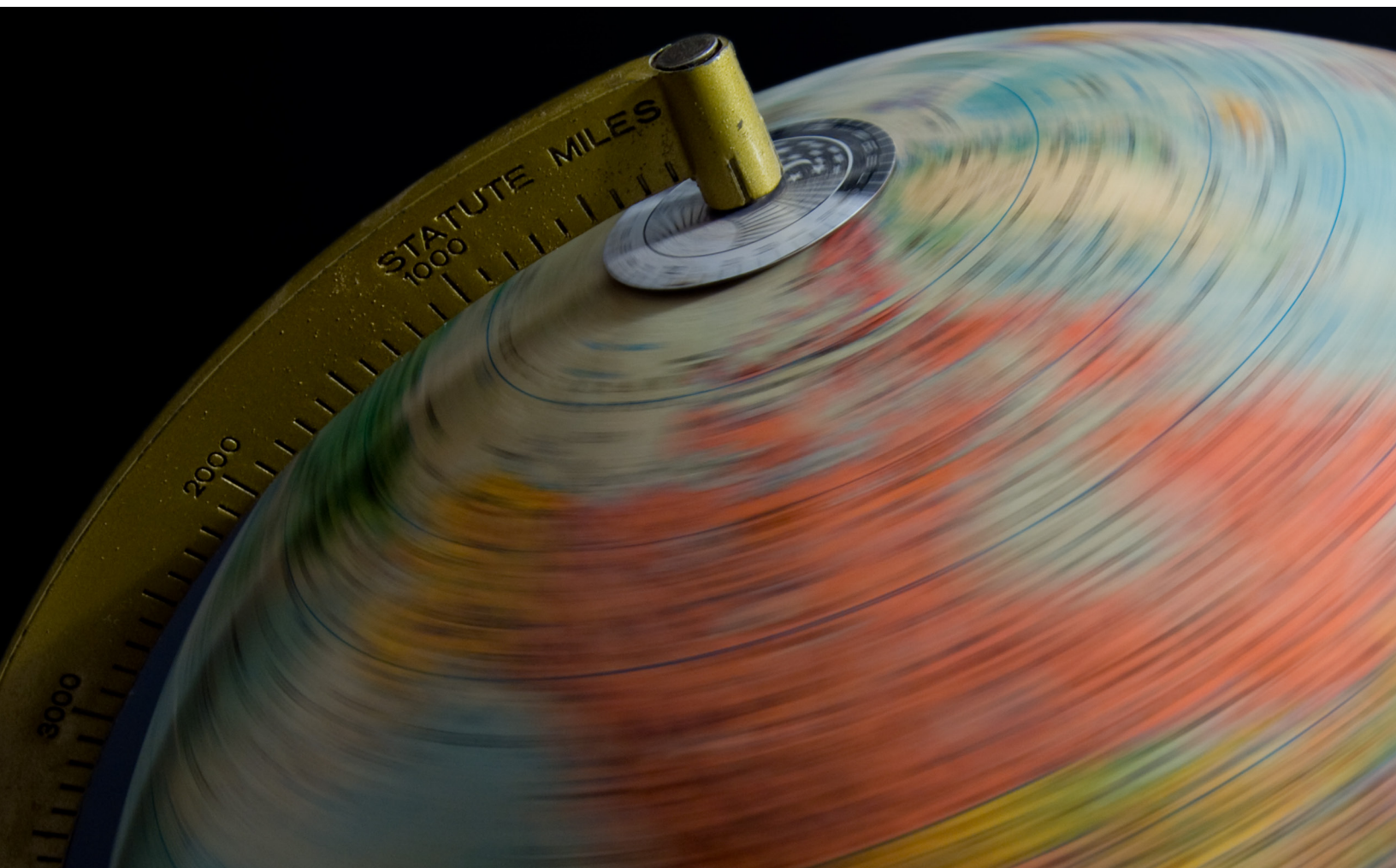


International Baccalaureate Diploma Programme: Examining College Readiness



*Prepared by the Educational Policy Improvement Center
on behalf of the International Baccalaureate Organization*

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About the Educational Policy Improvement Center (EPIC)

EPIC's mission is to improve educational policy and practice that will increase student success, particularly with students historically underserved by public schools. EPIC conducts a range of policy-related research studies and develops practical tools and techniques to support a dramatic improvement in college and career readiness for students. EPIC is distinguished by its pioneering use of state-of-the-art, criterion-based, and standards-referenced methods of course and document analysis.



