NATIONAL CENTER FOR RESTRUCTURING EDUCATION, SCHOOLS, AND TEACHING

TEACHERS COLLEGE, COLUMBIA UNIVERSITY

AN ANALYSIS OF THE DEVELOPMENT OF POSITIVE ACADEMIC MINDSETS IN DIVERSE IBO SCHOOLS

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Executive Summary

AN ANALYSIS OF THE DEVELOPMENT OF POSITIVE ACADEMIC MINDSETS IN DIVERSE INTERNATIONAL BACCALAUREATE WORLD SCHOOLS

Overview

There is growing evidence that students' postsecondary and career readiness is driven by more than their content knowledge and core academic skills. Non-cognitive factors (i.e. sets of learning strategies, academic mindsets and behaviors) play a critical role in student success (Farrington, Roderick, Allensworth, Nagaoka, Keyes, Johnson, and Beechum, 2012; Levin, 2012). The literature also increasingly suggests that students are more likely to demonstrate those non-cognitive behaviors, attitudes and strategies in educational contexts that are specifically structured to encourage students to develop and exhibit them.

The current study examined the ways in which International Baccalaureate (IB) Diploma Programme (DP) schools and classrooms foster and develop students' non-cognitive assets, with a particular focus on academic mindsets. Academic mindsets are the "beliefs, attitudes, or ways of perceiving oneself in relation to learning and intellectual work that support academic performance" (Farrington, et al., 2012). We follow Farrington et al. in considering a set of four dimensions of academic mindset: 1) the belief that success is mainly a product of effort, 2) a sense of belonging, 3) confidence in one's ability to succeed, and 4) a conviction that learning tasks are important, interesting and/or relevant. Their research suggests that students' academic mindsets have an important influence on academic behaviors such as study skills and time management that are closely related to academic performance.

The following questions guided our research:

1. How do DP schools' structures (philosophy, structure, leadership) and classroom practices (curriculum and intended and enacted instruction) contribute to students' positive academic mindsets?
2. To what extent do DP students and teachers perceive that the IB programme and the schools' structure, curriculum and instruction support the development of positive academic mindsets?
3. What outcomes do DP students obtain on standardized measures of academic mindset? How do these outcomes compare across schools, especially those in different countries? What school-based factors might contribute to this variation?
4. What linkages can be observed between positive academic mindsets and positive academic behaviors in DP schools?
5. What strategies might the International Baccalaureate Organization (IBO) use or strengthen to develop positive academic mindsets among DP students in the future?

This study was conducted using a multiple case study design, implemented in four schools—two in the United States and two in Peru. Data were collected using student surveys and by conducting school visits that included interviews and observations. School findings were examined individually, although the focus was on cross-school results.

Summary of findings

Our research provides evidence in support of the relationships among school conditions and academic mindset. The student survey results suggested that particular aspects of the school environment and a number of classroom practices are indeed associated with positive academic mindsets. The table below shows the relationship between student responses to school environment and classroom practices scaled items and academic mindsets scaled items. We found positive and statistically significant associations between school environment and academic mindsets and between classroom practices and academic mindsets.

Table. Relationship Between School/Classroom Factors and Academic Mindsets

Relationships		Correlation (r value)
School environment with….	Malleable intelligence	.26***
	Sense of belonging	.59***
	Self confidence	.51***
	Relevance of schoolwork	.56***
Classroom practices with….	Malleable intelligence	.08*
	Sense of belonging	.43***
	Self confidence	.47***
	Relevance of schoolwork	.43***

* Statistically significant at the p< .05 level or less.

** Statistically significant at the p< .01 level or less.

*** Statistically significant at the p< .001 level or less.

For instance, students who believed that the school culture was positive were especially likely to feel a strong sense of belonging (an r value of .589, a strong relationship). Similarly, students who

believed that there were good classroom practices were especially likely to feel a sense of self-confidence (an r value of .469, a moderate relationship).

Further, students with positive academic mindsets were found to be more likely to practice the good academic behaviors associated with positive student outcomes, as found in the research literature.

The student survey results also suggest that, while malleable intelligence (or growth mindset) gets more attention, senses of relevance, belonging and self-confidence are more closely associated with positive academic behaviors in the IB schools studied. They were also present in higher levels among students at all four of the schools participating in our research, increasing their potential impact on positive academic behaviors. Furthermore, we found that school leaders and teachers had developed more ways to promote self-confidence, belonging, and relevance than malleable intelligence.

The most important findings related to school environments and practices that promote positive academic mindsets were as follows:

Malleable intelligence: Attitudes varied with regard to the malleability of intelligence among both adults and students in the four schools studied. Several schools had adopted practices that built on this concept by emphasizing policies such as de-tracking. Others were more likely to seek out different ways for students to shine (e.g. through the arts or leadership). While both strategies could help students be successful, the first is more likely to advance the idea that all students can grow their intelligence, while the second is more likely to make students feel that it's acceptable to not be an intellectual star if you can succeed in other ways.

Similar numbers of students said that they were praised for intelligence and for effort. This suggests that some practices considered detrimental to a malleable intelligence mindset (i.e. praise for intelligence) are widely used. At the same time, school leaders expressed a commitment to having all students go as far as possible in their learning and we found policies encouraging access to the intellectually challenging DP curriculum in all of the four schools. In all schools, every student, including special education students, took at least one DP course, and most learned that they were capable of succeeding in these rigorous and challenging courses.

In addition, school leaders and teachers were able to describe instructional practices that they believed would strengthen students' malleable intelligence mindset. These included seeking the right blend of challenge/high expectations and support/scaffolding or, as one principal said, "the right amount of dissonance – struggle without deflation." Most, if not all, teachers communicated that they believed that all students could learn rigorous course material and that student effort in the classroom was key to academic success. A number sought ways to put in place structures to help students through the steps involved in challenging themselves intellectually.

Belonging: A sense of belonging was described differently in each school, with some emphasizing school spirit, while others talked about school pride or a sense of being part of a comfortable family environment. Among students surveyed, over half (54%) agreed with the statement "I feel a sense of belonging to the school community." The development of a sense of belonging seemed to be more pervasive in the Peruvian schools where the students had attended the same school since age three or four. Across all schools, warm relationships between students and teachers were mentioned as especially important to developing a sense of belonging. In some cases, teachers showed their concern for students by spending extensive out-of-class time with them.

Schools used different methods to foster a sense of belonging including structures such as homeroom, houses, and a range of activities in which students could engage in out-of-school time. Teachers at some schools arranged their classrooms in ways that encouraged a sense of community (e.g., organizing desks in circular groups or clusters) or provided students with opportunities to work in groups, facilitating peer bonding. CAS activities were also settings in which students bonded with each other and developed a sense of belonging; they were also cited as helping students to develop self-confidence and see their learning as relevant.

Self-confidence: Especially in the US schools, efforts were made to promote students' self-confidence in undertaking challenging DP courses. Interviewees stated that students often gained confidence in their ability to be successful in school from the experience of succeeding in these courses. In addition, there were examples of more general efforts to build student self-confidence, often through leadership opportunities in the classroom, in clubs, sports, etc. In the one all-girls school in the study, a school leader talked about how a single gender environment encourages the development of leadership and self-confidence among students, as they do not have to compete with – or defer to – boys.

There was evidence that several schools worked to help students find arenas in which they could shine as a way to bolster their self-confidence. This sometimes took the form of encouraging exploration of different interests and "selves" through involvement in CAS with its emphases on community service, the arts, and sports. In addition, some teachers emphasized developing self-confidence through self-knowledge and provided opportunities for them to use written reflections to consider their areas of strength and to embrace working on areas of weakness. Opportunities for autonomous decision-making were also seen as a way to build student self-confidence. Theory of Knowledge, CAS, and Extended Essay teachers tended to give their students considerable autonomy in choosing what projects to work on.

Relevance: Developing a school environment in which students perceived their coursework as relevant had much to do with emphasizing the importance of learning for the attainment of future goals, especially success in college. This was a high priority for the majority of students in each of the schools. In some cases, this was reinforced by the coursework available through IB. While most students took core college preparatory courses, some also took DP courses such as business

management and music that allowed students to learn about topics they found engaging or worth considering as career options. Teachers in our study schools were often observed to be making an effort to engage students because they recognized that students will put more effort into work that they view as relevant.

Most teachers stated that they build relevance in their classroom by pushing students to engage with questions that ask them to examine their lived experiences in Theory of Knowledge and other classes. In other cases, teachers sought out ways to keep learning connected to life by giving students choices on research paper topics or in selecting CAS or classroom projects of interest to them. CAS projects and related travel were often cited as important to connecting learning to life experiences.

Final thoughts

IB schools are clearly settings in which there is considerable interest in high quality education and in developing the environments and classroom practices most conducive to student success. The IBO works hard to provide strong materials and professional development to support them. In our research, we observed a high level of commitment to the use of innovative practices and processes for continuous improvement in the schools we visited and in the IBO. We commend them for these qualities and hope that this research on academic mindsets serves as a further source of inspiration going forward.

AN ANALYSIS OF THE DEVELOPMENT OF POSITIVE ACADEMIC MINDSETS

IN DIVERSE IBO SCHOOLS

Introduction

Reason for this Research

There is growing evidence that students' postsecondary and career readiness is driven by more than their content knowledge and core academic skills. Non-cognitive factors (i.e. sets of learning strategies, academic mindsets and behaviors) play a critical role in student success (Farrington, Roderick, Allensworth, Nagaoka, Keyes, Johnson, and Beechum, 2012; Levin, 2012). The literature also increasingly suggests that students are more likely to demonstrate those non-cognitive behaviors, attitudes and strategies in educational contexts that are specifically structured to lead students to develop and exhibit them.

The current study examines the ways in which International Baccalaureate (IB) Diploma Programme schools and classrooms foster and develop students' non-cognitive assets, with a particular focus on academic mindsets. Academic mindsets are the "beliefs, attitudes, or ways of perceiving oneself in relation to learning and intellectual work that support academic performance" (Farrington, et al., 2012). We follow Farrington et al. in considering a set of four dimensions of academic mindset: 1) the belief that success is mainly a product of effort, 2) a sense of belonging, 3) confidence in one's ability to succeed, and 4) a conviction that learning tasks are important, interesting and/or relevant. Their research further suggests that students' academic mindsets have an important influence on academic behaviors such as study skills and time management that are closely related to academic performance.

This study was conducted using a multiple case study design, implemented in four schools—two in the United States and two in Peru. It was designed to inform the International Baccalaureate Organization's thinking about how it promotes positive school environments and classroom practices that support student development of positive academic mindsets. It will also provide contributions to the literature on the ways in which non-cognitive assets that contribute to students' successful academic performance can be taught and learned in school and classroom settings. This will be of particular interest to those interested in how non-cognitive assets are valued and expressed in different cultures and settings.

International Baccalaureate (IB) Programmes

IB schools offer one or more of four available IB programmes. Three of these are well established and have been offered for many years—the *Diploma Programme* (DP) implemented since 1968, the *Middle Years Programme* (MYP) since 1997, and the *Primary Years Programme* (PYP) since 1994 (Bunnell, 2011). More recently, the IBO has added an *IB Career-related Certificate* (IBCC)

Programme, intended to integrate academic and career-oriented learning. All of the programmes seek to promote life-long learning and international mindedness, an aim that is advanced through helping students to strive to be inquirers, knowledgeable, thinkers, communicators, principled, open-minded, caring, risk-takers, balanced and reflective, as described in the IB Learner Profile (IB, 2008).

In addition, each programme has its own goals and norms. The Diploma Programme, offered to students 16-19, is by far the largest, accounting for 56% of total IB programmes (IB 2011 Annual Report). It is noted for its rigor and for its use of exams to assure that students meet high academic standards. Students engage in coursework in languages, social studies, the experimental sciences, mathematic, the arts, and Theory of Knowledge (TOK). Those completing their courses, passing associated exams, writing an extended essay, and participating in Creativity, Service and Action (CAS) activities are eligible to earn the IB Diploma.

The IB/DP programme structure and practices, the Learner Profile, their newer Academic Teaching and Learning framework, the focus on international mindedness, and the practices of teachers in DP classrooms may all play a role in supporting the development of positive academic mindsets in students.

The National Center for Restructuring Education Schools and Teaching

The National Center for Restructuring Education Schools and Teaching (NCREST) at Teachers College, Columbia University conducted this study. Founded in 1990, NCREST is an education research and development organization that carries out research in critical areas of school reform such as assessment, accountability, standards, and restructuring elementary, middle, and high schools—including their organization, governance, instruction, curriculum, teacher and student learning. NCREST's mission is to disseminate knowledge to multiple stakeholders on how learning- and learner- centered schools and education can increase equity.

Review of the Literature

Non-cognitive assets, including academic mindset, have recently gained prominence among those concerned with student academic performance. Prior research has found an important association between the expression of non-cognitive skills and academic success and persistence in both secondary and postsecondary education (e.g., Porchea, Allen, Robbins, & Phelps, 2010; Poropat, 2009; Robbins, Allen, Casillas, Peterson, & Le, 2006; Trapmann, Hell, Hirn, & Schuler, 2007).

Academic mindsets are a sub-set of non-cognitive skills or assets. The term mindset is closely associated with the work of noted scholar Carol Dweck. She conducted research showing that students with a "growth," rather than a "fixed" mindset are more likely to be effective learners and attain good academic outcomes (Dweck, 2006). In her research, she emphasizes the importance of

believing that it is possible to be a successful student based on effort, not just ones based on innate qualities.

While there is extensive literature on the topic of non-cognitive skills and a considerable amount on academic mindsets in particular, we found two sources to be of particular relevance in constructing this study. As noted above, Farrington et al. (2012) offer a well-argued approach to framing non-cognitive skills that draws extensively on the research of the Chicago Schools Research Consortium as well as from other scholars and organizations. In addition, we found that Snipes, Fancsali, and Stoker (2012) have synthesized a range of studies that describe interventions that promote positive academic mindsets. In tandem, these two resources allowed us to lay a strong foundation for this study.

Farrington et al. (2012) posit that non-cognitive skills can be sub-divided into several categories. In their framing, academic mindsets are considered to be foundational and a precondition for other non-cognitive skills. Positive academic mindsets contribute to academic perseverance, defined as the intensity, direction and duration of student effort. This, in turn, leads to positive academic behaviors such as study skills and time management, which then result in good academic performance. In their framework, therefore, positive academic mindsets underlie other non-cognitive skills, and thus have particular importance. In the current research, we follow Farrington et al. (2012) in considering four dimensions of academic mindset: 1) the belief that success is mainly a product of effort (which we shorten to "malleable intelligence"), 2) a sense of belonging to an academic, learning and/or social community ("belonging"), 3) confidence in one's ability to succeed ("self-confidence"), and 4) a conviction that learning tasks are important, interesting and/or relevant ("relevance").

Building on the work of a number of researchers, Snipes, Fancsali, and Stoker (2012) identify a range of school-based "tools, practices, and strategies focused on promoting positive academic mindsets and learning strategies" (p. 4) and discuss the evidence supporting their use. Their list is extensive and pertains to many aspects of school practice. We identified those that appeared most likely to be relevant to IB schools and classified them into those related to school environments and those used in the classroom. This two part division is aligned with the work of Durlak and colleagues (2011) who identified two main strategies that promote the development of non-cognitive skills: instructional and environmental approaches.

While the following aspects of the school environment and classroom practice are summarized in the work of Snipes et al. (2012). It should be noted that many of these ideas come from – and are attributed to – other noted scholars and practitioners (e.g. Carr & Walton, 2011; Lee & Smith, 1999: Marzano, 2000).

