RESEARCH SUMMARY

The International Baccalaureate continuum: Student, teacher and school outcomes

IB CONTINUUM
CONTINUUM DE L'IB
CONTINUO DEL IB

Based on a research report prepared for the IB by:

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Background

With the introduction of the Primary Years Programme (PYP) in 1997, the International Baccalaureate (IB) established a continuum of international education based on a sequence of three programmes—the PYP, the Middle Years Programme (MYP), introduced in 1994, and the Diploma Programme (DP), introduced in 1969. Together, these programmes provide the prospect of a continuous international educational experience from early childhood to pre-university age.

An exploration of the impact of the IB continuum is important given the rapid expansion of IB-authorized schools internationally, within Asia in general and in Southeast Asia in particular. The purpose of this study is to explore and document the impact of the IB continuum (PYP, MYP and DP) on students, teachers and schools in five Southeast Asian countries: Cambodia, Indonesia, Singapore, Thailand and Vietnam. The study asked four principal questions.

1. What is the impact of the IB continuum on student outcomes?
2. What is the impact on teachers of implementing the IB continuum?
3. What is the impact on schools of implementing the IB continuum?
4. Do students experience unanticipated outcomes associated with implementing the IB continuum?

Research design

The authors conducted a mixed-methods study to address each of the research questions. Quantitative components of the study utilized three instruments:

- the IB Learner Profile Questionnaire (IBLPQ), which the researchers constructed and validated based on four learner profile attributes—"knowledgeable", "inquirers", "caring" and "open-minded"—and was completed by 758 students from 29 schools
- a teacher survey on school leadership, the International School Leadership Questionnaire (ISLQ), which was validated for the current study and completed by 333 teachers from 29 schools
- DP examination results for students completing examinations in Southeast Asian DP-only and continuum schools (that is, schools that offered all three IB programmes) in May 2013.

Through the use of demographic questions, the data pertaining to students who experienced the IB continuum were compared with "multi-programme" students who experienced different configurations of the three IB academic programmes (ie PYP and DP or MYP and DP); "DP-only" students (students who experienced the DP solely); and a composite category, "non-continuum students", consisting of both multi-programme and DP-only students. The school and student categories are presented in Figures 1a and 1b below.

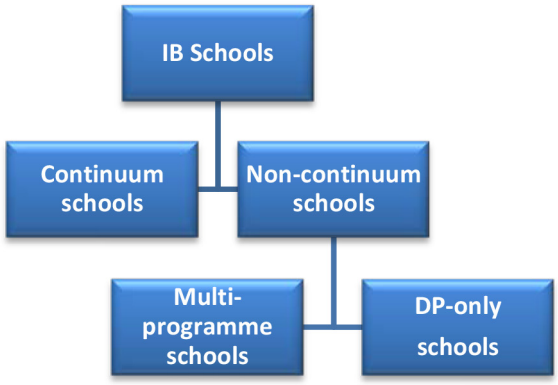

Figure 1a: School categories used in the study

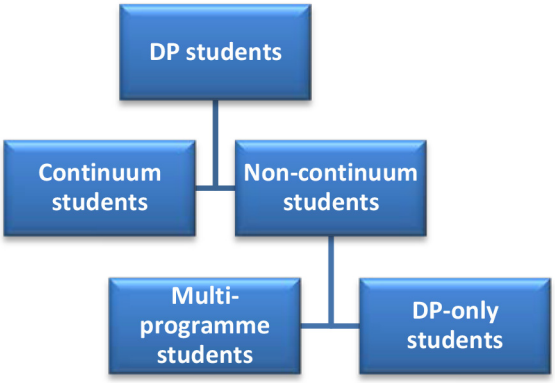

Figure 1b: Student categories used in the study

The analysis of student data considered the effect of the continuum on the learner profile attributes and examination results. Analysis of the teacher survey included a comparison of results from continuum schools and DP-only schools, focusing on teacher ratings of leadership constructs.

The qualitative aspects of the study involved the collection of interview and documentary data through two in-depth case studies of continuum schools. The case studies were designed to:

- provide an in-depth picture of practice and school cultures that foster effective implementation of the IB continuum across grade levels and programmes
- identify underlying factors that impact on the enactment of the IB learner profile attributes that the validation study and teacher surveys identified as significant.

Heads of school, school principals, programme coordinators and selected teachers and students were interviewed. The quantitative and qualitative data were analysed separately and then comparatively.