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This three-phase study explored the impact of the International Baccalaureate (IB) Diploma Programme on college readiness by examining the academic and non-academic preparation of students who participated in IB Diploma Programmes in high school. The study compared college readiness data collected from two groups of students who matriculated to the Robert D. Clark Honors College at the University of Oregon. One group of students participated in the IB Diploma Programme in high school (referred to hereafter as IB/Honors students) and the other group of students did not participate in the IB Diploma Programme in high school (referred to hereafter as Non-IB/Honors students). The study examined both IB/Honors and Non-IB/Honors students' levels of academic, social, and emotional adjustment and investigated the degree to which specific aspects of the IB Diploma Programme facilitated preparation for the transition from high school to college.

The first phase of this study involved analyses of academic indicators of college success using extant data for IB/Honors and Non-IB/Honors students between 2005 and 2012. Results suggest that IB/Honors students in general are on track to earn postsecondary degrees, persist over two years, and earn high GPAs in their first two years of college. IB/Honors and Non-IB/Honors students earn comparable college GPAs, but IB/Honors students who took the University of Oregon math placement exam scored higher than Non-IB/Honors students, and a greater proportion of IB/Honors students persisted through college.

In the second phase, IB/Honors and Non-IB/Honors students took a postsecondary version of CampusReady, a self-report instrument that

gauges metacognitive, cognitive, and college adjustment behaviors and attitudes mapped to the Four Keys to College and Career Readiness (the Four Keys). Developed by Dr. David T. Conley (2014), the Four Keys are a widely used, research-based model that consists of four critical areas that together embody college and career readiness. CampusReady results indicated that, on average, IB/Honors and Non-IB/Honors students show similar degrees of metacognitive, cognitive, and college adjustment attitudes and behaviors across the Four Keys.

EPIC employed a qualitative methodology in the final phase to more closely examine how IB/Honors students differed in preparation and college experience from Non-IB/Honors students. EPIC collected data by conducting design charettes with both student groups that included observation protocols, interactive activities, and discussion questions to provide insights into students' academic preparation, academic success, non-academic preparation, and adjustment to college. The qualitative results suggest that students who participate in the IB Diploma Programme in high school are more academically adjusted to the rigor and expectations of college courses. Compared to their Non-IB/Honors peers, IB/Honors students report feeling less intimidated by the heavy workload required in college honors courses, more comfortable having one final exam account for a large portion of their course grade, and more able to manage their time and workload efficiently.

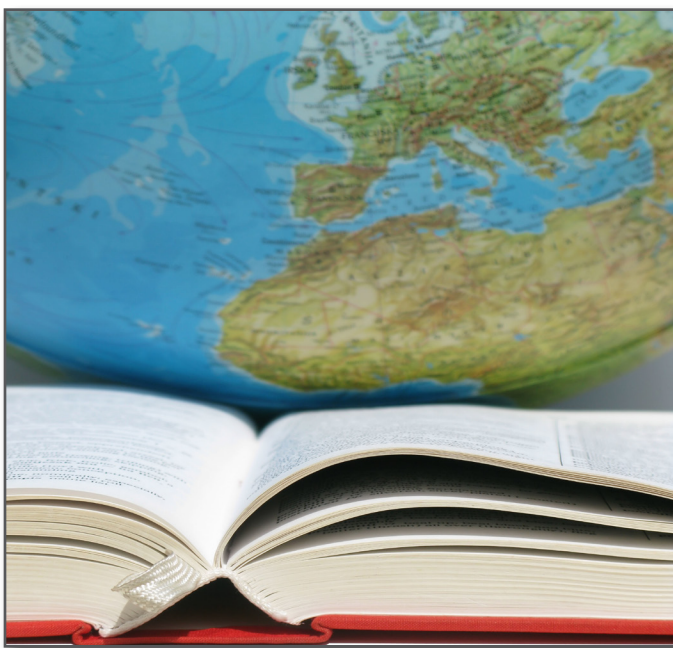
Overall, this study indicates that the IB Diploma Programme can be instructive to the field on how to better foster critical academic and non-academic (e.g., metacognitive) skills leading to improved postsecondary preparedness.