School environment: Certain aspects of a school's culture have been found to be associated with positive academic mindsets including an atmosphere of respect for scholarship, an emphasis on

teamwork, a positive peer culture, school-wide assumptions that all students can be successful learners, and an overall strong and healthy organization. Scholars have also found evidence that certain structures such as extended time with teachers and a consistent group of peers (e.g. block scheduling, looping) are associated with the development of positive academic mindsets. Other school conditions found to be positive are a system of rewards and consequences that are transparent so that students understand what is required to succeed. In addition, students build positive academic mindsets when they are given opportunities to engage in service to others.

Classroom practice: At the classroom level, researchers have found that aspects of curriculum and instruction, student supports, assessment practices and classroom culture can influence the development of positive academic mindsets. Students are more likely to hold positive mindsets when the instructional practices include challenging but achievable assignments; when praise is offered for hard work rather than intelligence; through opportunities to undertake authentic, relevant tasks applied to real world settings; and when classroom activities incorporate students' cultural knowledge and personal opinions. In addition, it is helpful when students are given choices, cognitive autonomy and ownership of learning. In addition, students who have access to supports when they struggle with learning are more likely to develop positive mindsets. With regard to assessments, students benefit from transparent grading practices and from regular, supportive feedback from teachers on progress toward goal attainment.

Linkages have also been found between positive academic mindsets and trust and safety in the classroom. Students benefit also from high expectations among teachers, especially when it is also clear that teachers respect them as learners. More generally, positive student-teacher relationships are associated with positive mindsets.

In addition, we looked for ways in which particular IBO core ideas, framing documents and initiatives might intersect with efforts to promote positive academic mindsets among students. We expected that there might be particular connection between the IB Learner Profile and academic mindsets, while also acknowledging that the specific items in the profile did not overlap to a significant degree with the four focal dimensions of academic mindsets.[1] In addition, we were interested in whether a relatively new initiative within IBO entitled the Approaches to Teaching and Learning (IB)[2] would be likely to promote positive academic mindsets, in particular with regard to the self-management skills, one of five areas emphasized. Finally, we believed that aspects of the DP design could lead to positive academic mindsets such as Creativity, Action and Service (CAS), the extended essay, and the Theory of Knowledge Course (IBO, 2016). In each of

[1] The IB Learner Profile qualities are inquirers, knowledgeable, thinkers, communicators, principled, open-minded, caring, risk-takers, balanced, reflective. See http://www.ibo.org/benefits/learner-profile/

[2] These are thinking skills, communications skills, social skills, self-management skills, and research skills. See http://www.ibo.org/globalassets/digital-tookit/flyers-and-artworks/approaches-to-teaching-learning-dp-en.pdf

these cases, we hypothesized that students would be exposed to experiences that required them to consider – and possibly develop – belief in the malleability of intelligence, a sense of belonging, self-confidence and a sense that learning was relevant.

There is considerable difference of opinion regarding whether non-cognitive assets are innate or can be learned. If they are indeed learned, in whole or partially, then they can be taught in educational settings. While there is reason to believe that people may be born with personality traits such as conscientiousness that are associated with good academic outcomes (Noftle & Robins, 2007), there is also considerable evidence that non-cognitive assets can be influenced by teachers and schools (Farrington et al., 2012).

Yeager and Walton (2015) posit that work to promote positive academic mindsets may be less about teaching content than about intervening in social-psychological terms. They note that relatively small interventions may have an outsized effect when they target key mental processes that can deter student achievement. Conversely, Shechtman et al., (2013) suggest that opportunities to learn academic mindsets be introduced into the academic core so that students can explicitly learn and practice them in academic situations and understand how they can influence their academic achievement. Farnsworth et al. (2012) found research evidence that positive academic mindsets may be fostered both in relation to instruction in specific content areas as well as in contexts that span content areas.

Studies have shown ways that the development of positive academic mindsets can be advanced through the curriculum (Bailey, Heape, & Shields, 2009), through student supports (Cassen, Feinstein, and Graham, 2008) or through socio-cultural approaches that involve school-wide ways of thinking about student capacity (Duckworth, Kamentz & Keene, 2012). Classroom teachers can help students develop a strong academic mindset by presenting tasks in ways that seem attainable as well as by offering the support and tools needed to be successful (Dweck, Walton & Cohen, 2014).

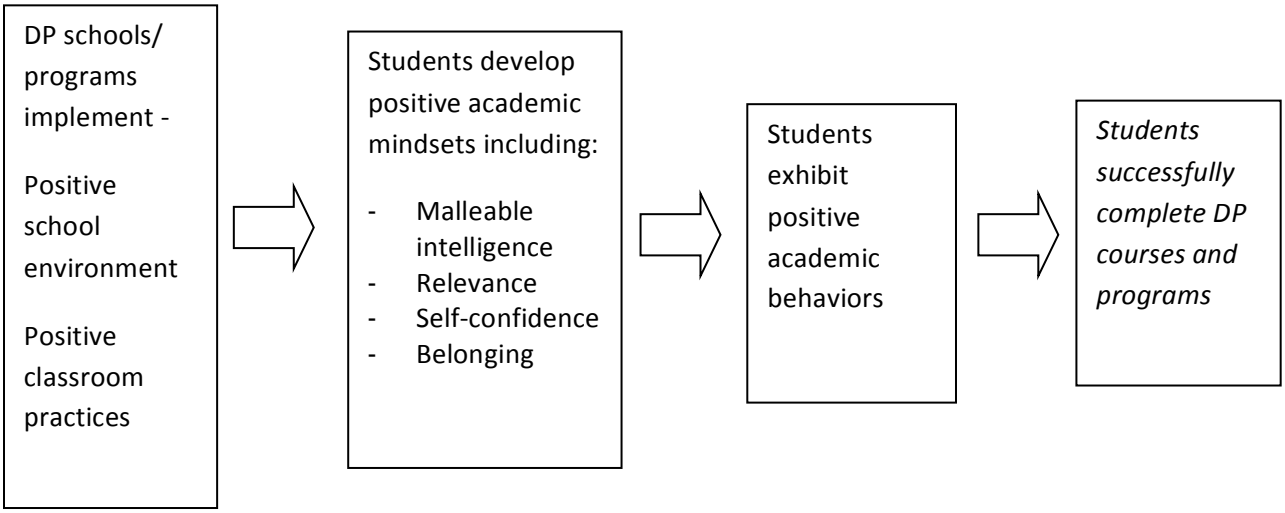
Research Design and Methodology

Overview

NCREST employed a mixed method, multiple case study design for this study. Each IB school selected for inclusion comprised a case or unit of analysis. A multiple case study design was selected to enable NCREST to study and describe the school and classroom-level factors that contributed to students' development of positive academic mindsets at each of the schools in our sample, as well as to explore and describe common and divergent themes that emerged across the IB study schools. We used both quantitative (survey administration and analysis) and qualitative (guided interviews and classroom observations) methods to answer the research questions.

To frame our research, we developed the following logic model, based on the research literature that we reviewed and our understanding of the DP model. In our study, we focused on the first three boxes; the fourth one could not be explored within the timeframe or resources available.

Figure 1: Logic Model- Research on Academic Mindsets



The following questions guided the research:

1. How do DP schools' structures (philosophy, structure, leadership) and classroom practices (curriculum and intended and enacted instruction) contribute to students' positive academic mindsets?
2. To what extent do DP students and teachers perceive that the IB programme and the schools' structure, curriculum and instruction support the development of positive academic mindsets?
3. What outcomes do DP students obtain on standardized measures of academic mindset? How do these outcomes compare across schools, especially those in different countries? What school-based factors might contribute to this variation?
4. What linkages can be observed between positive academic mindsets and positive academic behaviors in DP schools?
5. What strategies might IBO use or strengthen to develop positive academic mindsets among DP students in the future?

Sample selection

Our research focused on four schools located in two countries. To make decisions about which countries to work in, we prioritized those with a considerable number of IB schools and decided that one of these could be the United States (ideally New York State) to keep costs in check. We considered only countries where English or Spanish is spoken as these are the two IB languages in which our research team is fluent.

In selecting schools, we developed a set of criteria intended to identify those with well established DP programs as well as conditions that might be favorable to this research. We were assisted in the identification of schools by representatives of IBO based on our selection criteria, as follows:

1. Time in existence (authorized after 2008).
2. Evidence of full implementation of DP with a preference for schools recognized for their use of the Learner Profile.
3. Some diversity (in the US, with 20% or more students from minority groups or eligible for free or reduced lunch).
4. A substantial proportion of students who were DP exam takers (over 25% in public schools; over 50% in private schools).
5. An interest expressed by school personnel in participating in a study of this kind.

The following four schools were selected:

Table 1. Sample School Characteristics

School	**Location**	**Control**	**Grades/forms**	**No. of students**	**DP participants**
School A	NY, USA	Public	9-12	1100	All students take DP courses; about half work toward the Diploma
School B	NY, USA	Public	9-12	1400	All students take DP courses; 5-20 work toward the Diploma
School C	Peru	Private	Pre-K through Form VI	1200 girls	All secondary students take DP courses; about half work toward the Diploma
School D	Peru	Private, parent cooperative	Pre-K through Form V	1400	All students take PYP, MYP or DP courses; about half work toward the Diploma

Data collection methods

To collect data, two-day visits were made to each school. During each visit, interviews were conducted with the DP coordinator, the school head or principal, the person in charge of CAS and the extended essay, selected teachers (including the TOK teacher), and other school leaders. In addition, we conducted observations in a range of classrooms and some CAS activities. During or just prior to our visit, a student survey was administered to students participating in DP. In preparation for our visits, we conducted an interview with Jenny Gillett, Senior Curriculum Strand Manager at International Baccalaureate in The Hague, to learn about how the IB curriculum integrates any of the four dimensions of academic mindsets of interest in our research.

The following summarizes the research activities undertaken:

Table 2. Summary of Data Collection Activities in the Sample Schools

School	**Location**	**Date of visit**	**Interviewees (#)**	**Observations (#)**	**Students surveyed (#)**
School A	NY, USA	Nov 2016	9	4	454
School B	NY, USA	Nov 2016	18	4	406
School C	Peru	Oct 2016	5	4	44
School D	Peru	Oct 2016	12	4	162
Total			*43*	*16*	*1066*

More specifically, the following activities were completed at each school. All instruments and protocols were developed in English and translated into Spanish for use in Peru. These are included in Appendix A. Consent forms and procedures were also developed in both languages.

1. ***School Leader and IB Coordinator Interviews***. NCREST developed protocols for and conducted semi-structured interviews with school leaders and DP Coordinators. The interviews were designed to collect data on the school and program-level structures and practices that develop and support students' positive academic mindsets. We were also interested in how IB and DP resources such as the Learner Profile and the Theory of Knowledge curriculum might promote positive academic mindsets.
2. ***Teacher Interviews***. The teacher interview guides were designed to collect data on teachers' understandings of academic mindsets as well as instructional practices that support students' development of positive academic mindsets. They also addressed teachers' perceptions of the ways in which the IB program as well as other school and classroom factors support the development of positive academic mindsets, in the context of local cultures and norms.

3. ***Student Survey***. NCREST developed a two-part questionnaire that was administered to DP students in the study schools. Items in the first part were developed by NCREST and were used to collect student demographic information as well as data on students' perceptions of school environments and classroom practices that may support the formation of positive academic mindsets. To facilitate later analysis, we constructed scales in which items related to school environment and to classroom practice were clustered. The final scales used are included in Appendix B along with their validity (Cronbach's alpha) values.

   The second section of the student questionnaire contained items/scales designed to assess students' academic mindsets and academic behaviors. For these, we drew on existing scales that had been previously validated. An important source was the *Motivation and Engagement Scale* (MES), developed in Australia, which measures behavioral, emotional and cognitive dimensions of student engagement and has eleven subscales (Martin, Yu, Papworth, Ginns, & Collie, 2015). The MES-High School (MES-HS) was designed for students age 12-19 and has strong psychometric properties; it was normed on 21,579 students in 58 high schools in Australia. Cronbach's alpha for the eleven subscales is 0.79 for the MES-HS (0.77–0.82 for individual scales).[3] From the MES, we used scales for academic behavior, relevance and self-confidence.

   We also incorporated one version of Dweck's (n.d.) mindset scale to measure students' perceptions of malleable intelligence.[4] To measure belonging, we adapted a scale developed by Hurtado and Carter (1997) for use in research conducted with Latino college students.

   All items used closed response options and all items that entered scales used a Likert scale ranging from 1 for strongly disagree to 5 for strongly agree.

4. ***Classroom Observations.*** During our visits, the researchers spent time in classrooms and CAS activities, when possible. The observations were guided by an observation protocol that focused our attention on teacher interactions with students that were likely to generate/support positive academic mindsets. The observation guide used in this research is included in Appendix D.

5. ***Review of School Documents***. NCREST also collected and reviewed relevant school documents, such as mission statements, policies, curriculum documents, etc. relevant to our research questions.

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[3] The MES was developed by Dr. Andrew J. Martin of the University of Sydney, and is published by the Lifelong Achievement Group. Sample items and information on constructs measured, psychometric properties, administration and scoring are can be found at: http://www.lifelongachievement.com/the-motivation-and-engagement-scale-mes-i8/

[4] https://mindsetonline.com/testyourmindset/step1.php. It should be noted that this was the one scale that we used with a low Cronbach's alpha value. Despite this, we decided to go ahead and use it in its original form because it has been used extensively in previous studies.

Data analysis

The analysis of interview data was done using detailed notes taken during each interview; recordings were also made and used to verify the notes when needed. These notes were analyzed by first organizing them according to the research questions and then clustering the responses into categories by emergent theme.

The survey responses were downloaded in Excel and transferred to SPSS for analysis. We first generated simple descriptive tables and charts showing average student responses to each item and for each scale. We next looked for correlational relationships between the different scales included in the logic model. See Appendix B for more details.

Findings

School Environment and Classroom Practices that Foster Positive Academic Mindsets

In this section we address our first two research questions. These are, "*How do DP schools' philosophy, structure, leadership, curriculum and intended and enacted instruction contribute to students' positive academic mindsets?"* and "*To what extent do DP students and teachers perceive that the IB programme and the schools' structure, curriculum and instruction support the development of positive academic mindsets?"* Because our interview and survey questions focused on both of these topics at the same time, it was difficult to disentangle the two; therefore we address the two questions together. In keeping with our logic model, our discussion is separated into school environment and classroom practices sections.

School environment

<u>School environment and malleable intelligence</u>

Emerging and compelling research that suggests non-cognitive factors associated with positive academic outcomes and school success, such as pro-academic mindsets, are largely creations of school and classroom contexts rather than the personal characteristics that students bring with them to school (Farrington, et. al, 2012; Hamedani, Zheng & Darling-Hammond, 2015). For the most part, we found that there was widespread belief in the four schools visited that intelligence is malleable, although it was occasionally questioned to some degree. In many cases, respondents told us that all good teachers believe that intelligence can be built with effort and good teaching. Most students surveyed (79%) agreed with the statement that their IB program emphasized hard work as a way to succeed. Sixty two percent of students agreed with the statement, "No matter how much intelligence you have, you can always change it a good deal." However, fewer - 52% - agreed that they were generally praised for effort while 46% said that they were praised for their intelligence, suggesting that perceptions of adults on this topic vary.

In a number of cases, belief in the malleability of intelligence was seen as related to both family and school culture. In several of the schools, the point was made that students' families encouraged them to believe that they could learn with effort.

