Research report

A review of research relating to the International Baccalaureate Middle Years Programme

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Executive summary

Introduction

This literature review gives an account of research in the International Baccalaureate Middle Years Programme. It summarizes themes, trends and patterns of accessibly theoretical and empirical evidence gathered from a comprehensive search of educational literature published since 2005 in English. It synthesizes those significant debates, key messages, findings, implications and suggestions on research topics and related issues. Accordingly, it considers gaps, connections and possible implications for further developments and research in the MYP.

Method

Combinations of search terms within a range of sources are: 1) "International baccalaureate" OR "IB" in all fields AND "middle years programme" OR "MYP" **in all field** and 2) "International baccalaureate" OR "IB" in all fields AND "middle years programme" OR "MYP" **in abstract**. 120 references were initially found and further defined based on a list of inclusion criteria. **54** of them are selected and further analysed by employing the strategies of open, axial, focused and conceptual coding based on the researcher's interpretation of the selected evidence and understanding of the programme. Techniques of mapping, comparing and counting are employed to indicate methodological, thematic and conceptual relationships. Categorization and key points of emergent themes and sub-themes are presented subsequently.

Trends of research in the MYP

Research efforts in the MYP have been increasing over the past four years and the focus of research appears to be influenced by the programme establishment timeline moving from MYP-DP transition and student achievement to the effectiveness and strategies of program implementation and expected learning outcomes fundamental to the MYP framework. Most of the research efforts are outcome-oriented which may increase a general perception that the programme aims to prepare students for university success and globally competitive marketplaces. Comparative analyses and case studies appear to be the methodological design of those studies and thus findings from them could not be viewed as generalizations applicable or appropriate to different educational contexts. Nearly half of the studies were conducted in the US, which indicates a need and potential benefits of focusing on non-western-centric educational contexts.

MYP: its educational approach and characteritics

The MYP fosters **holistic education** experience for students through inquiry-based approaches to teaching and learning to develop critical thinking, creativity, independent research skills, self-efficacy and self-identity situated in a broad subject base, cultural contexts and authentic global issues. It enables students to achieve highly-recognized academic standards and to become active, international-minded citizens. It also encourages innovative pedagogy, interconnected curriculum planning across disciplines, collaboration and positive school culture.

Program expansion and marketization

The **neo-liberal market-oriented policy** accommodates the IB as an alternative, appealing curriculum of choice considering its reputation as a global brand of distinction, its innovative and high quality curriculum, its positive impact on schools as an educational reform approach, its multilingual approach to compulsory education and its capacity to successfully embed itself in larger educational systems. Commitments to and coordination of **professional development** at macro level to meet local needs is critical. Involving all stakeholders within school communities to build **shared understandings and responsibilities** and to connect with other constituencies is also important in the selection and introduction process of the IB.

Approaches to program implementation

A **top-down approach** to political, financial and professional support structures and services determines the success of program implementation. **Inquiry-based approaches to teaching and learning** embedded in the MYP framework is sometimes challenging. Teacher's role as a facilitator, active involvement in real-life contexts and meaningful tasks, concept-based focus, reflection and self-evaluation and cross-departmental collaboration appear to be effective strategies to increase the effectiveness of inquiry. Making articulated learning objectives transparent and direct as well as engaging students in **criteria-based assessment** processes by employing differentiated strategies is an important part of the taught and assessed curriculum of the MYP.

Leadership and management

Distributed leadership is commonly-adopted to strengthen interdisciplinary instruction design and content reorganization and alignment as well as to enhance administrative, pedagogical and socioemotional supports. Logistic support and appropriate level of authority need to be given to **MYP coordinators as middle managers** to smooth the process of facilitating connections between subject areas, between middle and high schools and with the other two IB programmes.

Teacher attributes, pedagogy and professional development

Teacher motivation is a driving force leading to meaningful changes in mindsets and professional practice. Clarification, explicate communication, co-constructed understanding and appropriate support addressing professional development needs throughout MYP implementation process are influential. Regarding teachers' beliefs in the efficacy of their **pedagogical practice**, differences between MYP and traditional teachers in instructional differentiation, encouragement of responsibility, assessment for learning, and classroom management are observed. Building of a shared purpose, professional dialogues, ongoing reflection on problems, pedagogical leader advice, lean performance management, empowerment through respect, collaborative curriculum development process and organizational learning are regarded as effective means to teacher **professional development**.

School climate and ethos

The MYP framework encourages opportunities for **collaborative** planning processes, creating a sense of shared experiences and constructing discourse collectively within **teams** or professional communities. Departmental autonomy, institutionalized structures fostering frequent interaction, a sense of shared responsibilities and understandings of MYP

educational approaches and substantial amount of time for administration are supporting conditions for collaboration. The **IB learner profile attributes** are regarded as good indicators to assess school climate and the quality of collaboration and teamwork underpinning the values of MYP implementation.

Learning components

Attempts to connect planned, taught and assessed curriculum for music, mathematics, geography and language(s) with the values and components of international mindedness in different educational contexts are identified in the literature. Strategies for curriculum planning and pedagogy include, for example: 1) situating disciplinary learning with more contextual, disciplinary and cultural perspectives, 2) conceptualizing and assessing expected learning outcomes in classrooms full of complexities and diversities innovatively, 3) designing meaningful month long activities around themes to introduce subject specific skills and theories to build integrated, informed understandings of concepts, and 4) investigating different sources of information and using visible thinking routines to encourage analytical inquiries and critical thinking skills.

Educational continuum

'Backward mapping' is adopted as a strategy to enhance **curriculum coherence and consistency** considering shared features between the MYP and DP; however, such strategy could weaken or distort the unique characteristics of the MYP. Providing a rigorous and student-centered learning experience, strengthening student-teacher relationships, establishing clear norms and expectations around attendance, behavior and academic effort, developing study skills and social skills and ongoing student data monitoring to ensure early identification of issues are strategies for smooth **transition within the MYP**. Forms of cross-programme and departmental interaction such as collaborative planning and team teaching appear to be common means to bring about effective **MYP-DP and PYP-MYP transitions**. In specific, suggestions for improving MYP-DP transition tend to be curriculum development oriented and those for smoother PYP-MYP transition appear to be program implementation related. Experiences in **within-school transition and between-school transfer** seem to be similar as students are able to quickly adjust themselves to changes resulted in organizational and social aspects of the move.

Learning outcomes

Empirical comparative study results reveal a positive relationship between the MYP participation and student **academic achievement** even the main effects on performance in subjects are relatively small. **The Learner Profile attributes** are interrelated with **approaches to learning** embedded in the MYP framework and exhibited throughout the completion of authentic problem solving tasks and Personal Project. As being **global-minded**, MYP students express a deep personal concern for others around the world with a sense of moral responsibility and also appreciate the values rooted in diverse cultures. Correlations between the degree of students' social and emotional **engagement** and academic performance found from studies conducted in different settings are dissimilar.

1. Introduction

1.1 Aims and research questions

The aim of this literature review project is to search, examine and document a range of theoretical and empirical studies in the International Baccalaureate (IB) Middle Years Programme (MYP). The review will summarize the scope, key messages and findings of previous research and also synthesize themes, trends, patterns and relationships emerged from the thematic and conceptual analysis of those studies. Research questions and objectives of the review are specified in Table 1.

Table 1. Research Questions and Objectives

Review Questions	Objectives
1. ***What are theoretical and empirical studies in the MYP since 2005?*** 2. ***What are themes, trends and patterns of those studies?***	• To undertake a thorough, systematic literature search from a variety of sources to identify relevant published evidence based on methodologically-sound search strategies and clearly-determined criteria for inclusion, categories of classification and thematic areas • To indicate themes, trends and patterns by employing the strategies of open, axial, focused and conceptual coding
3. ***What are significant debates on research topics and related issues? What are the various positions? Is there a consensus on relevant topics and related issues?*** 4. ***What are gaps and commonalities of key messages, findings, implications and/ or suggestions of those studies?***	• To summarize concepts, meanings, claims, arguments, relationships, consequences and conclusions emerged from the analysis of selected evidence • To identify gaps, similarities and differences among those descriptive and analytic codes by employing the techniques of comparing and mapping
5. ***What is the chronology of those research topics about the programme? How does it relate to the developments in the MYP?***	• To develop a storyline of the above • To interpret and connect those theoretical perspectives and empirical findings to the developments in the MYP based on the researcher's understanding of the programme

2. Methodological design

2.1 Identifying and describing evidence

2.1.1 Seeking potential studies: search strategy

The review followed several steps in seeking relevant studies for data extraction. First of all, "middle years programme", "MYP", "International Baccalaureate" and "IB" were used as search terms and Boolean operators "AND" and "OR" were used to identify all potential evidence. Combinations of these search terms were: 1) "International baccalaureate" OR "IB" in all fields AND "middle years programme" OR "MYP" in all field and 2) "International baccalaureate" OR "IB" in all fields AND "middle years programme" OR "MYP" in abstract. The search terms used were deliberately open in order to capture all possible studies from a diverse range of sources of information. Search strategies and sources utilized are listed in Table 2. Lists of potentially relevant studies were merged and stored in Endnote[1] after removing duplicated studies.

Table 2. Search Strategies and Sources

Search Strategies	Sources
1) ***Searches of electronic databases[2] of education literature***	• British Education Index & Australian Education Index • EBSCO: Education Research Complete, Education Full Text and ERIC • ProQuest • Database of Research on International Education[3] • International Education Research Database[4]
2) ***Hand searches of relevant journals***	• Journal of Research in International Education • International Schools Magazine, International Education Journal: Comparative Perspectives • Compare: a Journal of Comparative and International Education • Research in Comparative and International Education and International Education Studies.
3) ***Wed-based searches of Google scholar and publishers***	• Taylor & Francis and Sage
4) ***Web-based searches of organizations, associations/ networks and research centers for international education***	• UNESCO online materials[5] • UNESCO Internal Bureau of Education[6] • Aga Khan Foundation[7] • IB Research Unit at the University of Bath[8] • Harvard Project Zero
5) ***Citation chasing***	• References listed in selected research reports were checked to identify any other possible relevant studies

[1] A software tool for publishing and managing bibliographies, citations and references
[2] These electronic databases listed were accessible through the National Central Library in Taiwan.
[3] Managed by the Australian Council for Educational Research (ACER) (http://www.idp.com/about-idp-education/research-database/quick-search.aspx)
[4] An IB hosted database for international education studies (https://ibdocs.International Baccalaureate Organization.org/research/)
[5] http://www.unesco.org/new/en/unesco/resources/
[6] http://www.ibe.unesco.org
[7] http://www.akdn.org/akes
[8] http://www.bath.ac.uk/ceic/ibru/

2.1.2 Defining relevant studies: inclusion criteria and study screening

Titles, abstracts and descriptions of identified potential evidence were read. The following inclusion criteria were applied to define studies to be examined:

1. *Years of publication*: published since 2005 (except those seminal works contributing to the evolution of the MYP)
2. *Types of publications*: refereed journal articles, research reports, postgraduate studies and books
3. *Language of publication*: English
4. *Study design*: employing a methodologically sound approach

After identifying studies from the electronic search, there were two screening phases. The title and abstract of those relevant studies were screened by applying the inclusion criteria and the full-texts were retrieved for those studies that remained after the screening. Through 'snowballing', the number of included studies was further extended.

2.1.3 Selection of studies for synthesis

120 references were found and archived in Endnote and 54 of them were indexed in Microsoft Office Access[9] (see Table 3 for the total number of studies searched and selected) according to the following explicitly-defined categories. Details of the studies included in the review are illustrated in Appendix 1.

1) Research purpose
2) Areas of focus
3) Types of research
4) Types of sources (primary or secondary)
5) Setting(s) (region/ country)
6) Methodological design
7) Study participants/ samples

Table 3. Search and Screening Results

Stage	*Number*
1. Initial searched	120
2. Not relevant	47
3. Not Used	16
4. Repeated	3
5. Selected	54

[9] A database management system

2.2 Analyzing and synthesizing theoretical and empirical evidence

2.2.1 Overall approach to and process of synthesis

Those selected studies were initially mapped for coding according to a list of pre-determined thematic areas. Based on the researcher's interpretation of areas of focus of those studies, emergent thematic areas were indicated and incorporated into the pre-determined categories as follows:.