The International Baccalaureate (IB) “works with schools, governments, and international organizations to develop challenging programmes of international education and rigorous assessment” (IBO, 2009a). These programmes aim to create lifelong learners who are inquirers, knowledgeable, thinkers, communicators, principled, open-minded, caring, risk-takers, balanced, and reflective (IBO, 2009b). These dispositions are cultivated through the IB Diploma Programme, a rigorous two-year course for students in the 16 to 19 age range (IBO, 2009a). The IB Diploma Programme includes six academic areas and a central core composed of an extended essay (EE); a theory of knowledge (TOK) course; and a creativity, action, and service (CAS) program. It is this comprehensive curriculum that makes the IB Diploma Programme a demanding course of study designed to prepare students for success in postsecondary institutions (IBO, 2009a).

With the increased federal policy focus in the United States on college and career readiness, the IB Diploma Programme, which predates

the current federal reform agenda, takes on increased significance as an accelerated learning opportunity that aligns to entry-level college course requirements. Several states, such as Florida and Georgia, have started to include in their accountability systems access to and success in accelerated learning opportunities (Florida Department of Education, 2012; Georgia Department of Education, 2012). As more schools are held accountable for providing accelerated learning opportunities, more students will have the opportunity to participate in programs like the IB Diploma Programme. Furthermore, universities recognize the benefit of these experiences by offering college credit, which allows students to make progress toward degree completion before entering college and to bypass some prerequisite courses, thus reducing costs for students. With the widespread variety of accelerated opportunities available to students (e.g., IB Diploma Programme, Advanced Placement [AP], dual enrollment, middle colleges), determining the distinguishing characteristics of what an IB Diploma Programme student embodies becomes a priority.

Given the IB Diploma Programme’s dual emphases on academic rigor and development of broader dispositions, this study explored IB/Honors students’ level of college readiness in terms of both academic and non-academic preparation. For the purpose of this study, college readiness is understood as the level of preparation a student needs to enroll and succeed in college, not simply to gain admission—that is, readiness, not just eligibility (Conley, 2007). Research suggests that, to be prepared for college and career success, students must have a variety of knowledge, skills, and abilities, and that both academic and non-academic factors are important for success during the transition from high school to college. A meta-analysis of 241 data



sets that contained demographic, non-cognitive, and traditional (e.g., intelligence, SAT) correlates of college GPA reported significant average weighted correlations for 34 of 42 non-cognitive indicators (Richardson, Abraham, & Bond, 2012). Performance self-efficacy, defined as “perceptions of academic performance capability” (p. 356), had the largest correlation with college GPA ($r = .59, p < .05$), stronger than that of high school GPA ($r = .40, p < .01$), ACT scores ($r = .40, p < .001$), or SAT scores ($r = .29, p < .01$). Academic self-efficacy ($r = .31, p < .01$) and grade goals, defined as the grade or GPA that students set out to achieve ($r = .35, p < .01$), also were correlated significantly with college GPA. Oswald, Schmitt, Kim, Ramsay, and Gillespie (2004) reported significant relationships between first-year GPA and both adaptability ($r = .21, p < .05$) and students’ ratings of their knowledge acquisition during prior experiences ($r = .22, p < .05$). The results of a meta-analysis (Thomas, Kuncel, & Credé, 2007) of studies that used the Non-Cognitive Question-

naire (Tracey & Sedlacek, 1984) found relationships that were not as strong between college persistence and non-cognitive factors, including self-concept ($r = .14$), self-appraisal ($r = .02$), and long-term goals ($r = .03$).

Additionally, the Educational Policy Improvement Center (EPIC) has conducted multiple analyses of entry-level college courses from both general and career and technical education arenas (Conley, Drummond, de Gonzalez, Rooseboom, & Stout, 2011; Conley, McGaughy, Brown, van der Valk, & Young, 2009; Conley, McGaughy, Cadigan, Forbes, & Young, 2009). These results suggest that college readiness and career readiness share many important elements, including a range of cognitive strategies, study skills, time management, persistence, and ownership of learning. Based on this extensive research, Dr. David T. Conley (2014) developed the Four Keys to College and Career Readiness detailed in Figure 1.