> *We live in a community where success is very important to faculty, students and home. Parents push them at home. IB is rigorous. You really have to work in order to be successful. Students just have that mindset coming in.*

In other cases, the emphasis was on the climate and philosophy of education within the school itself:

> *The school itself fosters that. We have a climate where [students] are challenged and it is not cool to take the easy path…The idea that everybody can do it is fostered from the day they walk in in 9th grade.*

In general, school leaders expressed a commitment to having all students going as far as they can in their learning and we found that policies encourage progression through the DP curriculum in all of the four schools. At School B, the principal noted that "IB for all" is a motto and message at the school. The school encourages students to consider themselves as capable of achieving at high levels, and to try things that are difficult. Structurally, the school requires all 11th graders to take the DP English and History course. The principal explained that it's a way for students "to learn what is involved and lose the fear of more rigorous coursework." The school has a no minimum requirement for entry into a higher level DP course and, as the principal noted, if a student is willing to try, they are not discouraged.

We also found that measures are taken to help students to build a conviction that they can engage in rigorous and challenging academic work. At School A, staff work to create an environment in which students are challenged but also frequently praised and supported. These efforts are part of the school's long-term commitment to de-tracking and engaging students in rigorous coursework. As part of its de-tracking efforts, the school offers varied IB options ranging from taking one class, to taking several, to earning the DP diploma. In addition, the school has support classes for students with special needs as well as staff resources (e.g. guidance counselors, social workers and psychologists) to help students tackle more challenging coursework.

At School D, policies and structures communicate an underlying belief that all students, including special needs students, can succeed in the rigorous DP academic program. Students complete the DP coursework by the equivalent of the US 11th grade, an earlier age than is typical for DP students. The school is concerned with boosting students' confidence and academic self-efficacy. They have started a department of learning support, which includes both academic supports and social-emotional counseling. Another theme that emerged was helping students to grow their intelligence by providing the right mixture of challenge and support or, as one principal said, "the right amount of dissonance – struggle without deflation."

In addition, a number of schools used systems that provide systematic ways to help students through rigorous tasks, likely to influence their belief that their intelligence is grow-able. The thinking is that students will benefit from a set of structured experiences that would allow them to grow intellectually. For example, a teacher at School D talked about how IB's Extended Essay process helps students to build a belief that they can tackle a difficult project.

> *It's a progressive 2-year effort. For year 2 they pick the topic or course where they will be doing their research. They meet with their supervisor at the end of year 1 to begin research. Before year 2 there is another meeting to make sure there is some movement…. At the beginning of year 2 there is a review. There is a form where students and supervisors track their progress so they can finish on time.*

Leadership attitudes appeared to be very important in addressing questions about malleable intelligence, particularly whether all students are capable of engaging in rigorous coursework. This was especially salient in the US public schools that were enrolling progressively more students in DP courses. One principal in particular was eloquent on this topic.

> *How do teachers react? Teachers are cautious at first. Guarded. This is second order change. Change is hard for anyone…. It's a big shift to believe this can be done for all. The majority now believe that all students can do this but it's not easy. Leaders have to keep up the press.*

At the same time, we encountered examples where doubt was expressed by school personnel that intelligence is fully malleable. One questioned whether all students should be prepared for college, believing that "not all students are wired that way." Another interviewee believed that girls' and boys' brains learn differently and that girls benefited from being in classrooms segregated by gender.

<u>School environment and a sense of belonging</u>

Students' sense of belonging is fostered and exhibited when they form a sense of identity with and feel that they are genuine members of an academic and learning and social community—at the school-level and/or classroom level. (Snipes, et. al., 2012). A sense of belonging was described differently in each school. Some talked about school spirit, while others talked about school pride, or a sense of being part of a comfortable family environment. Among students surveyed, over half (54%) agreed with the statement "I feel a sense of belonging to the school community."

In the two Peruvian schools, a sense of belonging was well established by the time students were in the DP programme. In both cases, most students entered at the age of three or four and stayed until graduation from secondary school. As one school leader said,

> *Here the kids come in at nursery so the spirit is there and they grow up together. The students are comfortable with one another. There are very few instances of bullying and students seem to have a respect for one another.*

In addition, the populations of these schools are well off economically and fairly homogeneous, reducing the differences among students that can cause tensions. Thus, the schools did not need to make as much effort to engender a sense of belonging among students. However, School C explicitly addressed the importance of a sense of belonging on their website:

> *We value each and every student, their uniqueness, and the diversity of our community, and the commitment and skills of our staff. Building a strong sense of community is very important for us; we believe that when pupils feel they belong they are more likely to become academically motivated, to act ethically and to develop social and emotional competencies.*

School C also fostered students' sense of belonging through structures that create student identity groups. All students are assigned to a homeroom at the beginning of their secondary school years and to a lead teacher who stays with the student cohort through graduation. They meet briefly at the beginning of each day and also once a week for a personal development class. The lead teacher keeps track of how individual students are doing both socially and academically and intervenes when necessary. In addition, the school has a house system, in which students are assigned to one of four houses in the 2nd grade in which they remain until graduation. The house system aims to promote school spirit, teamwork and healthy competition among houses in academic sports and special projects.

In the US schools, students were less likely to have grown up together and particularly in one school, students were less well-off. However, explicit efforts were made to promote a sense of belonging among students. Both US schools encouraged students to participate in activities and organizations such as fishing or language clubs that would promote a connection to the school and each other. At School A, the school encouraged participation in their 56 student clubs and activities, some of which could be used by DP students to fulfill their CAS requirements. In School B, a school leader talked about efforts made to engender a sense of belonging across the years.

> *Explicit efforts for belonging? New 9th graders get a tour. We have spirit week….clubs… back to school night…junior gala…homecoming.*

At School B, the principal noted that he makes it a priority to support students and staff to develop a sense of belonging and pride in the school, and notes that he frequently hears students say with pride, "I'm an IB student." In addition, the principal perceives that the students who strive to earn the DP diploma feel a sense of kinship and pride in undertaking rigorous work.

Across all schools, warm relationships between students and teachers were mentioned as especially important to developing a sense of belonging.

> *I can't really ascribe happiness to anything the school does in particular. The school is a fairly friendly place because students already know the staff and who's going to be their teacher from year to year.*

> *Students have lots of affection for the teachers. There are great relationships. Teachers go to weddings of former students, know the family. There are always things going on in students' families.*

At the same time, there were cases where the sense of belonging could be weakened by the division of students into DP diploma students and those who were not. Students working toward the diploma were sometimes considered different or of higher status in the school, something that could diminish the sense of belonging to a school community.

School environment and self-confidence

As cited in Farrington et al. (2012), Bandura (1986) noted that students are most likely to engage in learning activities that they feel able to complete successfully and to avoid those that they do not feel confident about undertaking. According to our interviewees, IB coursework can seem daunting to students and, especially in the two US schools, efforts were made to promote students' self-confidence in undertaking these courses. In addition, there were examples of more general efforts to build student self-confidence.

There was evidence that several schools worked to help students find arenas in which they could shine as a way to bolster their self-confidence. This sometimes took the form of encouraging exploration of different interests and "selves" through involvement in CAS with its emphases on community service, the arts, and sports. A teacher at School D pointed out that many of these opportunities are un-graded so it encourages students to take more risks and develop confidence in trying new endeavors. One CAS coordinator said, "We encourage them to step outside of their comfort zone."

In other cases, students were offered leadership opportunities that appeared to contribute to their self-confidence. In one of the Peruvian schools, students could be leaders within student government, in "houses" similar to those in the British school system, or in various sports, clubs, and activities, allowing them to gain confidence in different roles. In the one all-girls school that we visited, a school leader talked about how a single gender environment encourages the development of leadership and self-confidence among their students. There was no deference to boys or assumptions that girls are limited to certain areas of accomplishment.

> *With an all-girls school, girls are able to recognize and see themselves as scientists and mathematicians…. Because this is an all-girls school, girls believe they can thrive anywhere.*

There was also thought given to helping students take charge of their own education. At one school, an external reviewer had questioned whether students were given too much support. The school was in discussions about whether to reduce the amount of "spoon feeding" and increase students' opportunities to "think for themselves."

Finally, in some schools, there was explicit concern with students' self-concept and support is provided to bolster it. As one leader said, the rigor of the program can make it hard for students to maintain their confidence and the school offers various resources.

> *The psychologist is always involved with supporting the kids with social emotional problems. She does lots of coaching for kids who need it. Some students were shocked when their grades went down because of the rigor of the IB program.*

The DP coordinators were another resource for students whose self-confidence needed bolstering. Across all of the schools, they were involved in encouraging faltering students and helping them believe that they could succeed in challenging classes and aspire to become a DP diploma holder.

In one of the US schools, the principal made a particular effort to build a sense of pride and a belief that students at that school could be as good as students anywhere. In fact, the use of the IB curriculum has played a role in convincing students that they can succeed in life.

> *When I started here 27 years ago, there was low self-esteem and the belief that [School D] students are dumb. I kept telling them that they're great. I started by making the school look better to reinforce the idea of self-pride. IB has been a big part of that also.*

<u>School environment and relevance</u>

School wide structures and practices that promote and foster student adoption of academic mindsets include learning opportunities and experiences that students enjoy and perceive to be relevant and valuable to themselves, their communities and "the real world" (Snipes, et. al, 2012). In the four case study schools, we consistently found that school faculty identified structures and practices that build students' belief that education is relevant. Of students surveyed, 60% agreed that "I'm able to use some of the things I learn at school in other parts of my life," one measure of relevance.

Developing a school environment in which students find their coursework relevant had much to do with emphasizing the importance of learning and achievement for the attainment of future goals, especially success in college. The majority of students in all four schools were brought up with the idea that they should take the steps necessary to attend and graduate from a good college; 94% of those surveyed expected to go to college right after high school. According to school staff, this message is often driven home by parents. In addition, schools took measures to reinforce the idea that school success leads to college success. At one school, alumni were regularly invited in to speak with students about the value of studying hard.

> *How do you convince students it's worth the effort? Bring in former students to connect how this will be relevant and helpful. Bring them in for school events to remind them that DP is a struggle but that once you get to university, it's a cake walk.*

In some cases, students took courses that were relevant to their future plans. IB courses offered at School A such as business management and arts allowed students to learn about topics they found engaging or useful. Faculty at School B discussed ways that other DP components such as CAS and the Extended Essay offer learning experiences that are intrinsically enjoyable and relevant, as student are encouraged to focus on topics and experiences that are meaningful to them.

In addition, we observed that school leaders and staff were often committed to making the learning relevant to students' current lives and interests. At School A, recent faculty professional development had focused on differentiating courses in ways that take into account student choice and interests, including student selection of research and study topics, ways of learning, and sometimes means of assessment. At School D, connecting student learning opportunities and experience to student interests is fostered through the structure for course selection. Students and parents decide what courses should be taken based on their interests and goals.

CAS activities were often structured to give students a connection with the real world. In many cases, service projects brought students into contact with people and places they would not have otherwise known; they also provided students with opportunities to be useful to others. This appeared to be especially true in the Peruvian schools where many students had led sheltered lives. For example, at one school, students were tutoring younger children from a low-income school. In another, students organized games and social activities for special education students. CAS activities also allowed students to be creative in real world settings. One group of students was working with a small local museum to set up interactive displays that would engage the public and help them to learn about ancient textiles. At the same time, only half (50%) of students surveyed agreed that they learn skills in CAS activities that are relevant in the real world, suggesting that more could be done to connect CAS to student interests.[5]

Finally, most of the schools involved at least some students in trips to places that broadened their horizons and understanding of the world. At one of the US schools, students go on a field trip to Nicaragua almost every year to carry out service activities. Students formed close relationships with their host families and gained insights into a different culture. This school also regularly took groups of students to conduct research in the library at a local college to expose them to the college environment and resources. At one of the Peruvian schools, there was an annual trip to the jungle to study ecology as well as to do service projects.

In addition, it was clear that students were often concerned with making the adults in their lives proud of them, an attitude that made success in school relevant in a personal way. This connection was strengthened within schools by the dedication that teachers showed to educating and supporting their students.

[5] Although the range was from 89% agreeing at School C to 28% at School B.

Classroom practices

Farrington et.al. (2012) state that "Classroom conditions have powerful influences on students' feelings of belonging, self-efficacy, and valuation of school work and can also reinforce or undermine a growth mindset (p.32)." Unfortunately the research is limited with regard to specific classroom strategies that directly translate into the development of academic mindsets. However, multiple studies have found there are interventions that have a positive effect in promoting positive academic mindsets (Snipes, 2012). These findings serve to highlight the ways that IB teacher practices influence academic mindsets in the four case study schools.

Classroom practices and malleable intelligence

Classroom practices that support a malleable intelligence mindset are complicated to identify and assess. In many ways, they are embedded in ongoing teacher practice and daily communications with students. Research suggests that much depends on how teachers communicate and value student effort as well as how students internalize the message. In this study we found that teachers overwhelmingly expressed a belief that intelligence is malleable, yet students in general did not score as high in the malleable intelligence mindset as they did for the other academic mindset measures in the student survey (see Figure 2 on page 25 and item-level survey results in Appendix B).

Most, if not all, teachers communicated that they believed that all students could learn rigorous course material and that student effort in the classroom was key to academic success. In some cases, the assessment system reflected effort as well as mastery of knowledge and skills. School B's teachers give "good house marks" to students who are excelling academically and students who demonstrate positive behavior in the classroom. A DP coordinator at School D stated that, "students earn both academic and attitudinal grades. Professors may recognize extra effort."

In addition, attention was paid to bolstering students' willingness to invest effort in their studies. In School B, a teacher talked about ways to make sure student morale is high. For instance, if she has a student who is not proficient in English she may provide an alternative assignment or avoid asking him or her questions in front of the whole class to avoid embarrassment. Similarly, teachers from Schools B and D mentioned the importance of providing students with positive feedback and the effect it has on their academic success. In School B, teachers were specific in stating that they have gravitated away from highlighting student failures or mishaps. One stated,

> *In the old days if you were in trouble, you lost points or lowered your grade. Now we emphasize areas you are able to do well. 'If you add these pieces to your writing then you will be here or there.' Students understand what is needed to thrive and the effort needed.*

This is a clear indication of a teacher's effort to gravitate towards a style of teaching aligned with promoting positive academic mindsets. This teacher went on to explain that she helps student understand the need for perseverance by expressing herself honestly and showing students her own struggles. She sometimes models her own process of conquering her weaknesses and helped students realize that, although the coursework may be difficult, it is achievable, and they are capable of achieving her rigorous standards.

In addition, we noted that teachers took advantage of the characteristics of several DP courses and activities to promote a malleable intelligence mindset. These included the Theory of Knowledge (TOK) course, the Extended Essay, and the Community, Activity and Service (CAS) program. Teachers across schools pointed out that these are settings in which students are required to apply skillsets that may be neglected in typical academic classrooms. In a course like TOK students may spend more classroom time thinking deeply and critically about academic and life issues and stretching themselves as intellectuals. One teacher from School D stated,

> *They are encouraged to question things in their lives. It gets them connected to real life and a series of relevant topics. It's not only about asking questions, but also finding answers. Thinking about different ways to answer based on different kinds of framing.*

TOK courses allow teachers to probe complex issues with students and to grant students the academic space to challenge themselves and validate their perceptions about their own intelligence. As another School D lead teacher put it:

> *Inquiry is another area that encourages growth mindsets. When there is no right or wrong answer [to these open-ended questions]. It's not about the right or wrong answer but rather how did you get your answer. This promotes mindset.*

Many CAS coordinators felt similarly that their overall goal is to encourage inquiry and reflection. For instance, a CAS teacher at School A stated that after 18 months of working with their peers and in the community, students' written reflections show a growth in maturity and in complexity of thought. These student reflections play a significant role in grading and allow teachers to provide positive feedback and promote positive academic mindsets. Teachers overseeing students' Extended Essays also practice strategies that promote a belief in malleable mindsets, particularly helping students learn how to handle challenging projects.

