, mentors, parents and students, offering a good model of reflection in action.

- IT use observed in the case study schools include data searching, text management, document sharing, co-writing, data presentation, a small amount of problem solving and model making and a small amount of data logging.

- The importance of the experience of doing the exhibition was evident in the case study schools. Schools who had done a number of exhibitions had clearer structures and the participants understood their roles more clearly. In these schools, annual training for teachers and mentors, with regular review, was important.

- PYP Students, parents, MYP students and PYP teachers all perceived the PYP exhibition as excellent preparation for the MYP, in particular, and further schooling in general. This was stated less strongly and less often by teachers.

- Information about the PYP exhibition was not shared between schools across transfer and this may be a possible development point in terms of policy and guidelines.

- The assessment of the PYP exhibition involved on-going, formative assessment and, in most cases, a summative assessment.

- Parents and students expected feedback about the PYP exhibition but were uncertain about the form or timing of this. In most cases, it was part of a final school report.

The project found the PYP exhibition to be a valuable and pivotal experience in the life of the schools, families and students who were studied. The exhibition was inquiry-led but the structured support of teachers emerged as a key factor in giving students space and freedom to make decisions and conduct inquiry. This was somewhat in tension with the need to organise every step of the process and share information with parents. Teachers, mentors, parents and students played active roles and the reflections of all participants were at the heart of continued improvement in the PYP exhibition experience. However, it was clear that experienced schools were better able to manage the experience to give students optimum experience, select challenging and action linked topics and support students. Sharing this experience, between experienced and less-experienced schools, would be valuable. Experienced staff have the potential to act as critical friends and support reflection in less experienced schools. The project noted that the value of the PYP exhibition experience could be enhanced by better transfer of information across school transition.

2 Introduction

The International Baccalaureate Primary Years Programme (PYP), shown diagrammatically in Figure 1, offers a holistic education focusing on whole-child development through an inquiry-driven programme of knowledge, concepts, skills, attitudes and action. It forms part of a 3-19 continuum with the Middle Years Programme focused on 11-16 year olds and the Diploma Programme and Career-related Programme meeting the needs of 16-19 year olds. The aim of IB programmes is to offer a continuum of international education that 'encourage[s] both personal and academic achievement, challenging students to excel in their studies and in their personal development' (IBO, 2017).

The PYP culminates in the PYP exhibition: a collaborative, transdisciplinary, in-depth inquiry into real life issues or problems (IBO, 2008) and the means by which the inquiry-based learning which has taken place over the previous PYP years is assessed. The PYP exhibition is used flexibly in the students' final year of the PYP. The exhibition is one of the six units of inquiry in the final year of the PYP and takes place under a transdisciplinary theme at the discretion of the school. Therefore, the PYP exhibition involves a good deal of planning for teachers and represents a significant event in the life of a PYP school and student, bringing together the essential elements of the PYP and sharing them with the whole school community.

The process of planning, supporting and giving feedback about the exhibition should offer teachers multiple opportunities to promote learner attributes, critical thinking and international mindedness. The exhibition also has the potential to play an important role in transition to the MYP – an area that has, until now, gone unexplored. Although the PYP exhibition guidelines (IBO, 2008) offer teachers the chance to self-evaluate the exhibition there has been no in-depth exploration of the impact of the PYP exhibition on the development of international mindedness, critical thinking and the attributes of the IB learner profile.
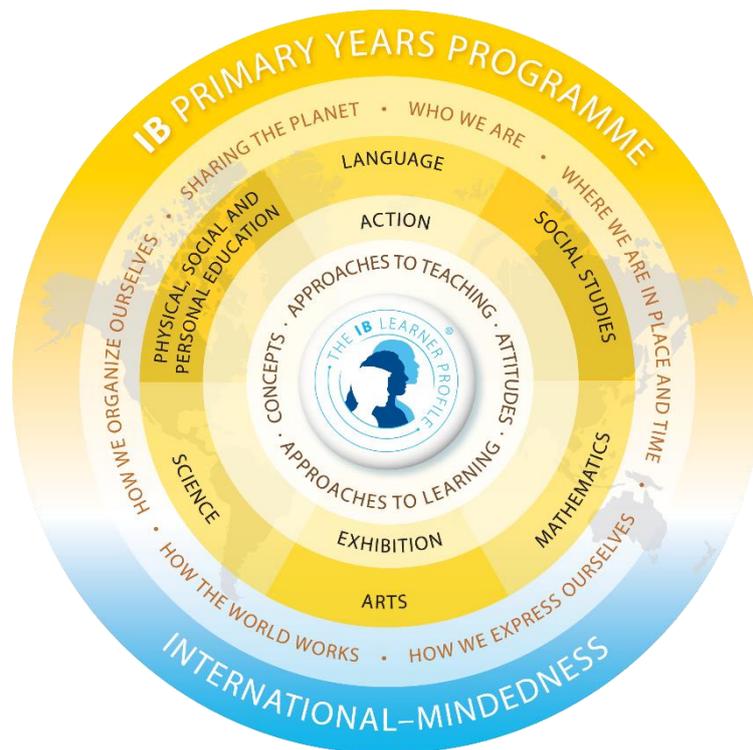
Figure 1: The IB Primary Years Programme

This study aimed to investigate participant views about the impact the exhibition had upon them - and to share the practices that, in theory, develop international mindedness, critical thinking and the attributes of the IB learner profile. The project investigated the understandings and perceived impacts of the experience of preparing, delivering and reflecting upon the PYP exhibition on pupils in the PYP and those in their first year of MYP. The study also included investigation of the perceived impact of planning, teaching and assessing the PYP on teachers and co-ordinators in schools.

The study was driven by the following research questions.

1. What variations in practice exist in implementing the PYP exhibition in case-study schools?
   a) How do PYP teachers plan PYP exhibition study?
   b) How do PYP teachers support PYP exhibition study? What role, if any, is given to parent/guardians?
   c) How do PYP teachers assess the PYP exhibition?
   d) What feedback is given to parent/guardians and students during and upon completion of the PYP exhibition? How does this support student learning?
2. What do PYP teachers, students and parent/guardians believe to be the impact of PYP exhibition study on

a) International-mindedness.

b) Critical thinking.

c) IB learner profile attributes.

3. What is the role played by the PYP exhibition in promoting parent/guardian engagement with, and understanding of, the IB Programmes, for example through promoting parent/guardian understanding of international-mindedness, critical thinking and IB learner profile attributes?

4. How does mentor participation (where used) promote international-mindedness, critical thinking and IB learner profile attributes?

5. What role does the PYP exhibition play in supporting student transition to the MYP?

a) How do PYP teachers prepare students for transition to more independent forms of learning in the MYP through the PYP exhibition?

b) What do MYP students who have completed the PYP exhibition believe to be the effect of that study on their transition to the MYP?

c) How is exhibition feedback incorporated into supporting student transitions into the MYP or elsewhere?

In the following section of the report, we provide an overview of the literature and the key debates that have informed this research. This includes a discussion of inquiry, collaboration and authentic learning and the support for the PYP exhibition available to IB PYP schools.

In the succeeding section, the methodology of the study is examined. This includes details of the survey instruments and case study methods used. The analysis of both qualitative and quantitative data and an explanation of how these analyses were used to address the research questions is set out. The ethical considerations of the project are also presented here.

In the final sections, we set out our research findings, analyses and conclusions in relation to the questions that guided this study. We conclude by offering a number of recommendations that we hope will be helpful for the IBO, for schools that currently offer the PYP and MYP, for candidate schools and for those that are considering offering the PYP and MYP in the future.

3 Literature Review

The PYP exhibition is a complex process with its roots in the values and beliefs about learning that underpin the PYP. This literature review draws together some of the issues most relevant to the PYP exhibition as a learning experience with relevance within and beyond the PYP. The review considers the nature of inquiry learning, collaborative inquiry, authentic inquiry, critical analytical thinking and the nature of critical thinking. The review also considers issues of transition between programmes in the IB curriculum or, indeed, transfers to other curricula, because the PYP exhibition aims to promote learning that is lifelong and pervasive. Moreover, school transfer is internationally recognized as a problematic issue.

3.1 The PYP exhibition as inquiry learning

The exhibition is intended to be a collaborative and student-led, in-depth inquiry during which students can demonstrate agency and take responsibility for their own learning (IBO, 2008). This review of literature summarises the background to this approach and the importance of critical thinking and international mindedness within it.

The exhibition is a process that aims to engage students in inquiry learning (IL) because it situates learning in problem-solving or investigations of complex phenomena. Inquiry learning is multiply and ill-defined (Alfieri et al, 2011), but here we mean learning where students conduct investigations related to one or more research questions, set by either student or teacher. The term 'inquiry' as a search term in the online literature yields publications related to primary and secondary education and there is some overlap with the term "problem-based" in the HE literature. The notion of 'inquiry' is central to the pedagogical approach and curricula articulated in the IB programmes, based on a conviction that human learning is at its most effective when it arises as the result of genuine questions on the part of the learner, although this philosophy has not always been at the heart of popular pedagogical approaches. A rather different model of education was typical of many 20th century classrooms – namely, the teacher was the repository of all the knowledge that learners would need on any given topic; the teacher's responsibility was to pass on as much of that knowledge as possible to the students; students would then be tested/examined on what they could remember of this knowledge. This model of education may have been effective for an era of human history in which the knowledge base needed to function effectively in society was relatively limited and static, but the 'knowledge society' that we now live in requires new thinking about what constitutes effective and engaging teaching and learning (Cho et al., 2015).

We would also argue that, especially in the context of the rapid growth of international schools, contemporary education demands an international perspective. Teachers are now faced with the challenge that 'former conceptions of knowledge, minds and learning no longer serve a world where what we know is less important than what we are able to do with knowledge in different contexts' (Friesen, 2009, p. 3).

Recent research findings in the learning sciences suggest the effectiveness of a constructivist, inquiry-orientated view of learning, though the research tends to be concentrated in the learning of STEM subjects. Furtak et al. (2012), for example, conducted a meta-analysis of science learning and found that students who did inquiry with "minimal guidance" from their teacher learned more than children exposed to "traditional teaching" techniques. Alfieri et al. (2011) conducted a similar meta-analysis across subjects and found that, although inquiry-based learning with no instruction was less effective than direct instruction, when students received adequate guidance during inquiry, they learnt more. Moreover, although the ability to inquire does develop with age, children as young as five years old could generate simple hypotheses, undertake experimentation and evaluate evidence - and so were able to conduct inquiry. Zimmerman (2007) summarises the research in this area by saying that children are far more competent than first suspected, and adults less so. This places the teacher in a very important position in inquiry learning, which tends to be seen as a student-led approach.

Not surprisingly, then, controversy about inquiry learning in the literature has focused on levels of instruction and the student role in learning. Kirschner et al. (2006) launched an attack upon constructivist approaches to teaching and learning in science and what they term 'minimal guidance'. However, Hmelo-silver et al. (2007) argued that contemporary inquiry-based methods involve high levels of scaffolding for pupil learning, effecting a shift from whether inquiry learning per se is useful to an exploration of the conditions in which inquiry learning is most effective. This has sparked a range of studies into guidance levels in classrooms, culminating in the meta-analysis by Lazonder and Harmsen (2016) of studies of the effects of guidance in inquiry learning. They drew upon studies (and other meta-analyses) from STEM domains and all age groups. They designed a new six level typology of inquiry learning guidance, from process constraints, which are the least specific guidance and restrict the scope of the task, to explanations, the most specific guidance, which specify how to perform an action, though other taxonomies exist.

The analysis showed that guidance is helpful in inquiry learning, both in short inquiries, such as a single lesson, and longer inquiry projects. Adequate guidance is not the same as very specific guidance and too much specificity can challenge the inquiry nature of the task. However, if teachers want children to maximise their performance (not necessarily their learning) such as in making a presentation to parents, then highly specific guidance is probably necessary. The study found that young children do not necessarily benefit from more specific guidance than older children but that that the frequency of guidance of all sorts was important in improving outcomes. The way that guidance is used through a longer project is an important issue - and the orchestration of guidance, by teachers and pupils, merits further study. This is very relevant to the exhibition as a longer-term activity which may involve a number of shorter inquiry tasks, an overall longer inquiry and a presentation task. The research suggests that such a range of tasks will need a range of types of teacher support.

Much of the power of an inquiry-based approach to teaching and learning lies in its potential to increase intellectual engagement and foster deep understanding through the development of a hands-on, minds-on and 'research-based disposition' towards learning. IB students learn to use this approach to develop as knowledgeable inquirers, thinkers and risk takers. An approach through inquiry recognises the complex, interconnected nature of knowledge construction, and provides opportunities for both teachers and students to collaboratively build, test and reflect on their learning (Lüddecke, 2015).

There have been a number of attempts across the world to embed a more inquiry-led approach into mainstream education. Harste (1990) stressed the link between inquiry and modern iterations of literacy, while Wray (1999) and Perkins (2010) emphasised the importance of inquiry as underpinning a distinctive pedagogy across the entire curriculum. It would be fair to say, however, that these attempts have not met with a great deal of success. Most jurisdictions appear to have retreated during this early part of the 21st century to a reductionist model of a knowledge-centred curriculum, often drawing inspiration from such theorists as Hirsch (1987), whose 'cultural literacy' approach is centred around a centralised definition of what counts as knowledge for students, rather than a more organic conception of knowledge led by student interest.

The IB programmes represent one of the few, current, centrally-sanctioned attempts to put student inquiry at the heart of the teaching-learning process.

3.2 Collaborative inquiry

The PYP exhibition is intended to give students the opportunity to develop both individual and group skills and, as such, ways of working are of as much interest in this research as the outcomes of working.

Both co-operative and collaborative learning focus on peer interaction and the promotion of social skills within groups and the terms are often used interchangeably though co-operative learning is usually more structurally defined than collaborative learning. The shared, student-led nature of the PYP exhibition is a key issue of interest in this project and schools may use both approaches to group work within the PYP exhibition process.

One of the major results of research into learning in schools during past decades is that co-operative learning has been shown to evoke clear positive effects on three principal categories of outcomes: achievement, attitudes and perceptions (Kyndt et al., 2013). In a review of 122 studies, Johnson et.al., (1981) noted that that co-operation was considerably more effective than interpersonal competition and individualistic efforts and identified eight co-operative learning methods, all of which had a significant positive impact on student achievement, when compared with competitive learning (Johnson et al., 2013). The consistency of the results and the diversity of the co-operative learning methods provide strong validation for the effectiveness of co-operative learning and in the last decade a range of meta-analyses of studies of co-operative learning and instruction in schools have been published. These analyses have suggested moderate and above effect sizes, varying by student age and subject domain (Igel, 2010; Kyndt et al., 2013; Nunnery, Chappell & Arnold, 2013; Puzio & Colby, 2013).

The PYP exhibition exemplifies the five defining characteristics of successful co-operative learning as identified by Johnson et al., (2008).
- Groups work together to accomplish shared goals.
- Group members make each other accountable for producing high quality work and achieving goals.
- Group members work face to face and support each other to produce joint products.
- Group members are taught social skills and are expected to use them to work together to achieve their goals.
- Group members analyse how effectively they are working together in achieving their goals.

These are features of a co-operative approach, which values student reflection on roles within group work. However, teachers may also use more loosely structured, student-led collaborations and the choice of strategy may depend on either student characteristics such as maturity (Rookwood, 1995a) or on the nature of the material and desired learning outcome. (Rookwood, 1995b).

This research examines ways in which the characteristics of effective co-operative/collaborative learning are enacted and understood by teachers, students and parents in different IB PYP exhibition settings, and how this impacts upon their development of critical thinking, international mindedness and IB learner profile characteristics.

3.3   Authentic inquiry for 21st century learners

This research was based on the proposition that the authentic nature of the PYP exhibition as an action-focused activity is not only unique, but important for the development of international mindedness, critical thinking and the attributes of the IB learner profile. Conventional problem-solving of pre-structured problems, and related instructional practices, have limitations in a modern learning environment where people flexibly solve novel problems, with no single right answer, in a constantly changing world (Thomas and Brown, 2011).

A key problem identified by research in the learning sciences is the failure of learners to use what has been termed 'inert knowledge' and prior experiences when solving new problems. This happens when learners are faced with new contexts with changed surface features (Gentner et al., 2003) and can severely limit students' new learning. However, it is through inquiry into "messy" or "ill defined" problems that students can learn to use this internal knowledge flexibly. Bevins and Price (2016) claim that 'We believe that inquiry is currently the best way for students to leverage their existing knowledge and their investigative skills to find, and internalise, new knowledge and solutions to questions they have formulated' (p. 19). The PYP exhibition aims to give pupils the opportunity to collaboratively solve complex, semi- or unstructured problems related to the real world - that is, authentic problems with an action focus:

> *Teaching and learning in the IB celebrates the many ways people work together to construct meaning and make sense of the world. Through the interplay of asking, doing and thinking, this constructivist approach leads towards open, democratic classrooms. An IB education empowers young people for a lifetime of*

learning, independently and in collaboration with others. It prepares a community of learners to engage with global challenges through inquiry, action and reflection. (IBO, 2013, p. 4)

Authentic learning models offer students and teachers the opportunity to tackle the inert knowledge problem and to develop key competences for twenty first century learners, which have been identified (NRC, 2012) as cognitive, intrapersonal and interpersonal, detailed breakdowns of which are very similar to the attributes of the IB learner profile. By working collaboratively on an authentic inquiry, IB PYP learners ought to have opportunities to engage in critical thinking, collaborative knowledge building, self-regulation and the development of transferable skills (Cho et al., 2015), although this prediction is, as yet, untested by research. Moreover, we argue that authentic problem solving, as the PYP exhibition is designed to be, is part of the culture of the IB PYP and, indeed, the very heart of the MYP. This is important, as students learn about problem solving and inquiry as community practices (Lave, 1988; Brown et al., 1989). Thus, authentic inquiry learning may well be allowing students in the IB PYP to engage in community practices of authentic learning, providing models for them to employ in their future learning.

3.4 Critical analytical thinking in inquiry learning

The term "21st century Skills" is widely used but there is limited agreement about what these are (Higgins, 2014). However, some of the skills Dede (2010) identifies as "perennial" - not new, but still of importance in this century- are the skills of critical thinking. These skills are central to the teaching and learning approach underpinning the PYP exhibition. Critical thinking is generally thought of as the capability to think clearly and rationally and definitions tends to imply reflectiveness. McPeck (1981) defines critical thinking as "the appropriate use of reflective scepticism within the problem area under consideration" (p.7) while Ennis (1987) focuses more on the reflective aspects, defining critical thinking as "reasonable reflective thinking that is focused on deciding what to believe and do"(p. 45). A simpler definition by Kuhn (1991) conceptualised critical thinking as a specific instance of the sense of reasoned justification of argument- the sort of incidence that might be expected in an inquiry led project such as the PYP exhibition. Kuhn (1991) echoed Ennis' (1987) and McPeck's (1981) assumptions that dispositions and skills occur within the global concept of critical thinking. Kuhn's perspective, that critical thinking employs not only logic but also broad intellectual criteria, underpins a growing belief that such thinking is associated with the learner's own ability to reflect on his or her learning progress (Brown & Campione, 2002). This

development of reflective skills is built into the IB Learner Attributes and is an important part of becoming an inquiring learner.

In the context of the PYP exhibition there may be conditions promoting critical thinking. These may be related to the characteristics of the learners, including age, although there is evidence that young children are able to engage in many aspects of critical thinking as well as older children (Murphy et al, 2014) The promotion of critical thinking may also be related to the content matter being studied and, therefore, the choice of topic for an inquiry such as the exhibition. To promote critical thinking in the classroom, some authors recommend the use of activities based on authentic, real-life problems (as discussed above) as opposed to the routine exercises usually worked through (Pine, et al., 2006). The development of critical thinking has also been linked, through constructivist notions of the relationship between language and thought (Vygotsky, 1978), to the development of co-operative and collaborative group work (discussed above), particularly through certain types of discourse (Murphy, et al, 2014) and exploratory talk (Mercer, 2009). Moreover, critical thinking may be defined and enacted differently in different cultural settings. Fung and Howe (2014) considered critical thinking in a Hong Kong context and argue that collaborative group work is more effective than whole-class instruction in cultivating students' critical-thinking abilities in that context. They see the teacher direction of group work as a very important part of successful critical thinking because it promotes social and communicative skills. Moreover, teacher intervention motivates children to expand and develop their arguments. This summary of literature about critical thinking suggests that, in the PYP exhibition, students may experience different opportunities for critical thinking depending on their cultural setting, pedagogy and topic. We aimed to explore these ideas in this project.

3.5   Student transition across programmes

The literature on the transition of students between phases within one school and between phases across schools indicates that the change from primary to secondary schooling can pose specific challenges to students (Murphy et al 1998) and can be difficult for schools and parent/guardians to manage. Little work has previously been carried out looking at transitions and transfers[1] of IB students between the PYP and the MYP but one study, focused in an international school, found that students expressed

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[1] Here, we follow Demetriou et al. (2000) and use 'transitions' to refer to movements between programmes in the same school, and 'transfers' to refer to movements between programmes across different schools.

anxiety about moving from the PYP to the MYP, due to perceived increases in cognitive difficulty of work, and an increase in homework (O'Boyle, 2009), fears which have been identified elsewhere in non-IB settings (Mackenzie, McMaugh and O'Sullivan, 2012). However, surprisingly, once students had made the move into the MYP, they perceived the PYP to be more academically challenging than the MYP because of the demands of the exhibition (O'Boyle, 2009). The MYP involves a good deal of inquiry-led learning and the experience of the PYP exhibition as an introduction to the greater autonomy in inquiry offered by the MYP is something that has not been considered in earlier research. This suggests that there is value in exploring how the PYP exhibition process and feedback is communicated between teachers in the two programmes, and to what extent the PYP exhibition serves as a formative experience in preparing students and parent/guardians for the MYP.

4   Methods and Methodology

As indicated previously, this study is focused on participant views of the experience of the PYP exhibition and how it promotes critical thinking, international-mindedness and the attributes of the IB learner profile in five countries. This mixed methods project drew on both qualitative and quantitative sources of data to investigate views about the PYP exhibition, and aimed to combine a multi-site case study methodology and the use of questionnaire surveys to develop a wider, informed picture of the PYP exhibition.

The fieldwork aimed to document both the extent and the character of the PYP exhibition, by drawing upon self-report measures (survey and interview) that involved students, parents, classroom teachers, coordinators and school leaders. We see this study as drawing on a tradition of appreciative inquiry (Cooperrider et al., 2008) in that the focus was on identifying what was working well, understanding not only what that looked like, but how it was achieved, and helping others apply learning lessons to their own contexts in order to bring about change. This study is concerned with the views and beliefs of participants and so, of necessity and choice, is a shared enterprise with the case study schools.

4.1   Sampling

Five target countries were identified in negotiation with the IBO: China, Russia, Kenya, Mexico and the UK. All schools offering both MYP and PYP were invited to participate in the research by email and responses enabled the team to identify seven schools in the five countries to participate. Where a volunteering school was small, another school in

this country was included. This allowed us to include the perspective of schools with different levels of IB experience- from those who have run an exhibition for over 10 years to a school doing so for the first time.

We are keen to maintain the anonymity of schools (and individuals) as this was an undertaking we gave to all participants. For this reason, we have chosen not to present individual anonymized profiles of the participating schools as this would not be compatible with ensuring non-identification. To provide readers with important contextual information we offer the following background information about the sample of schools involved. Where specific school features impact on the findings we refer to these in the relevant section of the results.

This study is based on visits to the seven schools that accepted the invitation to participate from amongst all eligible schools. Two of these schools were located in China, two in Russia, one in the UK, one in Mexico and one in Kenya. School sizes varied from under 250 students to just over 1000.

The student profiles of the seven schools varied considerably by school. In Russia, almost all of the children in the schools were of Russian origin and this was reflected in the many lessons taught in Russian. In Kenya, most of the children were Kenyan. In China, a high proportion of the children had one Chinese parent, reflecting local legislation that restricts host country nationals attending international schools. The Mexican school included approximately 80% Mexican or Mexican American students and 20% children from other origins. The London school included a higher proportion of expatriate children and the biggest range of first languages. The size and population of these schools reflects the wide range of international schools studying the PYP across the world.

A questionnaire survey for parents, students, teachers and coordinators was developed on the basis of these case-studies, to give a wider picture of the impact of the PYP exhibition on the development of IB learner profile attributes, critical thinking and international-mindedness. The sample for this survey included all the IB schools that offered the PYP (and therefore, the exhibition) and the MYP, in the five case-study countries. The survey was administered in English in Kenya and the UK and in English and either Chinese, Russian or Spanish in the other countries. The analysis of this survey will serve as a means of testing, validating and broadening insights gleaned from a more fine-grained study of school practices in the case studies.

4.2 Case studies

We conducted seven case studies in the five countries.