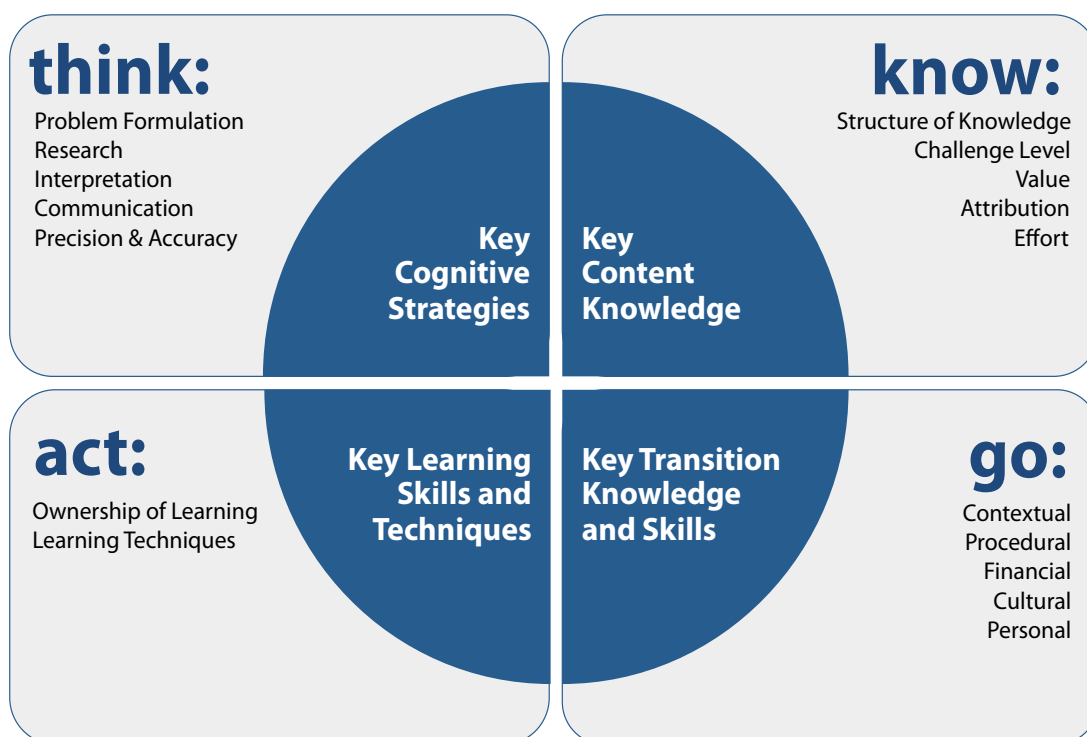


Figure 1. The Four Keys to College and Career Readiness.

The Four Keys to College and Career Readiness provide a conceptual framework to analyze the multiple factors that constitute readiness. Academic factors include the knowledge and skills that are typically the focus of formal education, including development of critical thinking skills (the Think key) and student subject matter knowledge as indicated by high school grades and exams in combination with standardized test scores (as included in the Know key). Non-academic factors, also referred to as metacognitive learning skills, include factors such as student ownership of learning, study skills, motivation, and postsecondary contextual awareness (as included in the Act and Go keys). Research shows that metacognitive skills are linked to outcomes such as GPA, college retention, and workforce success (Sedlacek, 2004; Sternberg, 2008). This

study used the Four Keys to examine student preparation and success in college to address the five research questions posed by this study:

1. To what extent are IB/Honors students academically prepared for college?
2. To what extent are IB/Honors students academically successful in college?
3. To what extent are IB/Honors students prepared for the non-academic aspects of college?
4. How do IB/Honors students adjust to college?
5. What aspects of the IB Diploma Programme prepare students for college success and adjusting to college?

This study explored IB Diploma Programme students' level of college readiness. EPIC conducted analyses comparing two groups of University of Oregon (UO) students enrolled in the university's Robert D. Clark Honors College (Honors College): (1) those who participated in the IB Diploma Programme in high school by completing four or more IB Diploma Programme courses (referred to as "IB/Honors") and (2) those who did not participate in the IB Diploma Programme in high school (referred to as "Non-IB/Honors").