<u>Classroom practices and belonging</u>

Humans have a basic need to belong in the world (Mazlow, 1943) and, for many students, the classroom is a major part of their life. Teacher practices that promote a student sense of student belonging depend on a classroom culture that is established by teacher. Student supports must be

in place so students may productively struggle with their academic work and yet persist and thrive in their academic environment. So is a teacher's ability to promote trust in the classroom (Farrington et al., 2012). A sense of belonging in the classroom involves relationships with and among both teachers and peers.

Almost all school leaders spoke highly of their teachers' efforts to promote students' sense of belonging by supporting them and showing them that they were important. One way this was communicated across schools was through teachers' willingness to stay after school or come to school early to help students who requested their assistance. A school administrator at School C stated:

> *Teachers are very willing to give their free time to help students. Students rarely say that a teacher does not want to help them.*

Beyond being available, teachers used other strategies to promote classroom cohesiveness and a sense of belonging. Teachers at Schools A and D arranged their classrooms in ways that encouraged a sense of community (e.g., organizing desks in circular groups or clusters). Similarly, providing students with opportunities to work in groups allowed teachers to encourage interaction among students with different academic and non-academic characteristics, facilitating peer bonding. As one School D teacher noted:

> *Kids form connections that aren't necessarily based on academic levels; they're based on other kinds of affinities. But both are good. In many groups, students divide up the work depending on their different strengths.*

These strategic classroom practices facilitate dialogue, which School C teachers felt was important to promote a sense of belonging in the classroom. A teacher stated that he demanded "good discussion" and avoided structuring the classroom in a way that emphasized the role of the teacher as a lecturer. This teacher preferred to begin classes with small group discussion.

Another important piece in creating a classroom environment that promotes a student sense of belonging is assigning tasks/projects that encourage bonding among students. School C sent its students to the rain forest to conduct research on local ecology. Another school took groups of students to visit their local university where they were guided by university librarians in conducting research. One school took its students to visit another school in a mountainous region famous for its archeological sites. These experiences created, as one School A teacher put it, an "all in this together mentality."

However, students' sense of belonging in the classroom often came back to their relationship and sense of connection with teachers. A teacher from School D said,

> *It's about the relationship with the teacher….. Students will come and say that they used to be really scared—both excited and scared—felt unable to be successful…..So you need to show students that you believe in them. That makes a big difference.*

In some cases, there were other motivations for connecting with students, however. A teacher from School D stated that classrooms would be empty if they did not have positive relationships with their students. Teachers of classes that are less intrinsically popular need to create a classroom environment that is both academically challenging and fun so that students will take their classes.

Classroom practices and self-confidence

Many teachers in the four schools studied believed that their students were quite motivated and confident, but took measures to reinforce this in the classroom. One School B teacher used talking points to remind students that there are multiple opportunities for success in school and in life. Teachers from several schools (Schools A, B and D) mentioned that students' written reflections were very important in identifying their weaknesses and strengths, allowing them to assist students to harness areas of strength, while pushing themselves to improve in areas of weakness. In School D, a teacher talked about using differentiated instruction as a tool for helping students to gain confidence as learners (e.g., auditory/visual learners).

Opportunities for autonomous decision-making were seen as a way to build student self-confidence. Theory of Knowledge, CAS, and Extended Essay teachers tended to give their students considerable autonomy in choosing what projects to work on. One school leader from School C said that, across courses and activities at the school, "students have the freedom to choose the projects they want to work towards." The opportunity to make these decisions contributed to their feeling that the work was relevant and also built their self-confidence as they chose topics of interest and then could build academic skills. This sentiment was echoed throughout our conversations with administrators and teaching staff. A School D teacher explained why giving students the freedom to choose is helpful:

> *It helps raise self-esteem because the projects force them to be leaders and make them be speakers. This helps raise self-esteem and makes them less introverted.*

A School C teacher echoed this view in talking about how CAS' semi-structured curriculum allows students to have a voice in what activities will be undertaken. Like other CAS coordinators, she conducts individual interviews with students throughout the course of the program where she encourages students to reflect on how CAS helps them to build skills and confidence. This teacher said,

This is the value of the individual interviews. Students talk about their fears and worries. One girl decided to overcome her fears by pushing herself to participate in the school play; then she got involved in the fundraising walk.

However, there were constraints to how much autonomy teachers will give their students. For instance, School C and D teachers supervising the Extended Essay will typically not let a student work on a project if instructors are not well versed in the topic or do not think that it will garner a good assessment from DP.

Assessment practices can also influence student self-confidence. Sometimes assessment guidelines come from IB in the form of comprehensive rubrics that teachers use to clarify what is needed to earn successful grades on DP projects and products. In courses where teachers were afforded more assessment autonomy, they tended to be very explicit about their goals for the classroom. For instance, one School D art teacher mentioned assessing her students at the beginning of the year and adapting her practice to fit the needs of her students. She stated,

The instruction becomes very individualized—starting with formative assessment and then working from their strengths. Getting students to take responsibility for their learning. Letting them fail; showing them where they could be stronger. Showing successes—once they feel successful they just go. In art there are many ways to be strong. Students can find themselves.

This teacher's willingness to adapt to her student needs showed her interest in using assessment and individualized instruction to build students' self-knowledge and self-confidence.

<u>Classroom practices and relevance</u>

It is widely understood that students are, "naturally motivated to learn when they perceive a task to be inherently interesting." (Farrington et. al, 2012, pg.29). The research of Lee et al. as discussed in Snipes (2012) emphasizes the importance of giving students authentic, relevant tasks that can be applied to real world settings and also making efforts to incorporate students' cultural knowledge in classroom discussions. Teachers in our study schools were often observed to be making an effort to engage students because they recognized that students will put more effort into work that they view as relevant.

Most teachers stated that they build relevance in their classroom by pushing students to engage with questions that ask them to examine their lived experiences. For instance, during a single Theory of Knowledge class in School C, there were a number of discussion topics that allowed students to reflect on their own experiences and explore their values.

- There was a discussion of *Eudaimonia*, one way of knowing that emphasizes human welfare. The class talked about the social consequences of mining using this framing.
- The teacher asked what students would do if stopped by a policeman and asked to pay a bribe to avoid a large fine. He asked, "Which is better? Does respect for the police officer require you to pay the fine? If you pay the fine, will it be used for corrupt purposes?"
- There was a discussion about whether people with mental illnesses have to behave ethically. A student asked about people with Asperger's. Another talked about someone she knew with schizophrenia.

Teachers at all schools, especially Theory of Knowledge teachers, similarly articulated a classroom norm where their students connect their learning with their lived experiences. A School D teacher gave a few examples of the types of prompts he used to facilitate meaningful discussion:

> *In the TOK, there are a series of tools that help you teach. The manner of asking questions is key—What are the limits of knowledge? What's the basis for the knowledge that we have? This helps kids to ask good questions and dig in to different topics. They are encouraged to question things in their lives. It gets them connected to real life and a series of relevant topics.*

Another practice that has already been mentioned in previous sections is teachers' willingness to allow students to pick their own projects, specifically for Theory of Knowledge, Extended Essay, and CAS. Giving students that autonomy increases the possibility that the student will choose to explore an area of content they are passionate about and in turn better engage with the material.

One School B administrator in particular emphasized the importance of making learning relevant. He stated, "Students don't want to just sit and do busy or boring work." He challenges the teacher to be engaging, using technology and flipped classrooms. A school leader at School A was promoting differentiated instruction as a way to engage students and make sure that they connect with the material taught. Professional development on this topic has been offered a number of times in the past year. In general, we noted that leadership support serves to motivate teachers to continue to figure out ways of making learning relevant.

Teachers at Schools A and B noted that there are aspects of the DP program that interfere with a teacher's ability to make learning and content relevant. Both teachers stated that the DP guidelines are too rigid and overly "academically based." They believed that the guidelines do not allow teachers to explore ideas that go beyond the required content.

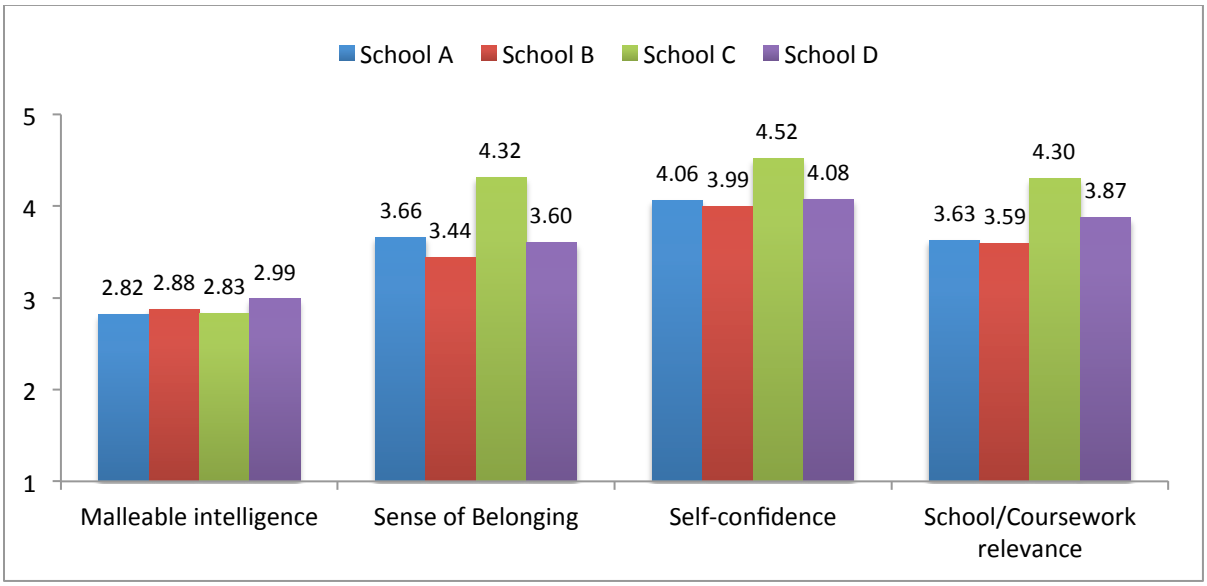
Measures of Students' Academic Mindsets

In this section, we examine the findings of our study that address research question 3: *What outcomes do DP students obtain on standardized measures of academic mindset? How do these*

outcomes compare across schools, especially those in different countries? What school-based factors might contribute to this variation? We primarily use the results of the student survey to address these questions. A section of the survey asks students to agree or disagree with scale items designed to indicate their strength on each of these dimensions of academic mindset. Each scale is comprised of multiple items as shown in Appendix B.

Figure 2, shows each school's average responses on each of the four dimensions of academic mindsets on a 1-5 scale where 5 indicated strong agreement.[6] Across all schools, students were less likely to embody a malleable intelligence mindset as compared with the other three mindset dimensions. Students' average ratings place them between "disagree" and "neither agree nor disagree" on the malleable intelligence mindset. It is worth noting that the reliability of the scale used to measure malleable intelligence was quite low (Cronbach's alpha of .56) indicating that the results should be interpreted with caution. With regard to their sense of belonging, students' average responses place them between "neither agree nor disagree" and "agree," except in School C where they were considerably higher. The same pattern is found on students' sense that school/coursework was relevant. Students' self-confidence was somewhat higher with averages falling between "agree" and "strongly agree" at all schools.

Figure 2: Average Responses to Measures of Academic Mindsets by School



We examined differences on the four dimensions of academic mindset across the four schools. Significant differences were found on each dimension. However, a post hoc Scheffe test revealed that the differences among schools were not consistent in any particular direction and were least

[6] 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree. Items were reverse coded where appropriate.

likely to be significant in regard to the malleable intelligence mindset. No particular conclusions are drawn from this analysis.

We also compared average academic mindsets scores by country. As Table 3 shows we found small but statistically significant differences on each of the four mindset dimensions—with students in the two Peruvian schools consistently scoring higher, on average, than students in the US schools. The largest differences found were in the dimensions of relevance and belonging. There could be many possible explanations for this. The two Peruvian schools were both private with relatively high socio-economic status among their students. Both enrolled students from nursery school through high school, giving them more time in which to establish norms and relationships associated with positive academic mindsets. At the same time, the sample of schools studied is extremely small, limiting our ability to draw inferences from this finding.

Table 3. Average Differences in Student Academic Mindset by Country

		Average	Difference
Malleable intelligence	Peruvian schools	2.95	.11*
	US schools	2.84	
Sense of Belonging	Peruvian schools	3.76	.21*
	US schools	3.55	
Self-confidence	Peruvian schools	4.17	.14*
	US schools	4.02	
Relevance	Peruvian schools	3.96	.35*
	US schools	3.61	

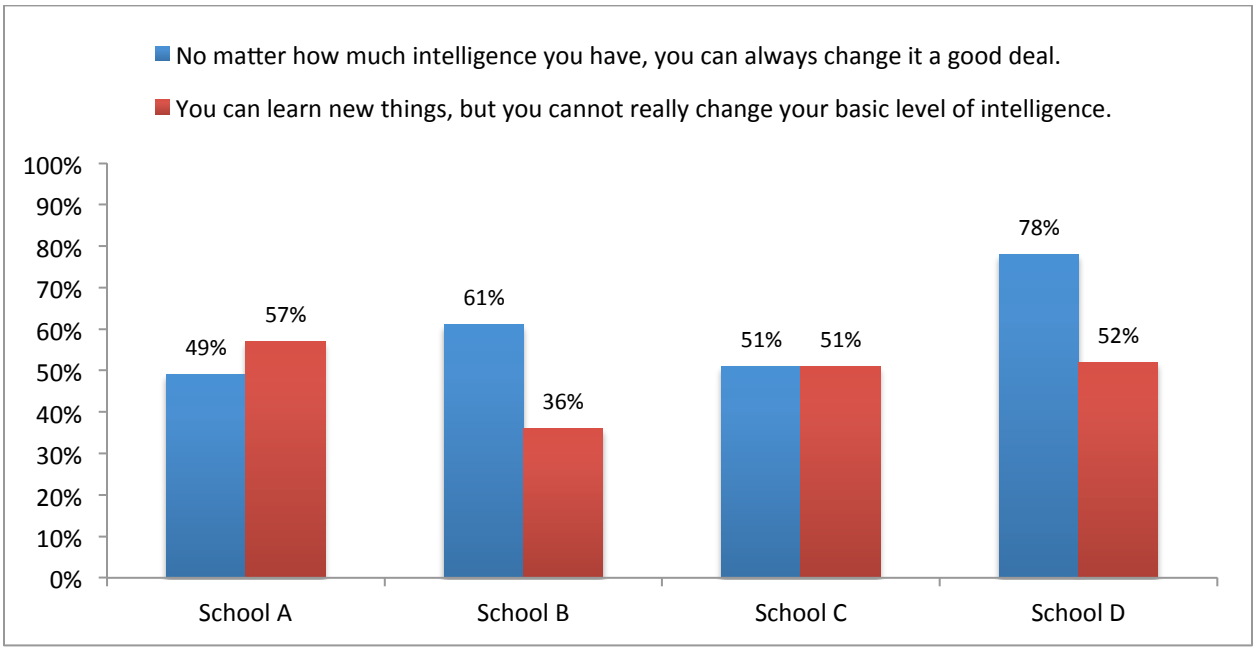
* Significant at the p<.05 level or less.