Findings

Quantitative findings

DP examination outcomes

To address research question 1, the authors compared DP students who went through the IB continuum with their DP peers who did not. Results indicate that there were no significant differences between student groups with regard to DP examination results. The average IB examination score of continuum students was 32.93, whereas that of their non-continuum counterparts was 33.35: $t(202.048) = -0.861$, $p = 0.39122F$ (N = 560).

When comparing continuum, DP-only and multi-programme students, results indicated a significant difference between the test results of multi-programme students (32.46) and DP-only students (34.17) but no significant difference between continuum students (32.93) and DP-only students (N = 547). An analysis of variance (ANOVA) test indicated that there was a significant group difference in IB examination results: $F(2,544) = 5.83$, $p = 0.003$. However, the effect size was very low: $\omega = 0.122$[1].

Learner profile outcomes

The researchers compared continuum and non-continuum student perceptions of their own capacity related to four learner profile attributes: "knowledgeable", "inquirers", "caring" and "open-minded". Overall, the sample students (both continuum and non-continuum) showed moderately positive perceptions of their capacity on the learner profile attributes: means range from 4.57 to 4.87, based on a six-point Likert scale.

In terms of group differences in the learner profile attributes, non-continuum students appeared to indicate slightly higher scores across the four learner profile attributes than continuum students, although the differences were minor. T-tests confirmed that there were no significant group differences in the scores obtained for the "knowledgeable", "inquirers", and "open-minded" attributes[2]. At the same time, a significant group difference was identified for the "caring" attribute. Non-continuum students showed a significantly higher rating than continuum students on the attribute of "caring".

1 ω is computed by degree of freedom and F statistics from ANOVA. In general, the interpretation of ω is as follows: 0.1, 0.3, and 0.5 represent small, medium and large effect sizes, respectively (Field, 2005; Hair et al, 1998).

2 Knowledgeable: $t(730) = -.921$, $p = .357$. Inquirers: $t(730) = -.208$, $p = .835$. Open-minded: $t(730) = -1.82$, $p = .069$.

LP Attributes	Groups	N	Mean	S.D.
Knowledgeable	Continuum students	126	4.82	0.71
	Non-continuum students	606	4.88	0.73
Inquirers	Continuum students	126	4.67	0.77
	Non-continuum students	606	4.69	0.84
Caring	Continuum students	126	4.44	1.07
	Non-continuum students	606	4.71	1.06
Open-minded	Continuum students	126	4.41	0.92
	Non-continuum students	606	4.59	1.02

Note: N = 732

Table 1: Descriptive statistics of the learner profile: Continuum students versus non-continuum students

Relationship of the learner profile to DP exam results

The association between learner profile self-ratings and IB examination scores presented a mixed picture: 1) positive associations of "knowledgeable" and "inquirers"; 2) a negative association of "caring"; and 3) no significant association between academic results and self-ratings of the attribute "open-minded".

There are some likely explanations for these mixed results. First, it is understandable that "knowledgeable" and "inquirer" attributes are positively associated with IB examination scores, as both have a strong academic focus. Following a similar logic, both the "caring" and "open-minded" attributes may lack a positive association with IB exam results because their focus is non-academic.

A recent study conducted in China (Lee et al, 2014) offers a possible alternative explanation of the relationship between the "caring" and "open-minded" attributes and examination outcomes. The research project, which targeted five high-performing DP-only schools in China, found that due to the binary pass/fail nature of the assessment criteria, students in the results-oriented culture of these schools (cf Lee, Hallinger and Walker, 2012a) often did not prioritize creativity, action, service. In addition, the study identified challenges in incorporating non-academic themes of the learner profile such as "caring" into day-to-day pedagogical practices and curriculum implementation, again due to the strong focus given to students maximizing their DP scores. Teachers and administrators noted that the learner profile consequently took a "back seat" for many students relative to the assessed parts of the DP.

Relationship of leadership practices to DP exam results

The current study's examination of the association of leadership practices with DP exam scores also presented mixed results: 1) both "strategic resourcing" and "within-programme interaction" were positively associated with IB exam scores, but 2) "classroom monitoring" was negatively associated with IB exam scores.

According to the authors, the positive association of strategic resourcing is understandable and in line with the leadership literature[3]. For example, in a recent study in the United Kingdom, resource allocation by principals was reported to be among the five most influential practices for improving learning outcomes (Sammons et al, 2011). Second, the positive association of within-programme interaction with IB examination scores is not surprising[4], given that the construct of within-programme interaction is based on measures of school leaders' support for teachers to share ideas and materials about effective teaching; share what teachers learn from workshops or conferences with other teachers; and discuss IB programme standards, assessment and philosophy.