Prior to the visits, we emailed schools with project descriptions and an invitation to participate in the study. When the school Principal gave his/her consent to participate, we sent consent forms for all participants and negotiated parental consent for pupils. We sent a detailed list of the interviews we wished to conduct to the principal and PYP exhibition co-ordinator and negotiated the visit schedule by telephone and email. In some cases, where the exhibition spanned more than two days and teachers and pupils were, therefore, engaged, we extended visits to ensure that the full range of fieldwork could be conducted at times when participants were available.

The pre-visit discussions and visits sought to establish, in some detail, what it was that schools were doing towards, during and after the exhibition, and why. We sought and received a high level of commitment from each school. For each case a member of the research team made a visit of between one and four days to each school, including the PYP exhibition days themselves. The schools also communicated with us outside of these days. We appreciate this significant participation of schools, which allowed us to forge useful relationships with them. The visits allowed us to identify issues within schools that could not have been identified in advance, and then have time to follow these up.

During the visits in all cases, the researchers observed the exhibition day in detail, including teachers, student and parent participation. Detailed notes and photographs were taken, with the consent of the schools.

4.3 Interviews

The qualitative data collection focused on developing an understanding of how the PYP exhibition was working in the selected case-study schools. This began with collection of documentation before the visits, as discussed below.

The principal purpose of the visits was to observe the exhibition, as a stimulus for discussion, and undertake interviews with key participants. In each case, schools were provided with full details about the project, its aims and methods. We developed a profile of the type of people/role holders that we wanted to interview for each school, and asked the school to construct a programme of interview spaces and participants. This involves some gate-keeping by the school, although we have no reason to suggest that this was a problem in any school we worked with. Schools needed to take some

control over the organization of the research visit as constructing such a programme inevitably was difficult, especially at such a demanding time as the PYP exhibition, where all sorts of spaces were already occupied by preparations. In many cases, schools were able to identify people important to the project whom the research team knew nothing about - for instance, school librarians played a key role in the PYP exhibition in one school. This collaborative approach to constructing a research programme was essential and, in our view, had no compromising effects on the research. Table 1 shows an overview of the planned fieldwork in each case study school.

Table 1: Overview of intended fieldwork in each case study school

Target number of interviews	Target time	Group or individual	Key focus points
6 Exhibition students	I hour	Group	• experiences and opinions of the PYP exhibition, • how they think it may have helped them develop their IB learner profiles, international mindedness and critical thinking • share artefacts they associate with the exhibition at school • discuss reflections
6 MYP students	30 minute	Group	• experiences and opinions of the PYP exhibition, • how they think it may have helped them develop their IB learner profiles, international mindedness and critical thinking • share artefacts they associate with the exhibition at school • discuss reflections
2-4 PYP teachers	1hr each	Individual	• experiences and opinions of the PYP exhibition; • how they managed the process; • how they assessed the PYP exhibition (both formatively and summatively); • how they view the impact upon their students; and how they evaluated this.
MYP teacher	1hr each	Individual	• experiences and opinions of the PYP exhibition; • views about contribution of exhibition to MYP
Co-ordinators (usually the PYP Coord but sometimes a separate Exhibition coord)	1hr each	Individual	• experiences and opinions of the PYP exhibition, how they managed and assessed the process; • training and management of colleagues; • how they view the impact upon their students; • actions as a result of evaluations.

Mentors	1 hr	Group	• understanding of the exhibition; • experiences of mentoring; • training and their role;
Parents	1hr	Group	• understanding and experience of the exhibition; • opinions about key points; • communication with school; • satisfaction.

Interviews were conducted in a range of formats. Most interviews with school managers and teaching staff were conducted with individuals or sometimes in pairs, with translators where necessary.

Interviews with students were always conducted in groups. The research team ensured student interviews were conducted this way partly for child protection reasons, but mostly because of the positive arguments that relate to group interviews. This enabled the researcher to observe as students debated the issue between themselves and provided interesting examples. This was particularly effective when mixed groups of students debated their attitudes to, and experiences of, cooperative working on a project where one group member was perceived to be contributing poorly. These types of exchanges would be impossible in a one-to-one interview. IB students do not have a monopoly on possessing good discussion skills but we would argue that a feature of an IB education is that the students are often very articulate and those interviewed certainly proved very capable of sustaining and directing reasoned debate. In this study group interviews with students produced lively exchanges and provided rich data.

Parents were also interviewed in groups. Schools found it easiest to organize parent interviews at one single time, especially during the exhibition days. Parents were drawn from those involved in Parents' Associations or parents who were able to "stay on" after their child's exhibition. All the parents we spoke with were very familiar with their school. Parents were generally very positive, and this may reflect the small sample size drawn from a particular source. However, there was no evidence that views might be unrepresentative, and indeed parent interviewees were very forthright on some issues. Although used for convenience, the advantages of group interviews that applied to students could be said to extend to parent interviews, and the meanings expressed by parents were enhanced and explained by the debate within the group.

Table 2: Interviews conducted as part of the case studies (figures in brackets indicate the number of people in each interview)

Numbers of interviewees by school	School							Total
	A	B	C	D	E	F	G	
Principal (or lower school lead)	1	1	1	-	1	1	1	6
PYP exhibition coordinator	1	1	1	1	1	1	1	7
PYP Teachers	2 (7)	2 (3)	1(2)	1(2)	1(2)	1(3)	1(2)	21
MYP Teachers	-	1(2)	-	-	1(2)	1(2)	-	6
PYP Students	1 (6)	1(6)	2(10)	1(5)	3 (16)	3(18)	1(5)	66
MYP Students	1(6)	1 (5)	-	-	1(7)	1(4)	-	22
Parents	2(14)	1 (7)	1(5)	1(4)	1(5)	1 (6)	2(13)	54
Mentors	1 (5)	-	1(2)	-	1(2)	1 (4)	1 (1)	14
Other	1 (lib) 1 (grade coord)	-	-	-	-	1 (lead mentor) 1 (upper school lead)	1 (deputy)	4

As shown in Table 2, the case studies thus resulted in 59 interviews, which were transcribed for analysis.

4.4 Observation within the school, and of lessons

The visits consisted of a single researcher working in a school for one to four days at a time when the PYP exhibition was in preparation or taking place. There was considerable opportunity to absorb the culture of the institution and of the PYP exhibition – including the high levels of excitement this generated. In all cases researchers were given a guided tour, usually conducted by PYP students. In some cases, following initial

orientation, researchers were left to navigate their own way around the school, finding their own way to the next interview or appointment. In some cases, teachers welcomed us into their classrooms, keen to show us the work they were doing, and how the classroom environment they had created reflects the IB experience they wanted to offer. In all cases the researchers observed the actual exhibition experience and the reactions to it by parents, students, teachers and the many visitors who came to see it. All of these experiences were very valuable and contributed greatly to our appreciation of the rich dynamics of each school. However, 'observation' *per se* was not part of our research design and although it is inevitable that researchers 'absorbed' what they saw, asked questions about the process and presentation, there has been no systematic attempt to analyse or compare the quality of what was observed.

4.5   Documentary and website analysis

Websites and other electronic platforms are a powerful means of communication and many schools now use them as their principal means of communication, acting as a channel for both internal and external audiences. Recognising this function of websites, the websites of our case study schools were examined, with permission, for relevance to the PYP exhibition. Content was recorded and analysed in so far as it shed light on the research questions addressed in the study but we have avoided using direct quotes from web pages in this report. Such quotes would be traceable and therefore could lead to the identification of individual schools.

In conducting this study, we became aware of the important role played by internet-based sources and platforms in the PYP exhibition. Much of the organisation of the PYP exhibition was managed for teachers through school intranets and external sharing platforms such as "Google Docs", although the actual platform depended on local restrictions. Where we have used this material, we sought hard copies and have been careful not to use the text verbatim for the reasons of confidentiality discussed above. Parents and children referred to websites as source material and platforms such as "Google Docs" repeatedly as a structural part of their PYP exhibition.

For each case study, we collected a range of documentation related to the PYP exhibition, support for teaching and learning in the PYP and transition across PYP/MYP. This included:
- Teachers' planning materials and assessment guidance, where schools were willing to share this,

- PYP exhibition artefacts in PYP schools, (including displays, leaflets, planners, class journals, videos),

- Examples of PYP planning and assessment in case study schools (exhibition reflection tool, individual student learning journals, teacher anecdotal records of student work and performance),

- Case-study school websites for information about the exhibition within the IB learner profile, school development plans, curriculum information, annual reports, etc.,

- Guidance for mentors and mentor records, where mentors were involved.

The documents were discussed with relevant participants to ensure teacher, student and parent perspectives were understood and notes about these documents were included in the Nvivo 11 for Mac qualitative analysis.

4.6 Survey

The research team reviewed a range of existing survey research instruments used in studies of inquiry-based, collaborative learning and transition but took the view that none of them aligned exactly with the specific activity of the exhibition. Some instruments identified particular elements of inquiry based learning or collaborative learning, but not all elements (e.g. Cho et al., 2015; Johnson et al., 2013).

The aim of the survey was to enquire into respondents' views about the impact of the PYP exhibition and we generally sought participants' views directly, using Likert scale attitude statements for the most part. The key issues in the questionnaires were:

- The role of parents/carers in the PYP exhibition
- The perceived learning outcomes of the PYP exhibition
- The PYP exhibition and international mindedness
- The PYP exhibition and critical thinking
- The PYP exhibition as co-operative inquiry
- The PYP exhibition and moving on to the next school/MYP
- The role of mentors in the exhibition

We developed three versions of a single electronic questionnaire instrument, for use with parents, students and teachers. In each of these versions, the words were not identical but the key items were the same, phrased to address the student, parent or teacher audience for each specific questionnaire. For example: the parents were asked to

indicate their level of agreement with the statement: "Doing the exhibition has enabled my child to use different forms of language and literacy". In the student questionnaire, the equivalent statement was "Doing the exhibition enabled me to use different forms of language and literacy." And for the teachers the statement was "Doing the exhibition enabled the children in my class to use different forms of language and literacy".

We piloted questionnaires with school coordinators in case study schools. They gave clear feedback that included insights into language use in these IB schools. Piloting indicated that questionnaires in English worked well in Kenya and the UK, where the local first language was English, but would be likely to exclude the participation of some parents, students, mentors or teachers in China, Russia and Mexico. For this reason, the questionnaires were translated into Chinese, Russian and Spanish by first language translators with educational experience, and cross checked by second first language speakers of each language (Examples are available in Appendix 4). The questionnaires were hosted online using Bristol Online Surveys. Distribution of the questionnaire links took place through the IBO, which contacted the school PYP coordinators on our behalf. The school coordinators distributed links to parents, teachers and students. Reminders to complete and return the questionnaires were sent on behalf of the research team by the IBO.

The survey response consisted of 559 total respondents, made up of 334 students (60% of the total responses), 128 teachers (23% of the total responses), and 97 parents (17% of the total responses). As shown in Table 3, a significant portion of the sample came from China and Mexico.

Table 3: Frequency of responses by role and country

	UK	Mexico	China	Russia	Kenya	Unknown	Total
Students	31	108	149	12	34	0	334
Parents	0	15	38	2	19	23	97
Teachers	4	47	54	2	3	18	128
Total	35 (6%)	170 (30%)	241 (43%)	16 (3%)	56 (10%)	41 (7%)	559

Table 4 shows the number of schools surveyed compared with the number of schools from whom responses were received, thus indicating the response rate for the questionnaire.

Table 4: Participating schools by country

	UK	Mexico	China	Russia	Kenya	Total
Participating PYP schools	3	15	15	2	1	36
Total PYP schools in country	13	32	38	9	2	175
Response rate	23.1%	46.9%	39.5%	22.2%	50%	20.6%

The Kenya and UK returns were all in English. The other countries did return some English language questionnaires. However, across the whole sample the majority of returns (61%) were in Chinese, Russian and Spanish, especially for parents (65%) and students (62%).

4.7 Ages and first languages of student respondents to the survey

The age of most students answering the questionnaire (given by the students) is shown in Table 5. Most children were 10-12 years of age. There was a notable difference in median age in the schools in each country. This is particularly noticeable between Russia and Mexico with median ages of 10 and 12, respectively.

Table 5: Age of participating students by country

	Student age					
	Median	**10**	**11**	**12**	**13**	**No response**
UK	11	7	24	0	0	
Mexico	12	0	27	61	20	
China	11	32	100	14	3	
Russia	10	8	2	0	0	1
Kenya	11	11	22	1	0	
N		58	176	76	23	1
Percentage of all student responses		17.4%	52.9%	22.8%	6.9%	

The questionnaire also asked students to identify their first language. The results (Table 6) suggest that a wide range of languages in the UK and China, with fewer in Mexico, China and Kenya. This suggests the population in the responding IB schools in Mexico, China and Kenya was characterised by families whose first language was Spanish, Chinese and English, making them more likely to be of local origin.

Table 6: First language of students by country location of the school (%)

	Country				
Language	**UK**	**Mexico**	**China**	**Russia**	**Kenya**
English	45	3	11	0	71
Spanish	6	95	0	0	0
Chinese	3	0	75	0	0
Russian	3	0	1	92	0
English + another	0	1	2	8	29
Other	42	1	11	0	0
Missing	0	1	0	1	0
(N)	31	108	149	12	34

4.8 Children's future school destinations

The parents were asked about the intended school destinations of their children the following year and 88 (86.5%) of respondents said that their children would go into MYP next academic year, 8 (8.3%) said they would not and for 5 (5.2%) their children's destinations were undecided.

4.9 Ethical considerations and challenges

The research design was approved by the University of Nottingham School of Education Ethics Committee. This decision was informed by the University of Nottingham Code of Research Conduct and Research Ethics, the British Educational Research Association's Ethical Guidelines for Educational Research (BERA, 2011) and the Economic and Social Research Council (ESRC) Framework for Research Ethics. Particular consideration was given to the non-identification of schools and respondents within those schools. The ethical approval procedures have been revisited at several stages throughout the research process to ensure compliance.

The need for cross-cultural understandings was recognized as important from the start of the project. The IBO's discussion document, 'East is East, West is West' (Walker 2010), recognizes the challenges in the alignment between the culture and values that underpin IB programmes and non-Western traditions. This was recognized in this study in relation to predominantly Confucian based cultures and is likely to have presented similar challenges in other contexts that were part of this study. In recognizing this issue we have tried to mitigate it through transparency in our decision-making and judgments. It is for readers to decide to what extent we have been successful or otherwise.

4.10 Analysis of qualitative data

Data was analyzed using *NVIVO 11 for Mac* software. The individual and focus group interviews were transcribed and then imported into NVIVO. In the following section of

the report the procedures for analyzing the data and moving towards a statement of its key themes is described.

Following the guidelines suggested by Charmaz (2003), the following questions were asked about the data as it was being coded:

- What is going on?
- What are people doing?
- What is the person saying?
- What do these actions and statements take for granted?
- How do structure and context serve to support, maintain, impede or change these actions and statements?

To show how coding was achieved, an example is given below of the way in which one extract from one focus group interview was dealt with. The screenshot below shows the transcript of responses made by a group of PYP exhibition students in response to the prompt "What was the role of your mentor in your exhibition?". Although this discussion occurred in response to one interview prompt, it involved interaction between interviewees and the interviewer probing further at certain points, to extend the information derived, reflecting the semi-structured nature of these interviews.

The extract in Figure 2 shows the sections of the text (marked) that were coded in some way during the data analysis and also the identifying coding (PYP exhibition students). Each of the initial codes was derived from the data itself and the analyst's judgment as to meaning of utterances. In NVivo terms, this involved the development of free nodes, although in a grounded theory approach (Strauss & Corbin, 1998), this would be referred to as open coding.
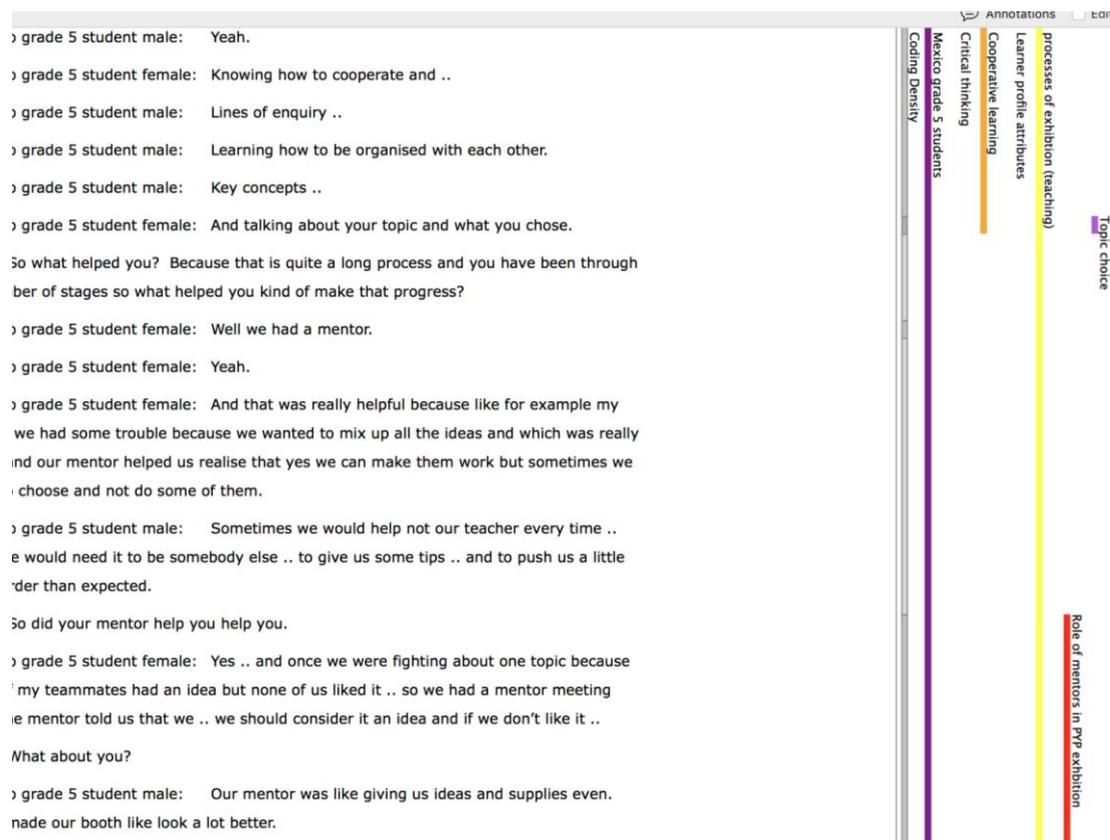
Figure 2: Screenshot of coding stripes in Nvivo 11 for Mac

The codes used on this example include:

- Processes of the exhibition
- IB learner profile attributes
- Cooperative learning
- Critical thinking
- Topic choice

The sections of text coded are large, reflecting the substantial and complex concepts being coded.

Open coding, following the above model, was carried out on the transcripts of the 59 interviews, case reports and case documents for each case using a constant comparative approach (Strauss & Corbin, 1998) in which data and its categorisation was constantly compared to what had gone before. By the conclusion of this process, 36 free nodes for broad categories of data had been developed in NVivo. These codes were mostly developed from the first half of these interviews and the analysis of the final half showed that the coding saturation point had been reached with this data.

The next round of coding was axial coding (Strauss and Corbin 1998). This meant attempting to inter-relate the codes already developed into categories, first through text searches then through visual displays of tree nodes. This produced tree nodes, or categories (Gurdial Singh & Jones, 2007). The tree nodes identified from the IB student data were as follows:

- Pride in achievement
- Enjoyment of the process
- Capabilities
- Topic selection and influence
- Qualities contributing to effective research
- Processes and challenges in designing, carrying out and reporting research
- Role of adults
- Children's roles
- PYP exhibition and the future

The whole qualitative data set, including interviews, case reports, photographs and documents was interrogated for each question.

4.11 Analysis of quantitative data

The quantitative data were initially downloaded as SPSS (Statistical Package for Social Scientists) files from the Bristol Online Survey tool. These SPSS files allowed analysis of the raw responses to give us a picture of the dataset and the trends in responses. Some of these descriptive outcomes will be presented in the results below.

5 Findings/Results

In this section, we present our findings in relation to each of the research questions.

5.1 Question 1: What variations in practice exist in implementing the PYP exhibition in case-study schools?

- **How do PYP teachers plan PYP exhibition study?**
- **How do PYP teachers support PYP exhibition study?**
- **What role, if any, is given to parent/guardians? How do PYP teachers assess the PYP exhibition?**
- **What feedback is given to parent/guardians and students during and upon completion of the PYP exhibition? How does this support student learning?**

To the outsider, the PYP exhibition might be construed as a single event at which students in their final year of the PYP have the opportunity to showcase their work and

to demonstrate their progress and learning over the previous years of PYP study. While both of these elements are indeed important, it is the process of the exhibition which is central to the life of the PYP school and which enables the exhibition to be a whole-school, community-owned endeavour. As a process, it is complex, and the IB PYP Exhibition Guidelines (IBO, 2008) offer a supportive framework to help schools plan for and implement the exhibition. Within this framework, however, there is a lot of flexibility for schools to make their own interpretations, which ensures that each exhibition is a unique event. In this section, we look at some of the variations in practice that exist amongst PYP schools and specifically how these impact upon international mindedness, critical thinking and the development of the IB learner profile attributes. We attempt to answer the four questions above through a thematic analysis of the data exploring the structure of the exhibition and student agency; choice of topics and the role of "action"; timing and schedules of the process and of the staging of the exhibition 'sharing event'; the components of the exhibition; and assessment and feedback.

Structure of the exhibition and student agency

The exhibition is structured according to the IB Primary Years Programme framework in which units of inquiry are set within transdisciplinary themes. (Below, we outline the three ways we observed this working in practice in our case-study schools.) Within this very broad structure, students have varying degrees of agency in and ownership of the work and these are commented on in further details below.

The first way we observed this working in practice was the most typical. In one Case Study School the exhibition forms one unit of inquiry and this can take place under any transdisciplinary theme. A central idea is developed, and lines of inquiry are then defined from this. The lines of inquiry inform the students' questions and often students with questions stemming from the same lines of inquiry will work collaboratively to support each other throughout the exhibition. (Please see Appendix 2: An example of how the transdisciplinary theme, central idea, lines of inquiry and student questions are interlinked).

The approach used in this case study school was very common, but we did observe variations to this practice in another school, where the exhibition spanned two transdisciplinary themes, 'Sharing the planet' and 'How we express ourselves' instead of one. The process of developing the central idea and defining lines of inquiry varied from school to school. In one school, different approaches had been tried in different years. In the previous year, all children wrote on a post-it note what their interests were. Then these post-it notes were collated and from those the teaching team tried to find a

disciplinary theme that they would all fall into. This had proven challenging, and had led them to approach the task differently in the current year. They had instead chosen the transdisciplinary theme 'where we are in place and time' as it had not yet been covered in class. The teacher talked that through with the students, and then asked them to choose questions related to that theme.

The PYP Coordinator explained how this worked:

> *So the head of SENCO and myself and the Y6 teacher and we also had the EAL teacher there and the four of us sat down and sort of read through the theme to make sure that we felt that it was broad enough and of course the themes are broad. But were broad enough that maybe all the children would find something that they had an interest in. So then what we did was she took the theme and she broke the theme down so that the children completely understood it. Then .. once they had talked through the theme. She just said to them. 'So now write on a post-it note what you think you might be interested in.'*

Students wrote on post-it notes what they were interested in within the theme, and then they were grouped together into groups of between three and five. Teachers came up with the central idea following the interests expressed on the post-it notes. From this central idea, students worked in groups with the mentor to develop a line of enquiry collaboratively. Finally, their individual research questions were refined from those originally written on the post-it notes.

One PYP coordinator discussed the difficulties in starting with the interests of the students for a piece of work that was inquiry-based and when not all areas of interest had a clear 'problem' that was appropriate for inquiry:

> *We started off by the kids just giving them time to research anything that they are passionate about and then we smack them with ..'Now you have to find an issue with that.' So if you love horses .. you need to find an issue with horses .. because .. and it didn't work that well because we had kids who wanted to inquire into things that they couldn't find an issue with still .. if that makes sense where the exhibition is about an issue or a problem. So we know how we are going to fix that next year and to not be .. yeah raining on the kids*

> *parade of excitement of horses and then you need to find a problem*
> *with your horse or whatever.*

One noticeable variation in this structural organisation of the exhibition was in the amount of agency and ownership afforded to students. In some cases, teachers decided on the transdisciplinary theme and the central idea whilst students decided collaboratively upon their lines of inquiry and wrote their own questions. Elsewhere, the students wrote their questions and these were used to collaboratively decide upon the central idea as well as the lines of inquiry. In one school a committee of students was responsible for all decisions relating to the exhibition. With the IB's permission, the school had abandoned having an overarching theme and tying it to specific units of inquiry. Instead, the exhibition itself was a unit, each individual student writing their own central idea for that unit, and the students were given entirely free-rein over question choice. One PYP Coordinator talked of the importance for motivation in giving ownership of the exhibition structure to students.