To provide further insight into students' status on academic mindsets across schools, we also display responses to one or two questions related to each mindset dimension. These were selected as items that are particularly representative of each.

Malleable Intelligence: Two specific survey items provide additional insight into students' status on malleable intelligence. Figure 3 shows the percentage of students who agreed or strongly agreed with two items that capture the core concepts associated with malleable intelligence (i.e. growth versus a fixed mindset). As can be seen, there was considerable variation by school in the percentage of students who agreed with these two items. In Schools B and D a majority of students (61% and 78% respectively) responded in a way that reflects a malleable intelligence mindset. In contrast, responses of the majority of students in School A (57%) reflected a fixed mindset. It is

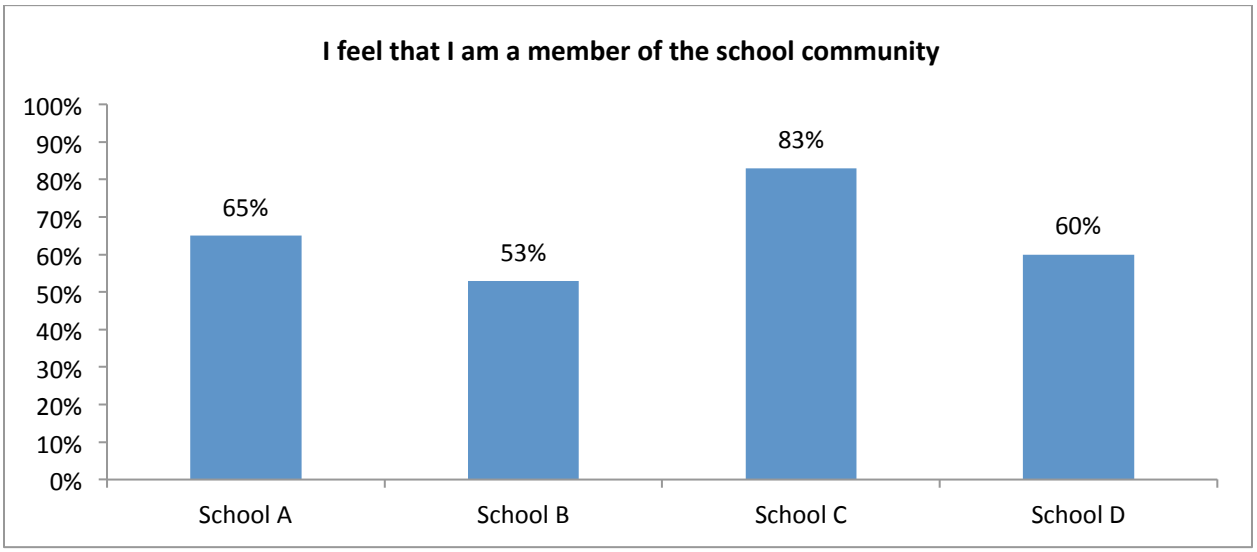
interesting that, despite the fact that the responses to these two statements should be different, some students (especially at School D) appeared to agree with both.

Figure 3: Responses to Malleable Intelligence Key Items (% who agreed or strongly agreed)



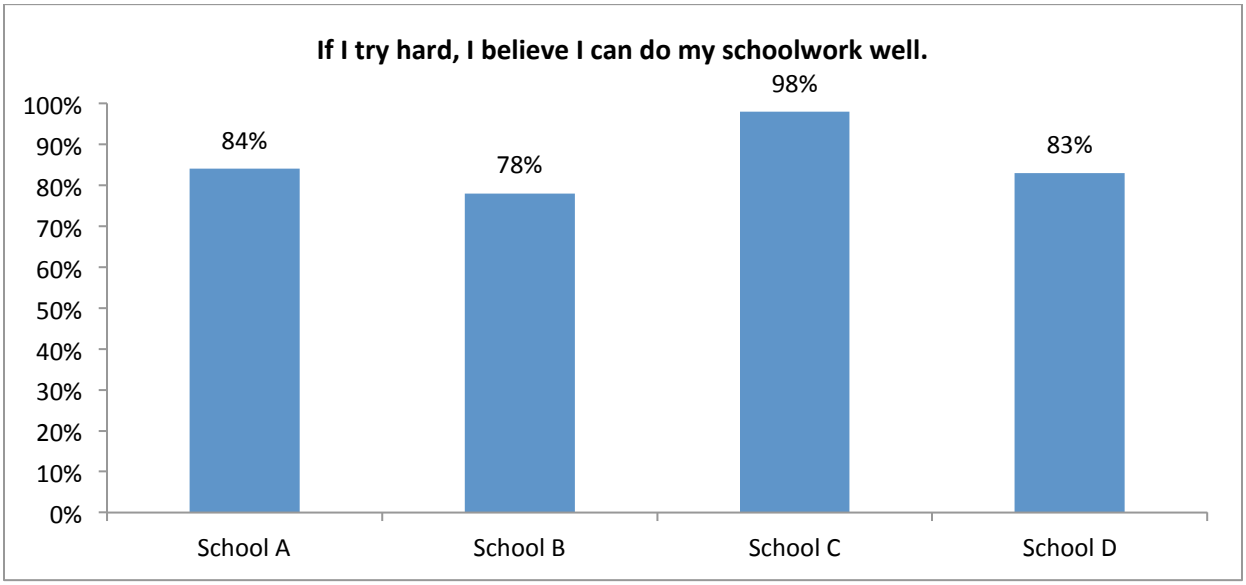
Belonging: Figure 4 provides students' responses across schools to one item pertaining to their sense of belonging. There is considerable variation by school on this dimension.

Figure 4: Responses to Sense of Belonging Key Item (% who agreed or strongly agreed)



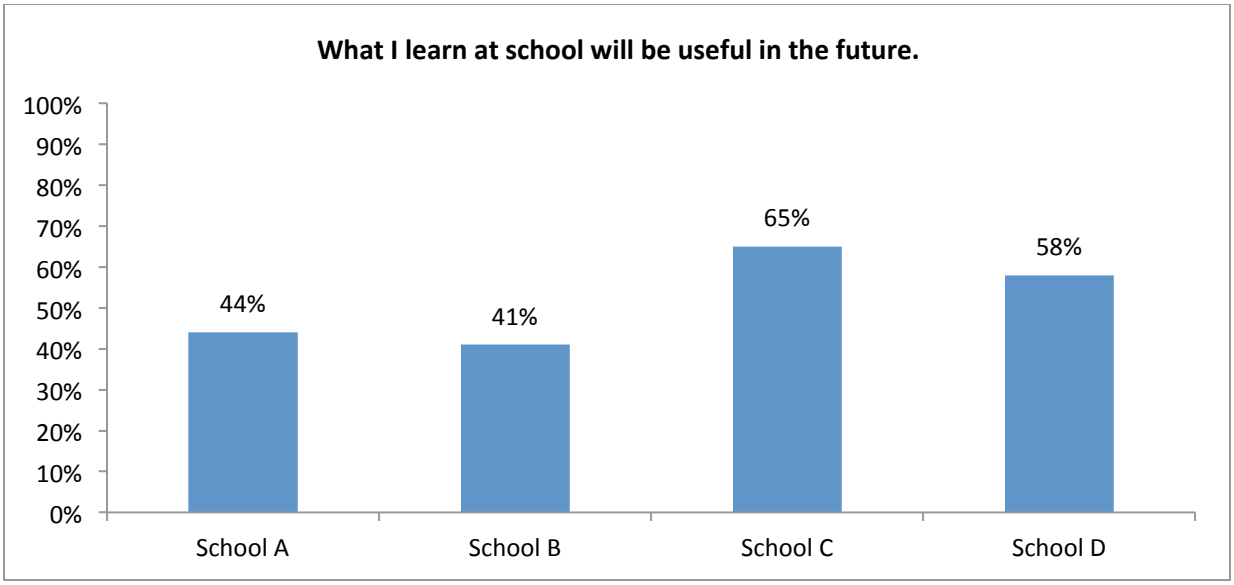
Self-confidence: Similarly, Figure 5 shows the level of student agreement with an item that reveals their self-confidence. Responses on this item were high across schools, although there continued to be considerable variation.

Figure 5: Responses to Self-Confidence Key Item (% who agreed or strongly agreed)



Relevance: In Figure 6, we see lower levels of agreement with the selected item on the perceived relevance of what they are learning to their future plans. Considerable variation across schools is found here as well.

Figure 6: Responses to School Work Relevance Key Item (% who agreed or strongly agreed)

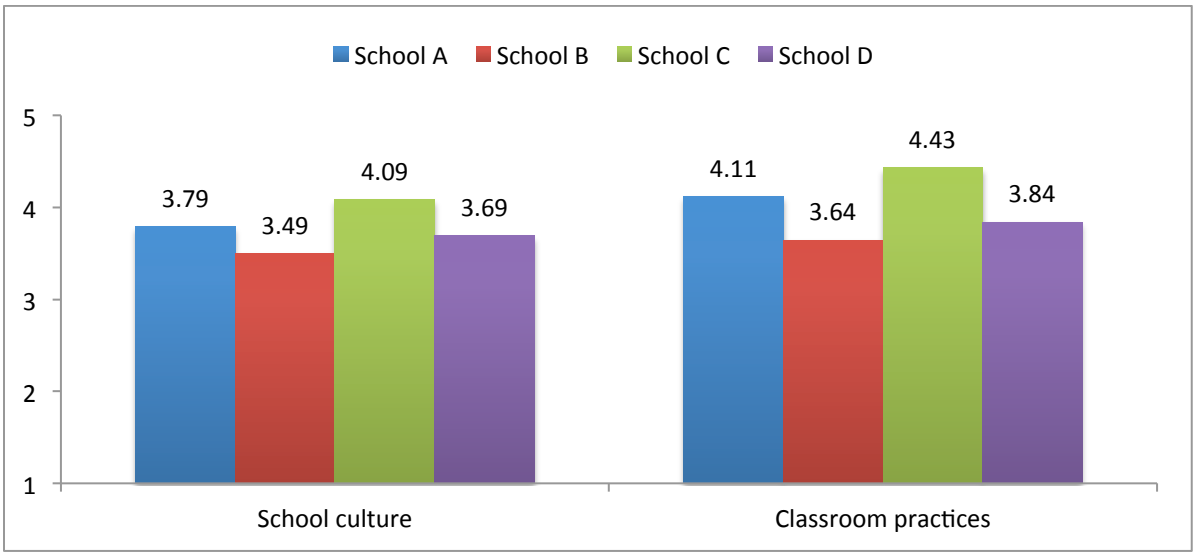


Student Perceptions of School Culture and Classroom Practices

To contextualize our examination of students' status on measures of academic mindset, we looked at student responses to measures of school culture and classroom practices posited to be associated with positive academic mindsets in students. The results reflect the extent to which students agreed that schools were strong on these dimensions.[7] Each scale is comprised of multiple items as shown in Appendix B; these scales had good reliability indicators.

Figure 7 shows average school responses on the two dimensions of school culture and classroom practices on a 1-5 scale where 5 indicated strong agreement. The results on school culture were fairly uniform across schools with the average response in Schools A, B and D falling between "neither agree nor disagree and "agree," but generally closer to "agree." School C had an average response of "agree." On students' ratings of classroom practices, the average responses at every school were more positive with Schools A and C being rated at "agree" or above and Schools B and D rated at slightly below "agree."

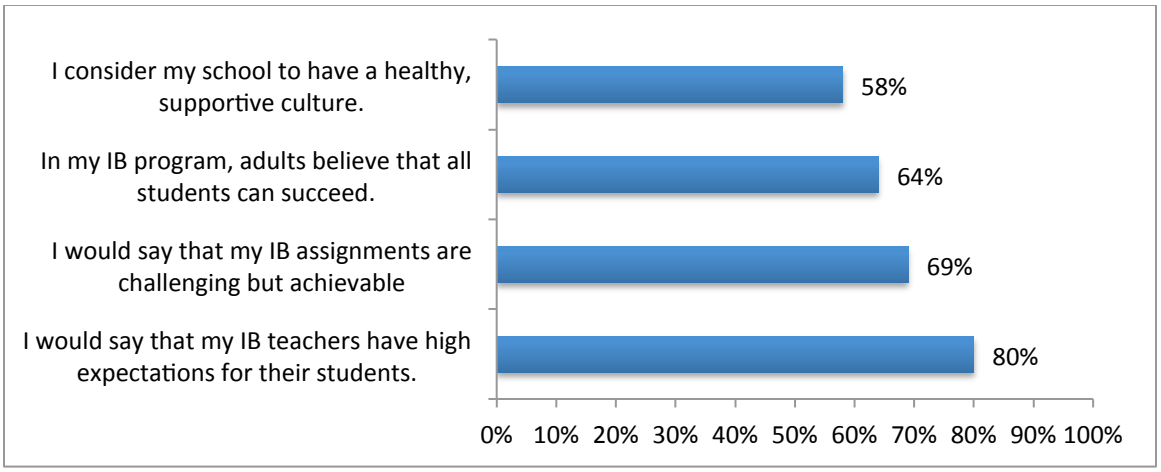
Figure 7: School Culture and Classroom Practices Average Responses By School



[7] Students indicated the extent to which they agreed with these statements. **School culture items**: My classmates show respect for people with academic ability; Teamwork is encouraged in my IB program; Students in my IB program tend to support one another; In my IB program, adults believe that all students can succeed; I consider my school to have a healthy, supportive culture; I feel safe in my school and IB courses; Teachers in my IB program believe that students like me can succeed. **Classroom practice items**: In my IB program, scholarship is respected; I consider my IB coursework to be challenging; I would say that my IB teachers have high expectations for their students; I would say that my IB assignments are challenging but achievable.

Figure 8 shows student responses to core items on the school culture and classroom practices scales. Although a majority of students across the four schools have positive perceptions of the school- and classroom-level factors posited by the research to be important to growth mindset development, the findings also demonstrate that there may still be room to strengthen school culture and practices.

Figure 8: Responses to School Culture and Classroom Practice Key Items (% who agreed or strongly agreed)



We were also interested in correlations – or relationships – between the dimensions studied. We ran statistical tests that show the strength of the relationship between any two factors such as school culture and each of the academic mindsets. A positive correlation (expressed as an r value) indicates that as student perception of school culture becomes more positive so may their academic mindset.[8]

In Table 4, we see the results of this analysis. As a rule of thumb, a correlation (r value) of .3 to .5 is considered moderate and a correlation of .5 and above is considered strong.[9] We can see that, for example, students who believed that the school culture was positive were especially likely to feel a strong sense of belonging (an r value of .589, a strong relationship). Similarly, students who believed that there were good classroom practices were especially likely to feel a sense of self-confidence (an r value of .469, a moderate relationship).

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[8] The opposite may also be true. As a student's mindset becomes more positive, their perception of the culture of the school may become more positive.