Finally, the negative effect of classroom monitoring is consistent with the findings of previous studies in different schooling contexts. For example, Lee et al (2012b) identified a negative link in Hong Kong public schools between a principal's focus on classroom monitoring and student learning outcomes. The findings suggest that teacher interactions with colleagues for sharing ideas and seeking feedback work better for student learning

3 Note that the *p*-value of "strategic resourcing" was 0.067. Although it was significant at the borderline level, the researchers interpret this as significance, given the relatively small sample size of the level-2 unit (school-level characteristics, see page 54 in the full report) (N = 25).

4 Note that the *p*-value of "within-programme interaction" was 0.091. Although it was significant at the borderline level, again the researchers interpret this as significance, given the relatively small sample size of the level-2 unit (N = 25).

outcomes than the direct involvement of principals in teaching and instruction, such as regular classroom observation and inspection of student work.

Qualitative findings

School outcomes

Data from the qualitative study identified a series of perspectives, practices and outcomes from two case study schools. At School I, the researchers noted a deliberate effort on the part of administrators and teachers to use the learner profile and IB programme frameworks to inform the school's language of learning and teaching and to guide decision-making. The language of the learner profile is used frequently in classroom teaching, informs formal and informal discussion among members of the school faculty, and is referenced in hiring practices, teacher appraisals and student admissions. A unique feature of School I is its deliberate effort to position the school overtly as an "IB school". To do this, the school has rewritten its mission statement to champion IB values, such as the learner profile. Describing the influence of the learner profile on school culture, the primary school principal explained:

"It's very embedded in what we do: it's embedded in our hiring policies, it's embedded in all of our curriculum areas. We use the language in general conversation. So, I think it's part of who we are now. It's very much embedded in the school culture."

Similarly, in School II, the continuum of programmes and the learner profile helped to foster a common language related to learning and teaching. Leaders and faculty in School II, however, seemed to believe that the learner profile alone was not sufficient for developing coherence across the three programmes. To address this perceived lack of cohesion, School II adopted Harvard University's *Teaching for Understanding (TFU) and Visible Thinking* frameworks to provide a more precise lexicon around which learning and teaching discussions could take place. The MYP Coordinator describes this approach:

"The Continuum gives us a common language and the common language is one of the things that help us connect between the different sections of the school. But also not just the common language, but a common way of thinking about education …. Working with the TFU framework is something that supports that. We're all moving in the same direction; and the direction is why we actually select certain content for our kids to learn—and what I'm seeing is that they're becoming critical learners."

In this sense, School II regards itself as "more than an IB school". Although IB values and the learner profile have their place in the development and implementation of the school's curriculum, the mission and values articulated by its governing body are the primary driver; the continuum supports this mission through an overarching pedagogical framework that serves as a touchstone for the school's values with regard to learning and teaching.

Student outcomes

Students and teachers in both schools reported a narrowing of the curriculum as students progressed through the continuum, beginning in the final years of the MYP. Both teachers and students viewed this progressive focusing towards scholastic domain attributes as a challenge. Typically, this programmatic shift was attributed to the disciplinary and examination focus of the DP.

This shift creates more content "gap" challenges for students moving from the MYP than for International General Certificate of Secondary Education (IGCSE) students, whose intensive disciplinary preparation bridges the DP examination content. However, students and teachers explained that the MYP-to-DP gap is mitigated by the broader range of learning, assessment and personal organization practices that continuum students have experienced.

Students and teachers in the two schools reported that a set of core skills developed in the PYP and the MYP helped to prepare students for facets of the DP pertaining to: organization and time management, inquiry-based learning, problem-solving and criterion-referenced assessment. Teachers described how MYP students demonstrated better preparation for the academic skills that are required to be successful in DP instruction, in particular, skills related to inquiry modes of learning and teaching.

Students who transferred to School I from IGCSE schools generally reported that, while they felt they were prepared to face the focused and intensive content taught in the DP, the IGCSE schools left them somewhat unprepared for aspects of the DP, specifically those related to knowledge construction. Teachers echoed this perspective, observing that some new transfer students initially found it difficult to think independently.

"[The IGCSE students] have the right answers. [But when] you ask them to go out and do this experiment and suddenly the long-term [MYP] kids are out doing stuff and our new kids are like, 'Huh? What's this stuff? How do I use a graduated cylinder?' They can't critically think and they don't have the kinetic lab skills that [full-continuum students] have." (DP Teacher 4)

Students who participated in the continuum were therefore perceived as having the skills and understanding of instruction and assessment practices that could be put to good use in the DP. This finding is important, as it suggests that the content expectations gap between the MYP and the DP may be counterbalanced somewhat by sound preparation in inquiry skills. Continuum students and teachers in School I also reported that the broader-based MYP curriculum helped them to make informed choices about the specific disciplinary focus they wished to pursue in the DP.