> *I give the lesson on the central idea. They build the central idea as a*
> *class and then from there they choose their topics and once they have*
> *their topics they as a team so maybe they are two or three people team*
> *or four people team they develop their lines of enquiry. Which is in line*
> *with the central idea and their topic. So then that just has .. they have*
> *complete ownership of that. And that to me is critical. For them and I*
> *mean you want them to be responsible and you want them to be*
> *enthusiastic about what they are doing .. so .. why not then I give them*
> *the power to do their own learning.*

Choice of topics

Questionnaire data gave a broad background to the types of topic titles chosen by students. The majority of topics were related either to environmental issues (76, 22.8%), to issues related to social or human rights (88, 26.35%) or to science topics. (66, 19.8%). There was also a large category of humanities-focused topics which included broad titles like "religion" and narrow titles like "Japanese cookware".

In the case study schools, the more experienced schools were more able to manage the creation of individual topics in relation to central themes. The topics chosen by the more experienced schools, and also those schools with older children, were more problematic, more global in their application and less likely to have "neat" answers, meeting the characteristics of inquiry problems most likely to lead to transfer of learning to other

contexts, as discussed in the review of literature. Table 7 shows the analysis of student topic choice.

Table 7: Student topic choice

	Number	Percent
Health	8	2.4%
Environmental issues	76	22.8%
Science	66	19.8%
Social and human rights	88	26.3%
History	14	4.2%
Personal improvement	15	4.5%
Humanities	59	17.7%

The qualitative data gave a greater insight into the topics chosen and the curriculum coverage of the topics. Students pursued a "central theme" identified by the school, in some cases this included participation by the students. Students identified lines of inquiry as a group or individually. For instance, within the year group topic of The Great Patriotic War (1941-45), children in one school identified topics such as "City Heroes" and "Military Vehicles in the Great Patriotic War". This is an unusually specific and local choice of topic. In a school that identified a science central theme of "How human innovation and technology impinges on our world", topics chosen by groups included "Technology and Health", "Green Energy", "Pharmacy" and "The Food Industry". These sorts of topics were more likely to be related to global issues and to a wider range of action.

In all the case study schools, the students primarily investigated their topic using social science methods. That is, they used a range of sources to research information and evaluated this information to produce a presentation and report that aimed to be balanced, well informed, referenced to a range of sources and, to a lesser degree, critical.

Sources used by the students included books, industry materials, internet sites and interviews with people in relevant positions and industries. Different schools engaged the students themselves in obtaining materials to different degrees. For example, in Mexico, students were supported to use parental contacts to write to prospective interviewees and this learning included aspects of interpersonal communication, good manners and interviewing technique. In Russia, children were directed to elderly relatives as a source of information. Children in all the schools used the internet as a source to a greater or lesser degree. For children in one case study school, use of the school iPads for this task

was a new experience and these children were aware that there would be a range of information available. They assured the interviewer that it was important to "check with the old books" to see what was true. In another school, the children used internet sources throughout the PYP and, as part of their exhibition, had "extra" training about evaluating the source and the intentions of internet information sources. This training was delivered by school librarians as part of the programme of research training offered to support the exhibition. The students in this school (and those who had already moved on to the MYP) were very articulate about this aspect of their work and showed real understanding of the role of author intentions and researcher criticality.

The research skills used in the exhibition included a small survey of some sort for most children. Examples included surveys of parents' opinions about technology use, surveys of time spent playing computer games and surveys of attitudes to issues such as disability or animal welfare. The results were analysed as descriptives and displayed as charts. This gave a mathematics aspect to the PYP exhibition curriculum, though, in two of our schools, the coordinator explained that maths was taught as a separate subject throughout the period of the exhibition.

Although science topics for the exhibition were reported in the questionnaire, most of these were topics such as "Living in space", "Personal information leakage", "Virtual reality". Though the questionnaire format did not allow us to make judgments about the science content of these topics, it was clear in the case study schools that "scientific inquiry" as described in the literature was not a strong feature of the PYP exhibition and, although science and technology topics were common, they were investigated through secondary research.

The selection of topics, from following central ideas to developing lines of inquiry, was a major concern for the teachers and some mentors. They saw this as a balance between the topic choice and group selection. Almost all the teachers aimed to give the students some choice in both their final choice of topic and their group constitution, but they aimed to ensure that no student felt excluded and that all students had some choice in one of these dimensions. This did not mean that all children chose their own topic or group colleagues to work with but all the children understood the decisions and how they were arrived at, maintaining the students' sense of ownership not only of the topics, but of the whole exhibition process. The students showed great maturity in how they described this process, and in discussing the strengths and weaknesses of their colleagues, often in terms of their cooperative working.

I think that like everybody in our group we really did use critical thinking when we were making the time machine like we were working on it like and like if something was to go wrong we wouldn't go running to a teacher and we would like stop and like think about what we were doing and then like fix it on our own without having asking for help and we would be going .. really settle about what we had to do and like fix all our problems and like and independently and without like getting a master or anything.(Student)

The teachers in five of the seven schools aimed to support their students in choosing topics that brought wider, global issues to their attention and did not have simple solutions. Only in two schools were children allowed to choose more "closed" topics and these were schools new to the IB PYP exhibition.

So all these things I think encourage critical thinking and so saying you can .. you can try to think and come to your own and reflect and then come to your own answer and not just necessarily go for the right one. Which .. so I think that it definitely does and I mean .. choosing .. just choosing their own topic. Why did you choose this topic? Why is it interesting? They have to .. they have to become critical thinkers. (Teacher)

Timing and schedules

The process of planning for the exhibition was usually lengthy. Often the process started after the previous year's exhibition by engaging in reflection on what was successful about the exhibition and what required improvement. One major difference between case study schools was in the amount of student involvement in this process. In one typical case study school the processes of reflection were very teacher-led: the lower school principal, PYP coordinator and Grade 5 (exhibition grade) teacher started to analyse what had gone well and what required improvement to the exhibition as one year's event finished. This process of reflection amongst the leadership team continued into the start of the academic year in April, with specialist teachers and mentors becoming involved from October, and the children from January. In another case-study school the process was much more student driven, with the PYP coordinator and grade 5 teacher forming a committee with student volunteers. This committee had a week away to allow themselves space to reflect on previous years' practices and to brainstorm how they would like the exhibition to look in the current year.

Exhibition timings also varied from school to school. In one school, they were experimenting with a whole-year process to allow depth of engagement with the research topics, although this did raise concerns that topics needed to be carefully chosen to ensure students' interest could be retained for the whole year; in another case study school the whole exhibition process was between five and seven weeks, with student activity compressed within an even shorter time. The exact length depended on the year and the timing of other events, such as the school exchange visit. In most case study schools the students' involvement was a six-week process even though the PYP coordinator and teachers may have been preparing and planning for much longer than that:

> *we run it for six weeks and because .. but it is usually more than that because the actual lead up to it is about two weeks long. The whole prepping and the whole coming up with what our central idea is going to be and then for the children to decide what they want to enquire into and then for them to come up with the questions and then to come up with your own .. enquiry cycle .. you know that is a good two weeks. So I would say that anything between five weeks to seven weeks.*
> *PYP Coordinator*

The presentations and performances – called the 'sharing event' by the IB (IBO, 2008) - also varied. In one school, they divided eight classes over three days, so that each class had one day for their exhibition. In another school, all students were involved over a period of two days. On Day 1 there was an opening ceremony and student presentations to guests, followed by student presentations to their peers, students and teachers from visiting schools on Day 2. Other schools had local "dignitaries" as additional visitors. In other schools, the complete event took place on one day, and in one school the exhibition was staged over one evening with only parents and teachers as audience. Children from other schools did not attend, and nor did older children from the same school, who were taught on a different campus located some distance away from the exhibition event.

Components of the exhibition

The exhibition guidelines from the IBO advise that the exhibition should include the following components:
- Examples of written work in a variety of formats and styles: poetry, reports, persuasive texts
- Oral presentations, individually or in groups, to the school community

- Uses of technology including ICT, working models, designs, science experiments
- Performances or compositions in any medium: dance, music, drama, visual arts, film, video, mixed media (IBO, 2008)

In our visits to case study schools we found a large amount of variation in the elements of the exhibition but all were within these guidelines. For example, one case study school included the following seven components:

1. Research report
2. Infographic poster (see Figure 3)
3. Oral presentation of the research report and infographic poster
4. Performance based on students' individual research ideas/reports.
5. Performance based on/inspired by a local art form.
6. Performance of drumming from around the world.
7. A conflict resolution exercise in Physical Education.

These components drew very explicitly on the expertise of teachers in the school. For example, the infographic poster (Figure 3) was the result of input from the art teacher, who taught students to map out a grid and use contrast and repetition as a way of communicating information. The elementary school principal explained the aim of the infographic poster and how the decision was taken to include this in the exhibition work:

> *But we are trying to teach visual literacy skills. So that they can essentially create an infographic that they speak to rather than writing a whole lot of things down that they then have to either read or just re-iterate. We try and teach the power of symbolism and the power of how can you show .. you know .. a disparity in numbers or something by the size of the shape and what is visually effective from of communication? … And we wouldn't ever have gone in this infographic direction except that we had a fantastic art teacher and that is where we went.*

Figure 3: Infographic poster from case study school

In another case study school, the exhibition included five components:

1. Research report including a persuasive piece explaining why they were doing the research.
2. A creative piece (there was a lot of flexibility regarding what this was, but it was emphasised that it needed to be 'meaningful'). For example, it might be a song, a skit, or a piece of art, or drama.
3. A musical piece as a whole year group.
4. A maths-related piece of work – this might be graphs, statistics. Again, the emphasis was on this being meaningful, rather than just for the sake of it.
5. Use of ICT.

In all case study schools, the students produced a piece of written work, usually in the form of a report, sometimes presented as a bound report, and other times displayed on boards (see **Error! Reference source not found.**). We saw examples of persuasive texts written in conjunction with research reports, but did not see other examples of written work such as poetry.
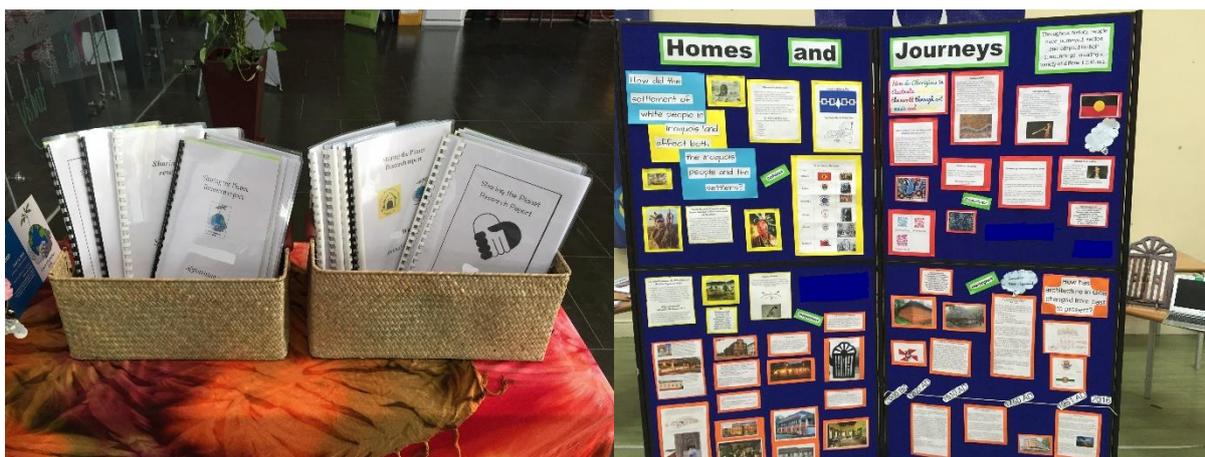
Figure 4: Photograph of an exhibition

In all case study schools' exhibition 'sharing events' we observed oral presentations. These were typically individual presentations, but done in the same small groups as had been working together throughout the exhibition process (usually grouped according to similar lines of inquiry). These were presented to other PYP students in the same school, teachers, and parents. Often MYP students were also invited to listen to the presentations. Sometimes students and teachers from other IB PYP schools were invited to hear the oral presentations. Sometimes the oral presentations were part of a larger sharing event at the same time as musical and dramatic performances; sometimes the musical and dramatic performances took place at the opening ceremony, and then the oral presentations formed a separate stage of the exhibition.

In all case study schools, the use of ICT was prolific. Students would use ICT skills during the research stage of their work – searching using an online browser such as Google, or using applications such as Skype or Facetime to communicate with each other during collaborative group work. Students learned to organise their work using ICT – using digital folders and email to communicate with teachers and mentors. In two of our case study schools, work was prepared using Google Docs and shared using Google Drive. During the 'sharing event' itself, frequently iPads or laptops were used to support the oral presentations; digital recordings were used; sometimes a screen would be set-up for students to project their images or digital presentations; and some students had designed electronic quizzes or games to entertain their audiences as part of their presentations.

In all case-study schools the research team observed music and drama being used by individual students and by the whole exhibition year group during the 'sharing event' to

demonstrate collaboration and community. One student, from a case-study school where the whole exhibition group had sung and danced together, explained why he had enjoyed these:

> *I liked the song and also the dance and because it is a time when you get loose from all the working that you have been doing and you can just like let go .. and also I liked the fact that we got to work with new people .. and I had never worked with any of my group members and they are all girls and I am the only boy! But .. I have never worked with them on any project before and so it was nice and it was nice to work with new people and the dance was a good part.*

Figure 5 shows the lyrics from one case study school's 'Exhibition Song'. The lyrics also demonstrate how the song was used to reinforce some of the IB learner profile attributes (open-minded and thinker) and to emphasise the goal of being internationally-minded (for example, through references to living in peace, and 'this is our global world').

EXHIBITION SONG

[music intro]
1.
Tribes are good (very good)
Tribes are cool (very cool)
No technology (none at all)
No fast food (we grow our own)
It's our culture (yes it is) x4

[music intro]
2.
Independence (that's our rule)
Civilizations (old and new)
Stick together (we have to)
Families first (we love you)
Open-minded (we are too) x4

[music intro]
3.
We make art (as we play)
We make music (every day)
Exploration (all the time)
Wander migrate (it's our way)
Change the world (yes we do) x4

[music intro]
4.
We live in peace (when we can)
Travel together (hand in hand)
Curious thinkers (yes we are)
Where we are (in place and time)
This is our (global world) x4

Figure 5: Lyrics written by students for the "exhibition song"

Other forms of drama observed by the research team included a piece inspired by the Beijing opera; a 'protest' with banners relating to the issues students had been studying as part of 'sharing our planet' such as 'Stop War!', 'Don't Abandon Animals!' and 'We Are Equal!'; and a dramatic presentation entitled 'War in the eyes of children' involving some

dance, rousing martial songs, representation of the loss of relatives and a reading of the names of family members, followed by a two minute silence.

In summary, the exhibitions in the case study schools were vibrant and varied. All components of the exhibition listed in the guidelines published by the IBO were included in some form by all schools, and in a wide range of variations across all schools.

Reflection, Assessment and feedback

Reflection was at the heart of the PYP exhibition processes in the case study schools. This was planned into the activity of the exhibition in a variety of ways, either as independent work done outside class or as a class lesson. For example, a PYP Coordinator explained:

> *PYP Coordinator: Yes. Every week we have reflection and we have a prompt for them and it is more of a .. and we decided to .. to give an idea for a general reflection because we wanted all teachers to .. to look for the same things. However if teachers wanted to reflect on something additional to this general reflection then they could and they have that liberty .. but in order to keep the formative assessment common within our eight sections we ask the general.*
> *Interviewer: So the reflection is part of the assessment?*
> *PYP Coordinator: Yes. Yes.*

In some schools, the planning of reflections by coordinators and teachers included identifying reflections about key activities undertaken by the whole class. In others, the reflection was focused around individual or group activities. The students discussed reflections and, though some students said they had found reflections "boring at first" they also recognised the importance of those reflections in improving the quality of their work and of their participation in group work.

All the schools undertook a final reflection by students following the exhibition and this was most incisive where students had undertaken regular reflections during the process of the exhibition. In some cases, the final reflection was videoed and in others written. In two schools, this was a group discussion activity. The focus of these reflections was on the skills, knowledge and IB learner profile attributes the students had used, as well as evaluation of the impact of their exhibition, related to action. Reflection was one of

the IB learner profile attributes that students found most visible and they referred to it often in the interviews.

Assessment of the PYP exhibition was complex and took a number of forms in each case study school and it was closely related to reflection because students also undertook self-assessment on how they use IB learner profile attributes and PYP attitudes. All the teachers interviewed were keen for students to understand the assessment criteria used for assessment of pieces of work and the final exhibition.

> *Interviewer: So tell me a little bit about the assessment.*
> *PYP Coordinator: So it is mostly reflection based because it is hard to quantify something during the entire process .. but we .. we reflect on skills and we reflect on meeting objectives which sometimes may be curricular objectives and in this case we had a lot of science standards embedded into our .. into our exhibition so we did look at them needing certain bench marks for science. We look at how they are building their IB learner profile attributes and so they will reflect on that .. so it is basically in terms of knowledge, skills, attitude and concepts. Those are .. those are the .. the indictors we use for reflection.*

The assessment of the PYP exhibition included assessment of target activities throughout the weeks of preparation. Schools planned the criteria and marked these activities in different ways to reflect their structures and ethos. In some schools, the exhibition year teachers planned the activities together and introduced an element of moderation of marking through their planning. In other schools, the teacher responsible for a particular curriculum area gave feedback on pieces of work related to that area (e.g. music teachers, PE teachers).

In addition to assessment of the exhibition by teachers and through self-assessment, some schools undertook peer assessment, to varying degrees. In some schools, for example, the students used a rubric to evaluate their cooperative learning skills and had done this regularly throughout the process of the exhibition. When discussing the participation of other members of the group, these students were balanced and incisive in their comments, despite the abstract nature of some ideas. They used examples well and sought positive improvements. This was clearly a very well established process. In another school, a similar rubric was used with mentors to self-assess cooperative learning processes. In one school, a whole class reflection session was observed, led by the teacher, with enthusiastic and experienced participation from members of a small

class. This reflection about cooperative learning was most obvious in schools with significant experience of doing the PYP exhibition.

The PYP exhibition sharing event was also assessed using a rubric in all the schools we visited. However, the mechanism and impact of this was different in each school. In one school, visiting parents, teachers from the MYP and "dignitaries" completed rubric grids to "judge" the event. These were the basis of a class discussion later. In another school, students "assessed" each other's presentation and the results from the rubric were analysed and fed back by the teachers in a reflection session.

The schools we visited included comments about both units of inquiry studied - the exhibition and one other– in end of term reports to parents, which, in some cases, were also shared with the next school attended by the students. However, it was notable that two of the MYP teachers said they did not use information about the PYP exhibition to inform their work with the incoming students and the other teacher was not sure whether such information was received by the school.

Finally, it is important to note that reflection was not confined to the children. The teachers, mentors and coordinators we spoke to were involved in both a final and ongoing reflection process. As one PYP coordinator said:

> we are going to reflect on Monday about what now we are going to tweak for next year and I guess what was quite cool about this year was that it was truly like we were truly enquiring as well and like we were .. Ahh! Right that was the wrong time to do that. Ahh! Let's do this. And it was such an organic process and we definitely know what we will do better next year.

The teachers and coordinators expected to make changes to improve student learning and experience and pointed out examples of changes made this year or previous years.

Action

The action element of the PYP exhibition was not always immediately evident in our case study schools, but was clear to the participants in all of them. They described it in relation to being caring, or being principled. Actions included leaflets, visits, videos, shows and posters related to actions about raising awareness of issues investigated as part of the PYP exhibition. Other actions included organising clothes collections for a charity working in the student's chosen field. Other groups of students produced films,

drama productions or musicals about their issues or about relationships and values. These were presented to the school and wider community.

The parents, teachers and coordinators spoke in mixed terms about actions. As one parent said:

> You have a responsibility with this knowledge that you have gained to do something .. and solve a problem in some way

However, principals and teachers said that action element of the PYP exhibition presented a teaching challenge. To help students to choose novel, meaningful actions was always difficult. A principal told us:

> …but I have always been impressed that we have never ended up with bake sales. It just doesn't happen.

The principals and teachers spoke warmly about the impact of the action on students. For example, a principal discussing an anti-bullying presentation for her school said:

> it was interesting to me that to my adult eyes I found the actions fairly passé ... but to the audience they were intended for, they changed the school and the playground dynamic changed and became a more harmonious place to be.

An issue that impacted upon the action element of the PYP exhibition was the time it took and when that time was included in the planning for the exhibition. In schools where the whole exhibition was confined to a short period, the action element of the exhibition was seen as problematic and participants spoke about it less. Schools inevitably encountered occasional problems with timing the whole sequence of the exhibition and, in these cases, it was usually time for action that was squeezed. This may be partly because the impact of the action element of the exhibition is not as obvious (as a justification for use of curriculum time) as some other aspects of the exhibition. However, the importance of action is subtle, pervasive and a key issue in the promotion of international mindedness. Schools where the exhibition was planned for a longer period and where action was considered well in advance found it easier to retain the importance of this aspect of the exhibition.

Although the action element of the PYP exhibition was a challenge for participants, it was also identified as one of the key ingredients of what made the exhibition meaningful and lifted it from being just another example of "school learning".

5.2 Question 2. What do PYP teachers, students and parent/guardians believe to be the impact of PYP exhibition study on: international-mindedness, critical thinking and IB learner profile attributes.

Parents, teachers and students were overwhelmingly positive about the PYP exhibition as the culmination of PYP studies in the interviews and also in survey responses. Teachers saw the exhibition as an expression of the values and goals of the PYP. They cited it as a key example of inquiry learning that involved all the IB learner profile attributes and developed the critical thinking of students through their questioning, in-depth knowledge and research skills. In the survey, responses showed a clear, shared view that the PYP exhibition was a key, valued, learning experience that had an impact on international mindedness, critical thinking and the IB learner profile attributes. Almost all the students (320, 96.4%) agreed or strongly agreed that they had learnt a lot through doing the exhibition.

The impact of the PYP exhibition on critical thinking

All the teachers we spoke to placed critical thinking as a key outcome of the PYP exhibition and saw it as an essential part of the exhibition activities, although there was a range of teacher views about the nature of critical thinking. Most teachers and school leaders saw critical thinking as related to knowledge, critical research skills and critical literacy, personal independence and, in some cases, wider global questions. So, when the teachers, students and parents discussed the opportunities for critical thinking in the PYP exhibition, they linked it to a range of experiences.

Some of the teachers and PYP coordinators linked critical thinking to action and awareness of a wider global context, as well as the need to live with and understand inequality and the action element of the exhibition. They identified critical thinking as a characteristic of an internationally-minded student.

> *I think that they are given that the kids that we are teaching here .. not*
> *so much about what is happening out there .. and you want to talk*
> *about things .. and what about and be able to talk about things out*
> *there and how about talk about topics and about what is happening*

> *locally .. because when you look at it .. and it is according to their social*
> *community that is different. For example for poverty. (Mentor)*

> *So the students are investigating conflicts in different place in the world*
> *and by learning about the conflict from another perspective and from*
> *looking at both sites they .. they learn about different perspectives and*
> *about the fact that people have different opinions and they are all might*
> *be right from their perspective. (Teacher)*

This quotation also illustrates the complex interplay of IB learner profile attributes such as caring, being principled and the ways these attributes contribute to critical thinking and international-mindedness.

All participants saw critical thinking as a literacy activity that was a fundamental part of the process of inquiry. This was evident from the quantitative findings where language and literacy was linked with the question items: *using evidence*, *looking at different points of view* and *reflecting on their own point of view*. All the children we spoke to understood the need to evaluate source material, although there were clear national differences in the depth of this understanding.

> *Critical thinking? Of course. There is a selection of sources primary*
> *sources and secondary sources. What are they? Verification of sources*
> *and then once they select what they need for the project and they use*
> *it to form their own opinion and to ... So .. this is one area how they*
> *develop their critical thinking and listening to each other .. providing*
> *feedback and constructive feedback .. receiving feedback .. I think this*
> *is all relevant to critical thinking and provides a good foundation for*
> *critical thinking. (Teacher)*

The availability of resources and the support to select from them were different in each country, reflecting internet access, wealth, local restrictions and different expectations in different settings and this did have an effect on the way students discussed critical literacy. Where students had more access to the internet in school, they spoke more fluently about the limitations of that internet material and the unreliability of viewpoints. In some countries, the independent and critical use of internet sources was heavily scaffolded by librarians, for instance, whereas in others children did much of their research at home, with less support to take a critical stance. When asked about critical thinking, most students replied in terms of research into texts allowing them to be

critical about different sources of information and viewpoints. They recognised this as a goal and as something they had achieved, at least in part. All the students expressed some caution with use of internet sources but those students who had more support and experience of internet use were much more critical about the sources and knew more evaluation strategies. The use of internet sources was a concern for teachers in two countries and a few parents in some countries. However, responsible use and protection for the students was evident in all schools. Some students also discussed global issues, the perspectives of others involved in conflicts and problem solving.

> *Critical thinking is like being knowledgeable and like thinking like how you would do something and how you would fix a problem (Student)*

Other students discussed critical thinking as a basic characteristic of meetings with mentors and teachers. These discussions often highlighted how teachers or mentors taught students to identify and evaluate viewpoints.