1) Program expansion
2) Choice and values at national, district and school level
3) Program integration and implementation
4) Curriculum components
5) Pedagogy and learning approaches
6) Assessment
7) Multilingualism and international mindedness
8) Educational transformation and leadership
9) Professional development including teachers' motivation and attitudes
10) Impact on student perceptions, academic achievement and non-academic performance

Concepts, meanings**,** claims, arguments, relationships, consequences and conclusions of individual studies under each thematic area were coded and sorted into sub-themes by using key words in context, repetitions or typologies. Techniques of mapping, comparing and counting were employed to indicate methodological, thematic and conceptual relationships among those themes, trends and patterns. Box 1 indicates an outline and categorization of the themes and sub-themes.

As for the synthesis, it was intended to build arguments around the core themes and used extracted data to support claims. Other literature indicated in those selected studies was also used as the evidence of support. Outcomes of the coding and synthesis were organized by the utilization of Docear[10] to capture all instances of a thematic area and its representative themes. It enabled the researcher to extract materials, interpret, paraphrase, quote and write up the outcomes of analysis and synthesis with a clear trail of evidence to address the review questions.

[10] A software tool assisting with the organization, creation and discovery of academic literature

Box 1: Categorization of themes and sub-themes

1. **MYP: its educational approach and characteristics**
   A. Holistic approach to education
   B. Characteristics of the MYP in teaching and learning
2. **Program expansion and marketization**
3. **Program implementation**
   A. Approaches, strategies and interventions
      - *Inquiry-based teaching and learning*
      - *Criteria-based assessment*
   B. Leadership and management
      - *A distributed perspective of Leadership and management*
      - *Coordinators as middle managers*
   C. Teacher attributes, pedagogy and professional development
      - *Teacher motivation and attitudes towards change*
      - *Teaching practices and beliefs in self-efficacy*
      - *Teacher professional development*
   D. School climate and ethos
      - *Collaboration and teamwork*
      - *Connection with the learner profile*
4. **Student learning**
   A. Learning components
      - *Music education*
      - *Mathematics education*
      - *Geography curriculum*
      - *Language learning*
   B. Educational continuum
      - *Curriculum coherence and consistency*
      - *Transition from one grade level to another with the MYP*
      - *Transitions across the continuum*
        a. From the MYP to DP
        b. From the PYP to MYP
      - *'Within-school transition' vs. 'between-school transfer'*
   C. Learning outcomes
      - *Academic achievement*
      - *Non-academic performance*
      - *Student engagement*

3. Trends of research in the MYP

Trends and a number of patterns were recognized in terms of their nature, scope and methodological design. The profile of MYP related research and implications for further research are presented in this section.

Figure 1. Year of Publication

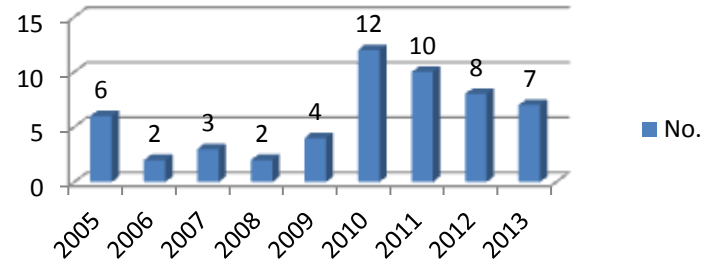


Figure 1 indicates an increased amount of research efforts in the MYP over the past four years. The focus of research tends to move from MYP-DP transition and student achievement to the effectiveness and strategies of program implementation and student learning and expected outcomes fundamental to the MYP framework, which may have been influenced by the establishment timeline of the programme.

Figure 2. Types of Publication

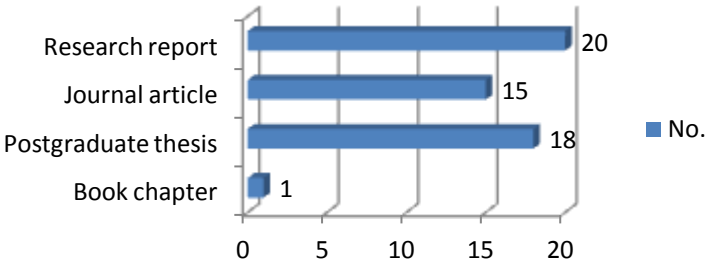
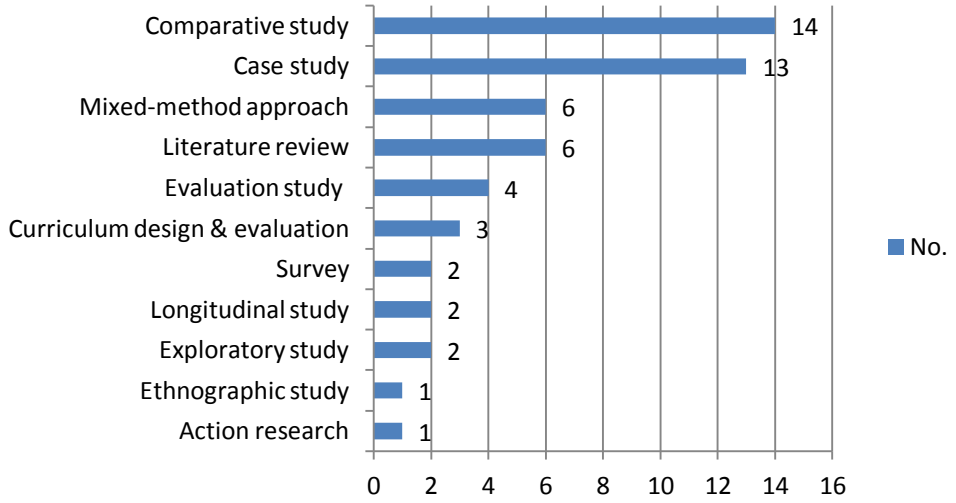


Figure 2 infers the accessibility of those research efforts in the MYP. Since most of those selected studies appear to be research reports and postgraduate theses rather than published books or articles, theoretical or empirical evidence in relation to the programme may not be easily found and gathered. A similar impression has also been recognized by other researchers (e.g. Willcoxon, 2005).

Figure 3. Methodological Design



About half of the references selected incline to be comparative analyses and case studies (see Figure 3). It is worthwhile noting that findings generated from those studies could not be generalizations applicable or appropriate to other educational contexts. Since educational experiences and intended learning outcomes could not be captured at a specific moment in time, longitudinal data would indeed be relevant to illustrate the long term impact of the MYP which is also suggested by a number of MYP studies (e.g. Healer, 2012; Siskin and Weinstein, 2008a).

Figure 4. Area of Focus

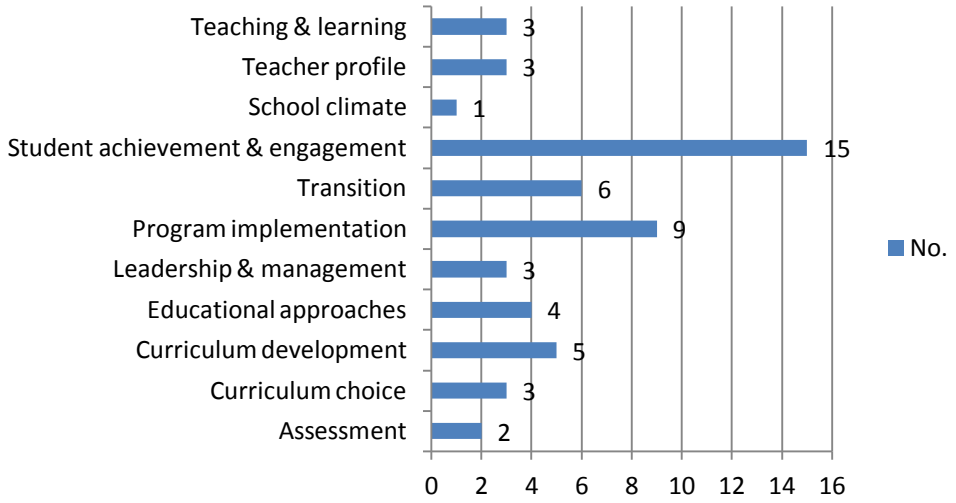
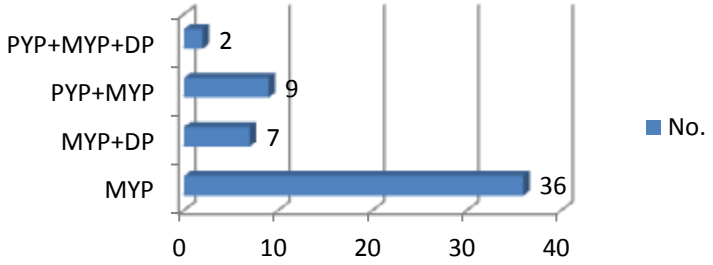


Figure 4 points out the focuses of the existing research in the MYP. It is evident that most of the research efforts are outcome-oriented which may increase a general perception that the programme prepare students for university success and globally competitive marketplaces. However, such empirical comparative analyses may not be directly relevant to teaching and learning in classroom or curriculum development. To strengthen further developments in the programme and also teaching and learning practices, further research on, for example, the effectiveness of the MYP in different contexts, non-academic performance and changes, how

to deliver 'international-mindedness' and other components essential to the IB and MYP is recommended to be further explored.

Figure 5. Programme Context(s)



Notably, Figure 5 indicates connections of the MYP with the other two IB programmes. Such an attempt is beneficial to demonstrate approaches, strategies, promising practices and concerns leading to the continuum of education.

Last, 26 out of those 54 selected references are conducted in the US context due to the fact that the largest population of schools offering the MYP is based in the US. As the IB values different perspectives, research efforts focusing on educational contexts which are not western-centric would be beneficial.

4. MYP: its educational approach and characteristics

4.1 Holistic approach to education

Holistic education appears to be a commonly-discussed theoretical aspect of the MYP in the literature. Principles, values, attributes and outcomes in association with the holistic approach to teaching and learning in the MYP context have to be clarified, refined and communicated to build shared understandings. Hare (2006) defines the essential components of holistic education comprising: interconnectedness, relationship development, a sense of shared community, a sense of caring, developing personal goals, managing personal development and growth and the environment full with trust and respect. He then further indicates values, behavioral outputs and key indicators linked with those components as the embodiments of effective MYP implementation called 'a person profile', that is, students' capabilities and attributes developed in the course of their middle years of education.

4.2 Characteristics of the MYP in teaching and learning

Table 4 summarizes positive impact of the MYP from the perspectives of school administrators, teachers, parents and students in the US and UK (e.g. Sizmur and Cunningham, 2012; Stillisano, *et al.*, 2010, 2011; Wade and Wolanin, 2012, 2013a). Those underpinning values of the programme are influential in parental program selection decision-making for their children.

Table 4. Characteristics of the MYP in Teaching and Learning from Different Perspectives

	UK			US	
	Students	*Parents*	*Teachers*	*Teachers & Admin.*	*Students*
1. Develop holistic education experience for students with exploration to broad subject base			●	●	
2. Increased self-efficacy and building self-identity					●
3. Inquiry-based approach to develop critical thinkers and independent, active researcher with evaluation skills	●	●	●	●	●
4. Develop open-mindedness through collaboration and discussion	●				●
5. Less focus on rote learning and examinations		●			
6. Develop global awareness/ international mindedness	●		●	●	●
7. Develop civic mindedness/ active citizenship/ helping others	●		●		●
8. Promote community service/ service learning	●				●
9. Use of feedback	●		●		
10. Use of authentic assessment	●			●	
11. Increased student motivation and engagement in learning		●	●	●	
12. Students leading lessons and teachers acting as facilitators		●	●		
13. Change in teaching philosophy and improved professional practice in pedagogy and lesson planning				●	
14. Autonomy and creativity in teaching		●	●		
15. Diversity				●	
16. Increased teacher collaboration and cross-discipline planning				●	
17. Relevance to students by relating learning to real life situations/ scenarios	●	●	●		
18. Prepare students for further studies, work and life		●	●		●
19. Academic achievement of national and internationally-recognized standardized tests				●	
20. Useful and versatile qualification		●			●
21. Positive impact on school culture		●	●		

(synthesized from Sizmur and Cunningham, 2012; Stillisano, *et al.*, 2010, 2011; Wade and Wolanin, 2012, 2013a)

5. Programme expansion and marketization

Policies for programme selection vary in different nations and educational settings. Taking Australia as an example, the demand for a centralized curriculum to encourage student mobility within the nation is increasing. Situated in a context with such neo-liberal market-oriented policy, the IB is perceived as an appealing curriculum of choice due to its reputation as a global brand of distinction, its positive impacts on schools and its capacity to successfully embed itself in the larger educational system (Doherty, 2009). Clear understanding of current school needs and a projected future is influential to carry out a thorough and inclusive MYP program selection process (Sperandio, 2010). Nevertheless, it is criticized that the design of school curriculum appears not to consider Australian localities and needs in specific even the IB addresses global and local frames of citizenship education, which remains to be further explored to increase the effectiveness of program implementation.