[9] From https://explorable.com/statistical-correlation

Table 4. Relationship Between School/Classroom Factors and Academic Mindsets

Relationships		**Correlation (r value)**
School culture with….	Malleable intelligence	.261*
	Sense of belonging	.589*
	Self confidence	.508*
	Relevance of schoolwork	.559*
Classroom practices with….	Malleable intelligence	.076*
	Sense of belonging	.425*
	Self confidence	.469*
	Relevance of schoolwork	.427*

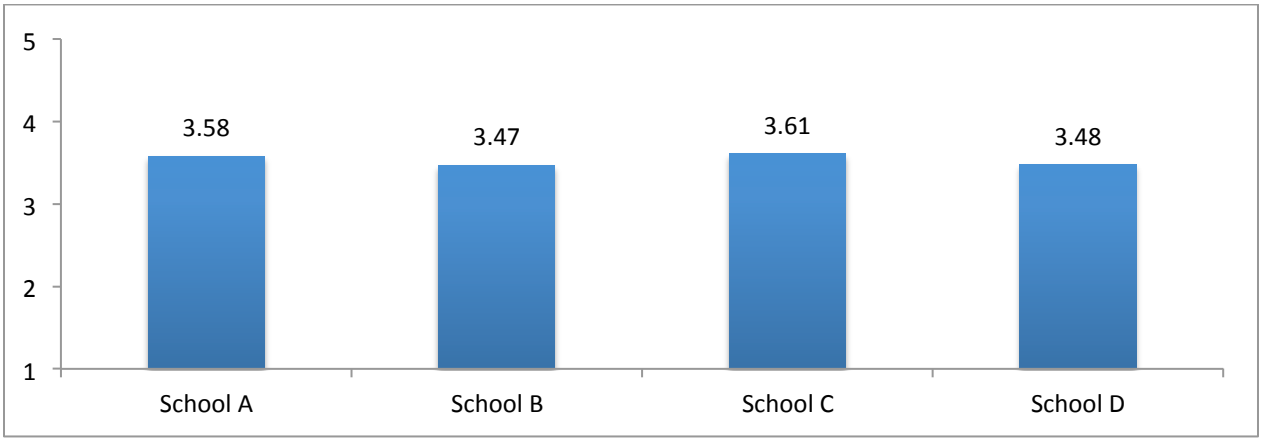
* Statistically significant at the p< .05 level or less.

Relationships Between Positive Academic Mindsets and Positive Academic Behaviors

We also used student survey data to address research question 4: *What linkages can be observed between positive academic mindsets and positive academic behaviors in DP schools?*
To look at these relationships, we first looked at whether students in schools with more positive school environments and strong classroom practices would also have more positive academic mindsets. Subsequently, we looked at the relationship between positive academic mindsets and positive academic behaviors.

Figure 9 presents students' average responses on the scale on academic behaviors (see Appendix B for more information on this scale). The items in this scale focused mainly on study habits such as: a) Before I start an assignment, I plan out how I'm going to do it, and b) When I study, I usually study at times when I can concentrate best. As with the previous items, responses were on a 1-5 scale with 5 being high/positive. As can be seen, students' responses to these kinds of questions fell squarely in the middle between "neither agree nor disagree" and "agree." There was little variation by school.

Figure 9: Student Academic Behaviors, Average Response by School



To examine whether there any associations exist between students' academic behaviors and their academic mindsets, we conducted correlation analyses between these scales. As Table 5 shows, there were positive and significant relationships between students' academic mindsets and their academic behaviors. Positive academic mindsets among students are associated with the practice of good academic behaviors. This relationship was strongest between a sense of relevance and good academic behaviors (r value of .381); it was weakest between the malleable intelligence mindset and good academic behaviors (.225).

Table 5. Relationship Between Academic Behaviors and Academic Mindsets

Relationships		**Correlation (r value)**
Academic behaviors with….	Malleable intelligence	.225*
	Sense of belonging	.320*
	Self confidence	.375*
	Relevance of schoolwork	.391*

* Statistically significant at the p< .05 level or less.

Conclusions and Implications for IBO

In this section we summarize our findings and also address our final research question: *What strategies might IBO use or strengthen to develop positive academic mindsets among DP students in the future?*

Summary of findings

Our research provides evidence in support of the relationships posited in the logic model on page 7. The student survey results suggest that school environments and classroom practices are indeed associated with positive academic mindsets; further, students with positive academic mindsets are more likely to practice good academic behaviors found in the research literature to lead to good student educational outcomes.

The student survey results also suggest that, while malleable intelligence (or growth mindset) gets more attention, senses of relevance, belonging and self-confidence are more closely associated with positive academic behaviors in the IB schools studied. They were also present in higher levels among students at all four of the schools participating in our research, increasing their potential impact on academic behaviors. Furthermore, we found that school leaders and teachers had developed more ways to promote self-confidence, belonging, and relevance than they did malleable intelligence.

The most important findings related to school environments and practices that promote positive academic mindsets were as follows:

Malleable intelligence: Attitudes varied with regard to the malleability of intelligence among both adults and students in the four schools studied. Several schools had adopted practices that built on this concept by emphasizing policies such as de-tracking. However, others were more likely to seek out different ways for students to be shine (e.g. through the arts or leadership). In both cases, there was intent to help students be successful, however the first is more likely to advance the idea that all students can grow their intelligence, while the second is more likely to make students feel that it's OK not be an intellectual star if you can succeed in other ways.

Similar numbers of students said that they were praised for intelligence and for effort. This suggests that some practices considered detrimental to a malleable intelligence mindset (i.e. praise for intelligence) are widely used. At the same time, school leaders expressed a commitment to having all students going as far as they can in their learning and we found that policies encourage access to the intellectually challenging DP curriculum in all of the four schools. In all schools, everyone, including special education students, took at least one DP course, and most learned that they were capable of succeeding in rigorous and challenging courses.

In addition, school leaders and teachers were able to describe instructional practices that they believed would strengthen students' malleable intelligence mindset. These included seeking the right blend of challenge/high expectations and support/scaffolding or, as one principal said, "the right amount of dissonance – struggle without deflation." Most, if not all, teachers communicated that they believed that all students could learn rigorous course material and that student effort in the classroom was key to academic success. A number of teachers also sought ways to put in place structures to help students through the steps involved in challenging themselves intellectually. They believed that students would be more likely to invest the effort in difficult assignments, for example, if the process was clearly laid out.

Belonging: A sense of belonging was described differently in each school, with some emphasizing school spirit, while others talked about school pride, or a sense of being part of a comfortable family environment. Among students surveyed, over half (54%) agreed with the statement "I feel a sense of belonging to the school community." The development of a sense of belonging seemed to be easier in the Peruvian schools where the students had attended the same school since age three or four. Across all schools, warm relationships between students and teachers were mentioned as especially important to developing a sense of belonging. In some cases, teachers showed their concern for students spending extensive out-of-class time with them.

Schools used different methods to foster a sense of belonging including structures such as homeroom, houses, and a range of activities in which students could engage in out-of-school time. Teachers at some schools arranged their classrooms in ways that encouraged a sense of community (e.g., organizing desks in circular groups or clusters) or provided students with opportunities to work in groups, facilitating peer bonding. CAS activities were also settings in which students bonded with each other and developed a sense of belonging; they were also cited as helping students develop self-confidence and see their learning as relevant.

Self-confidence: Especially in the US schools, efforts were made to promote students' self-confidence in undertaking challenging DP courses. Interviewees stated that students often gained confidence in their ability to be successful in school from the experience of succeeding in these courses. In addition, there were examples of more general efforts to build student self-confidence, often through leadership opportunities in the classroom, in clubs, sports, etc. In the one all-girls school in the study, a school leader talked about how a single gender environment encourages the development of leadership and self-confidence among students, as they do not have to compete with – or defer to – boys.

There was evidence that several schools worked to help students find arenas in which they could shine as a way to bolster their self-confidence. This sometimes took the form of encouraging exploration of different interests and "selves" through involvement in CAS with its emphases on community service, the arts, and sports. In addition, some teachers emphasized developing self-confidence through self-knowledge and provided opportunities for them to use written reflections to consider their areas of strength and to embrace working on areas of weakness. Opportunities for autonomous decision-making were also seen as a way to build student self-confidence. Theory of Knowledge, CAS, and Extended Essay teachers tended to give their students considerable autonomy in choosing what projects to work on.

Relevance: Developing a school environment in which students perceived their coursework as relevant had much to do with emphasizing the importance of learning and achievement for the attainment of future goals, especially success in college. This was a high priority for the majority of students in each of the schools. In some cases, this was reinforced by the coursework available through IB. While most students took core college preparatory courses, some also took DP courses such as business management and music that allowed students to learn about topics they found engaging or worth considering as career options.

Teachers in our study schools were often observed to be making an effort to engage students because they recognized that students will put more effort into work that they view as relevant. Most teachers stated that they build relevance in their classroom by pushing students to engage with questions that ask them to examine their lived experiences in Theory of Knowledge and other classes. In other cases, teachers sought out ways to keep learning connected to life by giving students choices on research paper topics or in selecting CAS or classroom projects of interest to

them. CAS projects and related travel were often cited as important to connecting learning to life experiences.

Implications for IBO

Considerable research suggests that positive academic mindsets lay an important foundation for other kinds of learning. Further, there is emerging and compelling research suggesting that the most effective way for schools to help students develop these mindsets (and other non-cognitive skills) is to support changes in educators' instructional practices (Farrington, et al., 2012). In many cases, schools attempt short-term, isolated interventions that focus on non-cognitive factors, e.g. academic mindsets. However, the research points out that non-cognitive learning is most effective when integrated comprehensively across key components of the school (Hamedani, et al., 2015). In fact, Farrington et al., (2012) concluded that, "*The essential question for developing students as learners is not how to change students to improve their behavior but rather how to create contexts that better support students in developing critical attitudes and learning strategies necessary for their academic success"* (p. 74).

Shechtman et al., (2013) further assert that opportunities to learn academic mindsets and related non-cognitive skills can be introduced into the academic core so that students can explicitly learn and practice them in academic situations and understand how they can affect their academic achievement. We observed in a number of settings that instruction that supported the development of academic mindsets was already in place in a number of schools; however, it is possible that this could be more intentional and better integrated within existing IB courses. Clearly, the Theory of Knowledge course came up repeatedly as one in which students were likely to develop positive academic mindsets, as did CAS. But could more be done?

One opportunity appears to emerge in relation to IB's *Approaches to Teaching and Learning* (ATL), launched in early 2015. This framework includes an explicit focus on self-management, including practical aspects like time management (aligned with "academic behaviors" in our logic model) and emotional aspects such as resilience and perseverance (aligned with "academic mindsets" in our logic model). In addition, the social dimension of the ATL includes opportunities for students to develop a sense of belonging. An ATL self-reflection tool (IBO, 2015) developed for use by teachers in auditing their own practices includes items aligned with academic mindsets such as:

- ask students to look for personal relevance in the subject matter;
- create an atmosphere where students do not think they have to get everything right the first time;
- help students to see the "big picture" relevance of what they are studying;
- explore contemporary global concerns such as development, conflict, rights, and the environment;
- encourage students to feel comfortable asking questions when they don't understand;

- set a task to gain insight into students' particular strengths and weaknesses.

It could be worthwhile to review and reflect on this and other ATL documents in light of the research cited in this paper - as well as our findings - to see if they might be strengthened. In addition, it appears that ATL is only beginning to be known and used by IB schools. Further efforts to disseminate the related resources would be useful to teachers thinking about how to incorporate building of academic mindsets into their lessons. Similarly, when revising the IBO standards and practices, curricula, and the Learner Profile, it would make sense to review the research on academic mindsets to make sure that these concepts are taken into account. This aligns well with IBO's interest in making sure that teachers are helped to be "teachers of learners, not just content" (IBO's Senior Curriculum Strand Manager, personal communication, May 2016).

The findings of this research suggest that there is room for growth on developing positive academic mindsets among students. They also provide some areas for reflection on how to do this. Some hints are in students' responses to research questions. For example, while 78% of respondents agree that their IB coursework in challenging, 33% say that they find it hard to get help if they are struggling with a difficult assignment. Less than half of students (46%) agree that what they learn in school will be useful in the future. A little over half (56%) agree that they like work that they'll learn from even if they make a lot of mistakes, a proportion that could ideally be higher. Time spent analyzing the results of the student survey could provide hints to ways to further strengthen the IB curriculum and approach.

Other approaches to strengthening academic mindsets emerge from the literature. The following list was gleaned from our early review of research and used to inform our research design and analysis. Further work could be done to include the following elements into IBO provided professional development and discussion groups.

School culture that encourages positive academic mindsets

a. Atmosphere of respect for scholarship (Achievement Gap Initiative, 2001; in Snipes et al, 2012)
b. Atmosphere of teamwork (Achievement Gap Initiative, 2001; in Snipes et al, 2012)
c. System of rewards and punishments (Snipes et al, 2012)
d. Assumptions that all students can succeed (Carr and Walton, 2011; in Snipes et al, 2012)
e. Extended time with teachers and peers (e.g. block scheduling, looping; Osterman, 2000; in Snipes et al, 2012)
f. Overall strong, "healthy" organization (Snipes et al, 2012)

Classroom practices that encourage positive academic mindsets

a. Messages about value of effort (Snipes et al, 2012)
b. Praise for hard work not intelligence (Dweck, 2007; in Snipes et al, 2012)
c. Transparent grading practices (Marzano, 2000; in Snipes et al, 2012)
d. Regular feedback from teachers on goal attainment (Marzano, 2000; in Snipes et al, 2012)
e. Challenging but achievable assignments (National Research Council, 2004; in Snipes et al, 2012)
f. High expectations of teachers conveying respect (various in Snipes et al, 2012)
g. Availability of supports for learning (Gordon & Bridgall, in Farrington et al, 2012)
h. Authentic, relevant tasks applied to real world settings (Lee et al., 1993; in Snipes et al, 2012)
i. Incorporating students' cultural knowledge (Lee et al., 1993: in Snipes et al, 2012)
j. Giving students choice, cognitive autonomy, ownership of learning (NRC in Snipes et al, 2012)
k. Chance to contribute to the greater good (Snipes et al, 2012)
l. Encouragement of good relationships (Snipes et al, 2012)
m. Level of trust and safety in the classroom (Bryk and Driscoll in Farrington et al. 2012)

Areas for Future Research

Added research could provide further insights into the school environments and classroom practices most conducive to the development of positive academic mindsets. Individual schools may wish to use the student survey developed by this project to conduct their own analyses of their students' status on mindsets and ways that their schools facilitate or hinder their development. IBO could identify the most promising school environments and classroom practices and conduct professional development to support their implementation; accompanying research could be conducted to evaluate the extent to which they lead to improved student mindsets, academic behaviors, and outcomes.

Final Thoughts

IB schools are clearly settings in which there is considerable interest in high quality education and in developing the environments and classroom practices most conducive to student success. The IBO works hard to provide strong materials and professional development to support them. In our research, we observed a commitment to innovative practices and processes for continuous improvement in the schools we visited and in the IBO overall. We commend them for these qualities and hope that this research on academic mindsets serves as a further source of inspiration going forward.

References

Bailey, R., Heape, T., & Shields, A. (2009). A thematic unit about perseverance. Retrieved from https://www.google.com/?gws_rd=ssl#q=Renee+Bailey%2C+Tracy+Heape%2C+Ashley+Shields

Bandura, A. (1986) *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Bunnell, T. (2011). The International Baccalaureate in the United States: From relative inactivity to imbalance. *The Education Forum*, 75: 66-79.

Carr, P. & Walton, G.M. (2011). Working harder together: A sense of working with others increases intrinsic motivation. Unpublished

Cassen, R., Feinstein, L., & Graham, P. (2008). Educational outcomes: Adversity and resilience. *Social Policy & Society 8:1, 73-85 [Cambridge University Press].*

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development, 82(*1), 405-432.

Dweck, C.S. (2006). *Mindset: The new psychology of success.* New York: Ballantine Books.

Dweck, C.S., Walton, G.M., and Cohen, G.L. (2011). *Academic tenacity: Mindsets and skills that promote long-term learning*. White paper prepared for the Gates Foundation. Seattle, WA.