> *Critical thinking is usually in the mentor meeting. Like the teacher asks somebody like some questions and then like we kind of put ourselves in others' shoes and think about what they would think ..(Student)*

Critical thinking was one of the key issues identified by parents in our case study schools as "real world" outcomes of the PYP exhibition, and one of the desirable outcomes of the PYP. They saw this as empowering their children to operate in education, employment and future careers.

Teachers and middle leaders built critical thinking into the PYP exhibition through planning student activities to select topics and working groups and designing guidance experiences for the students, such as mentor meetings. In at least one of our cases, co-ordinators also built training about critical thinking for mentors into the programme.

In summary, the teachers, parents and students found the PYP exhibition was a truly sustained opportunity to undertake critical thinking and that it brought together attributes, skills and knowledge learnt in the PYP.

> *Critical thinking is not something that you learn in one lesson anyway ..but the time.. uh length of the exhibition study gives them chances to develop depth. Certainly this fosters critical thinking but it is not the last word and it is not the first word and I mean .. that is you know .. a big part of IB. (Teacher)*

International Mindedness

International mindedness was the most difficult issue for our parents, teachers and student to discuss directly. They recognised the complexity of international mindedness and found it difficult to quantify in their discussions, preferring to use examples of topics or actions to make their points. Nevertheless, there was evidence that they saw development of international mindedness as one of the key impacts of undertaking the exhibition, often expressed in terms of knowledgeable, caring, open minded or principled students and actions.

The teachers, parents and students said that the degree of international mindedness in each exhibition depended on the topic chosen for the exhibition, and some topics had more potential to develop international mindedness than others. As one principal put it

> *I think that it supports critical thinking and I think as far as*
> *international mindedness .. I think that it depends on what their .. what*
> *they are looking at and what their topic is*.(Principal)

The students discussed the development of international mindedness as an outcome of problem solving. Importantly, they recognised that many of the topics, issues and problems they chose for their exhibition were things that could not be easily solved, that did not have short term solutions, and were problems globally, if not locally.

> *So for me it helped me with the part for international mindedness.   I*
> *was looking at issues .. friendship issues all over the world and I found*
> *out that we all have the same issues. (Student)*

The parents we spoke to found the choice of topics interesting. Many of them admired ambitious, principled or globally minded topics as offering their child broad horizons. Parents valued the global perspective of the PYP and saw the exhibition as a key example of this. They told us about their children's growing awareness of the world and the experiences of other children across it.

> *These topics you know .. animal adoption and conflicts and racism in*
> *the states .. these are very huge and huge topics and maybe these*
> *topics were not in their heads before in their boundary of life .. but now*
> *they are .. you know .. they are familiar with them and they .. they*
> *have lots of knowledge .. knowledge from this research and the one*

thing that I was impressed about was she tried to connect it .. connect

this topic to her own life. (Parent)

The choice of topic was described as "depressing" by one parent, provoking a discussion amongst the parents in the group of how important it was for students to learn about the wider world and how valuable an international education was in helping them to do this in a non-threatening way. Many of the parents said they valued the "wider view" of the world their child developed through doing the exhibition, and wanted their child to know about a global outlook. Some parents identified these as important attitudes for their child's future prospects. Although they did not necessarily relate to the term international mindedness, the parents identified this as one of the most important outcomes of their child's education and something they saw expressed in the exhibition. This was also evident in the survey findings, where parents were very likely to say that the students learnt a lot, but the most difficult things for them to agree with were that the exhibition helped their child understand how *other* people use language, enabled their child to explore information about other cultures, or enabled their child to understand the action of people in other cultures. It appears that parents found the term "international mindedness" less clear than the attributes of the IB learner profile - which collectively aim to develop international mindedness in learners.

International mindedness in the survey results

Levels of agreement with the statements in the questions about international mindedness, by teachers, parents and students in the three surveys, are shown in
Table *8* below.

Overall, a smaller proportion of students agreed with these statements about IM than did teachers or parents, but the pattern of agreement showed that the highest proportion of students (88.9%) agreed or strongly agreed that they had reflected on their own perspective. Other statements had lower levels of agreement, especially those asking about the perspectives of others (68.5%), the culture of others (66.4%) and the language use of others (60.4%), reflecting the greater demands made by these notions.

Cooperative or collaborative learning and inquiry

The PYP exhibition was identified by teachers, students and parents as a sustained experience of cooperative, or collaborative learning and inquiry. This was evident in the strong expressions of ownership of both the sharing event itself, but also of the processes and decisions that led to it. The extreme care and meticulous planning of teachers and IB coordinators in the process of the exhibition was evident to parents in

most schools, and had an important role in their understanding of the exhibition. However, despite this, the parents and children saw the process and product as a student-owned activity. The very strongest message we received from parents, students and teachers was one of pride in the students' independence!

Table 8: Total "agree" and "strongly agree" responses for items relating to international mindedness

	Teachers (N=127)	Parents (N=97)	Students (N=334)
Doing the PYP exhibition enabled: The children in my class… My child… Me…	*Number (and percentage) either agreeing and strongly agreeing*		
to use different forms of language and literacy	118 (91.5%)	85 (87.7%)	262 (78.4%)
to use another language	74 (57.4%)	71 (73%)	157 (47.15)
to understand how other people use language	89 (69%)	68 (70.1%)	202 (60.4%)
to explore information about other cultures	102 (79.1%)	76 (78.4%)	209 (62.5%)
to understand the actions of people in other cultures	107 (83%)	79 (81.5%)	222 (66.4%)
to reflect on their own perspectives	120 (93%)	93 (95.9%)	297 (88.9%)
to reflect on the perspectives of people in other cultures	100 (77.5%)	76 (78.4%)	229 (68.5%)

A visual comparison of this data can be seen in the following figure.
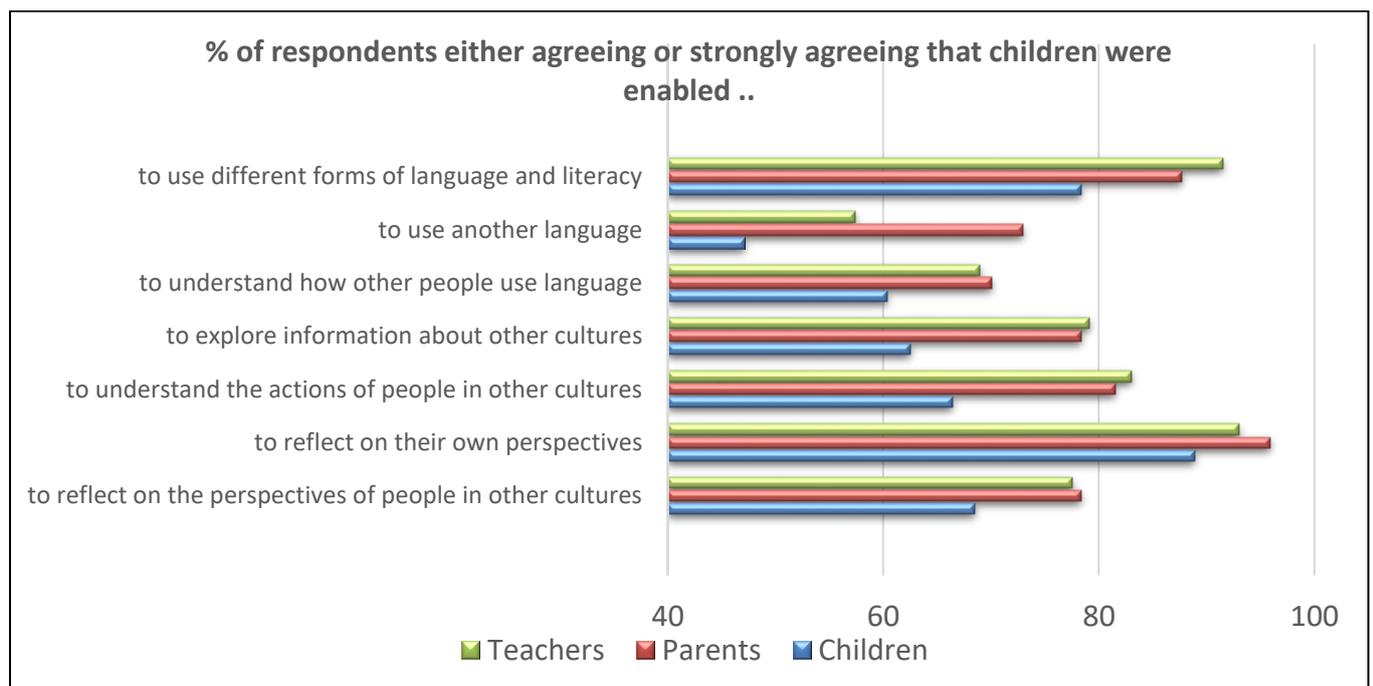
As discussed above, the students expressed this ownership and independence in their commitment to challenging topics and the actions they identified related to these. They also identified their ways of working as important. Students gave us examples of negotiation, changing tasks, group members who did not perform and of working together to solve problems. The students we spoke to discussed coaching sessions where mentors had advised them about negotiating skills and about teacher-led lessons about organising their work. Students in some countries used sophisticated document sharing skills to work on their materials from home, sometimes across the network of their group. Other children identified their use of "free" time, after lessons but still in school, as the best time to work with their group of students. The tone of these discussions was constructive and positive. Making decisions and working out differences were clearly, for the students we spoke to, achievements to feel proud of.

> *I think today I am feeling happier because even though we got into problems with my team mates .. the ones that didn't like to study .. today I saw them succeed and I was happy because I helped them a lot and then they came to me and they said thank you .. so .. and I recognised myself that they are not so dumb and like I thought myself .. maybe I underestimated some. (Student)*

Many of the varied working practices discussed by students showed the features of cooperative learning. Groups were working together to accomplish shared goals and were accountable to each other. These students were taught social skills and were expected to use them to work together, but they were aware that mentors and teachers were available to guide, resolve problems and offer advice. Finally, the teachers and students showed us examples of written, and videoed reflections done as part of the exhibition, which commented on the group work, decisions or difficulties students had encountered.

> *in terms of just refocusing on constantly saying. 'How have you communicated well?' And. 'What can you do better?' And. 'Where are you ranking yourself as a 2, what do you need to do get to be a four in that particular area?' So it is good. (Student)*

The centrality of reflection as part of the exhibition process ran through their views about cooperative learning as well as inquiry, critical thinking and international mindedness.

Cooperative learning in the survey results

Levels of agreement with the statements in the questions about cooperative learning, by teachers, parents and students, are shown in
Table 9 below.

These responses show very positive responses of all three groups to statements that experience of the exhibition had helped students develop their cooperative learning skills, although the teachers tended to feel that students had found working with other children challenging.

Table 9: Total "agree" and "strongly agree" responses for items relating to cooperative learning

	Teachers (N=127)	Parents (N=97)	Students (N=334)
Doing the PYP exhibition enabled: **The children in my class to…** **My child …** **I…**	*Number (and percentage) agreeing and strongly agreeing*		
worked closely with other children to complete the exhibition	109 (84.5%)	88 (90.7%)	270 (80.8%)
felt responsible to the other children he/she/I was working with	107 (82.9%)	83 (85.6%)	263 (78.7%)
found working closely with other children challenging	105 (81.4%)	58 (59.8%)	223 (66%)
improved his/her/my group work skills by working closely with other children to do the exhibition	115 (89.1%)	81 (83.5%)	270 (80.8%)
exhibition topic led to action in the real world	106 (82.2%)	79 (81.5%)	281 (84.1%)
identified a range of tasks to complete the exhibition	121 (93.8%)	85 (87.6%)	291 (87.1%)
gave him/her/me the chance to use a variety of resources	123 (95.4%)	91 (93.8%)	304 (91%)
The exhibition topic gave him/her/me the chance to reflect on their learning	119 (92.3%)	93 (95.9%)	301 (90.1%)
The exhibition topic involved ideas from different subject areas	121 (93.8)	88 (90.7%)	280 (80.2%)
The exhibition was assessed by the teacher as it took place	111 (86%)		
I understood how my exhibition was assessed			287 (85.9%)
helped him/her/me to look at different points of view	122 (94.6)	81 (83.5%)	296 (88.6%)
work out a range of ways to present his/her/my topic.	118 (91.5%)	89 (91.8)	298 (89.2%)

A visual comparison of this data can be seen in the following figure.

% of respondents either agreeing or strongly agreeing that children ..
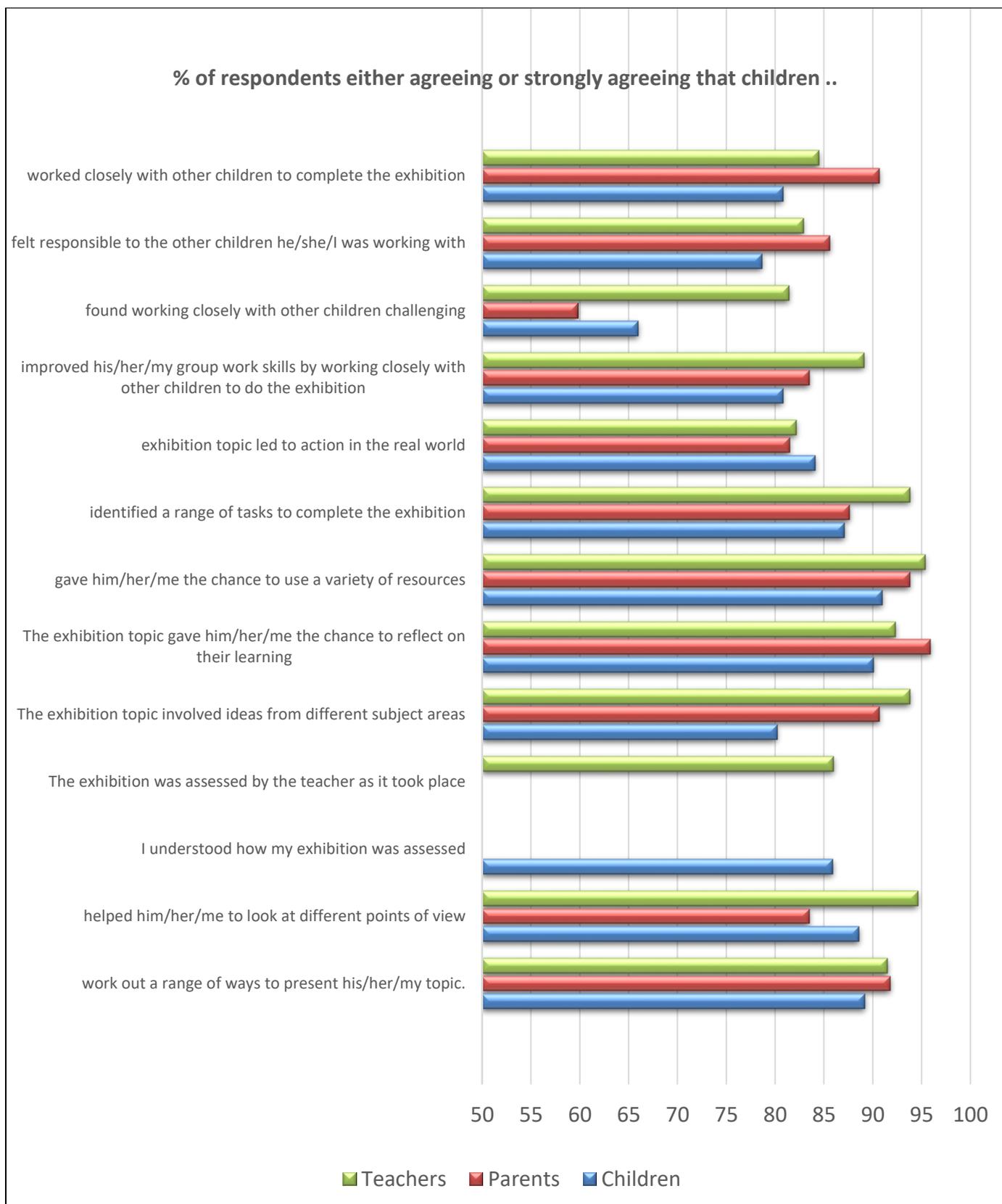
Inquiry skills in the survey results

The teachers and parents showed very high levels of agreement with the statements in the questions about inquiry skills, as shown in Table 10 below.

Both parents and teachers agreed most strongly that the students had undertaken reflection on their own points of view, their selection of information sources and their analysis of those information sources. A smaller proportion of teachers than parents agreed that the students had discussed information with others or justified their arguments using evidence and argument. This could suggest that the teachers had underestimated the amount of discussion being undertaken with parents. However, both parents and teachers were least likely to agree that the students had evaluated the point of view or truthfulness of the sources, possibly because this is a somewhat more demanding activity than reflection on their own point of view.

The students also showed high levels of agreement with the inquiry skill statements, though lower across all questions than parents and teachers. They agreed most strongly with the idea that they had selected sources, but other skills were agreed with by around the same proportion of students.

Table 10: Teacher, parent and student agreement with items related to inquiry skills

	Teachers (N=127)	Parents (N=97)	Students (N=334)
The children in my class… My child… I…	*Number (and percentage) either agreeing or strongly agreeing*		
selected sources of information	119 (92.2%)	91 (93.8%)	321 (96.1%)
analysed sources of information	120 (93.1%)	91 (93.8%)	292 (87.4%)
evaluated the point of view and truthfulness of different sources of information	103 (79.8%)	87 (89.7%)	280 (83.8%)
discussed choices of information with others	109 (84.5%)	95 (97.9%)	282 (84.4%)
reflected upon my/their own point of view	120 (93%)	93 (95.9%)	289 (86.5%)
justified arguments, using evidence and argument	116 (89.9%)	89 (91.7%)	278 (83.2%)

A visual comparison of this data can be seen in the following figure.

% respondents either agreeing or strongly agreeing that children
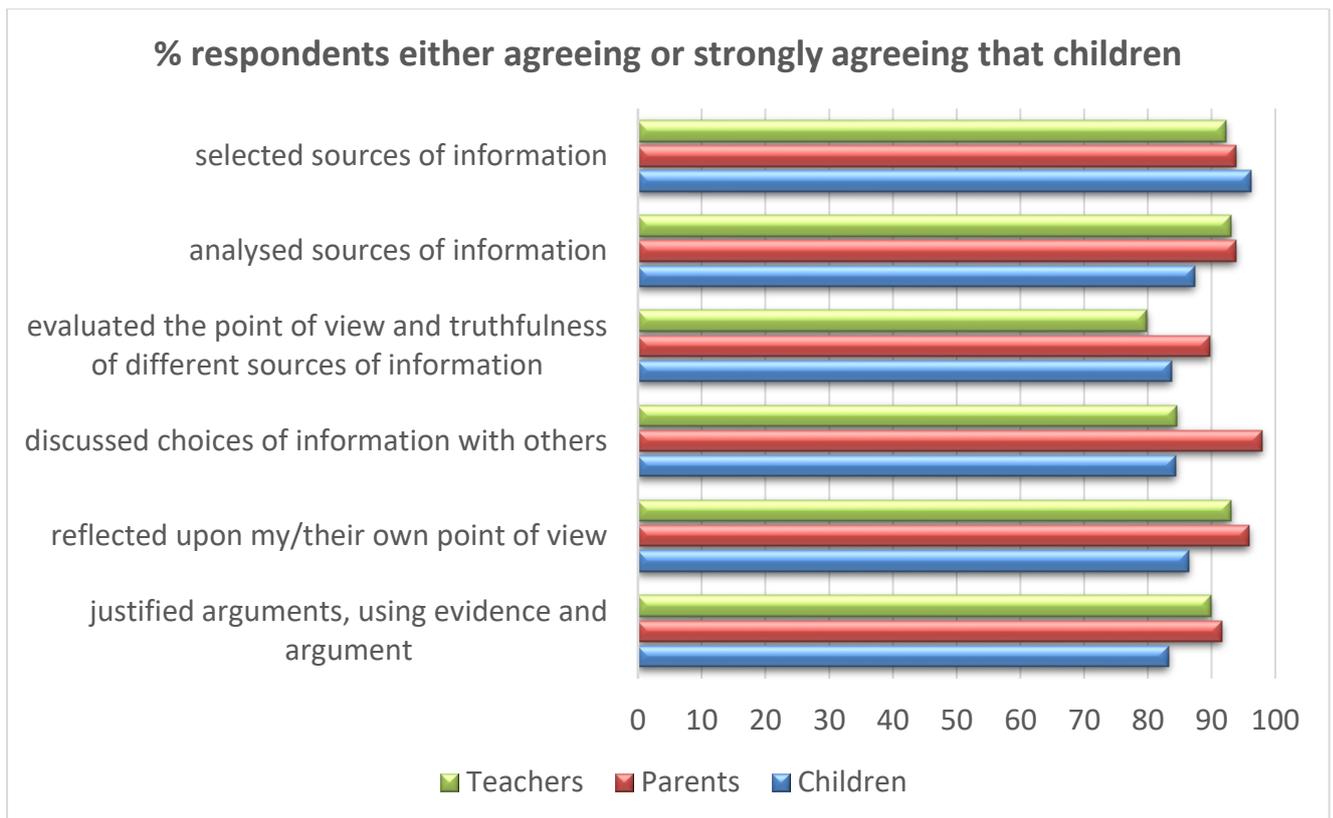
Overall, the questionnaire responses suggest that parents, teachers and students valued the PYP exhibition as an activity that gave students the opportunity to work cooperatively, to develop critical inquiry skills and to learn about different perspectives. They placed the highest value on student reflection on their own learning and point of view, the opportunity to use a range of languages and literacies, to use a range of resources and to select information.

5.3   Question 4   What is the role played by the PYP exhibition in promoting parent/guardian engagement with, and understanding of, the IB Programmes, for example through promoting parent/guardian understanding of international-mindedness, critical thinking and IB learner profile attributes?

Qualitative findings about parental engagement

The PYP exhibition promoted parents' engagement with the exhibition through the participation of parents in the exhibition process, which was carefully managed by school staff. All the case study schools aimed to ensure that parents understood the process nature of the exhibition and to manage parental expectations of participation.

Parents discussed the exhibition in terms of key IB learner profile attributes of inquiry and knowledge most, but also in terms of open mindedness, risk taking, caring, being principled and reflection. As discussed above, they linked these to "real world" outcomes of an international education. The parents we spoke to were keen for their child to develop a global perspective and, though the term International Mindedness was not much used, it was expressed in other ways.

> *What I like about it is the way that it encourages children to be academically and intellectually adventurous and to draw different things together .. to apply concepts globally and through history.*

The parents prized reflectiveness and independence and these qualities, along with confidence, skills and knowledge were qualities of the exhibition that represented the outcomes of the PYP. Parents were also very aware of the importance of PYP as preparation for MYP or other schooling and valued learner attributes, reflectiveness, teamwork and inquiry skills as a feature of the exhibition, the PYP, and their child's future success.

For many of the parents we interviewed, the PYP exhibition vindicated their choice of an IB education for their child and they also saw it as preparing directly for the MYP because of the inquiry focus.

How were parents involved in their child's PYP exhibition?

The questionnaire responses gave a general picture of high levels of parental participation in the exhibition (see Table 11 below).

The parents reported a high level of involvement, although 68 (70.1%) of parents agreed or strongly agreed that they "would like to be more involved in their child's PYP exhibition". Involvement took a range of forms. Almost all parents reported attending their child's exhibition (94: 97.9%) and most attended a school briefing about the exhibition (86: 88.7%) and discussed the PYP exhibition with their child (82: 84.5%). Fewest parents reported discussing the exhibition with their child's teacher (28; 28.9%), acting as a mentor (30: 31.3%), helping to choose their child's topic (28: 28.9%) or helping their child to organise the child's work (43: 45.3%).

Although most parents believed they would get written feedback (57: 60%) or verbal feedback (58: 60.4%) from the school about their child's assessment, 87 (89.7%) agreed or strongly agreed that they "*would like more feedback about their child's PYP*

exhibition". This may be an area where parents and children need clearer expectations about what feedback they will get.

Table 11: How were parents/carers were involved in the planning of their child's exhibition?

	Yes	**Don't know**	**No**
Attended a school briefing meeting	86 (88.7%)	2 (2.1%)	9 (9.3%)
Took part in school activities or trips towards the exhibition	65 (67%)	3 (3.1%)	29 (29.9%)
Helped my child to choose his/her topic	28 (28.9%)	4 (4.1%)	65 (67%)
Worked on researching material with my child	6 (6.3%)	1 (1.1%)	31 (32.6%)
Helped my child prepare elements of the exhibition	68 (70.8%)	2 (2.1%)	26 (27.1%)
I discussed the exhibition with my child's teacher	45 (46.4%)	0	52 (53.6%)
I (or another parent) attended (or will attend) the exhibition	94 (97.9%)	0	2 (2.1%)
I got or will get written feedback about my child's exhibition	57 (60%)	15 (15.8%)	23 (24.2%)
I got or will get verbal feedback about my child's exhibition	58 (60.4%)	16 (16.7%)	22 (16.7%)
I helped my child to organise his/her work	43 (45.3%)	2 (2.1%)	50 (52.6%)
I helped to keep my child motivated	78 (81.3%)	1 (1%)	17 (17.7%)
I discussed the exhibition with my child	82 (84.5%)	1 (1%)	14 (14.4%)
I was a mentor	30 (31.3%)	5 (5.2%)	61 (63.5%)

A visual presentation of the percentages of parents claiming to have done these activities can be seen in the following figure.