Implementation of the IB programmes as a strategy for district reform is another example of decision-making for program selection at macro level, aiming to build a stronger foundation for meeting academic demands and to build connections between schools to facilitate professional dialogues and curriculum development efforts across multiple schools (Siskin and Weinstein, 2008b). District level involvement in situating and providing financial, political, and professional supports is rather critical to the success of program implementation. For instance, the program offering policy to require Advanced Placement (AP) or the MYP and DP affects the level of educational coherence. Connections from within a district and from other constituencies influence the efficiency and effectiveness of communication. Financial and personnel commitments to and coordination of professional development to meet local needs is essential to the degree of effectiveness of programme implementation but also efficacy of the district.

From the institutional perspective, the interest in undertaking the MYP in the Dutch public bilingual school context is growing since its educational goals, curriculum framework, pedagogical approaches and assessment models meet newly-defined standards for bilingual education to increase competitiveness (Visser, 2010). How the MYP fits the needs of bilingual education in the Netherlands as one of the crucial initiators of effective programme selection is evident. Additionally, the reputation and image of the MYP and its focus on international perspectives are the other two influential factors in choosing the MYP. Visser (2010) further identifies factors preventing the introduction of the MYP including the culture of Dutch secondary schools and political context do not welcome the MYP as it is seen as an ambitious, complex programme. This implies the importance of including key stakeholders of schools within their school communities to build a shared understanding and responsibilities in the selection and introduction process.

It is realized that a school with no pressure to improve academic results seeks programme features which can be translated into practice the school community has committed. On the contrary, a school with pressures to bring about a rapid change in student outcomes seeks programmes based on their perceptions of its capabilities to interact with programme features. By surveying administrators from 336 public and independent schools worldwide, Sperandio (2010: 143-144) indicates twelve reasons for selecting the MYP and also illustrates strategies and factors involved in the selection process at school level. Those influential factors are synthesised and prioritized in the following order:

1. Innovative programme features (54.4%)
2. Using the MYP along with the PYP and DP to develop a 'holistic', 'continuum' curriculum (42.9%)
3. A good fit with existing mission statements and educational philosophies (38.5%)
4. Promoting intercultural awareness within a school community (36.9%)
5. Providing high academic standards and challenges (32.0%)
6. Distinct international education brand (23.4%).
7. Explicit teacher guidelines and direct links of required professional development for teachers to the programme (16.9%)
8. Connections with other schools to smooth transition and mobility (11.2%)
9. Proving resources of externally validated, internally assessed student work and teacher developed units (10.7%)
10. Flexibility in choosing content knowledge and assessment methods (10.1%)
11. Providing certificates of achievement with its international recognition (10.1%)
12. Distinct from local/national curriculum or educational systems (7.4%)

The above analysis implies that the most important *determinants of MYP selection* relate to innovative, holistic, continuum, value and intercultural aspects of the programme rather than academic outcomes resulted from programme implementation.

From the personal perspectives of 11 MYP coordinators from Australia, Canada and the USA on reasons of introducing the programme to their schools, those reasons are ordered as follows (Visser, 2010):

1. Its value and an opportunities to become part of the IB community (10 responses)
2. Its educational philosophy and connectedness with the IB Diploma Programme (7 responses)
3. Its appropriateness to those who work in heterogeneous classes (6 responses)
4. Its structure as a model for educational reform (4 responses)
5. Its emphasis on student-centered, guided constructivist teaching and learning methods (3 responses).
6. School profiles (3 responses)

Asked what they deemed the most important aspects of the programme, it was again the whole philosophy permeating the MYP chosen most often. In the Anglo-Saxon world, MYP educators firmly believe it is the programme philosophy that giving the implementation shape and substance.

Values underpinning the decision-making process to pursue implementation of the IB programmes, both internal school-level and external policy factors influencing and interplaying with decision making by school boards and principals to pursue the IB programs, not only to improve the overall quality of the school but to potentially reduce school level policy layering and promote greater school-level autonomy in myriad current and upcoming policy reforms deriving from both state/district and national policies in U.S. public education (Clissold, 2012). Although the adaptation of the MYP has been increasing, lack of recognition of the MYP in the UK and by universities as well as confusing assessment criteria have been identified (Sizmur and Cunningham, 2012). The expansion of IB programmes in both private and public schools and competition between them for students around the globe call for more

resources for program support, credentialing of students, and marketing of the school are needed for effective programme choice and wide recognition.

6. Programme implementation

6.1 Approaches, strategies and interventions

6.1.1 A top-down approach to program implementation

As mentioned that political, financial and professional supports determine the success of program implementation. Taking a 3-year project awarded from the Advanced Placement Initiative (API) grant as an example to broaden access to the IB programme for Title I high schools in the US, a model of support structures and services to build a pathway that will connect to build a pathway that will connect programs and prepare students from the Middle Years through the Diploma, and to expand participation across schools, staff, and students. Key components of such design include (Siskin, *et al.*, 2010):

- Increasing scaffolding materials and leadership activities
- Creating a new whole school coaching model and providing on-site coaches with the expertise in IB, experience in urban schools, practical knowledge about the processes and problems of change
- Offering new supports and training for guidance counsellors to change understandings of who could be IB to expand access to more students
- Developing backward mapping of curriculum from MYP through the Diploma
- Drawing on the experiences and insights of other IB practitioners through Professional Learning Groups (PLGs)

6.1.2 Inquiry-based teaching and learning

The inquiry-based approach to teaching and learning embedded in the MYP framework is sometimes challenging. The Khan Academy (khanacademy.org) is suggested as an digital tool to facilitate the teaching and learning in MYP classroom by having students engage in real-world problems through the exploration of practical, tangible resources that focus on key concepts across the range of MYP subjects and subsequently put ting the concepts and skills acquired into effect as meaningful actions followed by self-evaluations of their performance (Lenihan, 2013). For this to be achieved, teachers are encouraged to play the role as a facilitator, are committed to cross-departmental collaboration and employ a variety of co-agreed pedagogical approaches.

6.1.3 Criteria-based assessment

Teachers' interpretation and understanding of a program and course criteria affect their articulation of learning objectives, which indicates the subjectivity of criteria-based assessment (Sadler, 2005) and the need to explicate articulated objectives and requirements. This is evident in the findings from a study examining the co-relationship between the level of understanding and the degree of explicit articulation of learning objectives and assessment criteria in the MYP (Carlson, 2012). Interviews data revealed that perceptions on the quality of learning objective articulation varied between teachers and students. The study outcomes showed that even teachers' understanding of subject areas' assessment criteria appeared to be adequate, their understanding of how to articulate such information and understanding in

a manner that would foster student engagement and autonomy in the assessment process tended to be superficial. Observations also found only a small percentage of students demonstrated an understanding of learning objectives of the MYP and assessment criteria of subject areas, which influenced the quality and forms of student involvement in the assessment process such as the application of strategies of self-adjustment, self-improvement, and reflection. To articulate expectations and learning objectives and implement a criteria-based assessment model successfully, students must be actively involved in assessment process so that they are capable to critically self-evaluate their learning and set coherent and clear academic goals (Wiggins, 1998), which enhances the development of metacognitive processes and skills.

Carlson's (2012) study also found that many teachers relied heavily on a non-differentiated approach to articulate learning objectives for assessment tasks such as distributing rubrics and presentation sheets. To encourage the development of student self-evaluation, metacognitive processes and academic reflection, practical strategies recommended include: 1) contextualizing reflection activities (Davies and La Mahieu, 2003), 2) developing and working with task exemplars (Sadler, 2005) and 3) developing and implementing formative assessment practices aligned with summative learning goals (Pinchock and Brandt, 2009).

6.2 Leadership and management

6.2.1 A distributed perspective of Leadership and management

Distributed leadership appears to be the most commonly-mentioned leadership style in the literature. By integrating theories of distributed leadership and social networks to form a conceptual framework for analysis, an exploratory case study (Bolivar, 2009) described how those theoretical aspects linked to practical leadership actions and therefore effects during the design and early implementation of a MYP curriculum master plan (see Table 5).

Table 5. Leadership Enactments and Outcomes in Curriculum Planning and Early Implementation

Leadership Tasks	Actions	Leadership Enactments	Outcomes
Design Tasks	**Content reorganization**: redistributing subject content to meet the MYP criteria and incorporate new and relevant knowledge	A collaborative distribution of responsibilities based on participative decisions and guided by heads of departments	• A dynamic process • Enables horizontal (within grade levels) and vertical (within departments) articulation • Meets coherence necessary to achieve a systemic academic vision
	Content alignment: assigning each grade level with corresponding MYP learning objectives	Individual teachers working on their own responsibilities resulted in a 'atomized' distribution	
	Interdisciplinary instruction design: developing learning units that integrate essential knowledge and skills in the interdisciplinary way	Collaborative, informal and fluid patterns of interaction among teachers	
Teacher Support Tasks	**Administrative support**: disseminating and communicating information on procedures, deadlines and planning instruments	Rather centralized on MYP coordinators and heads of departments	• Providing a unifying direction to the MYP by disseminating consistent logistical information • Minimizing divergent interpretations
	Pedagogical support: fostering teachers' instructional practices in alignment with a shared vision		• Giving teachers the ability to focus on instructional issues
	Social emotional support: recognizing teachers' efforts and advising on personal issues		

(adapted from Bolivar, 2009)

6.2.2 Coordinators as middle managers

MYP coordinators often see themselves as innovators and/ or dedicators who seek challenges, are willing to try new things and push boundaries, and promote the ideologies and pedagogical values of the programme and IB education. Key functions of MYP coordinators recognized from the study view them as:

1. 'Guide alongside' co-constructing MYP curriculum units with teachers, which encourages the establishment of credibility and trust;
2. 'Administrator' managing curriculum documentation and meetings, which is less favoured by both coordinators and teaching staff;
3. 'Facilitator' overseeing the implementation process in terms of pace, emphasis, and communication, which is depended on coordinators' abilities to improvise and enlist support; and
4. 'Professional developer' providing resources and leading in-school training, which empowers them in leading professional development of teaching colleagues.

The practice of having coordinators to lead the process of curriculum development and implementation collectively could be regarded as an embodiment of the distributed view of leadership and management. A study contributing to understanding of the role of MYP coordinator in implementing the programme in a variety of school settings evoked 'collaborative partnership' as a means for program development and educational policy implementation. MYP coordinators play an essential role in facilitating connections between subject areas, between middle and high schools and with the other two IB programmes - the PYP and DP (Robertson, 2011). Similarly, Wade (2011) has stressed that MYP coordinators need to ensure the alignment of the MYP aims and objectives with the district curriculum and the core curriculum.

As identified that coordinators are often with much responsibility and little authority, it is suggested that their senior managers need to be supportive to address logistical challenges and also to act as authority figure. Furthermore, as MYP coordinators work closely with teachers, their input is valuable to help with school-wide incorporation of MYP structures and expectations (Wade, 2011). To enhance competences of IB coordinators, better understanding of number and range of other roles they play in schools and various types of supports provided and their impact on coordinators' practices is essential and further research in this area is needed (Siskin and Weinstein, 2008a).