The research objectives were operationalized and investigated in three phases. First, EPIC analyzed available extant data to make quantitative comparisons across academic indicators, using both demographic and college success data from students who attended the Honors College from 2005–2012. EPIC examined college success by analyzing IB/Honors and Non-IB/Honors students' college GPA and college persistence (as indicated by graduation within five years or advancement to sophomore, junior, or senior standing within respective 2-, 3-, or 4-year periods). In addition, student scores on the UO math placement test (an internally designed placement examination broken into four sections aligned to different courses to determine which math course a student should take) served as an indicator of students' academic preparation for college. During the second phase, EPIC examined student preparation on non-academic indicators using CampusReady, a web-based survey instrument developed and validated by EPIC that gauges non-cognitive, cognitive, and college preparation behaviors and attitudes mapped to the Four Keys (Conley, 2014). Students from each group took a postsecondary version of CampusReady, and EPIC analyzed mean scores for each of the Four Keys for differences between the two groups. In the third phase, EPIC conducted

a qualitative analysis to understand students' postsecondary experiences. A sample of the two student groups participated in separate design charettes. Qualitative observation protocols, interactive activities, and discussion questions elicited information about how students' experiences contributed to their college preparation, adjustment, and success.

Sample Population

This study examined groups of students at the University of Oregon's Honors College. Sampling from the Honors College student population provided an opportunity to investigate differences in college readiness and success between IB/Honors students and Non-IB/Honors students who are assumed to have a comparable history of high academic performance in high school; the sampling also helped to minimize variability of the students' college experiences and the level of college course rigor. Although the students' majors may span across the university, a separate and more rigorous process is required for Honors College admission. In 2012, the average high school GPA for University of Oregon freshmen was 3.57, while the middle 50% GPA range for admitted Honors College students was 3.79–3.98. SAT scores for the middle 50% were also noticeably higher for Honors College students across Critical Reading (640–740), Math (600–670), and Writing (620–710), compared to general University students (Critical Reading: 490–610, Math: 500–620, Writing: 490–600) (University of Oregon Admissions, 2013).

Phase I: Quantitative Comparisons Across Academic Indicators

Phase one of this study was designed to address the first two research questions regarding the extent to which IB/Honors and Non-IB/Honors students are academically prepared for college,

as well as the extent to which they are successful in college. EPIC explored statistical differences in IB/Honors and Non-IB/Honors students' college preparation and success using extant data from the University of Oregon. EPIC worked closely with the Office of Institutional Research to identify historical and current data for IB/Honors students ($n = 196$) and Non-IB/Honors students ($n = 1,495$) who enrolled in the Honors College from 2005–2012. Out of the 1,691 students attending the Honors College between these years, 12% participated in the IB Diploma Programme in high school. Groups were matched according to demographic characteristics.

The Office of Institutional Research provided student records for both groups of students ($N = 1,691$), which included demographic characteristics and a group indicator (IB/Honors or Non-IB/Honors); first-year, second-year, and cumulative GPA; student persistence; and University of Oregon math placement scores. The sample of IB/Honors students was comparable to the Non-IB/Honors students in terms of gender and ethnic/racial composition. See Table 1 for demographic percentages by participation group.

EPIC conducted multiple regression analyses to address the first research question regarding IB/Honors and Non-IB/Honors students' academic preparation for college, as indicated by student performance on the UO math placement test. The UO math placement test places incoming students in the most suitable math course based on their current knowledge rather than on prior math courses taken. The test is composed of four progressively more complex sections, and math course placement is determined by correctly answering a specified number of questions for each section of the test. Three dichotomous predictors (gender, minority status [White or Non-White], and group [IB/Honors or Non-IB/

Table 1

Sample Description: Demographic Characteristics of IB/Honors and Non-IB/Honors Students

Descriptor	IB/Honors ($n = 196$)		Non-IB/Honors ($n = 1,495$)	
	n	%	n	%
Gender				
Males	74	38	535	36
Females	122	62	960	64
Ethnicity				
Asian	27	14	139	9
Native Hawaiian or Other Pacific Islander	5	3	3	<1
African American	2	1	11	<1
American Indian or Alaska Native	2	1	12	<1
Hispanic/Latino	6	3	54	4
White	158	81	1,254	84
Multiple races	4	2	50	3
Unknown	9	5	67	5

Note. More than one ethnic category could be selected.

Honors]) were simultaneously entered to allow examination of the relationship between group and UO math placement scores, while controlling for gender and minority status.

To address the second research question regarding IB/Honors and Non-IB/Honors students' academic success in college, EPIC examined college GPA and persistence. Three multiple regression models were analyzed in which first-year GPA, second-year GPA, or cumulative GPA independently served as the outcome variable. Cumulative GPA is either GPA at graduation or point of withdrawal. For each of the three analyses, researchers simultaneously entered gender, minority status, and group to examine whether group was related to the GPA outcome of interest, while controlling for background characteristics.