% of parents reporting that they ...

Category	%
Attended a school briefing meeting	
Took part in school activities or trips towards the exhibition	
Helped my child to choose his/her topic	
Worked on researching material with my child	
Helped my child prepare elements of the exhibition	
I discussed the exhibition with my child's teacher	
I (or another parent) attended (or will attend) the exhibition	
I got or will get written feedback about my child's exhibition	
I got or will get verbal feedback about my child's exhibition	
I helped my child to organise his/her work	
I helped to keep my child motivated	
I discussed the exhibition with my child	
I was a mentor	

Scale: 0, 50, 100

Parent views of their children's PYP exhibition experiences

We asked parents about their children's experiences of the PYP exhibition. The responses to the questionnaire suggest that parents valued and understood the role of the PYP exhibition in their child's education. Of the 97 parents who responded to the survey, 91(93.8%) agreed or strongly agreed that the PYP exhibition was a good use of curriculum time and 95 (97.9%) agreed or strongly agreed that "my child learnt a lot through doing the exhibition". 83 parents (85.5%) agreed or strongly agreed that the PYP exhibition "improved their understanding of the PYP curriculum".

In terms of the children's understanding, use of and insights into how others use languages and literacy, parents were aware that their children had developed their reflection on and use of language. 93 (95.9%) agreed or strongly agreed that "Doing the PYP exhibition has helped my child to reflect on his/her own perspective" and 85 (87.7%) agreed or strongly agreed that "Doing the exhibition has enabled my child to use different forms of language and literacy". Fewer parents 68 (70.1%) agreed or strongly agreed that "Doing the exhibition has enabled my child to understand how other people use language" and that "Doing the exhibition has enabled my child to use other languages" (71: 73%). However, it should be noted that these figures are high throughout and this may represent a learning progression whereby children reflect upon

themselves and their own action before they are able to reflect on the actions, languages and perspectives of others.

We asked parents for their views about the critical information use of their children. Here again, the item most parents 95 (97.9%) agreed and strongly agreed with was "During exhibition study my child has discussed his/her choices of information with others". The second most agreed and strongly agreed item (93: 95.9%) was "During exhibition study my child has reflected upon his/her own point of view". This, again, indicates that parents had understood the importance of reflection and the reflective opportunities the PYP could offer for their children. Slightly fewer parents agreed and strongly agreed that their child had selected sources of information (91: 93.8%) or analysed those sources (91: 93.8%) and fewest (87: 89.7%) agreed or strongly agreed that their child had evaluated the truthfulness of the information. All these levels of agreement were high and suggested that parents thought that their children were involved in critical information handling.

The qualitative data gave a subtler picture of parents' views about the impact of the exhibition on their children. As with the questionnaires, the parents were overwhelmingly very positive about these experiences.

The PYP exhibition promoted parents' engagement with the exhibition through the participation of parents in the exhibition process, which was carefully managed by school staff. Our case study schools had taken action to ensure parents understood the process nature of the exhibition and parents told us about this many times.

> *I don't think that the topic that they picked was as important as everything else that they learned .. they used technology.. and the time. Having to organise themselves and learn to work .. the team work .. the mentors … I mean. It is a really…er…sustained project.*

Schools shared an approach to the exhibition by inviting parents to briefings, through regular communication with parents and also welcoming parents' participation in the exhibition of other year groups. The schools also took action to manage parental expectations of participation. Although many aspects of parental participation were "generic", others showed a "school culture" of expectation. For instance, in one country, strict limits were placed on parental spending on the PYP exhibition, to allow students to create and value their own resources. In another country where schools ran an extended day programme for most students, the parents did not seem to expect to be involved in the exhibition and said they did not focus on it at home. Teachers saw this as an expression of trust.

Almost all the parents we spoke to attended their child's exhibition, and many had attended exhibitions of siblings. Most of the parents we spoke to had also attended a briefing from the school about the exhibition and some found this exciting and illuminating. The content of this briefing was important, because it not only informed, but also gave the parents a vision of the role of the exhibition in the PYP and their child's future and reassured them that the exhibition was carefully structured and supported. As one parent put it *"the exhibition has taught me about the IB learner profile all over again – I really get it."*

Some of the parents had played a direct role in the exhibition for their child's class or for some individuals in the class. We spoke to parents who had come into school as visiting speakers to discuss particular skills or experiences, parents who had accompanied trips which were part of the class exhibition and parents who had been interviewed by individuals and small groups of children as part of their exhibition. These parents contributed to the exhibition of children other than their own.

Most participation by parents was directed at their own children and here, parents often experienced a tension between wanting to help their child and pride in their child's independent learning. Parents told us about help where they had particular skills, such as writing, technology or internet searches. Parents had an important role as a source of contacts for interviews, though parents were particularly impressed when their children sought out and emailed unknown interviewees. Parents often "rehearsed" interviews with the children and discussed presentations of surveys and reflections.

In addition to the initial briefing about the exhibition, most parents were keen to know about their child's exhibition work. The more experienced schools really understood the importance of shared expectations and communication. These schools provided a very clear structure for the exhibition including binders, worksheets and time plans. Parents found access to their children's planning and reflections illuminating and many of them said it gave them new insights into the range and scope of the work their children did and the skills they had as learners. One teacher gave a weekly bulletin about the children's progress on their exhibition, which parents loved. This allowed parents to feel "connected" to their child's exhibition despite a low level of universal parenting guilt about whether they should have done more.

Parents spoke about their own children's exhibitions in terms of enthusiasm and wonder. They were impressed by their children's achievements, skills and maturity. They

discussed the children's achievements in terms, not of the school curriculum, but of the "real world". Skills like internet searching, evaluating information and, above all, reflectiveness were valued because they are the skills and attitudes parents want their children to take into their next school and onto the world of employment

For many of the parents we interviewed, the PYP exhibition vindicated their choice of an IB education for their child and they also saw it as preparing directly for the MYP because of the inquiry focus.

The parents we spoke to were keen for their child to develop a global perspective and, though the term International Mindedness was not much used, it was expressed in other ways.

> *What I like about it is the way that it encourages children to be academically and intellectually adventurous and to draw different things together .. to apply concepts globally and through history (parent).*

The parents prized reflectiveness and independence and these qualities, along with confidence, skills and knowledge were qualities of the exhibition that represented the outcomes of the PYP. Parents were also very aware of the importance of PYP as preparation for MYP or other schooling and valued learner attributes, reflectiveness, teamwork and inquiry skills as a feature of the exhibition, the PYP, the MYP and their child's future success.

In some of our case study schools, parents were also very aware of the history of the exhibition and of the changes schools had made in response to their evaluation of a previous exhibition. Some parents had attended exhibitions of older children, had visited the previous year's exhibition or had simply talked to other parents. They spoke positively about improvements schools had made in the structures and, in one case, even the staff training.

> *The school has changed in what they are doing and it is seems a lot more organised and a lot of it has been taken away and in a good way I think. Away from the parent focus and being parent driven, to being school driven currently. And I think that helps becomes more than a school driven and it also becomes child driven and in the past it was a lot of parental involvement which to be fair I don't think was fair on the child…*

One aspect of the exhibition which parents were confident about was its impact on the future. They looked beyond schooling to discuss the way learning to manage independent work, inquiry skills and a global view would prepare their children for a 21st century future. They also spoke about the exhibition as a direct preparation for MYP. In particular, they had a clear view that the sustained inquiry was a preparation for MYP.

> *.. in doing this research it is important because the PYP does eventually lead eventually to the MYP. (Parent)*

A few parents wanted to see stronger links between their own child's PYP and MYP experiences.

> *It's that they work on this huge project at the exhibition level and then it is all forgotten. And you are saying to yourself .. what happened .. where and why? And I think that is something that needs to be addressed. (parent)*

However, it was notable that the exhibition was also seen as a key activity to prepare for transfer by parents whose children were not going on to MYP.

5.4 How did mentor participation (where used) promote the IB learner profile attributes, international-mindedness, and critical thinking?

This question addressed the use and participation of mentors in the PYP exhibition, exploring who the mentors were, how they were recruited, trained and developed and what they did to support students in the exhibition, before going on to examine their role in the promotion of the IB learner profile attributes, international mindedness, and critical thinking.

Who were IB exhibition mentors?

The use of mentors in the PYP exhibition is not mandated by the IB (IBO, 2008) but in all case study schools, mentors were used to support the exhibition process. Whilst the IBO suggests that mentors could be recruited according to student interests, or that different mentors could be recruited for specific stages in the exhibition process such as research, writing and presentation skills, this was not what was typically observed in the case study schools. Instead, one mentor, usually a teacher of another grade in the school, would be assigned to work with one group for the duration of the exhibition process.

The IB advises that mentors can be community members, older students, parents and teachers (IBO, 2008). However, in the case study schools in this project, the overwhelming majority of mentors were teachers in the school, followed by others working in school in non-teaching roles (such as librarians, teaching assistants and support staff). Parents acted infrequently as mentors, although, as we explain below, parents did often take on a less formal role as informers and guides. Table 12 shows the responses from the questionnaire indicating the breakdown of who acted as mentors.

Table 12: Who acted as mentors?

Country	Who acted as mentor?						Total
	Teacher	Other Staff	My parent	Another parent	Don't know	No mentor	
UK	21 (68%)	10 (32%)	0	0	0	0	31
Mexico	70 (66%)	20 (19%)	1 (1%)	11 (10%)	2 (2%)	2 (2%)	106
China	129 (88%)	10 (7%)	3 (2%)	0	2 (1%)	3 (2%)	147
Russia	8 (80%)	0	1 (10%)	1 (10%)	0	0	10
Kenya	33 (97%)	0	1 (3%)	0	0	0	34
Total	261 79.6%	40 12.2%	6 1.8%	12 3.6%	4 1.2%	5 1.5%	328

Where mentors came predominantly from the school staffing body, by far the most common scenario, this frequently caused problems with timetabling for schools due to the large amount of time that mentors needed to dedicate to their mentoring role. Mentors would normally meet with students between two to three times per week, and for between twenty minutes and one hour at a time. This demanded what one participant described as 'juggling'. Strategies for dealing with juggling included leaving the TA to manage the class, or meeting with students during out-of-class time:

> *most of the … mentors are class teachers and they are leaders of their*
> *own departments and so you find that … they have to step out from*
> *class and leave the TA in the class. So .. we.. and it is juggling time*

> *and so if you have 20 to 25 kids in a classroom to take care of and you*
> *also have to have go to a group and talk to them about where they are*
> *at .. so it is juggling .. (Mentor)*

Timetabling was particularly problematic in schools where only teachers were used as mentors, as indicated by the Deputy Principal of one PYP school:

> *we are always thinking about that and thinking about how we manage*
> *and juggle that.*

And it was acknowledged that in general, the demands of the exhibition on the whole school meant that other activities had to be sacrificed:

> *And in this way our full days' school activities and our possibilities to*
> *have all .. the whole school and the whole day I mean .. it is good. But*
> *sometimes we need to sacrifice some different lessons or activities in*
> *order to give them a chance to work together. (PYP Coordinator)*

In contrast, in schools where parents, librarians and others were invited to become mentors these scheduling difficulties were alleviated as teachers' time was less stretched. The research team did encounter parents in the role of mentor but this was unusual. Parental involvement, where it did occur, was often constructed as a less formal role, as expressed by this PYP Coordinator:

> *essentially it is an opportunity for the kids to share and for the parents*
> *to go and give them some feedback and we do it as a rotation. So the*
> *parents are involved.*

In another school, parents were invited into school at each key stage of the exhibition (topic choosing, research, report writing, action, exhibition presentation) and sat outside the classroom offering consultations to individual students (or small groups if topics were the same). Elsewhere, PYP Coordinators voiced reservations about using parents as mentors in case they became too involved in students' exhibitions and took an overly didactic approach to support. Parents were valued though for their connections, and what this could offer to the school in terms of opportunities for students to interview key informers. One mentor commented on the '*big contribution*' from parents '*as they are well connected*'. Another mentor described the excitement that students and mentors felt at being able to visit the Chief Justice of the city:

> *I remember a group that we had ... and I think that it was two or three*
> *years ago ... but the focus was on justice and we went to meet the*
> *chief justice. For us, even as mentors, it was a really big deal ..*

It was very rare for students to act as mentors to other students. The research team were only aware of one instance of a student acting in a quasi-mentor role when a student from the Diploma Programme helped the PYP students by sharing her specific skill set - building an architectural model of a local landmark.

The findings from this study suggest that IB World Schools could take a more creative approach to the use of mentors in the exhibition. Recruiting mentors from a wider range of people, adults and older students, could have a number of benefits, in addition to the obvious advantage of making teacher timetabling somewhat less of a juggling act.

Recruitment and training of mentors

The recruitment of mentors happened in different ways in different schools. In some, teachers were asked to volunteer as mentors via an email from the PYP Coordinator:

> *the way that we define our mentoring system is that we email all*
> *teachers in the school and everyone, actually any staff member and*
> *they just sign up (PYP Co-ordinator)*

In other schools, students approached teachers directly and asked if they would be a mentor for their group, and elsewhere there was more of a requirement that teachers work as mentors, sometimes on a rota basis. Often, teachers considered the role of mentor to be an enjoyable privilege, despite the extra demands placed on their time:

> *I mean I have been really lucky because I had the chance in all of my*
> *four years to be a mentor every year.*

The ongoing need for mentors within a PYP school, and the different modes of recruitment of mentors, meant that mentor training was often considered an important aspect of the exhibition demands on a school. Like recruitment, training would take different forms: sometimes new mentors would have weekly or bi-weekly meetings with the PYP Coordinator, sometimes there would be large training sessions as part of staff meetings, and sometimes guidance and support for the mentoring process would be

disseminated via email. In one school, they used a system of lead mentors. Lead mentors had several years' experience of mentoring, and would work with a group of students together with a small team of assisting mentors:

> *So we had a mentoring session for the staff and so we are quite a large staff because we are growing and we opted to have what we call a lead mentor for each group and then a couple of assisting mentors so everybody is attached to a group but in a different capacity. But we also created mentor booklets for them and so we had a full training for them in the staff meeting where they went through the booklet and they actually got to know exactly what it is that they got and what they expect from them and then the lead mentor who already had experience at it. So that they could kind of guide the others. (PYP Co-ordinator)*

This notion of collaboration between mentors was evident in other schools too, and was evidence of what was frequently observed by the research team as a whole-school community approach to supporting PYP students with the exhibition:

> *so every Monday morning all the mentors would meet and we would have a discussion about what expectations for the children. (Mentor)*

What did mentors do?

The IBO describe the primary role of mentors as acting as 'a guide and resource in the accomplishment of specific tasks during the exhibition process'.(IBO, 2008, p. 5). Indeed, many mentors commented on their efforts to support students with time-management, keeping focused on the work, and some of the more logistical aspects of developing the exhibition process. One of the 'lead mentors' talked about the importance of keeping students focused:

> *… mostly you find that we just making sure that they are getting the things done and just making sure that everyone is focused on the task they are supposed to do.*

And another mentor in the same school emphasised the importance of time-management:

> *A lot of that .. time management and then getting things done on time*
> *.. you know because again sometimes they lose focus   (Mentor)*

This theme was echoed by other mentors, who described the difficulties that young students faced in learning how to meet deadlines:

> *I think that a big part of it is helping them to stay focused and on task*
> *for like deadlines and because they are not .. I mean .. you know .. it is*
> *also the first time that they are being allowed to set their own schedule*
> *to a certain extent so .. you know .. and obviously they haven't*
> *developed the skills before so .. you know ... reminding them to stay*
> *focused and reminding them to stay on track.*

Mentors did take on tasks themselves to support learners. For example, arranging speakers or visitors to talk to students about their areas of interest was a common approach, and this mentor described how the logistical arrangements for such visits were frequently part of the mentors' responsibility:

> *One of the other things that I think is a major role with the way that it*
> *works here is setting up the field trips and getting the guest speakers*
> *and like it is up to us to kind of solicit them or find them and make that*
> *first contact before they [the guest speaker] can come, and if they [the*
> *students] can go anywhere [to visit experts to support them with their*
> *research]..*

Given the focus of this research project, it was noticeable how the role of the mentor was less on supporting the development of the students' thinking, and more one of study skills support and practical arrangements. Nevertheless, mentors did have a role in helping students with the substantive aspects of their exhibition work and supporting them in understanding the IB learner profile attributes and making them relevant to the exhibition, and developing critical thinking and international mindedness.

IB learner profile attributes

The IB learner profile comprises the central core of the PYP, as it does with all IB programmes, and all learning takes place within the framework of the ten attributes (see Appendix 3). As all mentors in our case study schools were teachers, other staff members, or parents of PYP children, they were very familiar with the IB learner profile,

and understood its central role in the development of the exhibition. The exhibition mentors we interviewed believed that a) the IB learner profile attributes were tightly integrated into the exhibition, and b) their development was a fundamental part of the process of the exhibition. One exhibition mentor described how the attributes of communicator, balanced, enquirer and knowledgeable were fostered through the exhibition:

> *seeing them all communicate together .. and their team working skills*
> *and their communication skills in terms of the IB learner profile and I*
> *mean they just have to .. they have to do so many different activities*
> *and work in so many different realms that it is obviously a balance ...*
> *and they have to grow in this way and they have to be communicators*
> *and they have to be enquirers .. and they have to develop knowledge.*
> *So really it pushes them all in all of those areas.*

One mentor commented on the fundamental nature of the IB learner profile and expressed bemusement that it was the last construct (out of the three foci of this project – critical thinking, international mindedness and IB learner profile attributes) that the interviewer had asked about:

> *That is a huge thing that is required and I think that it is interesting*
> *that it is put as the last one because it is kind of where they start with*
> *the whole .. exhibition project .. you have to start reflecting on*
> *everything that you have learned .. you know .. on the IB learner*
> *profile and on all of the study you have to start by reflecting on all of*
> *that stuff before you can plan where you are going to go.*

For this mentor, reflections on the IB learner profile were an important starting point of the exhibition planning, but other mentors spoke candidly about the fact that because the IB learner profile was so well incorporated into PYP work it was sometimes over-looked, resulting in the conscious, explicit consideration of how the attributes had been developed being left until the end of the process, which was too late for students to gain maximum benefit from this as a learning experience:

> *… with my group I think that I left it a little bit to the end and we did*
> *sort of sit down this week and say right .. well let's look at that IB*
> *learner profile and now we have been enquirers and we have been good*
> *thinkers. And then we started making how we enquired and how we*

have been thinkers …but I think that really and it is my fault .. that process should have happened and should have happened as we were going along and so that you need to cover as much of that IB learner profile as possible. so those IB learner profile attributes are what will make a child .. a well-rounded child. So I think therefore it would make sense that if at the beginning of that exhibition it is .. it is kind of pointed out and made more explicit to the children. That this is really what you are aiming for. You are aiming at to .. you know .. to cover this list of IB learner profile attributes and to show this in your exhibition.

Within the IB programmes, the IB learner profile is also regarded as a key tool for developing international-mindedness in students.

International mindedness

The IB learner profile is considered a framework that 'helps students construct a foundation of values on which international-mindedness can flourish' (IBO, 2013). In other words, the IB learner profile encapsulates what is meant by 'international-mindedness' within the IB programmes (IBO, 2009). Barratt Hacking et al (2016) have referred to the many 'fuzzy' definitions of international mindedness, but have attempted to consolidate these into 3 philosophical positions.

First, IM is relational in that it is about reaching out to how we perceive and interact with others from diverse cultures. It then becomes intra-personal or reaches in to better understand ourselves with respect to different others. Above all, IM is a process or a journey and this process is more important than any fixed definition. (p.2)

The mentors we interviewed as part of this study felt that the IB exhibition was an important arena for fostering international mindedness and many talked about the opportunities the exhibition offered for students to put international-mindedness into practice. For example, one mentor talked about students showing tolerance and respect to each other whilst working in a small group:

In my group they showed their curiosity. Ok .. umm .. tolerance and maybe respect to each other and independence. It is for me it is very good because it is very important for them to show their independence

*to do something by themself and to find and to select and to make
conclusions and of course show their curiosity.*

Another mentor talked of the importance of using the exhibition to celebrate the
different languages spoken in the school as an overt display of international-
mindedness:

> *I think that there is never a stigma and … to be international is just so
> common place here and discussing things in different languages and
> speaking about different places is so normal anyway that it is only
> natural that in the exhibition it is sort of showcased.*

One aspect of international mindedness that was commented on was the importance of
students knowing and understanding their local context in order to demonstrate
international mindedness more completely. There was a strongly held belief that unless
students had a thorough understanding of their direct world around them, they could not
be truly internationally-minded:

> *And they know very well that their world does not work in isolation ..
> because we do try to bring that out but we have local issues for
> example like the justice group they know that .. our justice system is
> not unique and uniquely Kenyan .. and it .. it has been applied and it is
> borrowed from outside .. and I think it came out when they spent an
> hour with the chief justice and the mentors they were told to go out
> stayed with the students and he talked to them about democracy and
> who are your leaders and so on .. yes .. their international mindedness
> .. I think sometimes it is state of mind also rather than where you have
> been .. or where you go to but you have to know your local content ..
> and not only that but what is happening around the world and so on ..*

And yet there was also an acknowledgement that because of the elite nature of the
student body in the case study schools, their international knowledge and awareness
may be greater than their local knowledge and so an important function of the exhibition
was to help them gain local awareness:

> *Some are from the communities here but they might not know more
> about what happens elsewhere like the UK .. and so it is really helps*

and they are already quite international .. and so it helps to ground them .. and then to see things locally too.

And it also depends on their investigating perspective at all because clearly if they are investigating perspective then they are going to start getting into more of an international mindedness of how other people and how other cultures might address the topic or so on and so forth .. but if the .. you know .. so it depends on the concepts that they are chasing and stuff.

And even I think international mindedness. We live in a very like large city with huge social disparity in .. and you know our population only sees a very small sector of the city .. and just .. if you go into .. you know .. air pollution and just drive an hour away in the car and them seeing how other people live in their own city .. it opens up their world .. and their city even .. you know.

While the concept of international mindedness may have been complex and difficult for PYP teachers and students alike, there was plenty of evidence in our study of all participants making serious attempts to ensure students' horizons were broadened by it.

Critical thinking

As with our discussion with students, the mentors identified the mentor meetings are key sites for critical thinking, learning about critical thinking and reflection on critical thinking, as well as critical literacy. This role was something both teachers and pupils shared with us.

Yeah .. well critical thinking and I mean .. again you know .. it is that .. it is a good mentor asking and a good Y6 teacher asking .. you know .. why are you doing that? What is the point of that? How has that effected it? And I think that it is asking those questions and again I think that .. you know .. IB says that obviously asking questions and especially asking deeper questions it is not .. you know .. it is not difficult to ask questions. But it is to get them to think on a .. on a .. on a more deeper level about .. you know. Why? How is that? What is that? (PYP Coordinator)

The students also saw the mentor's role as about supporting critical thinking.

> *Ok .. so when you say it was in the mentor meeting you mean the*
> *mentor asked you questions which prompted you to think critically?*
> *Yeah. (Interviewer and student)*

The idea of critical thinking was aligned with different identification of viewpoints in broadcasts, literature or online presence for all participants. This was the subject of direct teaching in lessons, but also of the mentor meetings where the teaching was less teacher-led. These meetings were but were reciprocal activities guided by students' progress.

> *Ok. So the mentor suggested that you need to think about it from this*
> *point of view?*
> *No like .. she or he .. like gave us some questions that make us think in*
> *that direction .. (Interviewer and student)*

In some schools, students identified the importance of these meetings for maintaining their focus and progress in independent work and also for getting advice about issues of viewpoint and trustworthiness of views. The mentors also saw their role as maintaining progress, developing depth in the projects and working with (and reporting to) teachers to support students.

5.5 What role does the PYP exhibition play in supporting student transition to the MYP?

- **How do PYP teachers prepare students for transition to more independent forms of learning in the MYP through the PYP exhibition?**
- **What do MYP students who have completed the PYP exhibition believe to be the effect of that study on their transition to the MYP?**
- **How is exhibition feedback incorporated into supporting student transitions into the MYP or elsewhere?**

The survey data gave an overview of teacher, parent and student beliefs about the role of the PYP exhibition in supporting student transition to the MYP/the child's next school. Responses suggest that the parents surveyed felt strongly that the PYP exhibition supported transition to MYP or other further study. 92.3% of parents agreed or strongly agreed with the statement, 'I feel more confident about my child going on to the MYP/ the next school after doing the exhibition.' In addition, 96.9% of parents agreed or strongly agreed that the *skills* their child had gained through the exhibition would be used in their next school/the MYP, while 94.8% felt that the *attitudes* developed through the exhibition would be used, and 92.8% that the *knowledge* gained would be useful.