6.3 Teacher attributes, pedagogy and professional development

6.3.1 Teacher motivation and attitudes towards change

Successful implementation of innovations in education requires changes in behaviors and attitudes. However, changing mindsets and thus professional practice appears to be challenging as teachers could easily retreat to what is safe, predictable, and stable, that is, their subject-based habitats (Robertson, 2011). Since teacher motivation is a driving force leading to successful changes, research efforts addressing the role of teacher motivation and their perceptions towards change throughout the implementation of an innovative programme such as the MYP would contribute to: 1) increasing a clear understanding of processes and the degree of involvement necessary to becoming an IB World school and 2)

providing appropriate support and professional development needs to individual and groups of teachers. A study of 35 teachers' profiles in an IB World School in the US indicates that personal investigation and conversation with other IB educators create their interest in and a sense of commitment to the MYP as an educational innovation (Walters, 2007). Table 6 further summarizes key areas of focus and research findings regarding teacher motivation and educational change.

6.3.2 Teaching practices and beliefs in self-efficacy

"Individuals with high levels of self-efficacy are more likely to initiate new tasks and persist in light of roadblocks, frustrations, and difficulties" (Meyerson, *et. al.*, 1992: 538). This indicates the importance of understanding factors affecting teachers' self-efficacy leading to effective implementation of innovations. Using Stronge and Tucker's (2003) 'Teacher Effectiveness Behavior Scale' and Tschannen-Moran and Woolfolk-Hoy's (2001) 'Teacher's Sense of Efficacy Scale' to examine the impact of MYP implementation on teaching practices and efficacy beliefs of MYP (n=20) and traditional middle school (n=20) teachers, it was revealed that both MYP and traditional middle school teachers' beliefs in their efficacy for student engagement, instructional practices and classroom management are not different (Hutchings, 2010). However, results from classroom observations and t-Test identified a statistically significant difference between MYP and traditional teachers in regard to instructional differentiation, encouragement of responsibility, assessment for learning, and classroom management. Comparisons of pedagogical practices between these two groups of teachers are detailed in Table 7.

Table 6. Key Areas of Focus and Research Findings on Teacher Motivation and Educational Change

Theme in Question	Guiding Theory	Focuses	Findings
Levels of concern experienced at different stages of the adaptation process	Concerns based adoption model (Hall, *et al.*, 1987) Stages of concern (Hall and Hord, 2001)	To provide a tool for clarifying change, constructing a common understanding of the change by everyone involved and exploring what teachers think about implementing the MYP and the change process	• Most concerns fell into self concerns, that is, 'awareness', 'informational' and 'personal', at various times during the MYP adoption process. • Professional development for staff should be in a progressive manner around the stages of concern including: 'awareness', 'informational', 'personal', 'management', 'consequence', 'collaboration' and 'refocusing'.
Personal changes throughout the MYP implementation	Diffusion of innovations theory (e.g. Rogers, 1995)	To provide a construct for examining the MYP implementation, the means of programme transmission among individuals, the rate of the MYP dissemination and the adopters of the implementation To provide a tool for explaining the adoption of the MYP and the implementation decision process that shapes the probability	• Philosophical changes (i.e. paradigm shifts) are critical for successful MYP implementation. • Behavioural changes resulted in the MYP implementation are aligned with the MYP approaches: global thinking, international outlook, making connections with areas of interaction, reflection, more curious about process and ways to document process, infusion of professional learning communities and more use of pre and post assessments.
Meaning made from the MYP implementation experience			• The school's reputation and pride created within the school community based on student performance are the meaning made out from the MYP implementation experience.
Necessary attributes for successful MYP implementation	Attribution theory (e.g. Weiner, 1979) Cause of success and failure (Heider, 1958)	To provide perceived reasons and retrospective judgments that shape performance in teachers while implementing the IBMYP	• Attributes of ability and effort are identified as essential attributes for successful MYP implementation. • Those 'ability' related attributes include: strong communication, classroom management, and organizational skills, creativity and lots of energy and flexibility. • A willingness to learn, ability to work with others, appropriate risk taking, ability to inspire and manage change were 'efforts' related focusing on personal development which would then be translated into classroom teaching.

			• All participants view the MYP implementation as a way to improve learning, shape teacher performance and increase motivation.
Level of confidence in ability	Self-efficacy theory (e.g. Bandura, 1997; Guskey, 1988)	To understand how intrinsic confidence levels and levels of personal capabilities affect motivation and persistence when teachers are faced with change and implementing the IB MYP	• The majority of the participants are confident, which infers the high level of self-efficacy (i.e. an awareness of self-capabilities), influences teacher motivation to implement the IBMYP innovation. • Their motivation is affected by student success, the potential for student impact on a global level, personal pride, program alignment and results, the increased amounts and levels of work and the time commitment for programme implementation and the MYP's commitment to life long
Level of self-efficacy influencing motivation to implement the MYP			

(adapted from Walter, 2007)

Table 7. Comparisons of Teaching Practices between IB and Traditional Middle School Teachers

	IB Teachers	*Traditional Teachers*
A) Characteristics of effective classroom management and organization skills		
1. Classroom management skills	●	
2. Classroom organization skills	●	●
3. Used more effective organizational strategies to maintain momentum and variety	●	
4. Organized and/or incorporated tasks, materials, and space to facilitate learning by students	●	●
5. Had smooth transitions and provided a classroom environment that supported ongoing instruction with minimal interruptions	●	●
B) Effective instructional strategies in teaching		
1. Instructional differentiation for individual students	●	
2. Instructional focus of learning, instructional clarity, instructional complexity, expectations for student learning, and use of technology	●	●
3. Maximized time on task and focused on instruction	●	●
4. Communicated effectively with students and provided examples to provide a better understanding of the material presented	●	●
5. Provided opportunities for students to utilize their higher order thinking skills	●	●
6. Consistently encouraged students to take responsibility of their learning	●	●
C) Use of assessment practices to monitor student progress		
1. Assessment for understanding	●	
2. Quality of verbal feedback to students	●	●
3. More regularly check for understanding and monitor student learning through a variety of methods (e.g. presentations, group work, student led discussion, and questioning)	●	
4. Provided verbal feedback and addressed students' areas of strength/weakness	●	●
D) Selected personal dispositions in classroom teaching		
1. Encouraged students to take responsibility of their learning	●	
2. Caring, fairness and respect, positive relationships, and enthusiasm	●	●
3. Demonstrated commitment toward their students in a caring manner	●	●
4. Demonstrated fairness and respect towards students	●	●
5. Modelled and nurtured supportive relationships with students	●	●
6. Enthusiastic and passionate about teaching which provided students with enjoyment of learning	●	●

The comparison results demonstrated that on average MYP teachers are fairly confident in their own abilities and effectiveness as teachers, which is also found in an IB-commissioned research project investigating the implementation of the MYP in the UK indicating more frequent associations of classroom practices with the MYP approaches (Sizmur and Cunningham, 2012). From an IB Access Project (Corcoran and Gerry, 2010, 2011), after being involved in the project for two years, the majority of participant MYP teachers from eight high schools in four districts reflect that they feel well-prepared for using high-impact instructional practices such as using rubrics, using inquiry, using lesson design, using student teams and emphasizing high-demand tasks (ranked as the most significant gains). Moreover, from the perspective of a group of MYP teachers in the US, involving students in critical thinking activities and connecting lessons with real-life issues and different cultures appear to be the most frequently-adopted classroom strategies (Wade and Wolanin, 2012). This is supporting the claim that the MYP is beneficial since it allows teachers to be fully committed to the teaching beyond what is tested in standardized tests (e.g. Kobylinski-Fehrman, 2013). However, it is not made clear whether such increases in teacher preparedness and the use of instructional practices were resulted from the provision of technical assistance, simply increased familiarity with the practices or more awareness of the expectations of the project.

Even the positive impact of MYP implementation on teachers' self-efficacy has been identified, they are less confident about their use of specific MYP tools and practices and also are not certain about their command of the Areas of Interaction, the Learner Profile and the MYP Unit Planner (Corcoran and Gerry, 2010). Besides, time, workload and strictness of district curriculum, priorities and requirements are other crucial factors influencing the degree of teachers' commitment and the effectiveness of their professional practices (Wade and Wolanin, 2012). For instance, lack of common planning time for collaborative planning is viewed as one the implementation challenges (Corcoran and Gerry, 2010; Siskin and Weinstein, 2008a). The pressure of keeping up outlined topics does not allow sufficient time to have students reflect on their learning.

6.3.3 Teacher professional development

Training is an absolutely non-negotiable part of the process of becoming a MYP teacher. When examining teachers' knowledge and their practical application of the MYP 'Areas of Interaction' (AOL) at two schools in the Netherlands (Lugt and Oosterhoff, 2009), teachers' awareness of principles and overall guidelines concerning the use of AOL in class was gained: throughout training received, dialogues at meetings, ongoing reflection on problems and from advice provided by pedagogical leaders. However, such knowledge and awareness of AOL are partially evident in the developed unit planners but not featured in all classes observed. Results generated from an investigation on teachers' perceptions and experiences of the MYP on their professional development illustrated that the majority of study participant teachers reflected that IB approved MYP training had supported their learning needs and provided useful information/ resources, especially on developing lesson plans and assessments, collaborating with others and learning about critical thinking, IB learner profile attributes and international mindedness (Wade and Wolanin, 2012).

Professional development resulted from the curriculum development process is also experienced by MYP coordinators in terms of capacity building to integrate diverse resources and enhancement of pedagogical practices. Additionally, to evolve a school-based curriculum framework, collaborative partnerships are promoted at different levels: 1) between schools with honest, constructive discourse about expectations, 2) between coordinators to exchange

ideas and resources, and 3) between teaching colleagues within schools as developing their own expertise (Robertson, 2011).

To improve teacher practice in designing curriculum and assessment that prepares students for the DP, tool development and on-site professional learning are suggested as effective support strategies including developing MYP units, assessment task banks, website, online professional development and mentoring, blended professional development, classroom videos, and recruitment materials (Corcoran and Gerry, 2010, 2011). To manage the professional development process more effectively, lean performance management is suggested as a means to approach sustainable organizational improvement (Flumerfelt, 2010). Perceived dimensions of "Lean Performance Management Variables" (LPMV) (Liker and Meier, 2006) identified comprised of shared purpose, needs-based processes, respect for people and problem-solving. Findings from this study demonstrated no significant relationship between LPMV and student achievement in Texas MYP schools. However, results validated that involvement in the continuous improvement process included: 1) employee shared purpose, 2) school commitments to values of needs-based processes, 3) empowerment through the concept of respect for people, and 4) embracing organizational learning (Villarreal, 2011).

6.4 School climate and ethos

6.4.1 Collaboration and teamwork

The interdisciplinary, inquiry-based pedagogical approach embedded in the MYP creates a structure for interactive, engaged learning and aims to promote a positive school climate and to enhance student engagement in learning (IBO, 2011). The implementation of the MYP creates a sense of shared experience and a positive attitude toward professional community in all participant schools for the IB Access project (Corcoran and Gerry, 2011). The programme framework also facilitates collaborative work among teachers and the development of deep collegial relationships through such collaboration (Kobylinski-Fehrman, 2013). Collaborative processes and constructive discourse underpin MYP implementation and bring about structural, cultural and emotional changes. The degree and quality of those changes appear to be depended greatly on the agency of pedagogical leadership teams (Robertson, 2011), which indicates that the level of collaboration is correlated to conditions resulted in leadership and management styles and strategies MYP schools adopted. An integration of empirical study and literature review findings is highlighted to illustrate those conditions supporting and constraining collaboration at school and team levels in Table 8.

6.4.2 Connection with the learner profile

Looking at effects of the MYP on school climate from the staff perspective, the IB learner profile attributes are regarded as good indicators to assess school climate (Millard, 2011). Involvement of administrators as positive role models and the level of commitment to the MYP are two essential influential factors in school climate.