Teacher outcomes

IB continuum participation provides some clear benefits for in-school professional development. In both schools, some faculty members reported that the provision of all three programmes creates opportunities to engage in on-site professional development and to share practices across programmes. The tendency for teachers to teach across the DP and the MYP programmes further allows for increased understanding and articulation of the continuum. Participants also described how valuable professional development opportunities often occur informally as part of the job, for example, peer-to-peer professional development.

A key area of teacher collaboration concerns efforts to understand the gaps between programmes and to work on programmatic alignment. This effort occurred formally, through articulation meetings and curriculum review, and informally, as teachers who taught both the MYP and the DP took the initiative to introduce MYP students to DP-related content and skills. School II participants explained that work on alignment was facilitated by the development of a standards and benchmarks curriculum that articulated the learner profile in every subject area at each grade level. Interviewees at School II also described how these conversations produced at least three major outcomes: fostering discussions about backwards planning (that is, planning with DP outcomes in mind) that cultivate an awareness of the entire continuum; aligning the top-down requirements of the DP with the distinctive elements of the PYP and the MYP; and providing opportunities for staff to engage in rich professional development.

Discussion points

Drawing on a comparative analysis of the quantitative and qualitative aspects of the study, the researchers offered several propositions for further consideration by the IB and IB World Schools. The tables below identify each proposition and offer details regarding the data sources underpinning each proposition.

Engagement in the continuum provides a point of reference that schools use to define and disseminate values about instruction, assessment and curriculum, as well as to allocate resources accordingly.

Quantitative Data	Case Study I	Case Study II
-"Strategic resourcing" is positively associated with IB examination results.	The school exhibits: -revision of mission statement to highlight learner profile and IB values -allocation of resources for IB-related professional development -utilization of learner profile for teacher recruitment and student/family admissions.	The school exhibits: -identification of school-wide values -decision-making framework based on articulation utilized -IB values and learner profile attributes embedded in strategic plans.

The disciplinary focus of DP courses and examinations leads to a narrowing of the curriculum with reference to learner profile attributes and assessment practices, leaving gaps or "jumps" between the MYP and the DP in particular. This has an impact on student experiences of the IB continuum.

Quantitative Data	Case Study I	Case Study II
-DP-only students in Southeast Asia tend to outperform multi-programme students in the DP examinations. -There is a positive association of "knowledgeable" and "inquirers" attributes with DP examination results. -There is a negative association of "caring" with DP examination results. -No significant association of "open-minded" attribute with examination results was found.	The school exhibits: -a strong understanding and philosophical continuity of continuum -a definite focus on inquiry based-learning across the continuum -continued application of learner profile–informed language across continuum -MYP students who are prepared for inquiry, assessment and time management.	The school exhibits: -the DP narrowing the curriculum focus to disciplinary content and skills -the DP narrowing the learner profile focus in learning areas to "inquirers" and "knowledgeable" -the continuum as preparation for inquiry, criterion-based assessment, time management, and skills pertaining to the extended essay.

Effective continuum schools engage all faculty members in focused dialogue around matters of curriculum, instruction and assessment, predicated on a culture of trust and the development of shared understanding. This dialogue is bolstered by rich, formal professional development opportunities. Participation in the IB continuum may encourage the school's development by stimulating fuller understanding of other IB programmes and networking with IB teachers in other schools.

Quantitative Data	Case Study I	Case Study II
-"Classroom monitoring" is negatively associated with DP examination results. -"Within-programme interaction" is positively associated with DP examination results.	The school exhibits: -school-based and IB-provided professional development and school-based training in other IB programmes -ensuring teacher "buy-in" to the school mission -participation of teachers in curriculum articulation.	The school exhibits: -professional development for all faculties in essential initiatives and school-based training in IB programmes -engagement of teachers in articulation of school values and in defining standards and benchmarks.

A more extensive explanation of the above propositions can be found in Chapter 9 of the full report.

Limitations

This study was conducted prior to the introduction of MYP: The next chapter. Participants in Schools I and II anticipate that revisions to the MYP will support the articulation of the curriculum and continuity of practice pertaining to instruction and assessment. There is potential for a study to analyse the impact on the continuum following implementation of these initiatives. The present study therefore provides a baseline for comparative purposes.

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This summary was developed by the IB Research Department. A copy of the full report is available at http://www.ibo.org/research. For more information on this study or other IB research, please email research@ibo.org.

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