However, it is possible that the parents overestimated the extent to which information about the exhibition would be useful to future teachers. Just over half of parents (53.1%) reported that their child would be remaining at the school where they had completed the exhibition, and only slightly more (65.3%) stated that their child's next school would be aware that their child had completed the exhibition. A school unaware of a child's exhibition experience would presumably be unlikely to use information about this.

Similarly, 91.6% of the teachers agreed or strongly agreed that the exhibition offered good preparation for the next stage of schooling, and 89.8% of them felt more confident about their students' going on to this next stage after they had completed the exhibition. 94.4% of the teachers thought that the exhibition had helped the children to develop the *skills* they would use in the MYP/ their next school, whilst 90.6% thought that useful *attitudes* had been developed, and 87.2% believed that the *knowledge* gained by the students would be used.

The students were less optimistic about the sharing of information with their next school than their parents: only 47.7% thought that their next school would know about the exhibition, and only 44.7% believed that someone from that school had attended the exhibition. Nevertheless, they shared their teachers' and parents' belief that the PYP had been useful in preparing them for their next stage of education: 82.5% felt more confident about going on to the MYP/their next school after completing the exhibition (although over half of them still felt nervous). They shared the beliefs of their parents and teachers that the exhibition had developed useful skills (93.1%), attitudes (90.4%) and knowledge (91.2%).

Whilst acknowledging that the survey numbers were not large, and that this group may be unrepresentative, it is clear that these parents, teachers and students felt that the exhibition was an extremely useful preparation for secondary education, developing student confidence, skills, attitudes and knowledge. Its role in assisting transition was seen as highly positive.

Preparation for Transition

The focus group discussions offered a more nuanced reflection on the preparation offered by the exhibition. As one parent commented:

> *I think that the school and PYP has prepared her well for the MYP. Has it prepared her well to go to a Chinese level school? Oh no! Has it prepared her to go to Australia? I don't know yet.*

MYP students in all countries believed that the PYP exhibition had been extremely useful in preparing them for the different expectations of MYP study. As one participant in a MYP focus group commented:

> *The good thing about the exhibition was that you get a great kick start to grade six because like what you do in grade five is like you get to do every single week in grade six and so it just helps you to get into the mood of it.(Student)*

They felt that they were more confident than students who had arrived in the MYP from local non-IB primary schools, citing presentations in particular as something they had learnt to do through the exhibition that they were expected to do throughout the MYP.

The MYP students interviewed in Mexico were able to identify specific skills they had learnt during the exhibition that they needed for MYP study:

> *Right now in 6th Grade we have to do a lot of research and we have to cite all our research and in the exhibition we also started to given an introduction to that and we .. we really had to do meticulous research and which we have to do it in detail and so I think that helped us in 6th grade to do better research and write better essays.(Student)*

They also felt that the independence, organization and planning skills they had developed during the exhibition were essential and were expected of them in secondary school, and summarized the impact as follows:

> *So it was like a creative start for us to like .. it was like an introduction to what we were going to visit in the MYP.(Student)*

Feedforward to the MYP

Preparation for the MYP is not an explicitly stated purpose of the exhibition, and none of the seven case-study schools did teachers actively employ learning outcomes or feedback from the exhibition to inform and support students' transition to the MYP. In

some schools, mentors included teachers from the middle school, but this was because they were a handy resource, rather than because the schools were proactively using the exhibition to support PYP-MYP teacher collaboration. MYP teachers also visited the exhibition so they were aware of the type of learning achieved through the experience. In one school, MYP teachers contributed to a judging panel, assessing the sharing event and completing an assessment rubric. In summary, aggregate and impressionist information about the exhibition was available to MYP teachers, rather than systematic communication about the learning outcomes of individual students.

In one school, the Grade 6 teachers gave feedback to the students from the exhibition in the form of things that they should concentrate on in the MYP, although this was not formalized into communication with their future teachers:

> *We normally photocopy the rubrics and one individual one and then one group one for each child and one of the assessors rubric .. I mean for their group. We photo copy all three because at the end of the year we give them a Y6 .. you know .. a packet and their leaving certificate with their PYP graduation certificate and with everything about the exhibition. All the rubrics that they need and we also have an oral group feedback where we sit with them and we talk to them about what went well and what are something's that you can work on as you move on to the MYP. (Teacher)*

One school principal acknowledged that connections between the PYP exhibition and the MYP were currently few, although MYP teachers did visit the exhibition:

> *The PYP teacher meets the MYP teacher post the exhibition because the exhibition is quite late on in the year. They may have already liaised and said .. 'Oh are you going to have Will next year and Will likes baseball and .. and he needs help with this but is very good at these skills.' But there is not that .. this displays the PYP skills and have a look at it as the MYP staff. There isn't that and perhaps we have missed a trick there?(Principal)*

Likewise, an MYP Coordinator informed us that:

> *We do not actually consciously look at what they did in the PYP. (MYP Coordinator)*

In these schools, then, feed-forward to the MYP about the exhibition was minimal, although both PYP and MYP teachers believed that it would be a useful source of information. We would recommend this as an area for future development.

Connections between the programmes

It was felt that the transition between the PYP and the MYP could be enhanced further in at least two ways. Firstly, there was a sense amongst some parents that little was done during the MYP to build on some of the inquiry skills developed through the exhibition; it was pointed out that an independent project on the scale of the exhibition was not done until the MYP Personal Project, completed 5 years later. This view was shared by many teachers and students.

One school principal felt that the skills developed in the PYP were not sufficiently built on during the MYP, and that the standard of work in the MYP project was only slightly advanced from that which the children had achieved four or five years earlier in their PYP exhibition. He also noted that several students chose to take further the topic that they had studied during the PYP. What this suggests, therefore, is that the possible connections between the PYP exhibition and MYP work are insufficiently developed at present.

Similarly, the Principal at another school also expressed the opinion that it would be possible for the MYP to capitalize better on the learning achieved during the exhibition:

> *You know for me even it could be a problem because the primary school teachers sometimes prepared for their investigations with their students much more than middle school years. Yeah. So they are making all that brilliant stuff and exhibitions and whatever and conference with the parents and then they come .. they come to the middle school and it is sometimes difficult. You know? So .. they are something like over qualified .. for the MYP and we are working on this of course we are working on this .. but you know the .. the primary teachers teach students and the MTP teach subjects .. and that is why! (Principal)*

In one school, the parents and students alike felt strongly that the children should be given an opportunity to do something akin to the exhibition in the early years of the

MYP; no-one wanted an annual event, but it was deemed a pity that the learning developed through the exhibition was not advanced. Similarly, the exhibition mentor in another school also suggested that there was too long a gap between the PYP exhibition and the MYP Personal Project, and that the children should be given an additional opportunity to develop these research skills.

In addition to wanting an exhibition-like activity early in the MYP, some parents felt that better connections between the programmes could also enhance the exhibition itself. For instance, some parents had been frustrated that their children had not been given the specialized help that secondary teachers could have offered their projects:

> My daughter her topic is safe water .. safe water and she .. she wanted
> to make little equipment to maybe a kind of sensor to learn when you
> taste the water and when you wash your hand or when you take the
> bus .. but she do not know who can help her to do this simple
> equipment and so she took action stage she gave up on this idea so if
> some science teacher can help her in the MYP it would be better I think.
> (Parent)

In summary, many teachers, parents and students felt that an exhibition-like activity after two or three years in the MYP would be beneficial, and some believed that further connections between the programmes could also enhance student learning during the exhibition.

6 Discussion

The PYP exhibition is a key activity at the end of the PYP in IB schools. In the case study schools, we saw a complex, but well understood, experience which all participants agreed was a sustained, inquiry-led piece of independent research by students in their last year of the PYP. A number of issues were identified as affecting the development of international-mindedness, critical thinking and the attributes of the IB learner profile. These included the community nature of the PYP exhibition process; the flexibility of the exhibition process around key principles; the importance of experience in managing the exhibition; the nature of the inquiry undertaken; the way the IB learner profile and action elements of the exhibition drove inquiry and the importance of sharing experience across the IB community.

We saw that the exhibition was a community engagement with the values of the PYP curriculum, involving not only the year group undertaking the process, but also the rest of the school and parents. Students in lower years learnt about the exhibition by visiting their older colleagues' events. They anticipated their own exhibition as a rite of passage and sign of maturity. Students who had completed the exhibition remembered it with pride and related it to their later learning experience. School staff talked about the exhibition as a key part of the PYP, when students showed their ability to be independent learners, using their IB learner profile characteristics to pursue an inquiry. Parents were also involved in the exhibition and regarded it as the embodiment of the IB curriculum so far and an engagement with the "wider world" of their children's futures. They were deeply proud of their children's achievements, independence, knowledge and skills and were surprisingly aware of the school processes for managing the exhibition. Parents, as well as children, evaluated and reflected upon the exhibition and its processes. They noticed changes from year to year and aimed to support their children to succeed.

The PYP exhibition operates flexibly across the world, in that the children in our study undertook it somewhere between the ages of 9 and 12 years old, as they reached the end of the PYP. Variation in how the exhibition is planned and operates have been noted in other studies of the PYP (e.g. Kauffman, 2005) and some of this variation appears simply to be the result of slightly differing interpretations by schools and teachers of the purpose and nature of the experience. Thus, in the case of the schools which Kauffman (2005) studied, one saw the exhibition focus as about students learning more about themselves (increasing mindfulness in current parlance, e.g. Zenner et al, 2014), while another saw it as the opportunity for students to create something lasting and worthwhile for their school – a school garden in this case. The point made by Kauffman is that each of these forms of the exhibition remained "easily consistent with the IBPYP" (p.8).

In the current study, the age of the children had an impact upon the children's activities and their development of critical perspectives. This impact was seen in the choice of topics by younger children and also in the range of skills and understandings, particularly about points of view, that the students felt they developed. Children of all ages have been shown to engage in inquiry and to develop critical faculties, so it is perhaps to be expected that all the children felt they had created new knowledge, conducted inquiry, worked cooperatively and gained a wider view of the world. However, younger children focused on reflection, understanding their own points of view and justifying these, whereas older children were more likely to be understand the points of view of others. The exhibition has a great deal to offer students of all ages, but this study suggests that

the age at which they do it may have an impact upon their engagement with a process which seeks to connect them with a wider world.

The way the PYP exhibition was organised depended on a number of local factors, such as the nature and timing of other high stakes assessments in other curricula and on academic term times. Some schools prepared for the exhibition with a long lead in time and saw it as a very significant part of the year. Where the exhibition was "squeezed", for example by the need for children to do high stakes tests for a local curriculum, students reported a less significant experience.

The level of experience of the school was also significant in how it operated and in the opportunities it offered to students. Experienced schools engaged children (and parents) more fully in the processes through longer lead in times, more precise planning and clearer understanding of the roles of students, parents and mentors. These schools gave students support to choose challenging topics that included a global dimension and supported students to think critically. Palmer (2016) reports an evaluation of the PYP exhibition in a school in Azerbaijan where the global dimension was paramount and this reflects the ambitions and scope of the exhibition work undertaken in some of our case study schools. Less experienced schools chose narrower topics that did not promote international mindedness and sometimes limited critical thinking through over-structured activities.

Schools with significant experience of running the exhibition benefitted in a number of ways. They not only had previous plans and reflections to fall back on in their current planning, but also knew the timescales of all aspects of the exhibition, including the location and training of a supply of mentors, the incorporation of research skills into the rest of the curriculum in preparation for the exhibition, and the need to allow appropriate time for a full reflection on the processes and outcomes of the experience. Schools with experience of doing the exhibition had staff who were able to pass on successful practices. They were also able to evaluate how much organisation of students' activities was too much, and when to allow students to make decisions, and work independently. Where schools had the confidence and structures to allow students to take the lead, and schools allocated enough curriculum time, the PYP exhibition was a student-led inquiry, fostering critical thinking and international mindedness.

Most exhibitions in this study were examples of "social science" type inquiry, focused on literature from school libraries, internet resources, interviews, visits and surveys. The support and preparation for the exhibition supported these types of inquiry through the

revisiting of some of the inquiry skills already learnt in the PYP, additional study skills support and, in many cases, the support of mentors in the schools. Critical thinking was a key focus of this approach and was usually aligned with critical literacy skills, which may well be the origin of a "social science' approach. The choice of topic was also very important for the scope of critical thinking within the inquiries. Teachers and PYP co-ordinators managed the choice of topics and group allocations with care and sensitivity so that students understood and supported the decisions and decision-making process. This was a key part of the strong sense of ownership that students felt when they had participated in this process. There is a strong trend of research which demonstrates the relationship between student engagement and achievement (e.g. Lee, 2014) and, on this criterion alone, we would judge from our study that the case study schools were successful institutions.

The IB learner profile is at the heart of the exhibition because the exhibition is an expression of the IB values (cf Bullock, 2011). All the students, teachers and parents recognised this to a high degree. Parents felt the exhibition had raised their awareness of the IB learner profile and there was a degree to which they expressed this as a validation of their choice of the IB curriculum for their child's education. Parents saw the exhibition as their children undertaking a sophisticated independent inquiry, using 21st century skills and technologies that would prepare their child for the wider world. Students also valued "future" skills, but the students also recognised their cooperative working skills as important achievements and a source of pride. Many were clearly engaged in what Palmer (2016) has termed 'co-creating', that is, working alongside other on a shared project not just as a means of sharing the load, but also as a way of producing an outcome bigger than any of them could have managed alone. The PYP is not, of course, unique in its foregrounding of inquiry-based pedagogy. There have been several reports of successful inquiry-based approaches, some focusing on children as young as those undertaking the PYP (e.g. Hamm et al, 2013). It is probably the case, however, that the PYP is unique in the world in terms of the scale and comprehensiveness of the inquiry-led approach (Kushner et al, 2015).

The action element of the exhibition was challenging for schools and teachers; coordinators clearly found it demanding to help students to identify meaningful actions. However, parents and students in case study schools identified action as a key element of the exhibition, which leads the international mindedness of the exhibition. Parents spoke about the "real" nature of the activity and students aimed, in most schools, to make a difference. This led to a number of circular discussions, where parents explained their choice of IB education to prepare their child for a globalised future and ensure their

child understood the wider world. The action element of the exhibition appears to be a contribution to international mindedness, a concept that proved somewhat difficult to discuss. Barratt Hacking et al (2016) have referred to the many, 'fuzzy' definitions of international mindedness, which remains an important part of the exhibition. Such attention is also exemplified in the study by Palmer (2016) where links were deliberately made with the tenets of the Global Citizenship Education as outlined by UNESCO (2015).

Experienced schools planned in great detail to give students clear progress points, regular reflection slots, mentor support time, study skills training, workshop preparation time and many other facilities. Where this planning was accessible to parents, they found it informative and reassuring, as well as sometimes finding the expectations for their children quite high. The findings about cooperative group work suggest that the core skills of group work are recognised by students, parents and teachers alike. However, other aspects of cooperative learning, such as breaking down a process into tasks were not recognised by students and it may be that there is a slight tension between meticulous pre-planning and the students' abilities to make independent decisions.

The choice of topic was a very important part of the exhibition process because it was, in itself, an inquiry. Experienced school staff were more likely to enable students to choose broad, insoluble issues to explore in their exhibition. These are precisely the sort of "messy" forms of inquiry identified in the review of literature as "authentic" and which are most likely to lead students to engage with the problem solving that can be applied in new situations. In our case study schools, these types of exhibition topic were closely related to action and exploring the topic, and exploring the topics and setting limits for the inquiry was a valuable part of the whole exhibition process. At their best, they were exemplars of the student-centred integrative model of curriculum devised by Beane (1993) and applied to Australian middle level schooling by Dowden (2007).

Schools with experience of the PYP exhibition dedicated time and effort to preparation and training of staff and mentors for the exhibition. These schools were able to maintain a high-quality experience for students despite changes of staff. This continuity was a credit to the planning, reflection and training undertaken within the schools. It is likely that schools in this position could share their expertise with less experienced schools.

Students, parents and teachers all saw the PYP exhibition as preparing students for a longer-term future, in which critical, inquiring learners would have an advantage. However, the PYP exhibition was also seen as good preparation for the MYP curriculum (and also other unrelated curricula) by students undertaking the exhibition, by students

who had undertaken the exhibition, by parents and by PYP teachers. MYP teachers attended most of the exhibitions we observed, but we did not see a systematic transfer of information to schools, even though parents expected it. This was a wasted opportunity.

The assessment of the PYP exhibition was complex and ongoing. The criteria were unclear to parents and sometimes unclear to students. However, there was a shared understanding that assessment was a continuous process throughout the time of the exhibition and this had the support of most of the parents. A very few parents, in certain countries, would have liked to understand how their children were performing relative to other children, but this was an exception. This approach to assessment is very much in keeping with IBO tenets, as outlined and evaluated by Harlen and Johnson (2014).

All the schools we visited included a "judging" or criteria-related assessment of the exhibition day although the judgements were somewhat variable. In some cases, they were made by teachers, mentors, visiting MYP teachers or even visiting dignitaries. As such, these assessments were not well standardised but they were well understood by students. The most valuable use of these criteria was as a basis for student reflection, which took the form of self-assessment, video or a final written reflection. These reflections, like many of our interviews, showed self-aware students who were able to consider their own activities and cognition. They were balanced in their assessments and positive in identifying actions to take them forward.

7 Conclusion

This research explored a keystone event in an inquiry led curriculum. The study found overwhelming support from parents, students and teachers for the exhibition as an activity and a deep conviction that this was not only a good use of curriculum time, but the pinnacle of PYP achievement. For many parents, the exhibition renewed a relationship with the IB learner profile and affirmed their choice of an IB education. Students doing their exhibition were the independent, critical, internationally minded learners that parents and teachers aspired to.

The PYP exhibition promotes inquiry and critical thinking in ways that are obvious to the participants and which build on the student and teacher experience of the PYP. Through reflection on the IB learner profile attributes, the steps of inquiry and aspects of criticality, students and teachers could track these areas of learning, although there were differences in the nature and level of critical thinking expected in different local

circumstances. The arrangements for the exhibition include clear, structured support and teaching for inquiry, critical thinking and cooperative learning, in the context of an authentic and public opportunity to use these skills. At the same time, the exhibition teaches, promotes and celebrates these aspects of learning, the IB learner profile and the cooperation between students through group work. These are also important components of international mindedness. Although this was less easily expressed by participants, the parents praised the exhibition precisely for the world view, criticality, knowledge and learner profile attributes it engendered in their children. They identified these as "future friendly, "real world" and "global" attitudes and skills.

The action aspect of the exhibition is demanding for teachers but very important in driving international mindedness. This aspect of the exhibition is very important in establishing "authenticity" for the students. The action element of the exhibition engages students with the wider community and drives other aspects of international mindedness. At the same time, the "authenticity" of the exhibition, vested in the students' role in decision making, the choice of topic and the action, drive meaningful inquiry learning.

Experienced PYP schools have substantial expertise in managing what is a complex process. One size will not fit all and it is the skill of school staff in managing, reflecting on and adapting their planning that offers the very best experience. This should be shared across schools.

This research took a broad look at the participant's views of the IB exhibition through seven case studies and surveys of the participants. It did not aim to compare the outcomes in a structured way, though this would be a valuable activity. There is more work to be done to understand how cultural settings affect understandings of critical thinking and critical literacies and, indeed, the use of technologies.

8   Recommendations

The PYP exhibition is a valuable learning activity for students completing the PYP. It offers a culminating inquiry learning experience that develops critical thinking and international mindedness and should remain a key part of the PYP.

Schools should aim to support students to select wide-ranging topics for inquiry to promote international mindedness. It is important to review these topics as the exhibition proceeds.

Teachers should consider the "action" element of the exhibition from the start of planning, recognizing that this is a difficult, but valuable, aspect of the exhibition that is profoundly connected to international mindedness. Allocation of time to the action element of the exhibition is an important criterion for its success and should be planned and monitored by coordinators.

Teachers should plan well in advance for the PYP exhibition, starting with the engagement of parents and students with the exhibitions of pupils in previous years of schooling.

Schools should aim to plan "just enough" support to enable students to understand, engage with and achieve their goals- but should review this support to retain a student-led experience. Sharing the support offered with parents promotes confidence in parents.

In developing critical thinking, schools with younger children may wish to use clear examples and more structured teaching to explore the perspectives of others, as this is particularly challenging.

A range of sample "cases" should be made available to exhibition schools.

Schools with significant experience have a great reserve of expertise. It would be useful to other schools to share this. Currently, schools benefit enormously from visits to the exhibitions of other schools, but shared training and "critical friendship" between exhibition schools would be an advantage, especially for schools new to the exhibition.

Schools should build upon students' PYP exhibition achievements and feed information to their next schools. However, the use and format of this information will require further investigation to ensure it is useful for recipients.

Schools should share information about their management of the PYP exhibition with the next school.

Training sessions to develop the assessment of the exhibition would be useful but the focus on reflection should remain.

The exhibition provides an opportunity for students to see reflection as a "real world" skill, employed by their own teachers. At present this opportunity to share reflections of teachers is not always used and this could be developed.

The MYP should consider whether the inquiry skills developed in the exhibition are built upon early enough in the MYP.

9   References

Alfieri, L., Brooks, P., Aldrich, N., & Tenenbaum, H. (2011). Does discovery-based instruction enhance learning? *Journal of Educational Psychology*, 103, 1–18.

Barratt Hacking, E., Blackmore, C., Bullock, K., Bunnell, T., Donnelly, M., Martin, S. (2016). *The International Mindedness Journey: School Practices for Developing and Assessing International Mindedness Across the IB Continuum*. http://www.ibo.org/globalassets/publications/ib-research/continuum/international-mindedness-final-report-2017-en.pdf

Beane, J. (1993). *A middle school curriculum: From rhetoric to reality*. Columbus, OH: National Middle School Association.

British Educational Research Association (2011). *Ethical Guidelines for Educational Research*. https://www.bera.ac.uk/wp-content/uploads/2014/02/BERA-Ethical-Guidelines-2011.pdf

Bevins, S. and Price, G. (2016). Reconceptualising inquiry in science education, *International Journal of Science Education*, 38:1, 17-29

Brown, A. L., & Campione, J. C. (2002). Communities of learning and thinking, or a context by any other name. *Contemporary Issues in Teaching and Learning*, 2, 120–126.

Brown, J., Collins, A., and Duguid, P. (1989). *Situated cognition and the culture of learning*. Educational Researcher, 18 (1), 32-42.

Bullock, K. (2011). *International Baccalaureate IB learner profile: Literature review*. http://www.ibo.org/globalassets/publications/ib-research/iblearnerprofileeng.pdf

Charmaz, K. (2003). Grounded theory. In Jonathan A. Smith (Ed.), *Qualitative psychology: A practical guide to research methods* (pp. 81-110). London: Sage.

Cho, Y., Caleon, I., Kapur, M (Eds) (2015). *Authentic problem solving and learning in the 21st Century*. New York: Springer.

Cooperrider, D.L., Whitney, D. and Stavros, J.M. (2008). *Appreciative inquiry handbook* (2nd ed.). Brunswick, OH: Crown Custom Publishing.

Dede, C. (2010). Comparing frameworks for 21st century skills. In J. A. Bellanca & R. S. Brandt (Eds.), *21st century skills: Rethinking how students learn* (pp. 51–76). Bloomington, IN: Solution Tree Press.

Demetriou H, Goalen P, Ruddock J (2000) Academic performance, transfer, transition and friendship: Listening to the student voice. International Journal of Educational Research 33: 425ñ441

Dowden, T. (2007). Relevant, challenging, integrative and exploratory curriculum design: Perspectives from theory and practice for middle level schooling in Australia. *The Australian Educational Researcher*, 34, 51-71.

Ennis, R. H. (1987). A taxonomy of critical thinking dispositions and abilities. In J. B. Baron & R. J. Sternberg (Eds.), *Teaching thinking skills theory and practice*, (pp. 9-26). New York: W. H. Freeman and Company.

Friesen, S. (2009). *What did you do in school today? Teaching effectiveness: A framework and rubric*. Toronto: Canadian Education Association. http://www.cea-ace.ca/sites/cea-ace.ca/files/cea-2009-wdydist-teaching.pdf

Fung, D. and Howe, C. (2014) Group work and the learning of critical thinking in the Hong Kong secondary liberal studies curriculum. *Cambridge Journal of Education*, 44(2), 245–270,

Furtak, E. M., Seidel, T., Iverson, H., and Briggs, D. C. (2012). Experimental and quasi-experimental studies of inquiry-based science teaching: A meta-analysis. *Review of Educational Research*, 82, 300–329.

Gentner, D., Leowenstein, J., and Thompson, L. (2003). Learning and transfer: A general role for analogical encoding. *Journal of Educational Psychology*, 95(2), 393-408.