Table 8. Conditions Supporting and Constraining Collaboration

	Conditions supporting collaboration	*Conditions constraining collaboration*
School level	• Departmental autonomy for instructional decision-making distributing rather than centralizing responsibilities so that teachers are able to work collaboratively within their areas of expertise towards shared curricular outcomes • Authority and recognized expertise of subject area coordinators/ heads of departments facilitating in building consensus and finalizing team decisions so that collaborative processes are moved along (Harrison, 2005; Lin, 2001) • Institutionalized structures increasing the frequency of interaction and thus building intuitive working relationships among colleagues in schools	• Being reluctant to take on leadership roles in informal contexts (Krisko, 2001; Smylie, 1995), spontaneous forms of interaction without guidance causing more team instability than institutionalized working relationships (Gronn, 2003) • Disproportionate amount of administration requirements prevent teachers from spending time to develop lessons collaboratively (Fullan and Miles, 1992; Grossman, *et al.*, 2001Hennessy, *et al.*, 2004). • Limited face-to-face engagement, turnover in staff and other school and district agendas competing with the MYP project agenda (Corcoran and Gerry, 2011)
Team level	• Teachers' sense of shared responsibility for student learning supporting high levels of collaboration in instruction (Bolivar, 2009)	• Resistance to an interdisciplinary vision and joint lesson planning causes less interaction among colleagues and teacher isolation (Bolivar, 2009)

7. Student learning

Studies in relation to student learning are broadly categorized into learning components, process and outcomes, illustrated in the subsequent sections.

7.1 Learning components

Results of curriculum comparison between the MYP, GCSE and IGCSE show that content across these three programs are generally similar. Nevertheless, non-scholastic attributes such as international- and civic-mindedness as well as higher order thinking skills were more focused and pronounced within the MYP (Sizmur and Cunningham, 2012). Interconnectedness between subject areas and international mindedness has been indicated (Wade and Wolanin, 2012). Four references are found with regard to how planned, taught and assessed curricula for disciplinary learning connects to the cultivation of international mindedness (namely, multilingualism, intercultural awareness and global engagement) are demonstrated in the following sub-sections.

7.1.1 Music education

Field's paper (2010) focuses on the discussion of how a pluralist, process-oriented and student-centered approach to curriculum design for music education within the MYP framework promotes international mindedness. It is argued that 'understanding can be articulated, planned for and supported as students go about experiencing, acting, interacting and reflecting' (Field, 2010: 18). Accordingly, it is more productive to aim for intercultural 'understanding' rather than 'awareness' as one of the fundamental concepts in the MYP. To

cultivate such understanding in music education in the MYP, Thompson's (1998 cited in Field, 2010) categorization of ways to develop curricula for international education is used, including:

1. *Exportation:* transferring existing curricula in new settings. Performance or theoretical skill based examinations are adopted. Disciplinary and interdisciplinary understanding is encouraged.
2. *Adaptation:* acknowledging cultural or contextual differences through the exploration of various perspectives and their contexts. Value systems may not be changed. Intercultural awareness is encouraged.
3. *Integration:* situating disciplinary learning with more contextual, disciplinary and cultural perspectives. Performance and composition are used as assessment methods. Integrated, informed understanding is developed.
4. *Creation*: exploring themes or issues that are culturally or locally relevant and also globally significant.

By examining the above curriculum design models and curriculum initiatives for music education that foster intercultural understanding, a number of suggestions for further investigation are made, as follows:

1. Distinctions between 'multicultural' and 'intercultural' to prevent misunderstandings
2. Curriculum planning and pedagogical strategies for integrating own values and intercultural understanding with principles, values and components of international education
3. Innovative ways of conceptualizing and assessing expected learning outcomes in classroom full of complexities and diversities
4. Promising practices of situating learning in cultural contexts
5. Effective ways of introducing emergent issues surrounding technology, glo-balization, 'world music' as well as protecting vulnerable forms of musical expression

7.1.2 Mathematics education

Unlike studies focusing on subject-specific curriculum analysis and administrative issues, an ethnographical study (Corlu, 2013) employing a variety of qualitative data collection methods to capture dialectic and responsive processes and to demonstrate how healthy connections among class members of different cultures to create a shared mathematical culture in terms of ideas, norms, and values in a mathematics classroom within the context of the MYP in Turkey. Those promising strategies include:

1. Introducing a 'mathematical icebreaker' activity to share common and different interests among students
2. Designing month long activities such as 'Spy Game' around a cryptology theme to introduce basic mathematics skills and also number theory, combinatorics and graph theory
3. Teaching mathematics for a meaningful purpose but not just for tests
4. Dialoguing with mathematics teachers from different grades to perceive the continuities from one programme to another

It is found that students were consistently referred back in their comments to their homes or cultures and they changed their thought about how others did mathematics and their ethnocentric assumption that mathematics was largely a product of the intellectual work of Europeans

7.1.3 Geography curriculum

Ryan (2012) stresses the appropriateness of introducing controversial topics such as migration at a relatively early age by explicating her reflection on the implementation process and effects of lessons developed for a Grade 10 MYP geography curriculum. Pedagogical strategies adopted throughout the delivery of a themed unit include:

1. Use of databases to investigate different resources
2. Adaptation of visible thinking routines to encourage analytical inquiries and critical thinking skills
3. Use of role play to challenge stereotypes and evaluate benefits and bias

It is identified that students are able to explore self-identities and personal feelings and subsequently to develop a personal set of values and form classroom culture. A number of resources used include:

1. Geographical Association Continuing Professional Development unit 'Teaching About Migration'
2. Oxfam Global Citizenship Guide to 'Teaching Controversial Issues
3. A database developed by University College London (UCL)
4. A photo lesson plan developed by The British Red Cross and Project Zero's Visible Thinking skills routines
5. Role plays

7.1.4 Language learning

Language learning appears to be another area regarding learning component looked at in the literature. From the perspective of what constitute a well-designed ESL (English as Second Language) program and the need for different assessment modes in the context of middle school, Carder (2012) argues that the current MYP Language B assessment criteria refer to language rather than content, which disadvantages ESL students at the beginner's level. In addition, ESL students are best assessed by multiple measures such as classroom grades, projects and portfolios of student work which are not provisional in the Language B subject guide. To promote the potential of academic excellence, an appropriate curriculum for second language learners in the MYP taught by well-qualified and experienced ESL teachers is crucial.

7.2 Educational continuum

Three empirical studies were identified addressing educational continuum between the MYP and the other two IB programmes from the perspectives of curriculum development and program implementation.

7.2.1 Curriculum coherence and consistency

Curricula international schools use are predominantly market-driven considering the need for easy transfer of expat students back to their nations or on to universities. Developing

coherent and consistent curriculum is crucial to achieve educational continuum. Instead of comparing prescribed program syllabuses, identifiable philosophy, clearly-specified aims and objectives and assumptions about the nature of knowledge and learning are focused as mapping for coherence and consistency (Stobie, 2007).

Through analysing IB curriculum documents of the MYP and DP (published from 1997 to 2004), shared features of the programmes as well as aims, objectives and content of subject guides specifically those promoting international understanding and world citizenship are compared (Stobie, 2007). In theory, both programmes are perceived to be broad-based and holistic, support language development, provide international perspectives, focus on learning how to learn, develop critical thinking skills, encourage independent enquiry and emphasize community awareness and service.

To increase a better understanding of commonalities and differences between the MYP and DP, perspectives of teachers, administrators and students on the strength and limitations of the two programmes as well as practical aspects of educational continuum encouraged throughout program implementation were explored through the conduct of, a case study and Table 9 summarizes common responses (Stobie, 2007: 37):

Table 9. Summary of Perceived Strength and Limitations of the MYP and DP

Strength of the MYP	***Strength of the DP***
• Holistic approach • Students required to study a broad and balanced curriculum • Flexibility. • Teacher empowered • Learning to learn emphasised • Student enquiry encouraged • Personal project experience • Suitable for all ability levels	• Students required to study a balanced curriculum. Depth and breadth provided • Theory of Knowledge, Creativity, Action and Service and Extended Essay components add to educational experience • Academically rigorous • Widespread University recognition
Limitations of the MYP	***Limitations of the DP***
• Assessment standards not always clear • Trade-off between desirability of flexibility and need for prescription to prepare students well for the Diploma • Moderation feedback and process, while improving, not always consistent • Jump to Diploma expectations in some subjects	• Too much content prescribed and knowledge expected resulting in time constraints • Too much emphasis on final examinations • Can opt out of arts and not able do two arts as a Diploma option • No PE requirement • Not suitable for all ability levels

Asked about how well the MYP prepared the DP and how curriculum continuum influenced teaching practice, it is further indicated that the MYP well prepared students for the DP in a number of ways including: providing a broad and balanced curriculum and developing critical thinking skills, approaches to learning and language development. The emphasis on intercultural and community awareness was also viewed as a good preparation. The degree of flexibility and the format of assessment influence how the two programmes were taught. Many teachers and students viewed such differences as a natural progression but others considered them as a big leap. Many teachers and administrators felt that the 'holistic' elements of the DP were only bolted onto the programme through courses like TOK (Theory of Knowledge) and CAS (Creativity, Action and Services) were not their responsibility.

Most teachers reflected that their teaching experiences of the MYP had no impact on their pedagogical approaches to teach in the DP. However, teaching in the DP did impact on how they taught the last two years of the MYP so that they would be able to prepare students for the demands of the DP. Such 'mapping' of the curriculum objectives of the DP with relevant curriculum content for the MYP is also evident in a related study (Hallinger, *et al.*, 2010). However, it is noted that while this 'backwards mapping' strategy can enhance curriculum consistency and coherence, it may weaken or distort the unique characteristics of the MYP. It is also worth noting that comparison between the PYP and MYP in terms of the degree of coherent and consistency were not identified in current literature.

7.2.2 Transition from one grade level to another with the MYP

Students on-track at the end of their freshman years are four times more likely to graduate from high school graduation (Neild *et al.*, 2007) which indicates the importance of ninth-grade academic success (Roderick, 2006). Evident in the current literature, a systemic intervention framework for ninth grade students in a school in the US was designed and implemented to impact on educational engagement and achievement. The system includes the following strategies (Presidio, 2010):

1. Provision of a rigorous and engaging learning experience in the IB MYP
2. Support from an interdisciplinary team of teachers to strengthen student-teacher relationships and provide a more student-centered form of schooling
3. Establishment of clear norms and expectations around attendance, behavior, and academic effort that were supported by incentive and recognition systems
4. Development of study skills and social skills
5. Ongoing data monitoring to ensure early identification of issues related to academics, attendance, and behavior

The system of interventions was evaluated based on a pretest-posttest quasi-experimental design with a propensity score-matching method and regression analyses. A total number of all 372 ninth grade students participated in the study comprising of an intervention group of 73 students and a no-intervention comparison group of 299 students. In general, the findings indicated a more positive impact on the educational engagement and achievement of those intervention group students than that of those comparison group students. That is to say, the MYP participation is more likely leading to positive learning outcomes and academic success. However, the study's findings did not illustrate whether the increased student performance was due to the interventions or the MYP. Further investigation on the extant of how above strategies affect student engagement and performance is suggested.

7.2.3 Transitions across the continuum

7.2.3.1 From the MYP to DP

In terms of program implementation practice, perceptions of 219 IB coordinators from full (PYP-MYP-DP) and partial (MYP-DP) continuum schools on MYP-DP transition challenges are indicated in Table 10 (Hallinger, *et al.*, 2011: 129-130).

Table 10. MYP-DP Transition Challenges

MYP–DP transition challenges: similarities in perceptions of IB Coordinators in PCS and FCS
• Dealing with detailed and prescribed content in the DP (69%) • Change in student attitude to learning (52%) • Transition problems embedded in program design (MYP) (46%) • Decreased emphasis on skill development in the DP (42%) • Difficulty in identifying through-lines (40%) • Discontinuing holistic development of students (38%)
MYP–DP transition challenges: differences in perceptions of IB Coordinators in PCS and FCS
• Reduction in variety of assessment types • Smaller range of teaching methodologies used in the DP • Adapting to fewer subjects in the DP • Transition problems are school-based

The findings suggest that full continuum schools may tend to adopt a more holistic approach to program implementation (Hallinger, *et al.*, 2011). Most of those transition challenges appear to be related to the planned, taught and assessed curriculum of the programmes and the rest associate with student attitudes and school contexts. This is different from the findings found in Stobie's (2005, 2007) study claiming that the experience of the MYP and DP continuum is bound to be different depending majorly on school contexts and influenced by school culture, attitudes towards the continuum, the hidden curriculum and student and teacher composition.

Strategies and practices for improving curriculum coherence and consistency and thus enhancing successful programme transition from the MYP to the DP suggested from both studies are integrated and illustrated in Table 11 (Hallinger, *et al.*, 2011; Stobie, 2005, 2007).