Dweck, C.S. (n.d). Test your mindset. Retrieved on July 2016 from https://mindsetonline.com/testyourmindset/step1.php

Duckworth, A., Kamentz, D. & Keene, L. (2012). *Exploring how to measure and build students' non-cognitive skills to increase college persistence* [presentation]. Denver, CO: NACAC National Conference.

Farrington, C.A., Roderick, M., Allensworth, E., Nagaoka, J., Keyes, T.S., Johnson, D.W., & Beechum, N.O. (2012). *Teaching adolescents to become learners. The role of noncognitive factors in shaping school performance: A critical literature review.* Chicago: University of Chicago Consortium on Chicago School Research.

Hamedani, M.G., Zheng, X., & Darling-Hammond, L. (2015). Learning from successful practice: Social emotional learning in three diverse urban high schools. Stanford, CA: SCOPE.

Hurtado, S., & Carter, D. F. (1997). Effects of college transition and perceptions of the campus racial climate on Latino college students' sense of belonging. *Sociology of Education, 70*, 324-345.

IBO (2008). *IB learner profile booklet*. Cardiff, Wales, GB: International Baccalaureate Organization.

IBO (2015). *Approaches to teaching and learning in the Diploma Programme: Reflection tool.* Cardiff, Wales, GB: International Baccalaureate Organization.

IBO (2016). *Key facts about the DP*. Retrieved January 2017 from http://www.ibo.org/programmes/diploma-programme/what-is-the-dp/key-facts-about-the-dp/

Lee, V.E., Smith, J.B. (1999). Social support and achievement for young adolescents in Chicago: The role of school academic press. *American Educational Research Journal* 36: 907-945.

Levin, H. M. (2012). More than just test scores. *Prospects*, 42(3), 269-284.

Martin, A.J., Yu, K., Papworth, B., Ginns, P., & Collie, R.J. (2015). Motivation and engagement in the United States, Canada, United Kingdom, Australia, and China: Testing a multi-dimensional framework. *Journal of Psychoeducational Assessment* April 2015 vol. 33 no. 2 103-114

Marzano, R. J. (2000). *Transforming classroom grading*. Aurora, CO: Mid-continent Research for Education and Learning Institute.

Mazlow, A.H. (1943). A theory of human motivation. *Psychological Review, 50*, 370-396.

Muijs, D. (2004). *Doing quantitative research in education with SPSS.* Thousand Oaks, CA: Sage Publications.

Noftle, E.E., & Robins, R.W. (2007) Personality predictors of academic outcomes: Big five correlates of GPA and SAT scores. *Journal of Personal and Social Psychology*. 93(1):116-30.

Porchea, S. F., Allen, J., Robbins, S., & Phelps, R. P. (2010). Predictors of long-term enrollment and degree outcomes for community college students: Integrating academic, psychosocial, socio-demographic, and situational factors. *Journal of Higher Education*, **81**, 750–778.

Robbins, S. B., Allen, J., Casillas, A., Peterson, C. H., & Le, H. (2006). Unraveling the differential effects of motivational and skills, social, and self-management measures from traditional predictors of college outcomes. *Journal of Educational Psychology*, **98**, 598–616.

Robbins, S. B., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. *Psychological Bulletin*, **130**, 261–288.

Shechtman, N., DeBarger, A. H., Dornsife, C., Rosier, S., & Yarnall, L. (2013). *Promoting grit, tenacity, and perseverance: Critical factors for success in the 21st century*. Washington, DC: U.S. Department of Education.

Snipes, J., Fancsali, C., & Stoker, G. (2012). *Student academic mindset interventions: A review of the current landscape.* Columbia, MD: Impaq International.

Trapmann, S., Hell, B., Hirn, J. O. W., & Schuler, H. (2007). Meta-analysis of the relationship between the Big Five and academic success at university. *Journal of Psychology*, **215**, 132–151.

Yeager, D. S., & Walton, G. M. (2011). Social-Psychological Interventions in Education: They're Not Magic. *Review of Educational Research, 81*(2), 267-301.

Appendix A: Instruments

Leadership Interview Protocol

Introduction / Consent Script

Thank you for taking time out of your schedule to meet with us today. My name is _____ (and this is _____), and we're with NCREST. NCREST is a research and development center at Teachers College, Columbia University. The purpose of this interview is for us to understand how students' academic mindset is nurtured at your school and the role you play in creating a conducive environment for positive academic mindset development.

Academic mindsets are the "beliefs, attitudes, or ways of perceiving oneself in relation to learning and intellectual work that support academic performance" Academic mindset is especially about the belief that success is mainly a product of effort.

This conversation will take approximately 45 minutes and is completely voluntary. If you do not feel comfortable answering any of our questions, you can choose not to answer them, or end the interview. All the information we collect in this interview will be kept confidential.

We would also like to audio record the interview to make sure we capture your responses accurately, and so we can focus on the conversation with you. Please note that only the research team will have access to the notes, recordings, and transcripts collected during this interview. All of the information is stored securely and can only be accessed by the research team. Also, we will never mention your name in our report, and we will make every effort to prevent anyone outside of the project team from connecting your individual responses with your identity.

Do you have any questions for me?

Do I have your consent to move forward with the interview?

Introduction

1. To start, please tell me a little about yourself and the role you play in the school, specifically with regards to DP?

2. Can you tell us a bit about the school and the DP programme (Probe: where DP fits in the school; courses offered; number of students; accomplishments)
3. What school goals, if any, are being emphasized this year?

4. How would you describe your school culture? (vii,f)

Core Academic Mindset Questions

1. Would you say that most DP teachers at this school believe that intelligence can be built or increased? Please discuss. (MI)

2. Would you say that your DP teachers help students to appreciate the value of effort? If so, how does this happen? (MI)

3. To what extent is an effort made in your DP programme to make learning interesting to students? In what ways? (R)

4. What kinds of things are done to make learning relevant? (R)

5. Do your students have a sense of belonging to the DP programme? To their school? Please describe. (B)

6. Are any particular efforts made to build a sense of belonging?

7. Are there efforts made to build students' self-confidence? If so, please describe. (SC)

Facilitating a Positive Academic Mindset

8. Could you talk about the extent to which DP teachers are encouraged to work together? How/when does this happen? (ii)

9. How would you describe DP teacher-student relationships in general? Are there norms about the kinds of teacher-student relationships that are encouraged? (l)

10. Would you say that there is a school culture that encourages attention to studies among students? How so? (i, iv)

11. How is course scheduling done for each student? What factors are taken into account in developing a course schedule? (vi, j)

12. In general, what are the grading policies in the DP programme? How much of the grade depends on the DP exam vs. other kinds of work or effort? (c,d,e)

13. What kinds of supports are available for students who are struggling in their courses? (g)

14. In general, how comfortable do students feel about expressing differing opinions? About talking about their own cultural traditions? (m,i)

15. How is CAS handled at your school? (Probe for: leadership opportunities, chances to do good, involvement in authentic tasks, having choices) (k,j,h)

16. Are there any other ways that the school promotes positive academic mindsets that we haven't discussed yet?

Closing Questions

1. What have been the biggest challenges at your school as it relates to student success?
2. What else should we know about your school or DP programme?

Thank you for participating in this interview!

Teacher Interview Protocol

Introduction / Consent Script

Thank you for taking time out of your schedule to meet with us today. My name is _____ (and this is _____), and we're with NCREST. NCREST [insert sentence about NCREST] The purpose of this interview is for us to understand how students' academic mindset is nurtured at your school and the role you play in creating a conducive environment for positive academic mindset development.

Academic mindsets are the "beliefs, attitudes, or ways of perceiving oneself in relation to learning and intellectual work that support academic performance" Academic mindset is especially about the belief that success is mainly a product of effort.

This conversation will take approximately 60 minutes and is completely voluntary. If you do not feel comfortable answering any of our questions, you can choose not to answer them, or end the interview. All the information we collect in this interview will be kept confidential.

We would also like to audio record the interview to make sure we capture your responses accurately, and so we can focus on the conversation with you. Please note that only the research team will have access to the notes, recordings, and transcripts collected during this interview. All of the information is stored securely and can only be accessed by the research team. Also, we will never mention your name in our report, and we will make reasonable efforts to prevent anyone outside of the project team from connecting your individual responses with your identity.

Do you have any questions for me?

Do I have your consent to move forward with the interview?

Introduction

1. To start, please tell me a little about yourself and the role you play in the school, specifically with regards to DP?

2. Can you tell us a bit about the school and the DP programme (Probe: where DP fits in the school; courses offered; number of students; accomplishments)

3. What school goals, if any, are being emphasized this year?

4. Describe the type of culture you like to see in your classroom? (vii,f)

Core Academic Mindset Questions

1. You feel that most DP teachers, including yourself, at this school believe that intelligence can be built or increased? Please discuss. (MI)

2. What instructional tools/strategies do you use to encourage students to believe that academic success is tied to their effort not to their inherent intelligence? (MI)

3. What are examples of ways that you help students appreciate the value of effort? (MI)

4. How are these efforts incorporated into your in-class assignments and/ assessment of student work. (MI)

5. One of the goals of DP is to help prepare students with values and life skills to live a fulfilled and purposeful life. To what extent is an effort made in your DP classes to make learning interesting to students? In what ways? (R)

6. What types of tasks do you assign that require them to apply their learning to their lived experience? (R)

7. Do your students feel a sense of belonging in your classroom? (B)

8. What efforts are made to build a sense of belonging (e.g., Team building activities, group activities, DP instructional tools, DP curriculum, DP projects) (B)

9. Are there efforts made to create a classroom environment where students' self-confidence is nurtured and developed? (SC)

Facilitating a Positive Academic Mindset

1. How would you describe your experience working at this school? (ii)

2. How often are you able to work with other DP teachers? (ii)

3. How would you describe your relationship with other teachers (l)

4. How would you describe your relationship with students? What type(s) of student/teacher relationships are encouraged? (l)

5. Would you say that there is a school culture that encourages attention to studies among students? How so? (i, iv)

6. What teaching strategies do you utilize to promote an environment where students feel they have control over what they are learning? (J)
7. Do students decide the types of activities they will participate in or do they have a say in the creation of classroom norms/goals? (J)

8. In general, what are the grading policies in the DP programme? How much of the grade depends on the DP exam vs. other kinds of work or effort? (c,d,e)

9. How do you engage and support students who may be struggling academically (g)

10. Are there any early intervention systems for students who begin to show signs of struggle (g)

11. How do you keep high achieving students engaged? (g)

12. In general, how comfortable do students feel about expressing differing opinions? About taking about their own cultural traditions? (m,i)

13. How is CAS handled at your school? (Probe for: leadership opportunities, chances to do good, involvement in authentic tasks, having choices) (k,j,h)

14. Are there any other ways that the school promotes positive academic mindsets that we haven't discussed yet?

Closing Questions

1. What have been the biggest challenges at your school as it relates to student success?

2. What else should we know about your school or DP programme?

Thank you for participating in this interview!

Observation Protocol

- ➔ **District and School Name: _____**
- ➔ **Class Grade & Title: _____**
- ➔ **Number of adults in classroom: _____** **Number of students in classroom: _____**
- ➔ **What part of the period: beginning** OR **middle** OR **end**
- ➔ **Observer:_____** **Date:_____**

Instruction that influences academic mindsets

Topic or Activity	What is teacher doing or saying related to academic mindsets	4 aspects of academic mindsets (circle all that apply)
		B MI SC R
		B MI SC R
		B MI SC R
		B MI SC R
		B MI SC R
		B MI SC R

Classroom/school structures that influence academic mindsets

Classroom/school structures	Explain how they do so B MI SC R

Classroom visuals that provide insight into the 4 Academic Mindset components:

Visual Cues	Explain how they exemplify B MI SC R

- ➔ **Time spent teacher lead lecture:_____**
- ➔ **Time spent student independent work:_____**
- ➔ **Time spend student group work_____**
- ➔ **Other comments or observations:**

_____

Student Survey

[Student Assent]

Dear IB Student,

We are inviting you to participate in a research study being conducted by Teachers College, Columbia University about the International Baccalaureate (IB) Diploma Program at your school. The purpose of this study is to help us learn more about IB student experiences, your IB courses and your school.

Your participation in this study involves completing this online survey. The survey is not a test. There are no right or wrong answers. The survey will take about 30 minutes to complete.

Your participation is voluntary, and you can stop participating in the survey at any time by closing the web browser. You can skip a question on the survey if you do not want to answer it. If you decide not to participate, you will not be in any kind of trouble. How you answer these questions and whether or not you complete the survey will NOT affect your grades in any way.

We will not ask you to provide your name on the survey, and your responses to the questions will be sent directly to the researchers. Your individual responses will be kept totally private and will not be shared with your school administrators or teachers.

If you have any questions about the survey you can call Dr. Elisabeth Barnett at 646-745-8228

Please check the box below to indicate whether or not you agree to participate in this survey. Then click the "***Continue***" button below.

- ○ Yes, I agree to participate in the IBDP Academic Mindset Study Student survey. I understand this means that I will fill out this survey one time only. My answers will be kept totally private; no one else besides the researcher will ever see them. I understand I don't have to answer any question if I choose not to.
- ○ No, I do not agree to participate in the IBDP Academic Mindset Study Student survey. **<***filter to end of survey message: Thank you for your time***>**

[CONTINUE button]

1. **What is the name of your school?_____**

2. **What grade are you in? _____**

3. **Are you currently taking or have you already taken any IB classes?**
   - ○ Yes
   - ○ No <*Filter to end of survey; "Thank you for your time, the survey is for students who are in the IB program"*>

4. **In total, how many IB courses have you taken so far (including the classes you are currently taking)? _____**

5. **Do you expect to earn the IB diploma?**
   - o Yes
   - o No

ABOUT YOUR SCHOOL AND IB PROGRAM

6. **Please indicate your level of agreement with the following statements**	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
a) In my IB program, scholarship is respected.	O	O	O	O	O	O
b) My classmates show respect for people with academic ability.	O	O	O	O	O	O
c) Teamwork is encouraged in my IB program.	O	O	O	O	O	O
d) Students in my IB program tend to support one another.	O	O	O	O	O	O
e) In my IB program, adults believe that all students can succeed.	O	O	O	O	O	O
f) I see many IB classmates in more than one course each year.	O	O	O	O	O	O
g) Students in the IB program are praised for effort.	O	O	O	O	O	O
h) It is clear to me what I need to do to earn good grades in my IB courses.	O	O	O	O	O	O
i) I consider my school to have a healthy, supportive culture.	O	O	O	O	O	O
j) In my IB program, there is an emphasis on hard work as the way to succeed.	O	O	O	O	O	O
k) Teachers in my IB program believe that students like me can succeed.	O	O	O	O	O	O
l) I am praised for my intelligence.	O	O	O	O	O	O
m) I get regular feedback from my IB teachers on my academic performance.	O	O	O	O	O	O
n) I consider my IB coursework to be challenging.	O	O	O	O	O	O

o) I have an adult, other than my teacher, who can help me with my IB coursework.	○	○	○	○	○	○
p) I would say that my IB teachers have high expectations for their students.	○	○	○	○	○	○
q) It is hard for me to get help if I am struggling with a difficult assignment.	○	○	○	○	○	○
r) There are few topics that I study in my IB classes that are relevant to me.	○	○	○	○	○	○
s) I have drawn on experiences from my family and community life when completing IB assignments.	○	○	○	○	○	○
t) I often get to choose what to write about when doing writing assignments.	○	○	○	○	○	○
u) In my CAS activities, I learn skills that are relevant in the real world.	○	○	○	○	○	○
v) I would say that my IB assignments are challenging but achievable	○	○	○	○	○	○
w) I feel comfortable stating unpopular points of view in my IB classes.	○	○	○	○	○	○
x) We seldom have discussions about social justice topics in IB classes.	○	○	○	○	○	○
y) I have participated in a CAS project that was designed to improve society.	○	○	○	○	○	○
z) I feel safe in my school and IB courses.	○	○	○	○	○	○
aa) I frequently miss days of school.	○	○	○	○	○	○