Gilles, R. (2014) Cooperative learning: Developments in research. *International Journal of Educational Psychology*, 3(2) pp.125-140

Gurdial Singh, R. & Jones M. (2007) *Qualitative data analysis: making new discoveries and aligning old strategies*, 4th International Qualitative Research Convention 2007, Malaysia, 3-5 September 2007. http://ro.uow.edu.au/commpapers/425/

Hamm, E., Cullen, R. & Ciaravino, M. (2013) Using Inquiry-Based Instruction to Teach Research Methods to 4th-Grade Students in an Urban Setting. *Childhood Education*. 89:1, 34-39

Harlen, W & Johnson, S (2014). *A review of current thinking and practices in assessment in relation to the Primary Years Programme*, Report submitted by Assessment Europe to the International Baccalaureate Organization. http://www.ibo.org/globalassets/publications/ib-research/assessmentinthepypfinalreport.pdf

Harste, J. C. (1990). Inquiry-based instruction. *Primary Voices: K–6*, 1(1), 3–8.

Higgins, S. (2014) Critical thinking for 21st-century education: A cyber-tooth curriculum? *Prospects* 44:559–574

Hirsch, E. D. (1987). *Cultural literacy: What every American needs to know*. Boston: Houghton Mifflin.

Hmelo-Silver, C., Golan Duncan, R. and Chinn, C. (2007) Scaffolding and Achievement in Problem-Based and Inquiry Learning: A Response to Kirschner, Sweller, and Clark (2006). *Educational Psychologist*, 42(2), 99–107

IBO (2008). *Primary Years Programme: Exhibition guidelines*. International Baccalaureate Organization: Cardiff.

IBO (2013) *What is an IB education?* International Baccalaureate Organization: Cardiff.

IBO (2017). Programmes. http://www.obo.org/en/programmes

Igel, C. C. (2010). *The effect of co-operative learning instruction on K-12 student learning: A meta-analysis of quantitative studies from 1998 to 2009*. PhD Thesis presented to the Faculty of the Curry School of Education University of Virginia (UMI No. AAT 3435906).

Johnson, D. W., Johnson, R. T., and Holubec, E. (2008). *Co-operation in the classroom*. Edina, MN: Interaction Book Company.

Johnson, D. W., and Johnson, R. T. (2013). The impact of co-operative, competitive, and individualistic learning environments on achievement. In J. Hattie & E. Anderman (Eds.), *International handbook of student achievement* (pp. 372-374). New York: Routledge

Johnson, D.W., Maruyama, G., Johnson, R., and Nelson, D. (1981). Effects of co-operative, competitive and individualistic goal structures on achievement: A meta-analysis. *Psychological Bulletin*, 89(1), 47-62.

Kauffman, N. (2005) Variations on a Theme: Implementation of the International Baccalaureate Primary Years Programme. *Journal of Research in International Education*, 4(3), 243-261.

Kirschner, P. A., Sweller, J., and Clark, R. E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery,

problem-based, experiential, and inquiry-based teaching. *Educational Psychologist*, 41, 75–86.

Kuhn, D. (1991). *The skills of argument*. Cambridge: Cambridge University Press.

Kushner, S., Cochise, A., Courtney, M., Sinnema, C., & Brown, G. (2016). *International Baccalaureate Primary Years Programme in Aotearoa New Zealand: A case-study in whole-school innovation*. Bethesda, MD: International Baccalaureate Organization. http://www.ibo.org/globalassets/publications/ib-research/pyp/evaluation-of-the-pyp-in-new-zealand.pdf

Kyndt, E., Raes, E., Lismont, B., Timmers, F., Dochy, F., and Cascallar, E. (2013). A meta-analysis of the effects of face-to-face co-operative learning. Do recent studies falsify or verify earlier findings? *Educational Research Review*. 10,133-149.

Lave, J. (1988). *Cognition in practice: Mind mathematics and culture in everyday life*. Cambridge: Cambridge University Press.

Lazonder, A. and Harmsen, R. (2016). Meta-analysis of Inquiry-Based Learning: Effects of guidance. *Review of Educational Research*. 86(3), 681-718.

Lee, J-S. (2014) The relationship between student engagement and academic performance: Is it a myth or reality? *Journal of Educational Research* 107(3) pp.177-185

Lüddecke, F. (2015). Philosophically rooted educational authenticity as a normative ideal for education: Is the International Baccalaureate's Primary Years Programme an example of an authentic curriculum? *Educational Philosophy and Theory*, http://dx.doi.org/10.1080/00131857.2015.1041012 .

Mackenzie, E. McMaugh, A., and O'Sullivan, K-A. (2012). Perceptions of primary to secondary school transitions: Challenge or threat? *Issues in Educational Research*, 22(3), 298-314.

McPeck, J. E. (1981). *Critical thinking and education*. Oxford: Robertson.

Mercer, N. (2009). The analysis of classroom talk: Methods and methodologies. *British Journal of Educational Psychology*, 80(1), 1–14.

Molenaar, IW & Sijtsma (2000). *User's Manual MSP5 for Windows*. IECe ProGAMMA, Groningen, The Netherlands.

Murphy P., Rowe, M. & Ramani, G. & Silverman, R. (2014) Promoting Critical-Analytic Thinking in Children and Adolescents at Home and in School *Education Psychology Review*, 26:561–578

Murphy, K Nichols, G. and Gardner, J. (1998). *Pupils in transition: Moving between key stages* London: Routledge Falmer

NRC (National Research Council) (2012). *Education for life and work: Developing transferable knowledge and skills in the 21st Century*. Washington DC: The National Academies Press.

Nunnery, J. A., Chappell, S., and Arnold, P. (2013). A meta-analysis of a Co-operative Learning Models Effects on Student Achievement in Mathematics. *Cypriot Journal of Educational Sciences*, 8(1), 34- 48.

O'Boyle, É. (2009). Whispers from within: Students perceptions of the first year of the International Baccalaureate Middle Years Programme in an international school. *Journal of Research in International Education* 8(1), 30-56.

Palmer, N. (2016). Seeing the forest for the trees: The International Baccalaureate Primary Years Programme exhibition and Global Citizenship Education. *Journal of Research in International Education.* 15(3), 208-223.

Perkins, D. (2010). *Making learning whole: How seven principles of teaching can transform education*. San Francisco, CA: Jossey-Bass.

Pine, J., Aschbacher P., Roth E., Jones M., McPhee C., Martin, C., Phelps, S., Kyle, T., & Foley, B. (2006). Fifth graders' science inquiry abilities: A comparative study of students in hands-on and textbook curricula. *Journal of Research in Science Teaching*, 43(5), 467-484.

Puzio, K., and Colby, G. (2013). Co-operative learning and literacy: A meta-analytic review *Journal of Research on Educational Effectiveness* 6 (4), 339-360

Rasch, G. (1960). *Probabilistic models for some intelligence and achievement tests*. Copenhagen: Danish Institute for Educational Research (Expanded edition, 1980. Chicago: University of Chicago Press).

Rockwood, H. S. III (1995a). Co-operative and collaborative learning. *The national teaching & learning forum*, 4 (6), 8-9.

Rockwood, H. S. III (1995b). Co-operative and collaborative learning. *The national teaching & learning forum*, 5 (1), 8-10.

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). Thousand Oaks, CA: Sage.

Thomas, D. and Brown, J. (2011). *A new culture of learning: Cultivating the imagination for a world of constant change*. Lexington: CreateSpace

UNESCO (2015) *Global citizenship education: topics and learning objectives*. http://unesdoc.unesco.org/images/0023/002329/232993e.pdf

Vygotsky, L. S. (1978). *Mind and society: The development of higher mental processes*. Cambridge, MA: Harvard University Press.

Walker, G. (2010). *East is East: West is West.* http://www.ibo.org/globalassets/publications/east-is-east-and-west-is-west-en.pdf

Wray, D. (1999). *Inquiry in the classroom: Creating it, encouraging it, enjoying it* Toronto: Pippin Publishing

Zenner, C., Herrnleben-Kurz, S., Walach, H. (2014) Mindfulness-based interventions in schools - a systematic review and meta-analysis, *Frontiers in Psychology* 5, 603, http://journal.frontiersin.org/article/10.3389/fpsyg.2014.00603/full

Zimmerman, C. (2007). The development of scientific thinking skills in elementary and middle school. *Developmental Review*, 27, 172–223.

10 Appendices

10.1 Appendix 1: Samples of ethical documentation
(all documents available on request)

Information for potential participants

All consent forms were presented on University of Nottingham headed paper in the relevant language

The impact of the PYP exhibition on the development of international mindedness, critical thinking and attributes of the IB learner profile

Dr Jane Medwell
Dr Lucy Cooker
Dr Lucy Bailey

You have been invited to take part in a research study. Before you agree to take part it is important to understand why the research is being done and what it will involve.

Please take time to carefully read the following information. Please ask if there is anything that is not clear, or if you would like more information. Please think about it carefully and then decide whether you would like to take part or not.

What is the project about?
This project is about the PYP exhibition in IB World Schools. The research team want to find out about your views about how the PYP exhibition contributes to critical thinking, international mindedness and the attributes of the IB profile.

What are the aims of the research?
This project has five broad aims:
1. To understand the practices involved in implementing the PYP exhibition in IB schools.
2. To understand what PYP teachers, students and parent/guardians believe to be the impact of PYP exhibition study on international-mindedness, critical thinking and IB learner profile attributes.

3. To understand how PYP exhibition can promote parent/guardian engagement with, and understanding of, the IB Programmes.
4. To explore whether the PYP exhibition supports student transition to the MYP.
5. To understand how mentor participation (where used) promotes international-mindedness, critical thinking and IB learner profile attributes

Who else is and can be involved?

We are inviting a number of IB World Schools around the world to take part.

What sorts of methods are being used?

Data will be collected in a number of ways. We want to understand the views of school managers, parents, teachers and students. This will involve a survey to students, teachers and parents and interviews with teachers, students, senior administrators/managers and parents.

Why have you been chosen?

You have been invited to participate in this study because your child attends a school which offers the International Baccalaureate Primary Years Programme.

What are you being asked to do?

You are being asked to participate in an interview. It will last for up to one hour. The discussion will be recorded using a digital voice recorder.

Will my taking part in this study be kept confidential?

The data we collect will be treated confidentially, and only members of the research team will have access to the raw data. All information collected while carrying out the study will be stored on a database which is password protected and strictly confidential. The digital and textual data resulting from the interviews will be kept in a secure and confidential location. Your name will not appear on any database or any information which is then published. Instead, a number will be used as an identifier on all data associated with you. The master copy of the names associated with each number will be kept in a secure and confidential location. The management of the research data will be in accordance with the University of Nottingham's Research Data Management Policy: https://nottingham.ac.uk/research/research-data-management/creating-data/policies.aspx

We will report the results anonymously. When results are reported all individuals and institutions (individual schools) will be anonymised, so neither you nor your child's

school will be identifiable. We are committed to carrying out our research according to the University of Nottingham's Code of Research Conduct and Research Ethics and ethical guidelines provided by the British Educational Research Association:
https://www.bera.ac.uk/researchers-resources/publications/ethical-guidelines-for-educational-research-2011
http://www.nottingham.ac.uk/fabs/rgs/documents/code-of-research-conduct-and-research-ethics-approved-january-2010.pdf

What will happen to the results of the research study?

The results of study will be used in our report to the International Baccalaureate Organization. We also expect to present findings at professional conferences and in academic and professional journals.

Do you have to take part?

Your participation is entirely voluntary. It is important you understand that you do not have to participate in the project at all, and even if you decide to take part you are still free to stop at any time and without giving a reason. We will not ask you to participate without you formally providing your consent. If you do decide to take part you will be given this information sheet to keep and asked to sign a form giving your permission to take part.

What are the possible disadvantages of taking part?

The interview may take up to one hour of your time. We realise that some people may find this tiring or difficult. We will ask you to reflect on your child's learning and we understand that for some this may cause feelings of discomfort or anxiety. Otherwise, we do not believe there are any risks or disadvantages to you in taking part.

What are the possible benefits to me of taking part?

We hope that your views, and those of others, will be used to develop the IB Curriculum, and to help schools and the IBO understand how the PYP exhibition can be effectively developed in IB World Schools.

Who is paying for this research and who is carrying it out?

The research has been commissioned by the International Baccalaureate Organization in order to help them evaluate the effectiveness of their programme. It is hoped the research will help teachers further develop the curriculum in IB schools. The work is being carried out by researchers from the School of Education at The University of Nottingham in the UK. The team is led by Dr Jane Medwell – if you have any questions or

concerns about the research you can contact her or other members of the research team by email or by phone

Dr Jane Medwell
e: jane.medwell@nottingham.ac.uk p: +44 (0)7742 470702

Dr Lucy Cooker
e: lucy.cooker@nottingham.ac.uk   p: +44 (0)115 951 4437

Dr Lucy Bailey
e: Lucy.Bailey@nottingham.edu.my p: +6 (03) 8725 3583

You can also raise issues with the Research Ethics Committee, University of Nottingham School of Education

Agreement to participate through the survey. Consent wording- adults (examples are parents and teachers). Presented in the relevant language

Dear Parent,

The impact of the PYP exhibition on the development of international mindedness, critical thinking and attributes of the IB learner profile

We are a group of researchers from the University of Nottingham who have been commissioned by the International Baccalaureate Organization to carry out some research. The school which your child (or the child you care for) attends has agreed to participate in that research project.

We would like to invite your child/the child you care for to take part in the research study. In order for your child/the child you care for to take part, we need to ask for your consent. Before you agree to your child/the child you care for taking part it is important to understand why the research is being done and what it will involve.

Please take time to carefully read the following information. Please feel free to contact any member of the research team if there is anything that is not clear, or if you would like more information. All our contact details are at the end of this letter. Please think about the involvement of your child/the child you care for carefully, and then decide whether you would permit her/him to take part or not.

What is the project about?
This project is about the PYP exhibition in IB World Schools. The research team want to find out about your views about how the PYP exhibition contributes to critical thinking, international mindedness and the attributes of the IB profile.

What are the aims of the research?
This project has five broad aims:
1. To understand the practices involved in implementing the PYP exhibition in IB schools.
2. To understand what PYP teachers, students and parent/guardians believe to be the impact of PYP exhibition study on international-mindedness, critical thinking and IB learner profile attributes.

3. To understand how PYP exhibition can promote parent/guardian engagement with, and understanding of, the IB Programmes.
4. To explore whether the PYP exhibition supports student transition to the MYP.
5. To understand how mentor participation (where used) promotes international-mindedness, critical thinking and IB learner profile attributes

Who else is and can be involved?

We are inviting a number of IB World Schools around the world to take part.

What sorts of methods are being used?

Data will be collected in a number of ways. We want to understand the views of school managers, parents, teachers and students. This will involve a survey to students, teachers and parents and interviews with teachers, students and senior administrators/managers. Ideally we would like to talk to parents as well.

Why has your child/the child you care for been chosen?

Your child/the child you care for has been invited to participate in this study because they attend a school which offers the International Baccalaureate Primary Years Programme.

What is your child/the child you care for being asked to do?

Your child/the child you care for is being asked to participate in an interview with the research team. The interview will be age-appropriate and asks about your child's experience of the PYP and views on a number of related issues. The interview will take 30 minutes.

Will the involvement in this study of my child/the child I care for be kept confidential?

The data we collect will be treated confidentially, and only members of the research team will have access to the raw data. All information collected while carrying out the study will be stored on a database which is password protected and strictly confidential. The data resulting from the interviews will be kept in a secure and confidential location. The name of your child/the child you care for will not appear on any database or any information which is then published. Instead, a number will be used as an identifier on all data associated with them. The master copy of the names associated with each number will be kept in a secure and confidential location. The management of the research data will be in accordance with the University of Nottingham's Research Data Management Policy:

https://nottingham.ac.uk/research/research-data-management/creating-data/policies.aspx

We will report the results anonymously. When results are reported all individuals and institutions (individual schools) will be anonymised, so neither your child/the child you care for, nor their school will be identifiable. We are committed to carrying out our research according to the University of Nottingham's Code of Research Conduct and Research Ethics and ethical guidelines provided by the British Educational Research Association:

https://www.bera.ac.uk/researchers-resources/publications/ethical-guidelines-for-educational-research-2011

http://www.nottingham.ac.uk/fabs/rgs/documents/code-of-research-conduct-and-research-ethics-approved-january-2010.pdf

What will happen to the results of the research study?
The results of study will be used in our report to the International Baccalaureate Organization. We also expect to present findings at professional conferences and in academic and professional journals.

Does your child/the child you care for have to take part?
The participation of your child/the child you care for is entirely voluntary. Whether they take part in the study or not, there will be no impact on their grades or assessment.

It is important your child/the child you care for understands that they do not have to participate in the project at all, and even if they decide to take part they are still free to stop at any time and without giving a reason. We will not ask them to participate without both you (their parent/guardian) and the child themselves formally providing their consent.

If you and your child/the child you care for do decide to take part you do not have to do anything further. If you do not want your child to take part, please complete the slip at the bottom of this letter and return it to the school.

What are the possible disadvantages of taking part?
The interview will take up to 30 minutes. We realise that some children may find this tiring or difficult.

What are the possible benefits to me of taking part?

We hope that the views of your child/the child you care for, and those of others, will be used to develop the IB Curriculum, and to help schools and the IBO understand how the PYP exhibition can be effectively developed in IB World Schools.

Who is paying for this research and who is carrying it out?
The research has been commissioned by the International Baccalaureate Organization in order to help them evaluate the effectiveness of their programme. It is hoped the research will help teachers further develop the curriculum in IB schools. The work is being carried out by researchers from the School of Education at The University of Nottingham in the UK. The team is led by Dr Jane Medwell– if you have any questions or concerns about the research you can contact her or other members of the research team by email or by phone

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Dr Lucy Bailey
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You can also raise issues with the Research Ethics Committee, University of Nottingham School of Education educationresearchethics@nottingham.ac.uk

Yours faithfully

The PYP Exhibition in International Schools

Agreement to Participate

Please check your responses below.

1. I understand the nature and purpose of this research.

   Yes ☐   No ☐

2. I have received enough information to make an informed decision about taking part.

   Yes ☐   No ☐

3. I understand that I can raise questions, offer criticisms and make suggestions about the project.

   Yes ☐   No ☐

4. I understand that I can decide not to participate in this project at any time after agreeing to.

   Yes ☐   No ☐

5. Do you agree to contribute to this research?

   Yes ☐   No ☐

6. Do you agree the conversation or discussion can be audio-recorded?

   Yes ☐   No ☐

7. Your consent indicates that you have decided to take part in this project after considering the information provided, and that you know you can raise questions and decide not to participate at any time.

Signature/verbal consent _____

Date _____

Name _____

Email/contact

(optional)_____

For more information, contact Dr Jane Medwell (Principal Investigator), University of Nottingham School of Education, jane.medwell@nottingham.ac.uk

You can also raise issues with the Research Ethics Committee, University of Nottingham School of Education educationresearchethics@nottingham.ac.uk

10.2 Appendix 2: An example of how the transdisciplinary theme, central idea, lines of inquiry and student questions are interlinked

Transdisciplinary theme	Central idea	Lines of inquiry	Research questions
Where we are in place and time	Throughout history, people have explored, journeyed and settled all over our world	Ancient civilisations have shaped our beliefs and our understanding of the world we live in	In what way did the Egyptians' beliefs influence their way of life and does this still impact us today?
			How did the philosophy and science of ancient Greece have an impact of our knowledge of the world?
			What legacy did the Roman Empire leave us?
			How did the Aztec's culture adapt to the Spanish Conquest and still partly survive?
			How did the Incas' culture adapt to the Spanish Conquest and still partly survive?
		Our family histories have influenced who we are today	How does my family's personal trials in Europe during WW2 connect to the historical issue of the Holocaust?
			How does my family's personal involvement in the Tokyo bombing during WW2 connect to the USA's attitude towards Japan before and after the war?
			How does the story of the [family name] family in the last 100 years show us what life was like in England during this time?
			How does my family's perosnal involvement in the Armenian genocide and the Soviet deportations connect to broader historical events?
		Humans have made an impact on the world through their explorations and discoveries	How and why did the discovery of the North and South Poles affect the explorers as well as our understanding of the world?
			Who are the native peoples of the Himalayas and how were they affected by the European explorations both in the past and the present?
			How and why did the Portuguese discovery of Brasil take place, and what consequences did it have?
			How did Henry Hudson's discovery of Manahatta affect the Native Americans and forever change our world?
		Individuals and societies have migrated to other countries from choice or need.	How and why are Syrian refugees migrating to Europe?
			Why is there such a large Japanese migration to Hawaii and what are its effect on both the Japanese and the Hawaiian Americans?
			What negative or positive effects do refugees create for the countries that take them in?
			How did forced migration to Australia transform the lives of convicts and affect the country?
		Throughout history, people have journeyed, settled and adapted to their surroundings, creating a variety of different cultures.	How are the Amazon indios in South America able to keep their tribal culture alive in our technological world?
			To what extent do three African tribes (Masai, Chogga and San Bushmen) continue to keep their traditional culture alive in today's modern world?
			Why have homes and architecture in Goa changed from past to present, and how has this affected peoples' lives?
			How did the settlement of white people in Iroquois land affect both the Iroquois people and the settlers?
			How do the Aborigines in Australia understand the world through art, music and journeys?

10.3 Appendix 3: The IBO Learner Profile Attributes

IB learner profile

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

As IB learners we strive to be:

INQUIRERS
We nurture our curiosity, developing skills for inquiry and research. We know how to learn independently and with others. We learn with enthusiasm and sustain our love of learning throughout life.

KNOWLEDGEABLE
We develop and use conceptual understanding, exploring knowledge across a range of disciplines. We engage with issues and ideas that have local and global significance.

THINKERS
We use critical and creative thinking skills to analyse and take responsible action on complex problems. We exercise initiative in making reasoned, ethical decisions.

COMMUNICATORS
We express ourselves confidently and creatively in more than one language and in many ways. We collaborate effectively, listening carefully to the perspectives of other individuals and groups.

PRINCIPLED
We act with integrity and honesty, with a strong sense of fairness and justice, and with respect for the dignity and rights of people everywhere. We take responsibility for our actions and their consequences.

OPEN-MINDED
We critically appreciate our own cultures and personal histories, as well as the values and traditions of others. We seek and evaluate a range of points of view, and we are willing to grow from the experience.

CARING
We show empathy, compassion and respect. We have a commitment to service, and we act to make a positive difference in the lives of others and in the world around us.

RISK-TAKERS
We approach uncertainty with forethought and determination; we work independently and cooperatively to explore new ideas and innovative strategies. We are resourceful and resilient in the face of challenges and change.

BALANCED
We understand the importance of balancing different aspects of our lives—intellectual, physical, and emotional—to achieve well-being for ourselves and others. We recognize our interdependence with other people and with the world in which we live.

REFLECTIVE
We thoughtfully consider the world and our own ideas and experience. We work to understand our strengths and weaknesses in order to support our learning and personal development.

The IB learner profile represents 10 attributes valued by IB World Schools. We believe these attributes, and others like them, can help individuals and groups become responsible members of local, national and global communities.

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10.4 Appendix 4: Examples from questionnaires to parents, teachers and students in different languages

(Full versions of any of these questionnaires can be obtained on request to the research team)

PYP Exhibition Student Survey

Page 1: About this survey

We are asking students about the exhibition you do in this last year of your Primary Years Programme. We hope to learn what you think you learn by doing the exhibition.

Most of the questions in this survey do not ask for right or wrong answers. They ask for your views and opinions.

The information collected in this study will be treated confidentially. All data collection is anonymous and neither you, nor your school will be identified in any report of the results of the study.

Please answer all the questions.

This survey has 8 sections:

- About you
- The exhibition and your parents/carers
- Learning outcomes of the exhibition
- The PYP exhibition and international mindedness
- The PYP exhibition and critical thinking
- The PYP exhibition and inquiry learning
- The PYP exhibition and your next school year
- Your mentor

We estimate this survey will take around 15 minutes to complete.

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Page 2: About you

1. What is the name of your school?

[   ]

2. How old are you?

[   ]

3. What was individual the title of your exhibition inquiry issue?

[   ]

4. What is your first language?

[   ]

5. Please choose a level of agreement with the statements. ✻ *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
I chose the title of my exhibition myself	☐	☐	☐	☐	☐
I discussed my choice of topic with my parent/carer	☐	☐	☐	☐	☐
I discussed my choice of topic with my teacher	☐	☐	☐	☐	☐
I discussed my choice of topic with my mentor	☐	☐	☐	☐	☐
I understood the role of the exhibition in my education	☐	☐	☐	☐	☐
I learnt a lot through doing the exhibition	☐	☐	☐	☐	☐
I got (or will get) written feedback about the exhibition	☐	☐	☐	☐	☐

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Page 3: 小学项目学习成果展和父母/监护人员

6. 家长/监护人员是否参与计划你学校的小学项目学习成果展?

Please don't select more than 1 answer(s) per row.