Table 11. MYP-DP Transition Strategies and Practices

Strategies	Practices
Additional resources, tools and support from the IB for cross programme alignment	• Publishing MYP vertical and horizontal articulation documents • Publishing IB cross-program articulation documents • Providing harmonious terminology across programmes • Providing greater support and guidance for teachers in the MYP and DP • Working towards greater MYP program recognition with governments and universities
Changes regarding assessment policies across the programs	• Providing standardized internal MYP assessment tasks • Providing access to a wider range of assessment tools in the DP • Changing assessment approaches from content-based to meaningful assessment for learning
Cross program interaction	• Intensifying intentional and opportunistic cross program teaching • Facilitating collaboration and creativity in curriculum planning and development • Organizing opportunities for staff position switching and cross program student interaction
School ethos	• Increasing emphasis on interdisciplinary learning in the DP • Building shared understanding of educational philosophies and international mindedness

7.2.3.2 From the PYP to MYP

Most students reflected that the MYP was easier when comparing with the PYP due to the reduced amount of homework, less challenging and more freedom when doing assignments. One of the possible explanations could be that when faced with curriculum innovations, substantial shifts in practice from what was before are required. For instance, they might have believed that learning at the secondary level revolved around factual and conceptual knowledge and disregarded the importance of procedural or metacognitive knowledge. Accordingly, verbal and written dialogue to encourage discussion and recognition of effective learning and teachers' justifications of their pedagogical philosophies are suggested so that students are aware of necessary shifts to learning from one level to another.

Through the conduct of action research, efficacy of a contextualised and holistic transition programme from the PYP to MYP was designed, implemented and evaluated based on the perceptions of teachers and parents in a school context in Latin America (Cowie de Arroyo, 2011). Strategies and practices adopted in the transition programme and evaluation results are identified in Table 12.

Table 12. Transition Programme Strategies, Practices and their Impact

Strategies and Practices		Impacts
1)	Improving middle school teachers' lack of knowledge of their students and needs through collaborative planning and team teaching across grades and departments	• Better understanding of students • Sharing responsibilities • Building trust with students • Appropriate amount of homework
2)	Providing an induction program for students enrolling into their 1st year of the MYP	• More familiar with the rules and expectations
3)	Establishing student and IB-focused policies and procedures	• Better understanding of teaching and assessment procedures
4)	Setting up academic an tracking system and educational support programs to identify failing students and develop individualized educational plans for them	• Improved academic achievement • Improved organizational skills and study habits
5)	Encouraging social iteration by organizing more opportunities to interact among teachers and students and also implementing a personal, social and health program focusing on aspects such as the development of the IB learner Profile and identified problematic areas	• Better peer and teacher relationships • More comfortable and secure learning environment • Decreased misbehaviors relating student relationships and disciplines
6) *7)*	Designing teachers' professional development focusing on curriculum and instruction issues Implementing a performance management process addressing reflection on a set of standards designed with the school's mission, vision and educational purposes and the IB program's standards and practices	• Sustained development and quality of teachers
8)	Organizing parental conferences focusing on the above themes	• Better teacher feedback to parents equals to better understanding of students • Better communication and interaction with parents

(adapted from Cowie de Arroyo, 2011)

Forms of cross-programme and departmental interaction such as collaborative planning and team teaching appear to be a common strategy for effective MYP-DP and PYP-MYP transitions. However, suggestions for improving MYP-DP transition tend to be curriculum development oriented and suggestions for improving PYP-MYP transition tend to be program implementation related. It gives the impression that the fundamental principles of the PYP and MYP appear to be more aligned.

7.2.4 'Within-school transition' vs. 'between-school transfer'

When examining students' perceptions of their 1st year of MYP experiences, O'Boyle's (2009) consider not only 'within-school transition' but also 'between school transfer' in an international school in Turkey. Those perceptions are categorized into students' perceptions

of organizational structures, personal freedom, social interactions and the formal curriculum. Both transition and transfer students shared views of their experiences. Except experiencing a mixture of anxiety and excitement, students quickly adjusted themselves to changes in the organizational and social aspects of the move.

7.3 Learning outcomes

Academic achievement, non-academic performance, perceptions, behaviour and engagement appear to be the themes in question for learning outcome related studies in educational literature, which is illustrated in the below sections.

7.3.1 Academic achievement

Within the MYP context, special attention is given to empirical comparative study results that are based on the use of instruments for academic achievement in different subjects/ subject areas. Appendix 2 summarizes the purpose(s), backgrounds of samples, types of instruments used and findings of those comparative studies. Most of those comparative analyses revealed a positive relationship between the MYP and student academic achievement (e.g. Batson, 2010; Hutchings, 2010; Jackson, 2006; Kiplinger, 2005a, 2005b; Kobylinski-Fehrman, 2013; Wilson, 2007). However, the main effects on performance in subjects, for example mathematics and reading, are relatively small (e.g. Kiplinger, 2005a, 2005b). All of those studies were conducted in the US educational contexts and the samples of most studies considered students from higher income households and less diverse communities. Outcomes of those analyses remains superficial as they do not evidence: 1) whether other background factors, such as family income and educational level, students' interests in specific disciplines, motivation and parental encouragement to enrol in the IB programmes, also have an impact on academic achievement and 2) how well those samples of studies would perform without IB participation.

7.3.2 Non-academic performance

Comprehensive exploration of how students cultivate and embody the IB Learner Profile and 'Approaches to Learning' within the MYP framework is recommended. Accordingly, a list of 'Approaches to Learning Profile' indicators (see Appendix 3) has been developed based on the descriptions of open-minded, reflective, thinker and inquirer as well as 'Approaches to Learning' components and further adopted to evaluate the extent to which students exhibited characteristics in mathematics problem solving, humanities tasks and approaches to Personal Project by comparing students with and without prior IB experience (Jarvis, *et al.*, 2013). Through the analysis of interview transcripts and student sample work, the assumption that students with more experience in the IB would show more productive mathematics problem-solving action and clearer approaches to humanities problems was not observed. On the contrary, a strong relationship between overall academic achievement and the perceived quality of the approach to the 'Personal Project' process was revealed by students with prior IB experience, specified in Table 13.

Table 13. Demonstrated Approach to Personal Project

Demonstrated attributes and their indicators	
Inquiry	• Actively enjoy learning • Show a love of learning • Seek information from a variety of sources relevant to a task • Identify and work with useful mentors
Thinking	• Generate ideas using the techniques of brainstorming and mind-mapping • Articulate a plan for working towards a solution
Reflection	• Identify and reflect on own strengths and limitations • Identify key elements from long-term memory to help with understanding of problems • Identify a relevant area of interaction
Openness	• Consider the perspectives of others

(adapted from Jarvis, *et al.*, 2013)

Implications for effective Personal Project implementation are generated from a further interpretation of comparative analysis results. School-based supports, resources and an appropriate mentoring system are suggested along with the following example strategies:

- Facilitating students to understand the meaning of questioning and problem definition and therefore to develop effective inquiry questions
- Discussing with students about effective ways to find, contact and work with mentors
- Facilitating students to identify relevant Area of Interaction in the early stages of planning their Personal Projects to make meaningful connections across areas
- Encouraging students to keep and make use of a learning journal to shape and monitor ideas

'The Global-Mindedness Survey' (Hett, 1993) was adopted to assess the degree of global-mindedness dimensions of 175 MYP and 175 non-MYP students. Those five dimensions are:

1. *Responsibility*: deep personal concern for others around the world with a sense of moral responsibility to try and improve conditions in some way
2. *Cultural pluralism*: appreciation of values embedded in diverse cultures accompanied by taking pleasure in exploring and trying to understand other cultural frameworks
3. *Efficacy*: belief in individuals' abilities and actions to make a difference and in the importance of involving in national and international issues
4. *Globalcentrism*: contributes made to the global community not just to one's own country and willingness to make judgments based on global standards
5. *Interconnectedness*: awareness and appreciation of the interrelatedness of all people and nations to develop a sense of global belonging or kinship

Compared to non-MYP students, students with the experience in the programme: 1) responded more positively on the dimension of Responsibility and Cultural Pluralism, 2) indicated that their previous enrolment in the MYP had no effect on taking the IB DP, 3) tended to take more courses in science, social studies and world languages than required and 4) involved in service learning projects outside the school more (Wade and Wolanin, 2013a). Those evidence indicate MYP students' awareness and appreciation of different people and cultures, their interest in cultural and linguistic related subjects and their active involvement in caring about others and serving local, national or international communities.

7.3.3 Student engagement

The conduct of 'High School Survey of Student Engagement' (HSSSE) (Shah, *et al.*, 2010) along with 'Middle School Survey of Student Engagement' (MSSSE) (Wade, 2011) appears to be the largest study of student engagement among IB students and the instrument items of both are broadly categorized into three dimensions including:

1. Cognitive/ intellectual/ academic engagement (that is. engagement of the mind) considering students' effort, investment, and strategies for learning
2. Social/ behavioral/ participatory engagement (that is. engagement in school life) focusing on students' (inter)actions in extracurricular, social, and non-academic school activities with their fellow students as well as with other members of the school community
3. Emotional engagement (that is, engagement of the heart) emphasizing students' feelings of connection to their school

The appropriateness of utilizing the instrument has been recognized as these three dimensions are particularly relevant to the learner profile attributes and the educational objectives and approaches of both the MYP and DP. Firstly, the results of both HSSSE and MSSSE showed that IB students rated their levels of engagement more highly than non-IB students in general (Shah, *et al.*, 2010; Wade, 2011). Secondly, the HSSSE study further reveals that IB students tend to have higher levels of engagement than non-IB students even within the same school. Thirdly, based on the findings of the MSSSE study, the number of years in the MYP does not affect significantly on the levels of student engagement. Lastly, both studies indicate that the levels of engagement are connected more directly with student academic performance.

Looking at the social and emotional wellbeing of MYP students in specific, a worldwide investigation on students' socioemotional related perceptions, values, attitudes and dispositions and their correlations with International Schools' Assessment (ISA) performance (in 2009-2011) was conducted (Tan and Bibby, 2012). According to Table 14, correlations between students' socioemotional wellbeing and ISA performance were similar between MYP and non-IB students. Weal positive correlations were found between the MYP cohort and the non-IB cohort in the areas highlighted in yellow at different grades. It is noted that negative correlations were found between two cohorts in the areas: between Academic Outcome Orientation and Mathematics Literacy at Grade 8 and between Surface Learning and Mathematics Literacy and Reading at Grade 9 (highlighted in red).Unlike the results of HSSSE and MSSSE studies (Wade, 2011; Shah, *et al.*, 2010), correlations between students' social and emotional engagement and academic performance were not significantly strong.

Table 14. Comparison of IB and Non-IB Correlations between Student Social and Emotional Perceptions and ISA Performance at Grades 8 and 9

Dimension	Grade	Mathematical Literacy		Reading		Narrative Writing		Expository Writing	
		MYP	*Non-IB*	*MYP*	*Non-IB*	*MYP*	*Non-IB*	*MYP*	*Non-IB*
Student & Teacher Interaction	*8*	0.1	-0.1	0.0	-0.1	0.1	-0.1	0.1	0.0
	9	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.2
Social Connectedness	*8*	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
	9	0.0	-0.1	0.0	0.1	0.0	0.1	0.1	0.1
Personal Development Outcome	*8*	0.0	-0.1	0.0	0.0	0.1	0.1	0.1	0.1
	9	-0.1	-0.1	0.0	0.1	0.1	0.1	0.1	0.1
Surface Learning	*8*	-0.1	-0.2	-0.1	-0.2	0.0	-0.2	0.0	-0.2
	9	-0.2	-0.2	-0.1	-0.1	0.0	-0.1	-0.1	-0.2
Deep Learning	*8*	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.1
	9	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.2
Learning Goals	*8*	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.1
	9	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Academic Outcome Orientation	*8*	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
	9	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1

(adapted from Tan and Bibby, 2012: 70)

8. Implications for further research

To inform developments in the MYP and strengthen the effectiveness of teaching and learning, further research on, for example, 1) connections between different roles MYP teachers and coordinators play in schools and competences needed, 2) promising curriculum planning practices and pedagogical strategies of situating learning in disciplinary, cultural and global contexts, and 3) effective ways of using and integrating technology in teaching and learning are suggested. Research efforts focusing on educational contexts which are not western-centric would be beneficial.