Student persistence served as an additional indicator of college success. Persistence is a dichotomous variable for which “did not persist” indicated students who did not make adequate degree progress over a 2-, 3-, or 4-year period, or students who met adequate degree progress but did not graduate within a 5-year period. “Adequate” progress is defined by the University’s expectation that students will reach sophomore standing after 2 years (45 credits), junior standing after 3 years (90 credits), and senior standing after 4 years (135 credits) (University of Oregon, Office of the Registrar, 2013). EPIC conducted a chi-square test for independence to test for differences in the proportions of IB/Honors and Non-IB/Honors students who persisted.

Phase II: Quantitative Comparisons Across Non-Academic Indicators

Phase two of this study addressed the third research question regarding IB/Honors and Non-IB/Honors students’ non-academic preparation for college by comparing average responses from a subsample of students across four areas of college and career readiness. EPIC collected data by administering the postsecondary version of the CampusReady survey to both IB/Honors students and Non-IB/Honors students. The post-secondary version of CampusReady is composed of evidence-based metacognitive, cognitive, and college adjustment items in which students self-report behaviors and attitudes mapped to the Four Keys to College and Career Readiness (Conley, 2014). Using the student records ($N = 1,691$) provided for the extant data analysis, EPIC identified currently enrolled students and sent them an email inviting them to participate in the research study by completing CampusReady. Students were required to be at least 18 years



old and to have completed at least one term at the Honors College.

Interested students verified adherence to these requirements via email and completed an informed consent for participation form and a mutual confidentiality form, signifying their agreement to participate in the survey. Students then received an access code and survey instructions. Students were given a specific deadline for completion, but were allowed to complete CampusReady at their convenience. Recruitment was completed on an ongoing basis, until a minimum of 60 IB/Honors students and 60 Non-IB/Honors students completed the survey. Upon completion of the survey, students received a \$10 gift card as compensation for their time and participation.

Both IB/Honors participants ($n = 60$) and the Non-IB/Honors comparison students ($n = 65$) took the survey, producing aggregate scores for the Four Keys to College and Career Readiness:

Key Cognitive Strategies

- Problem Formulation: Hypothesize, Strategize

- Research: Identify, Collect
- Interpretation: Analyze, Evaluate
- Communication: Organize, Construct
- Precision and Accuracy: Monitor, Confirm

Key Content Knowledge

- Academic Attribution
- Academic Value
- Student Effort
- Challenge Level
- General Key Content Knowledge

Key Learning Skills and Techniques

- Self-Monitoring Strategies: Goal-Setting, Persistence, Self-Awareness
- Learning Strategies: Test-Taking, Note-Taking, Information Retention, Collaborative Learning, Time Management, Strategic Reading, General Study

Key Transition Knowledge and Skills

- Academic Awareness: College and Career Preparation, College and Career Expectations
- College Admissions Process: College Selection, College Application
- College and Career Culture: College Awareness, Career Awareness
- Tuition and Financial Aid: Financial Aid Awareness, Tuition Awareness

Students responded to a total of 160 items. Response options for each item included 1 (*not at all like me*), 2 (*a little like me*), 3 (*somewhat like me*), 4 (*a lot like me*), 5 (*very much like me*), and 0 (*don't know/NA*). Each CampusReady item is aligned to one aspect within one of the Four Keys listed above. Any response of *don't know/NA* was treated as missing, and aggregate scores were produced for each participant. EPIC conducted *t* tests for each of the Four Keys, to test for differences between average Key-level scores for IB/Honors and Non-IB/Honors students.

Phase III: Qualitative Analysis Using Design Charettes

Phase three of this study used design charettes to address the final two research questions, exploring how IB/Honors students adjust to college and how the IB Diploma Programme supports this adjustment and college success. Design charettes are a qualitative data collection method characterized by focused, collaborative sessions that emphasize participation and creativity, and are designed to engage participants and seek ongoing innovative thinking (Smith, 2012). EPIC selected participants using the student records ($N = 1,691$) from the extant data sample provided by the University of Oregon. EPIC identified currently enrolled students and sent them an email invitation and online survey inviting them to participate in the design charette component of the research study.

Interested students completed the online survey that confirmed their eligibility for participation and provided contact information, current college GPA, area of study, personality attributes, and availability for participation.



Eligible participants for the IB/Honors design charettes had to meet the following criteria:

- completed at least one full term at the University of Oregon,
- were enrolled in the Robert D. Clark Honors College,
- completed four or more IB Diploma Programme courses in high school, and
- were at least 18 years old.