	是	不知道	不是
我的家长／监护人员参与了学校的简要会议	☐	☐	☐
我的家长／监护人员参加学校关于成果展的活动或旅行	☐	☐	☐
我的家长／监护人员帮助我选择主题	☐	☐	☐
我的家长／监护人员帮助我一起研究、收集材料	☐	☐	☐
我的家长／监护人员帮助我准备展览的要素	☐	☐	☐
我的家长／监护人员和我的老师讨论了展览	☐	☐	☐
我的家长／监护人员参加了（或者将要参加）展览	☐	☐	☐
我的家长／监护人员得到了（或将要得到）关于学生的成果展的书面反馈	☐	☐	☐
我的家长／监护人员得到了（或将要得到）关于学生的成果展的口头反馈	☐	☐	☐
我的家长／监护人员帮助孩子安排他/她的工作	☐	☐	☐
我的家长／监护人员帮助我激发积极性	☐	☐	☐
我的家长／监护人员和我一起讨论了小学学习项目成果展	☐	☐	☐
我的家长／监护人员针对我的主题问了我问题	☐	☐	☐
我的家长／监护人员根据我的成果展给了我意见反馈	☐	☐	☐
我的家长／监护人员在我的成果展所需要的语言上帮助了我	☐	☐	☐
我的家长／监护人员给我提供了一些想法	☐	☐	☐

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Encuesta Para Maestros: La Exposición del Programa de la Escuela Primaria del IB (PEP)

Página 1: Introducción

La presente encuesta es parte del proyecto investigativo llevado a cabo por parte de la Universidad de Nottingham en nombre del Bachillerato Internacional (IB).

El propósito de esta encuesta es conocer la opinión de los coordinadores y profesores con respecto a la exposición del Programa de la Escuela Primaria del IB (PEP). Queremos saber lo que usted piensa que sus alumnos aprenden al tomar parte en la exposición. Por lo tanto, la mayoría de preguntas en esta encuesta piden su opinión.

La información obtenida en esta investigación será manejada con absoluta confidencialidad. Los datos obtenidos son anónimos y ni usted, ni su escuela, serán identificados en los informes que se publiquen sobre esta investigación.

Por favor responda todas las preguntas.

Esta encuesta tiene 8 secciones:

- Sobre su clase
- La exposición del PEP y los padres / guardianes
- Los resultados de aprendizaje de la exposición del PEP
- La exposición del PEP y la mentalidad internacional
- La exposición del PEP y el pensamiento crítico
- La exposición del PEP y el aprendizaje basado en la indagación
- La exposición del PEP y el próximo año escolar / PAI
- Los mentores y la exposición del PEP

Estimamos que le tomará alrededor de 10 minutos para completar la encuesta.

Página 2: Sobre su clase

1. ¿Cuál es el nombre de su escuela?

[   ]

2. ¿Cuál es su rol profesional?

☐ maestro
☐ maestro especialista / de una sola área disciplinaria
☐ coordinador del PEP
☐ coordinador de la exposición del PEP

3. ¿Cuántos años lleva ejerciendo de maestro incluyendo este año escolar?

[   ]

4. ¿Cuántos años lleva ejerciendo de maestro en el Bachillerato Internacional (IB)?

[   ]

5. ¿Cuánto tiempo ha dado clases en esta escuela?

○ 1 año
○ 2 años y medio
○ De 5 a 8 años
○ De 8 a 10 años
○ Más de 10 años

6. Por favor señale su nivel de acuerdo o desacuerdo con las siguientes afirmaciones.

Por favor no elija más de 1 respuesta(s) en cada fila.

	Totalmente de acuerdo,	De acuerdo,	Ni de acuerdo ni en desacuerdo,	En desacuerdo,	Totalmente en desacuerdo

Анкета о Выставке PYP: Родители

Page 1: Об анкете

Это исследование проводится Университетом Ноттингема (Великобритания) от лица Организации Международного Бакалавриата.

Мы опрашиваем родителей детей, которые в это году подготавливают выставку, об их мнении насчет Выставки PYP. Мы надеемся узнать ваше мнение о роли выставки в процессе обучения детей, поэтому большинство вопросов направлены на то, чтобы узнать вашу точку зрения.

Вся полученная информация этого исследования конфиденциальна. Все данные анонимны, и ни вы, ни ваш ребенок, ни школа не будут указаны в результатах отчёта.

Пожалуйста, ответьте на все вопросы.

Анкета состоит из 7 разделов:

- О вашем ребенке
- Выставка PYP и родители/опекуны
- Выставка PYP и международный взгляд
- Выставка PYP и критическое мышление
- Выставка PYP и изучение исследования
- Выставка PYP и следующий учебный год
- Наставник моего ребенка

Заполнение анкеты займет не более 10 минут.

Page 3: Выставка PYP и родители/опекуны

4. Насколько вы были вовлечены в подготовке к выставке?

Please don't select more than 1 answer(s) per row.

	да	не знаю	нет
Я посетил(-а) школьное собрание	☐	☐	☐
Я принимал(-а) участие в школьных мероприятиях и поездках, посвященных выставке.	☐	☐	☐
Я помог(-ла) своему ребенку с выбором темы	☐	☐	☐
Я работала(-а) над поиском материала для ребенка	☐	☐	☐
Я частично помог(-ла) ребенку в подготовке к выставке	☐	☐	☐
Я обсудил(-а) выставку с учителем своего ребенка	☐	☐	☐
Я (или другой родитель) посетил(-а)/посещу/посетит выставку	☐	☐	☐
Я получил(-а)/получу письменный отзыв о выставке моего ребенка	☐	☐	☐
Я получил(-а)/получу устный отзыв о выставке моего ребенка	☐	☐	☐
Я помог(-ла) своему ребенку в организации работы	☐	☐	☐
Я помог(-ла) ребенку сохранить энтузиазм в ходе работы	☐	☐	☐
Я обсудил(-ла) выставку с моим ребенком	☐	☐	☐
Я был(-а) наставником	☐	☐	☐

5. *В следующих утверждениях выберите наиболее подходящий ответ*

Please don't select more than 1 answer(s) per row.

10.5 Appendix 5: Further statistical analysis of the questionnaire outcomes

The quantitative data were initially downloaded as SPSS (Statistical Package for Social Scientists) files from the Bristol Online Survey tool. These SPSS files allowed analysis of the raw responses to give us a picture of the dataset. Some of these descriptive figures have been included in the discussion above. Analysing only the raw data or comparing percentages of agreement does not give an indication of patterns in the data, the variation of responses across items by an individual or the differences between the items overall, so further analysis was undertaken using Mokken Scale Analysis (Molenaar & Sijtsma, 2000) and Rasch (Rasch, 1960) analysis. These types of analyses are particularly useful for measuring Likert-style items and latent traits, that is, traits that are not directly observable. This is done by looking at the way participants respond to a pool of items, such as the items in our questionnaires about inquiry skills, cooperative learning and learner attributes to find overall patterns.

Analysing the data in this way acknowledges that survey responses give information about the characteristics of the participants as well as information about the items themselves and how well the items function in measuring the participants. In essence, looking the patterns of responses across people allows us to compare the items against each other to find relationships between items.

Mokken Scale Analysis and Rasch analysis are probabilistic models, meaning that "a person's latent trait value can be compared with the amount of the trait that is required by the item for its solution with a certain probability" (Molenaar & Sijtsma, 2000, p. 5). Mokken Scale Analysis was chosen to analyse this survey data to create a scale from a given pool of items and by finding which items 'scale together'. The analysis finds which items are theoretically measuring the same latent trait. For the Mokken Scale Analysis, the program MSP5 was used (Molenaar & Sijtsma, 2000).

Rasch analysis was conducted as the second step when more than six items were found to be statistically related. After finding which items measure together, through Mokken Scale Analysis, the next step was to find out the relationship between the items. Rasch analysis supposes that respondents demonstrate a range of 'ability' and that items portray a range of 'difficulty' based on how easy or difficult it is for each person to agree or disagree to the item. The analysis allows a range of views of respondents and requires a range of difficulty of items. Rasch analysis provides a deeper understanding of the data by finding which items were overall 'easy'/'common' or 'difficult'/'less common' for respondents to endorse across varying responses. It identifies respondents whose

responses 'misfit' the model and allows a critique of the items themselves. Rasch analyses were conducted using the programs Winsteps (Linacre, 2017).

A full technical appendix for the quantitative analysis is available on request by emailing the research team.

Statistical findings about the IB learner profile

The statistical analysis shows that a significant finding of this survey was concerning the PYP exhibition's impact on the IB learner profile attributes. All nine attributes scaled together to measure a single latent trait. While the IB learner profile attributes may seem to include varying concepts, the items were found to be statistically related and that they combine to form a single measurable trait. While these ideas could be conceptually analysed as separate attributes, they do seem to be related, especially in the context of inquiry-based learning.

The items in the survey asked for students' and teachers' perceptions of how well the PYP exhibition helped the students develop the IB learner profile attributes. The strength of the relationship and the number of items allows us to present the data in a hierarchy (Figure 6). This means that the attributes at the bottom of the hierarchy are most common and the items at the top are the least common, although all the items are related.
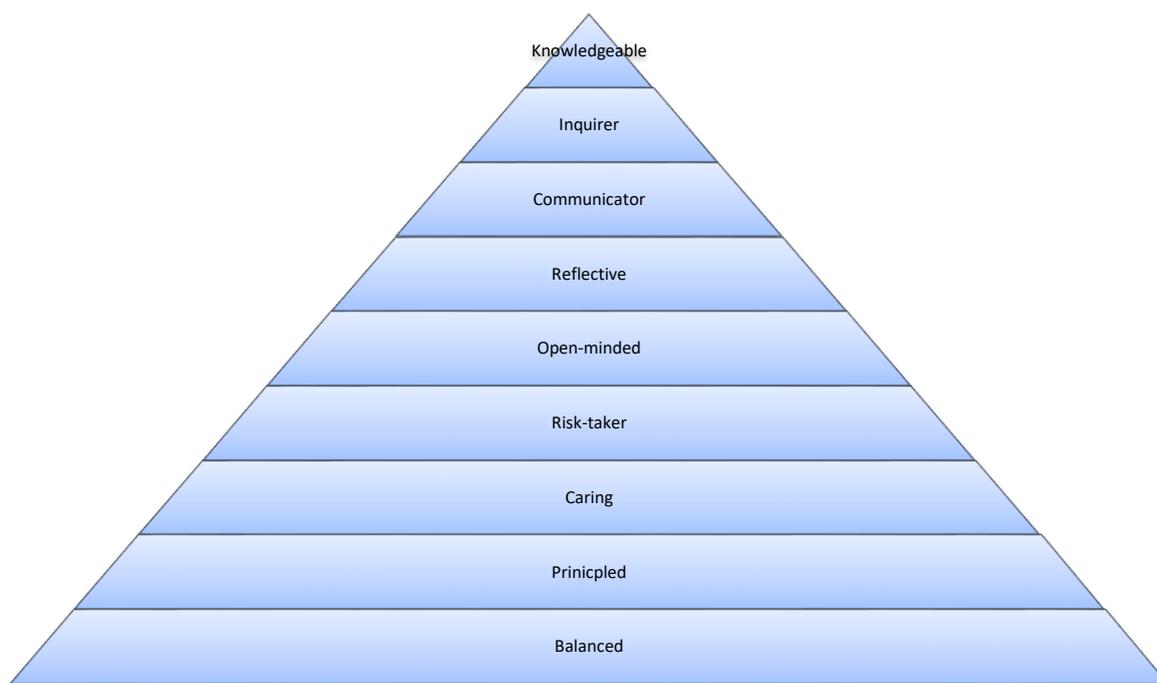
Figure 6: Item Hierarchy for IB learner profile Attributes Scale. Perception by parents, teachers and students of how much IB learner profile attributes were strengthened by student participating in the PYP exhibition

The statistical relationship of the responses means that participation in the PYP exhibition is perceived to increase all of the IB learner profile attributes in a related way. While the survey found that all of the IB learner profile attributes were perceived to be strengthened by participation in the PYP exhibition, the items at the bottom of the hierarchy were seen as more commonly strengthened than those at the top. The IB learner profile attributes of being balanced, principled and caring were strengthened the most.

Student Cooperation Scale and Student Action Scale

The students were asked a series of rating scale questions regarding their understanding of the exhibition, their perception of the use of language and literacy skills for the exhibition, their sources of information, teamwork skills, their inquiry skills, cooperative learning, and how they felt the PYP exhibition would prepare them for the MYP. In the student survey, two scales were created of items that were statistically linked.

A scale of three items that are statistically linked and increase together was created that demonstrates the relationship between working closely with other students, discussion information with others and feeling responsible toward the other students. This means that the group learning aspect of the project facilitates discussion about information

between the students and feelings responsibility toward each other. The related items are represented below in Figure 7.

Figure 7: Student Cooperation Scale. Students identified the ways that cooperation occurred during the preparation for the PYP exhibition

These items are particularly important features of cooperative learning approaches and Gilles (2014) notes that students who experience "promotive interactions', that is discussion with other group members who give feedback, are likely to be better motivated in their tasks. This combination of feelings also suggests students feel both personal responsibility and accountability- key features of successful co-operative learning. The group and individual aspects of the PYP exhibition combine to promote successful learning.

A second scale of was created of fifteen survey items that are statistically linked, i.e. they increase together. These demonstrate a clear trait or characteristic that we have called 'Student Action'. These items are identified below in Figure 8. The strength of the relationship means it is possible to present the data in a hierarchy. Where any respondent answered positively to the item at the top of the hierarchy, they are likely to have also answered positively to all the items below it. The items at the bottom of the hierarchy are most common and the items at the top are the least common, although all the items are related.
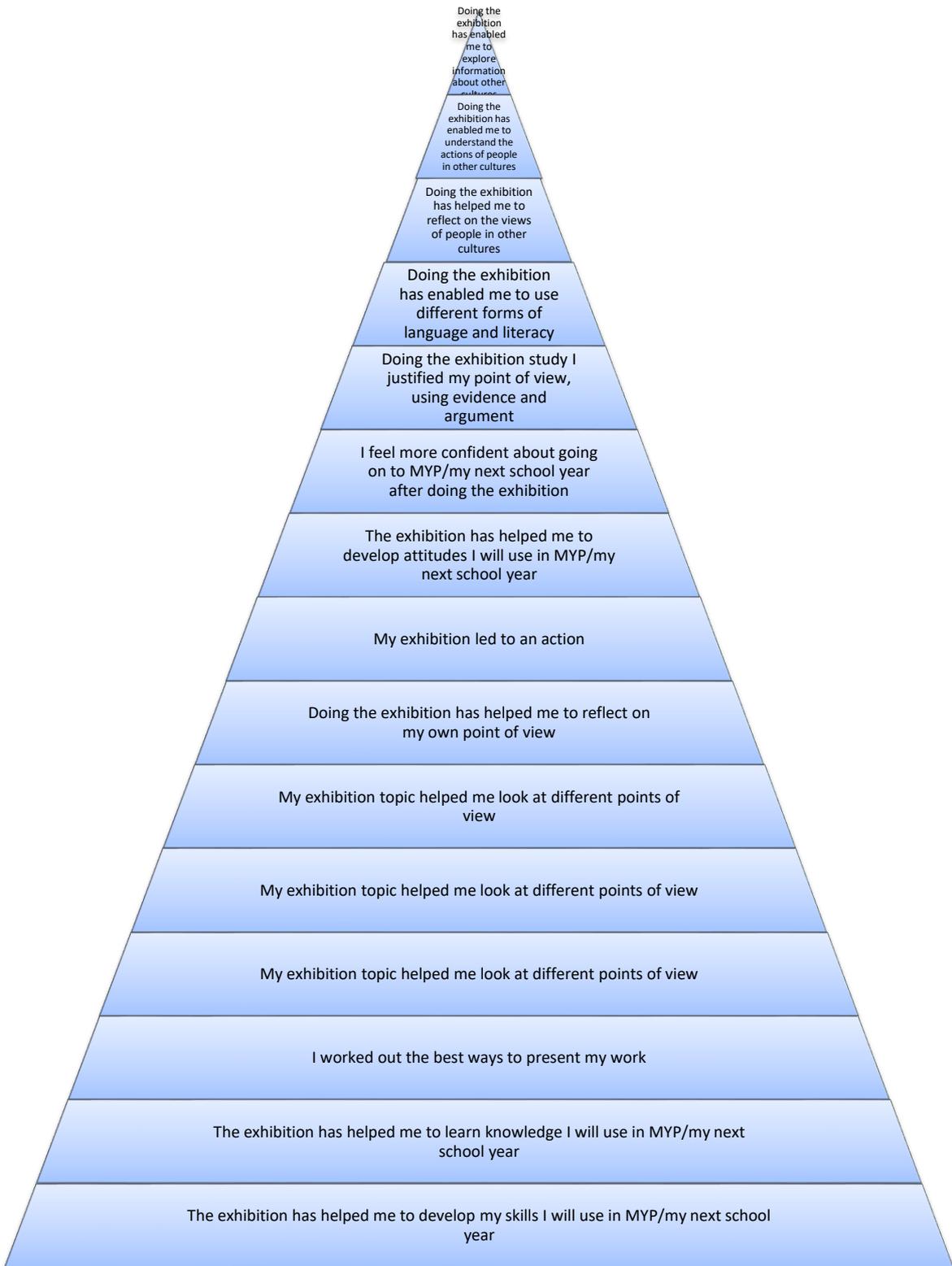
Figure 8: Item Hierarchy for Student Action Scale

The content of the pyramid from top to bottom:

Doing the exhibition has enabled me to explore information about other cultures

Doing the exhibition has enabled me to understand the actions of people in other cultures

Doing the exhibition has helped me to reflect on the views of people in other cultures

Doing the exhibition has enabled me to use different forms of language and literacy

Doing the exhibition study I justified my point of view, using evidence and argument

I feel more confident about going on to MYP/my next school year after doing the exhibition

The exhibition has helped me to develop attitudes I will use in MYP/my next school year

My exhibition led to an action

Doing the exhibition has helped me to reflect on my own point of view

My exhibition topic helped me look at different points of view

My exhibition topic helped me look at different points of view

My exhibition topic helped me look at different points of view

I worked out the best ways to present my work

The exhibition has helped me to learn knowledge I will use in MYP/my next school year

The exhibition has helped me to develop my skills I will use in MYP/my next school year

Parent/Carer Help Scale

Parents/carers, students and teachers were asked about the ways that parents/carers helped students prepare their PYP exhibition projects and, because similar questions were asked of all three groups, analysis was conducted including all three groups together. A Mokken Scale Analysis found that, while a few items scaled together with all three groups, the items did not uniformly scale across three groups. This may be due to the lower number of responses from parents and teachers and the higher number of responses from students. A Rasch analysis was conducted to further investigate whether the scaling issue was due to the items or to the respondents. Rasch analysis was conducted starting with all 12 items and all parents/carers, students, and teachers. The strength of the relationship means it is possible to present the data in a hierarchy (Figure 9) that demonstrates "Parent/Carer Help". This means simply that where any respondent answered positively to the item at the top of the hierarchy, they are likely to have also answered positively to all the items below it. The items are all related and the items at the bottom of the hierarchy are most common and the items at the top are the least common.
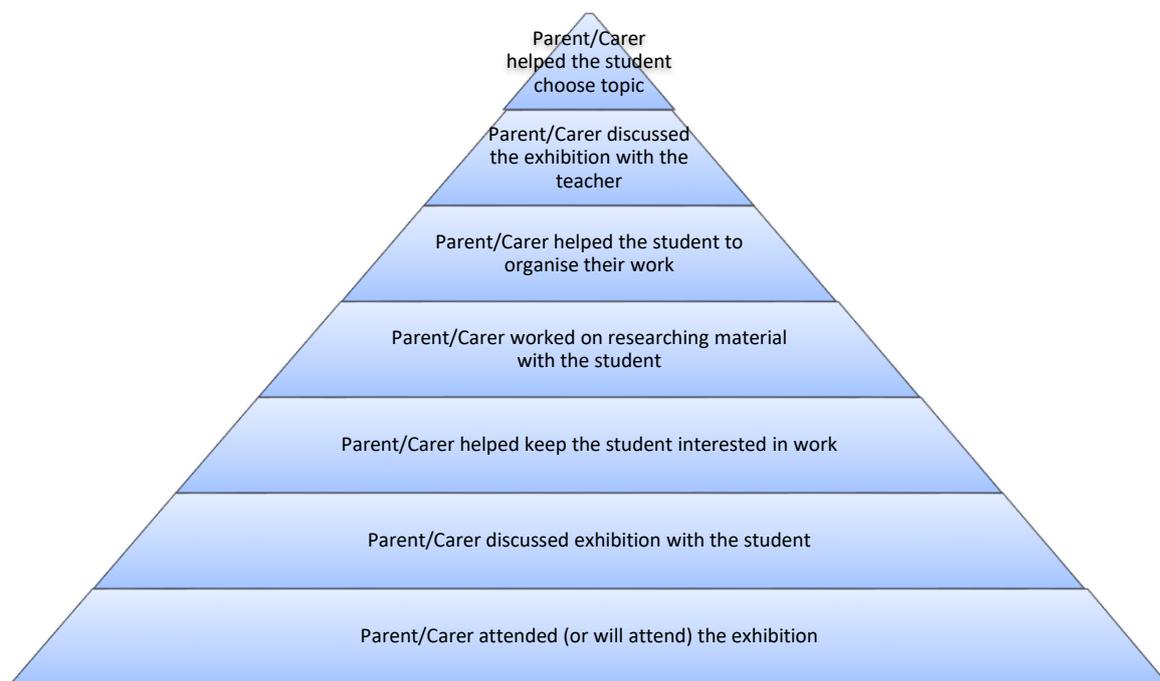

Figure 9: Parent/Carer Help Scale. Student, teacher, and parent/carer perceptions of parent/carer involvement in the PYP exhibition

The hierarchy of the items shows that parents/carers, teacher, and students perceived parent/carer support most frequently in parent/carer attendance at the exhibition. Parents/carer were also perceived to be discussion the exhibition with students and helping to prepare some elements of the exhibition. Parents/carers were least likely to be seen as choosing the students' topics, discussing the exhibition with teachers, and organising student work.
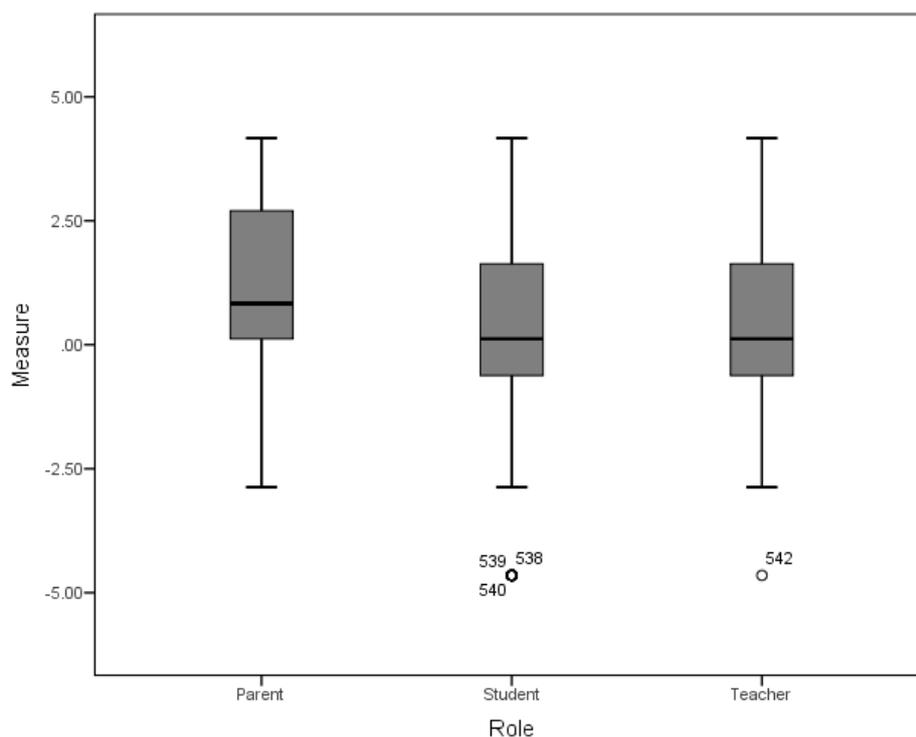

Figure 10: Measures on Parent/Carer Help Scale by role. Measures in logits based on Parent Help Scale items

Figure 10 shows the spread and median of each of the three groups on the same Parent Help Scale. While the spread of scale for each group was similar, the median parent/carer response is significantly higher than the median student or teacher response and all of the outlying cases are low on the Parent/Carer Help Scale and reported by students and teachers. This means that generally, parents/carers felt that they were more helpful than students or teachers thought the parents were.

Some parent/carer help items were not included in this analysis because they did not scale with these items, so they were not statistically related to the other items. Interestingly this included attendance at school briefings, "Took part in school activities or trips towards the exhibition", "discussed the exhibition with the teacher" and the items about feedback from parent/carer to student. It is possible that this may be

because teachers and students were not aware of these activities that the parents were involved in. It is also notable that the item "Helped my children prepare elements of the exhibition" did not scale with the other items, this may be because, as discussed above, this was an issue teachers felt very strongly about and in some cases the parents had been specifically asked not to assist their child in preparing materials.