Further research should also focus on the identification of what aspects of the MYP appear to be critical for improving student learning and achievement to help teachers and schools apply new strategies or strengthen their instructional practice and/or organizational conditions. In addition, longitudinal research design could be considered to address the question of whether the implementation of pedagogical and epistemological aspects of the MYP within any school continuum would achieve the same results with longitudinal student achievement growth in general and also in different subject areas (e.g. Healer, 2012). The role(s) of the MYP plays in increasing accessibility to the IB Diploma and Advanced Placement (AP) programs is another area suggested for further research (Willcoxon, 2005). From the analysis of classroom observation data of 90 PYP and MYP classrooms, those themes and features instrumental to IB programmes such as the application of metacognitive strategies, utilization of different ways to answer, participation in problem-solving, use of technology to learn basic skills and so-called 21st century skills are not demonstrated (Stillisano, *et al.*, 2011). A persuasive possibility of multiple-treatment interference is indicated. Accordingly, further examinations of whether the implementation of the MYP fosters the development of those expected learning outcomes needs to take this factor into consideration.

From the search of literature relevant to the MYP, it appears that research effort directly looking into behaviour and engagement in learning is limited. Examinations on learning outcomes should be expanded beyond measures of test gains. Given that standardized achievement tests do not accurately measure the success of the MYP, many of specific instructional and learning expectations would not be completely captured by instruments which are not deigned to fit the educational objectives and framework of the MYP. Impact studies should evaluate if particular characteristics of the MYP, such as its approach to holistic learning or emphasis on intercultural awareness, affect, for example, student attitudes toward the program, motivation and self-image. It is promising that such research effort is evident in the current commissioning of research projects funded by the IB (e.g. Wade & Wolanin, 2012, 2013a, 2013b). In terms of methodology, types of behaviours and degree and forms of engagement in IB classrooms would only be effectively captured through the adaptation of different methodologies from those quantitative methods such as pretest-posttest quasi-experimental design, propensity score matching method and regression analysis. Therefore, a more qualitative or multi-method criteria-based evaluation process might have been more suited for determining gains in learning.

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Appendix 1 – List of Selected Studies

Author(s)	Year	Type of Publication	Programme(s)	Study Type	Areas of Focus	Methodological Design	Type(s) of Sources	Setting(s)	Samples
1. Batson, B.	2010	Ed.D thesis	MYP	Empirical	Student achievement	Comparative study	Primary: exam scores	US	Students
2. Begum, T.	2005	M.Ed thesis	MYP	Empirical	Program implementation	Case study: interview, observation, document analysis	Primary: qualitative	Pakistan	1 principal and 1 IB coordinator
3. Bolivar, J.	2009	Ed.D thesis	MYP	Empirical	Leadership & management	Case study	Primary: quantitative and qualitative	A K-12 school in Venezuelan	Area and IB coordinators & principals
4. Bunnell, T.	2011	Journal article	MYP	Theoretical	Historical developments & current critics	Literature review	Secondary: literature & IB documents	Worldwide	N/A
5. Carder, M.	2011	Journal article	MYP	Theoretical	Curriculum: language	Curriculum design & evaluation	Secondary	Worldwide	N/A
6. Carlson, C.	2012	Report	MYP	Empirical	Assessment	Case study: structured surveys, semi-structured interviews & observation	Primary: quantitative & qualitative	2 schools in Latin and North America	Students, teachers, academic coordinators & parents
7. Clissold, K.	2012	Ph.D thesis	PYP, MYP & DP	Empirical	Curriculum choice	Case study: interview & document	Primary: qualitative	5 public schools in Hawaii, the US	Schools at interested phases
8. Corcoran, T., & Gerry, G.	2010	Report	MYP & DP	Empirical	Program implementation	Evaluation study	Primary & secondary: interview, survey & documentation	US	Teachers, administrators & students

9. Corcoran, T., & Gerry, G.	2011	Report	MYP & DP	Empirical	Program implementation	Evaluation study	Primary & secondary: interview, survey & documentation	US	Teachers, administrators & students
10. Corlu, M.	2013	Journal article	MYP	Theoretical	Curriculum: mathematics	Ethnographic study	Secondary: literature	Worldwide	N/A
11. Cowie de Arroyo, C.	2011	Journal article	PYP & MYP	Empirical	PYP-MYP transition	Action research: survey & interview	Primary: quantitative & qualitative	K-12 school in Bogota, Colombia	130 students aged 11-12
12. Daly, K. *et al.*	2012	Report	MYP	Theoretical	Curriculum development	Literature review	Secondary	Worldwide	N/A
13. Doherty, C.	2009	Journal article	PYP, MYP & DP	Theoretical	Curriculum choice	Literature review	Secondary: literature & IB documents	Australia	N/A
14. Field, J.	2010	Journal article	MYP	Theoretical	Curriculum: music	Literature review	Secondary	Worldwide	N/A
15. Hallinger, P., Lee, M. & Walker, A.	2011	Journal article	MYP & DP	Empirical	MYP–DP transition	Survey	Primary: quantitative & qualitative	Schools worldwide offering more than 1 programme	235 IB coordinators
16. Hare, J.	2006	Journal article	MYP	Theoretical	Educational approach	Literature review	Secondary: Literature	Worldwide	N/A
17. Healer, M.	2012	Ed.D thesis	PYP & MYP	Empirical	Student achievement	Comparative analysis	Primary: quantitative	US	Students
18. Hutchings, G.	2010	Ed.D thesis	MYP	Empirical	Teacher profile	Existing instruments	Primary: quantitative and qualitative	US	Teachers
19. Jackson, D.	2006	Ed.D thesis	MYP	Empirical	Student achievement	Comparative study	Primary: exam scores	US	Students
20. Jarvis, J. *et al.*	2013	Report	PYP & MYP	Empirical	Learner profile	Curriculum design & comparative study	Primary: student interview & sample work	South Australian	Grade 8, 9 & 10 students

21. Kiplinger, V.	2005 a	Report	PYP & MYP	Empirical	Student achievement (reading)	Longitudinal study	Primary: quantitative	US	Grades 5-8 & 8-10 students
22. Kiplinger, V.	2005 b	Report	PYP & MYP	Empirical	Student achievement (mathematics)	Longitudinal study	Primary: quantitative	US	Grades 5-8 & 8-10 students
23. Kobylinski-Fehrman, M.	2013	Ph.D thesis	MYP	Empirical	Student achievement	Comparative study	Primary including teacher focus group	US	Students & teachers
24. Lenihan, E.	2013	Journal article	MYP	Theoretical	Teaching & learning	Curriculum design & evaluation		US	
25. Lugt, D. & Oosterhoff, M.	2009	Report	MYP	Empirical	Teaching & learning	Case study: student questionnaire, teacher and coordinator interview & documents	Primary: qualitative	The Netherlands	Teachers
26. Magee, D.	2005	Ph.D thesis	MYP	Empirical	Student achievement	Comparative analysis	Primary: quantitative	US	Students
27. Millard, L.	2011	MA dissertation	MYP	Empirical	School climate	Case study: online survey & interview	Primary: quantitative and qualitative	Hong Kong	Teachers
28. O'Boyle, E.	2009	Journal article	PYP & MYP	Empirical	Transition	Questionnaire, journal writing & focus group	Primary: qualitative & quantitative	Turkey	Students
29. Presidio, S.	2010	Ed.D thesis	MYP	Empirical	Student achievement & engagement	Comparative study	Primary: exam scores	US	Students
30. Rentoule, D.	2013	Ph.D thesis	MYP & DP	Empirical	Teaching & learning	Case study: observation	Primary: qualitative	Japan	Classroom recordings
31. Robertson, J.	2011	Ed.D thesis	MYP	Empirical	Leadership & management	Case study: semi-structured interview	Primary: qualitative	US	IB coordinators
32. Ryan, V.	2012	Journal article	MYP	Theoretical	Curriculum: geography	Curriculum design & evaluation	Secondary	UK	N/A

33. Shah, S., Dean, M. & Chen, Y.C.	2010	Report	MYP & DP	Empirical	Student engagement	Comparative study	Secondary & primary: HSSSE	US	1st phase: 8 schools (n=7692 students) & 2nd phase: 100 schools (n=42,754 students)
34. Siskin, L., & Weinstein, M.	2008 a	Report	MYP & DP	Empirical	Program implementation	Evaluation study: survey	Primary: quantitative	US	127 students from Title 1-eligible schools
35. Siskin, L., & Weinstein, M.	2008 b	Report	MYP	Empirical	Program implementation (district support)	Case study: SAT scores, documents & interview	Primary & secondary	US	8 public schools in the 15th largest district
36. Siskin, L., Weinstein, M., & Sperling, R.	2010	Report	MYP & DP	Empirical	Transition	Evaluation study: interview, observation & documents	Primary: quantitative and qualitative	US	4 Title I-eligible schools
37. Sizmur, J. & Cunningham, R.	2012	Report	MYP	Empirical	Program implementation	Case study: online survey & document analysis	Primary	6 schools in the UK	Students, teachers & parents responses
38. Sperandio, J.	2010	Journal article	MYP	Empirical	Curriculum choice	Survey	Primary: quantitative	336 public and independent schools worldwide	Administrators
39. Stillisano, J. *et al*	2010	Report	PYP & MYP	Empirical	Program implementation	Mixed-method evaluation study	Primary: quantitative	Taxes, the US	PYP & MYP schools

40. Stillisano, J. *et al.*	2011	Journal article	PYP & MYP	Empirical	Program implementation	Case study: interview & observation	Primary: qualitative & quantitative	8 schools in Taxes, the US	Administrator interviews (N=49) & classroom observations (N=90)
41. Stobie, T.	2005	Journal article	MYP & DP	Empirical	Transition	Case study	Primary: qualitative	2 schools offering 3 programmes	Teachers, administrators & students
42. Stobie, T.	2007	Book chapter	MYP	Theoretical	Transition	Literature review & document analysis	Secondary: literature & IB documents	Worldwide	N/A
43. Tan, L., & Bibby, Y.	2010	Report	PYP & MYP	Empirical	Student achievement	Comparative study	Secondary: ISA results & PISA means	Worldwide	IB students (n=23,575) & non-IB students (n=14,317) (2007-09)
44. Tan, L., & Bibby, Y.	2012	Report	PYP & MYP	Empirical	Student achievement	Comparative study	Secondary: ISA results & PISA means & Social Emotional Wellbeing questionnaire	Worldwide	A total of 50,714 students of which 68% were IB students (2009-11)
45. Villarreal, J.	2011	Ed.D thesis	MYP	Empirical	Leadership & management	Correlation analysis	Primary: quantitative	Taxes, the US	Administrators
46. Visser, A.	2010	Journal article	MYP	Empirical	Program implementation	Comparative study: interview & questionnaire	Primary: qualitative & quantitative	(Semi-) public national bilingual secondary schools in the Netherlands	School managers and administrators, MYP coordinators & teachers from Australia, Canada and the USA

47. Wade, J.	2011	Report	MYP	Empirical	Student performance & engagement	Mixed-method approach	Primary: Middle Grades Survey of Student Engagement & interview	Large, socioeconomically diverse district of rural, urban, and suburban communities in the US	4000 students & principals from 5 MYP & 5 non-MYP schools
48. Wade, J., & Wolanin, N.	2012	Report	MYP	Empirical	Teacher perception	Mixed-method approach	Primary: online survey & interview	Large, socioeconomically diverse district of rural, urban, and suburban communities in the US	N=298 did the survey & n=15 interviewed
49. Wade, J., & Wolanin, N.	2013a	Report	MYP	Empirical	Global mindedness & student perception	Mixed-method approach	Primary: Global-Mindedness Survey	Large, socioeconomically diverse district of rural, urban, and suburban communities in the US	175 MYP & 175 non-MYP students
50. Wade, J., & Wolanin, N.	2013b	Report	MYP	Empirical	Student performance & engagement	Mixed-method approach	Secondary: exam scores	Large, socioeconomically diverse district of rural, urban,	1,317 students attending MYP schools & 1,266 students attending non-MYP (2009–10)

								and suburban communities	
51. Walck, C.	2010	Ph.D thesis	MYP	Empirical	Assessment	Comparative study	Primary: exam scores	US	Students
52. Walters, W.	2007	Ed.D thesis	MYP	Empirical	Teacher profile	Case study: scale & interview	Primary: quantitative and qualitative	Colorado, the US	Teachers
53. Willcoxon, A.	2005	Psy.D. thesis	MYP	Empirical	Student achievement	Comparative analysis	Primary: quantitative	US	Students receiving 2 years of the MYP
54. Wilson, J.	2007	Ed.D thesis	MYP	Empirical	Student achievement	Comparative study	Primary: exam scores	US	Students