YOUR STUDY HABITS

7. Please indicate your level of agreement with the following statements	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
a) When I study, I usually study in places where I can concentrate.	○	○	○	○	○
b) When I study, I usually organize my study area to help me study best.	○	○	○	○	○
c) Before I start an assignment, I plan out how I'm going to do it.	○	○	○	○	○

d)	When I study, I usually study at times when I can concentrate best.	○	○	○	○	○
e)	I get it clear in my head what I'm going to do when I sit down to study.	○	○	○	○	○
f)	I usually stick to a study timetable or study plan.	○	○	○	○	○

YOUR VIEWS ABOUT SCHOOL AND LEARNING

8. Please indicate your level of agreement with the following statements		Strongly agree	Agree	Neither agree	nor disagree	Disagree	Strongly disagree
a)	No matter how much intelligence you have, you can always change it a good deal.	○	○		○	○	○
b)	You can learn new things, but you cannot really change your basic level of intelligence.	○	○		○	○	○
c)	I'm able to use some of the things I learn at school in other parts of my life.	○	○		○	○	○
d)	I usually turn in my assignments on time.	○	○		○	○	○
e)	It's important to understand what I'm taught at school.	○	○		○	○	○
f)	I see myself as a part of this school	○	○		○	○	○
g)	If I work hard enough, I believe I can get on top of my schoolwork.	○	○		○	○	○
h)	I like my work best when it makes me think hard.	○	○		○	○	○
i)	What I learn at school will be useful in the future.	○	○		○	○	○
j)	I like my work best when I can do it really well without too much trouble.	○	○		○	○	○
k)	I like work that I'll learn from even if I make a lot of mistakes.	○	○		○	○	○
l)	I like my work best when I can do it perfectly without any mistakes.	○	○		○	○	○
m)	I feel that I am a member of the school community	○	○		○	○	○
n)	If I try hard, I believe I can do my schoolwork well.	○	○		○	○	○
o)	When something is hard, it just makes me want to work more on it, not less.	○	○		○	○	○

p)	To tell the truth, when I work hard, it makes me feel as though I'm not very smart.	○	○	○	○	○
q)	I feel a sense of belonging to the school community	○	○	○	○	○
r)	If I don't give up, I believe I can do difficult schoolwork.	○	○	○	○	○
s)	Learning at school is important.	○	○	○	○	○
t)	If I have enough time, I believe I can do well in my schoolwork.	○	○	○	○	○

MORE ABOUT YOU

9. What is your gender?
- o Male
- o Female

10. How old are you? _____

11. What is the high level of education of your mother or female guardian?
- o Less than high school
- o High school diploma
- o Some college
- o College degree
- o Graduate degree

12. Are you eligible for free or reduced lunch (US only)
- o Yes
- o No

13. Which is the language that you speak at home most often?
- o English
- o Spanish
- o Another language (please specify)_____

14. What is your plan for after high school? (check all that apply)
- o Attend college
- o Get a job
- o Other (please describe)_____

15. In what job/career would you eventually like to work?_____

Appendix B: Student Survey Design and Responses

During the months of October and November of 2016, a 10-15 minute Web-based student survey was administered to all students who had taken or were currently taking DP courses. All DP coordinators at their respective sites chose to administer the survey in captive administration, meaning all eligible students at each school took the survey at a specific point in time during the school day (typically done during an elective period). The survey posed general student characteristic questions and more detailed questions regarding student perspectives about their school and IB program, student study habits, and views about learning (results presented below).

The following table summarizes the scales used for this report. A confirmatory factor analysis was conducted on the first five field-tested scales. The last two scales are exploratory scales created using factor analysis with varimax rotation. Only variables with factor coefficients higher than .30 were retained for the exploratory scales. A scale reliability test (Cronbach's alpha) was computed for all scales. Additionally, only respondents who answered at least half the items received a scaled score for both confirmatory and exploratory scales.

Survey Scale Items and Scale Reliability

*** Malleable Intelligence** Dweck (n.d)	α=.56
No matter how much intelligence you have, you can always change it a good deal.	
You can learn new things, but you cannot really change your basic level of intelligence.	
I like my work best when it makes me think hard.	
I like my work best when I can do it really well without too much trouble.	
I like work that I'll learn from even if I make a lot of mistakes.	
I like my work best when I can do it perfectly without any mistakes.	
When something is hard, it just makes me want to work more on it, not less.	
To tell the truth, when I work hard, it makes me feel as though I'm not very smart.	
*** Sense of Belonging** Hurtado and Carter (1997)	α=.92
I see myself as a part of this school	
I feel that I am a member of the school community.	
I feel a sense of belonging to the school community	
*** Sense of Self-Confidence** Martin et al., (2015)	α=.84
If I work hard enough, I believe I can get on top of my schoolwork.	

If I try hard, I believe I can do my schoolwork well.	
If I don't give up, I believe I can do difficult schoolwork.	
If I have enough time, I believe I can do well in my schoolwork.	
*** Sense of Academic Relevance** Martin et al., (2015)	α=.82
I'm able to use some of the things I learn at school in other parts of my life.	
What I learn at school will be useful in the future.	
Learning at school is important.	
It's important to understand what I'm taught at school.	
*** Student Academic Behaviors** Martin et al., (2015)	α=.85
When I study, I usually study in places where I can concentrate.	
When I study, I usually organize my study area to help me study best.	
Before I start an assignment, I plan out how I'm going to do it.	
When I study, I usually study at times when I can concentrate best.	
I get it clear in my head what I'm going to do when I sit down to study.	
I usually stick to a study timetable or study plan.	
**** School Culture**	α=.86
My classmates show respect for people with academic ability.	
Teamwork is encouraged in my IB program.	
Students in my IB program tend to support one another.	
In my IB program, adults believe that all students can succeed.	
I consider my school to have a healthy, supportive culture.	
I feel safe in my school and IB courses.	
Teachers in my IB program believe that students like me can succeed.	
**** Classroom Practices**	α=.71
In my IB program, scholarship is respected.	
I consider my IB coursework to be challenging.	
I would say that my IB teachers have high expectations for their students.	
I would say that my IB assignments are challenging but achievable	

Source: IB Academic Mindset Student Survey 2016
Notes: All items are on a 5-pt. scale: 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, 5=strongly agree.
* Confirmatory factor analysis
** Exploratory factor analysis

Survey Results by Item

Survey Item 1

	San Silvestre	Lincoln	South Side	Hilton	Total
What Is the name of your school?	44(4%)	162(15%)	454(43%)	406(38%)	1066

Survey Item 2

	9th	10th	11th	12th	13th	Total
What grade are you in?	1(<1%)	91(9%)	549(52%)	415(39%)	1(<1%)	1057

Survey Item 3 – Question used to assure accurate student survey sample.

Survey Item 4

	Average	Minimum	Maximum
How many IB courses have you taken so far?	5.3	0	19

Survey Item 5

	Yes	No	Total
Do you expect to earn the IB diploma?	526(50%)	526(50%)	1052

Survey Item 6 a-aa

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Total
In my IB program, scholarship is respected.	33(3%)	36(4%)	220(23%)	414(43%)	249(26%)	952
My classmates show respect for people with academic ability.	35(4%)	76(8%)	155(16%)	538(55%)	182(18%)	986
Teamwork is encouraged in my IB program.	31(3%)	117(12%)	238(24%)	436(45%)	157(16%)	979
Students in my IB program tend to support one another.	39(4%)	94(10%)	249(25%)	415(42%)	184(19%)	981
In my IB program, adults believe that all students can succeed.	51(5%)	109(11%)	191(19%)	428(43%)	208(21%)	987
I see many IB classmates in more than one course each year.	19(2%)	32(3%)	118(12%)	426(44%)	372(38%)	967
Students in the IB program are praised for effort.	71(7%)	135(14%)	266(27%)	356(36%)	154(16%)	982
It is clear to me what I need to do to earn good grades in my IB courses.	53(5%)	102(10%)	160(16%)	453(46%)	221(22%)	989
I consider my school to have a healthy, supportive culture.	68(7%)	103(10%)	246(25%)	418(42%)	153(15%)	988
In my IB program, there is an emphasis on hard work as the way to succeed.	25(3%)	52(5%)	128(13%)	482(49%)	299(30%)	986
Teachers in my IB program believe that students like me can succeed.	26(3%)	42(4%)	158(16%)	485(49%)	270(28%)	981
I am praised for my intelligence.	58(6%)	148(15%)	329(34%)	311(32%)	135(14%)	981
I get regular feedback from my IB teachers on my academic performance.	55(6%)	143(15%)	272(28%)	381(39%)	125(13%)	976
I consider my IB coursework to be challenging.	31(3%)	50(5%)	133(14%)	344(35%)	426(43%)	984
I have an adult, other than my teacher, who can help me with my IB coursework.	187(20%)	280(29%)	171(18%)	214(23%)	99(10%)	951
I would say that my IB teachers have high expectations for their students.	26(3%)	34(3%)	134(14%)	452(46%)	339(34%)	985
It is hard for me to get help if I am struggling with a difficult assignment.	137(14%)	270(28%)	241(25%)	219(22%)	107(11%)	974
There are few topics that I study in my IB classes that are relevant to me.	66(7%)	145(15%)	293(30%)	283(29%)	193(20%)	980

Survey Items 6 a-aa (cont.)

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Total
It is hard for me to get help if I am struggling with a difficult assignment.	137(14%)	270(28%)	241(25%)	219(22%)	107(11%)	974
There are few topics that I study in my IB classes that are relevant to me.	66(7%)	145(15%)	293(30%)	283(29%)	193(20%)	980
I have drawn on experiences from my family and community life when completing IB assignments.	103(11%)	195(20%)	318(33%)	261(27%)	80(8%)	957
I often get to choose what to write about when doing writing assignments.	124(13%)	205(21%)	249(25%)	314(32%)	87(9%)	979
In my CAS activities, I learn skills that are relevant in the real world.	76(9%)	98(12%)	246(29%)	257(31%)	161(19%)	838
I would say that my IB assignments are challenging but achievable	55(6%)	70(7%)	178(18%)	521(53%)	157(16%)	981
I feel comfortable stating unpopular points of view in my IB classes.	85(9%)	133(14%)	283(29%)	325(33%)	148(15%)	974
We seldom have discussions about social justice topics in IB classes.	103(11%)	211(22%)	296(31%)	241(25%)	101(11%)	952
I have participated in a CAS project that was designed to improve society.	78(10%)	98(12%)	193(24%)	258(32%)	179(22%)	806
I feel safe in my school and IB courses.	43(4%)	71(7%)	192(20%)	454(47%)	214(22%)	974
I frequently miss days of school.	429(50%)	188(22%)	131(15%)	74(9%)	44(5%)	866

Survey Items 7 a-f

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Total
When I study, I usually study in places where I can concentrate.	19(2%)	48(5%)	122(13%)	489(51%)	280(29%)	958
When I study, I usually organize my study area to help me study best.	32(3%)	110(12%)	181(19%)	405(43%)	224(24%)	952
Before I start an assignment, I plan out how I'm going to do it.	53(5%)	173(18%)	239(25%)	342(35%)	160(17%)	967
When I study, I usually study at times when I can concentrate best.	36(4%)	112(12%)	204(21%)	386(40%)	218(23%)	956
I get it clear in my head what I'm going to do when I sit down to study.	36(4%)	158(16%)	212(22%)	392(41%)	163(17%)	961
I usually stick to a study timetable or study plan.	138(15%)	278(30%)	226(24%)	199(21%)	100(11%)	941

Survey Items 8 a-t

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Total
No matter how much intelligence you have, you can always change it a good deal.	39(4%)	98(10%)	223(24%)	422(45%)	161(17%)	943
You can learn new things, but you cannot really change your basic level of intelligence.	67(7%)	236(25%)	219(23%)	323(34%)	97(10%)	942
I'm able to use some of the things I learn at school in other parts of my life.	74(8%)	113(12%)	191(20%)	442(47%)	127(13%)	947
I usually turn in my assignments on time.	29(3%)	44(5%)	105(11%)	329(34%)	447(47%)	954
It's important to understand what I'm taught at school.	30(3%)	32(3%)	157(17%)	443(47%)	288(30%)	950
I see myself as a part of this school	46(5%)	94(10%)	200(21%)	399(42%)	207(22%)	946
If I work hard enough, I believe I can get on top of my schoolwork.	25(3%)	45(5%)	100(11%)	427(45%)	355(37%)	952
I like my work best when it makes me think hard.	121(13%)	211(22%)	299(32%)	226(24%)	84(9%)	941
What I learn at school will be useful in the future.	96(10%)	130(14%)	286(30%)	303(32%)	131(14%)	946
I like my work best when I can do it really well without too much trouble.	14(1%)	44(5%)	165(17%)	389(41%)	338(36%)	950
I like work that I'll learn from even if I make a lot of mistakes.	45(5%)	107(11%)	259(27%)	379(40%)	155(16%)	945
I like my work best when I can do it perfectly without any mistakes.	23(2%)	63(7%)	225(24%)	347(37%)	291(31%)	949
I feel that I am a member of the school community.	54(6%)	85(9%)	228(24%)	378(40%)	189(20%)	934
If I try hard, I believe I can do my schoolwork well.	22(2%)	37(4%)	107(11%)	437(46%)	342(36%)	945
When something is hard, it just makes me want to work more on it, not less.	105(11%)	207(22%)	277(30%)	237(25%)	110(12%)	936
To tell the truth, when I work hard, it makes me feel as though I'm not very smart.	99(11%)	228(25%)	241(26%)	220(24%)	136(15%)	924
I feel a sense of belonging to the school community	64(7%)	102(11%)	261(28%)	344(37%)	161(17%)	932
If I don't give up, I believe I can do difficult schoolwork.	19(2%)	70(7%)	192(20%)	418(44%)	246(26%)	945
Learning at school is important.	26(3%)	27(3%)	151(16%)	434(46%)	313(33%)	951
If I have enough time, I believe I can do well in my schoolwork.	14(1%)	24(3%)	119(13%)	423(45%)	365(39%)	945

Survey Item 9

	Female	Male	Total
What is your gender?	548(56%)	428(44%)	976

Survey Item 10

	Average	Minimum	Maximum
How old are you?	16.4	12	19

Survey Item 11

	Less than high school	High school diploma	Some college	College degree	Graduate degree	Total
What is the highest level of education of your mother or female guardian?	29(3%)	113(12%)	116(12%)	337(35%)	375(39%)	970

Survey Item 12 (US only)

	Yes	No	Total
Are you eligible for free or reduced price lunch?	128(16%)	687(84%)	815

Survey Item 13

	English	Spanish	Other	Total
Which is the language you speak at home most often?	764(79%)	193(20%)	16(2%)	973

Survey Item 14

	Attend college	Get a job	Other	Total
What is your plan for after high school?	902(94%)	44(5%)	15(2%)	961

Survey Item 15 – open ended response.

Survey Scaled Items

	Average	Minimum	Maximum
Malleable Intelligence	2.87	1.13	4.63
Sense of Belonging	3.60	1.00	5.00
Sense of Self-Confidence	4.06	1.00	5.00
Sense of Academic Relevance	3.68	1.00	5.00
Student Academic Behaviors	3.53	1.00	5.00
School Environment	3.68	1.00	5.00
Classroom Practices	3.91	1.00	5.00