Appendix 2 – Summary of MYP Student Academic Achievement Research

Study	Study Purpose	Samples	Instrument(s)	Findings
Kobylinski-Fehrman (2013)	To compare score differences between students from low-income households participated in the MYP and a traditional instruction program to identify achievement gap	Students completed 3 consecutive years of MYP (intervention school) and non-MYP (control school) within Atlanta metropolitan area	Eighth grade scores from the Criterion Referenced Competency Test (CRCT) for mathematics and reading	• Adjusted means on reading scores were not significantly different between the two schools • Adjusted means on mathematics scores at the MYP school were significantly lower when compared to the control school • Teachers' perspectives on the effect of the MYP on student achievement and teaching practices conclusively positive
Wade & Wolanin (2013b)	To analyze high school mathematics and science enrolment and student performance in five district MYP and five non-MYP schools	• 2009-2012 grade 9 and 10	State-mandated tests for advanced-level science and mathematics high school courses	• Significantly higher percentages of students who previously attended non-MYP schools earned a C • Students who previously attended MYP schools were significantly more likely to achieve a passing score on the biology exam • MYP enrollment had no effect on a student's likelihood of passing the algebra 1 state exam
Healer (2012)	To compare score differences between students fully participating in the IB PYP and MYP and students receiving traditional instruction methods through a longitudinal growth perspective	IB students (n = 50) and the control group: non-IB students (n = 50) at 5th, 8th and 10th grades	Colorado Student Assessment Program (CSAP) in science	• A statistical difference was indicated at each level between IB and non-IB students in the area of science performance as measured by the CSAP assessment

Study	Study Purpose	Samples	Instrument(s)	Findings
Stillisano, *et al.* (2010)	To compare the performance of IB PYP and MYP schools to a non-IB comparison group on standardized Texas achievement exams	2007/2008 reading an d mathematics scale scores from 22 PYP and 21 MYP schools in Taxes	Texas Assessment of Knowledge and Skills (TAKS)	• No significant differences in mathematics and reading achievement were found between IB schools and their comparison schools • Factors such as length of IB programme implementation, student gender and pre-achievement were not found to be significant predictors of TAKS mathematics and reading achievement
Batson (2010)	To explore the effect of the MYP on student achievement by comparing exam results taken pre, during and post implementation of the programme to identify the academic improvement of each subject			• Significant gains after the 1st year of implementation in all subjects with the exception of social studies which were improved after the 2nd year of implementation • The special education sub-group realized statistically significant growth after the 1st year of implementation in math and in reading after the 2nd year of implementation • No statistically significant difference showed in IB students' community service involvement compared with their non-IB peers

Study	Study Purpose	Samples	Instrument(s)	Findings
Wilson (2007)	To compare 7th-grade students' achievement, attendance, extra-curricular involvement and perceptions of life skills participated in the MYP and in a school's standard of care traditional academic program (TAP)	40 MYP and 40 TAP students at the 7th grade from the same school in a US district	1) Achievement: Norm Referenced Tests (NRT) subtests including the Normal Curve Equivalent (NCE) scores for Math, Language and Reading & Essential Learner Outcome Criterion Referenced Test (CRT) scores for math, and reading. 2) Attendance: Infinite Campus Student Information Program 3) Extra-curricular involvement: A student survey 4) Life Skills Perception: District written Life Skills Self-Assessment tool	• Both IBYMP and TAP students did not significantly improve their math, language, and reading scores but IBMYP did significantly improve their math scores • IBMYP students posttest math, language, and reading norm-referenced achievement scores were statistically significantly greater than TAP students • IBYMP students did significantly improve their Essential Learner Outcome criterion-referenced math and reading scores over the two-year intervention interval measured (TAP students did not) • The mean absence total difference is statistically significantly greater for the TAP students compared to the IBMYP students • Data gathered from both IBMYP and TAP groups confirm enviable student engagement and commitment to the research school community • Both IBMYP and TAP groups' Self-Reported Life Skills Perception mean scores were equivalent over the two-year intervention interval measured and are consistent with the research school and district expectations

Study	Study Purpose	Samples	Instrument(s)	Findings
Jackson (2006)	To compare Virginia Standards of Learning (SOL) achievement test results between students participating in IBMYP and non-MYP (of similar ability) schools	Grade 8 students participating in an authorized MYP school & students participating in non-MYP schools in Virginia. Both groups were matched by their Grade 5 Virginia SOL achievement scores and ethnicity	Virginia Standards of Learning (SOL) (including English 8, Reading 8, Mathematics 8, History/Social Science 8 and Science 8)	• Average SOL mean scores of the total MYP group were higher than the mean scores of the total non-MYP group in all areas although there were no statistically significant differences • No statistically significant difference existed between the average SOL mean scores of Black, Hispanic and White students who participated in the MYP and Black, Hispanic and White students who participated in non-MYP schools across the division • The content area that showed the greatest difference was English: Reading, Literature, and Research (15 scaled score points). Performance on the History/Social Science and Science SOL tests were virtually identical
Willcoxon (2005)	To compare test scores between students participating 2 years of the MYP and standard educational curriculum in public schools in Southern California	Students participating 2 years of the MYP from a public middle school & students participating in schools offering the standard educational curriculum in Southern California	California Standards Tests (CSTs) academic achievements in mathematics and English-language arts	• MYP students showed greater improvement in their CST Mathematics and English-Language Arts scores • MYP better prepared students for higher level mathematics courses • A unifying vision and rigorous standards appear to be crucial factors in meeting academic needs of students in public schools
Magee (2005)	To compare ACT Math and Reading scores between students participating in IBMYP and matched peers studying the traditional curriculum in a public school located in Colorado	MYP and non-MYP students from a high school located in Colorado	America Collegiate Test (ACT) Reading and Math scores on 8th grade Achievement Levels Test (ALT)	• There was statistical significance for the main effect of IB participation and Non-IB participation for ACT Reading and Math scores when controlling for prior achievement levels • There was no statistical significance in the interactions of IB/Non-IB with gender and ethnicity • Components of the IB curriculum are reflective of recommended goals for schooling in the United States

Study	Study Purpose	Samples	Instrument(s)	Findings
Kiplinger (2005a)	To investigate the effects of the IB program participation on mathematics achievement and growth from 2001 through 2004 in Grades 5-8 and 8-10	• 2002-2004 Grade 3-5 Cohort • 2000-2004 Grade 4-8 Cohort • 2001-2004 Grade 7-10 Cohort	Colorado Student Assessment Program	• The MYP does not appear to provide an obvious acceleration to students' learning growth in mathematics • Additional years of participation in the IB program during middle and high school appear to be associated with greater gains in mathematics achievement in high school. • Students' mathematics performance in Grade 5 and 8 is strongly related to their reading ability in Grade 5 and 8. • Males out-score females by 15 points, on average, on the Grade 8 mathematics assessment.
Kiplinger (2005b)	To investigate the effects of the IB program participation on mathematics achievement and growth from 2001 through 2004 in Grades 5-8 and 8-10	• 2002-2004 Grade 3-5 Cohort • 2000-2004 Grade 4-8 Cohort • 2001-2004 Grade 7-10 Cohort	Colorado Student Assessment Program	• All analyses indicate that IB students consistently perform better than non-IB students in reading • For students scoring at the same level in Grade 7, IB may have a slightly positive effect on reading growth rate during the middle and early high school years • Additional years of IB participation increases reading growth rate by about one and a half scale score points per year • Reading performance in Grades 5 and 8 does not appear to be related to growth in math from grades 5 to 8 or 8 to 10

Appendix 3 – Indicators of Approaches to Learning Profile

	Indicators based on the Learner Profile (LP) or Approaches to Learning (ATL)	
Inquiry		
I1	Demonstrates natural curiosity	LP
I2	Shows independence in learning	LP
I3	Actively enjoys learning/ shows love of learning	LP
I4	Poses questions for research and inquiry	LP
I5	Defines key terms related to the content of inquiry	Added
I6	Articulates goals for task completion	ATL
I7	Organises task information and resources	ATL
I8	Shows effective time-management for completion of task	ATL
I9	Seeks information from a variety of sources relevant to the task	ATL
I10	Uses a range of technologies to gather information	ATL
I11	Identifies and seeks information from both primary and secondary sources	ATL
I12	Identifies potential bias in sources	ATL
I13	Synthesises information from multiple sources	ATL
I14	Appropriately cites and references sources	ATL
I15	Describes sharing information with others using a variety of media	ATL
I16	Communicates understanding and information in ways that are both novel and effective	ATL
I17	Communicates ideas and information confidently	LP
I18	Demonstrates effective presentation skills in sharing information with others	ATL
I19	Identifies helpful mentors (parents, friends, teachers, neighbours, relatives)	Added
Thinking		
T1	Generates ideas, including through the use of techniques such as brainstorming	ATL
T2	Retrieves relevant knowledge from long-term memory to help understand a problem	ATL
T3	Identifies key elements or information in a presented problem	ATL
T4	Re-reads all or part of a problem to aid understanding	ATL
T5	Draws or elaborates a diagram or visual representation to aid understanding of a problem	ATL
T6	Devises a plan for working towards a solution	ATL
T7	Articulates questions in relation to a problem	ATL
T8	Self-corrects an error in problem solving	ATL

T9	Identifies a specific strategy for problem solving	ATL
T10	Switches to a different strategy	ATL
T11	Breaks down a problem into sub-problems	ATL
T12	Pauses problem solving to self-check for understanding	ATL
T13	Checks the result of a step or move in the problem-solving process	Added
T14	Applies an estimation strategy	ATL
T15	Uses mental imagery	ATL
T16	Applies analogical reasoning to understand a problem	ATL
T17	Employs mathematical calculation	ATL
T18	Makes an error	ATL
T19	Evaluates own progress or solution	ATL
T20	Makes an inference	ATL
T21	Reasons ethically towards a solution	LP
T22	Justifies or explains own beliefs	LP
T23	Makes meaningful connections across instances or discipline areas	ATL
T24	Explicitly ignores information	Added
T25	Generates a product, either as a step in the solution attempt or as a final answer	Added
T26	Elaborates an idea by adding detail	Added
Reflection		
R1	Sets (articulates) personal goals for learning	LP
R2	Identifies and reflects on own strengths and limitations	LP
R3	Identifies current and developing personal interests in relation to learning	Added
R4	Seeks constructive criticism	ATL
R5	Reflects on own learning process	LP
R6	Employs tools such as learning journals and portfolios to monitor and reflect on own learning	ATL
R7	Identifies relevant Area of Interaction	Added
Openness		
O1	Shows appreciation for own culture	LP
O2	Shows appreciation for own personal history	LP
O3	Displays openness to the perspectives of others	LP
O4	Displays openness to the values and/or traditions of others	LP
O5	Describes more than one point of view in relation to an issue	Added

O6	Evaluates or weighs up a range of points of view	LP
O7	Shows a willingness to grow from the experience of understanding diverse perspectives	LP
O8	Shows empathy, compassion and respect towards the needs and feelings of others	LP
O9	Demonstrates a personal commitment to service	LP
O10	Identifies a need/desire to make a positive difference to the lives of others	LP
O11	Identifies a need/desire to make a positive difference to the environment	LP
O12	Demonstrates a strong sense of fairness and justice	LP
O13	Demonstrates a strong sense of respect for the dignity of the individual, groups and communities	LP
O14	Articulates the importance of intellectual, physical and emotional balance to achieve personal wellbeing for self and others	LP
O15	Describes working effectively in groups, including adapting to roles and taking on responsibility as a group member	ATL
O16	Describes attempting to resolve group conflicts	ATL
O17	Describes negotiating goals with peers and teachers	ATL

(Jarvis, *et al.*, 2013: 25-26)