Eligible participants for the Non-IB/Honors charettes had to meet the following criteria:

- completed at least one full term at the University of Oregon,
- were enrolled in the Robert D. Clark Honors College,
- did not complete IB Diploma Programme coursework in high school, and
- were at least 18 years old.

EPIC received 69 applications for participation from IB/Honors students and 72 applications from Non-IB/Honors students. From this list of applicants, EPIC staff identified two comparison student groups that represented diverse demographics and experiences and a range of current college GPAs and programs of study. Forty total participants were selected, 20 for each group. Of the 40 students selected, 36 participated in the design charettes. Due to last-minute school commitments, four students were unable to participate. Each student participating in the design charettes completed an informed consent for participation form, a mutual confidentiality form, and a form to allow for audiovisual recording of their participation for public release. Table 2 provides characteristics of the design charette participants by group. As compensation for participation, students received two meals during the charette and a \$50 gift card.

Table 2
Design Charette Participants

Descriptor	IB/Honors (<i>n</i> = 18)		Non-IB/Honors (<i>n</i> = 18)	
	<i>n</i>	%	<i>n</i>	%
Gender				
Males	8	44	7	39
Females	10	56	11	61
Characteristics				
Number of states represented	5 ^a		5	
Number of programs of study represented	16		14	
College GPA range	2.90–4.10		3.13–4.08	

^aPlus one foreign country.

EPIC researchers facilitated four 5-hour design charettes over a two-day period. Nine students participated in each design charette for a total participation of 18 IB/Honors students and 18 Non-IB/Honors students. Participating students were introduced to the research project and placed in the role of “experts” or “professionals” on the IB or non-IB experience. Naming the students as experts rather than subjects of the research was an intentional effort to engage them in a more constructive and reflective conversation regarding college adjustment and preparation. EPIC designed question protocols to elicit qualitative information specific to research objectives.

The design charettes were structured around a series of activities, all linked to key research questions or objectives. EPIC staff captured qualitative data through detailed field notes, photographs, audio recordings, and artifacts completed during charette activities. Natural follow-up questions were used to reveal additional insights. A brief description of each activity follows.

Student Profile

Each student individually created a profile of him/herself on a large poster paper by responding to prompts. Students were encouraged to include thoughts, feelings, and characteristics of being a student. Students included what they enjoy about being a student, how they reach out for help when they need it, what drives their class selection decisions, and what makes them unique as students.

T-Chart

Students individually completed a two-dimensional T-Chart by placing high school and life experiences on a continuum that ranged from most challenging to least challenging on the x-axis, and most valuable to least valuable on the y-axis. Facilitators specifically asked IB/Honors students to include components of the IB Diploma Programme on their chart.

Index It

For this interactive activity, IB/Honors students described the IB Diploma Programme as if speaking to a friend, including whether or not they would recommend the programme to that friend and why. Students wrote responses on an index card and then did a role-play of the scenario with another student. Similarly, Non-IB/Honors students described and gave a recommendation about Advanced Placement (AP) courses, dual enrollment courses, or other accelerated learning opportunities as if speaking to a friend. During the analysis, EPIC researchers categorically coded these cards to identify overarching themes and patterns.

Adjustment Continuum

Students rated their academic, social, and emotional adjustment to college by placing a color-coded sticker on a continuum poster. Definitions of these three areas of adjustment are as follows:

- **Academic adjustment:** keeping up with work, setting academic goals, and student interest in coursework.
- **Social adjustment:** making friends and engaging in social activities.
- **Emotional adjustment:** feeling at ease in college settings and being comfortable with independence.

The response continuum included four sections:

1. I was fine the moment I stepped on campus.
2. Took me a term or two to adjust.
3. Still in the process of adjusting.
4. I don't know if I'll ever adjust.

All IB/Honors students placed their stickers on one poster and all Non-IB/Honors students placed their stickers on a separate poster to allow for observation of patterns.

Attribute Sort

Students were given an envelope with 27 academic-related attributes listed on note cards. Students then sorted the attribute cards into three categories: critical to student success in college, nice to have as a student, and not necessary for success in college. Facilitators gathered the categorized note cards and recorded the results using a spreadsheet.

Results and Key Findings

The following section provides a summary of results and key findings organized by four themes tied to the research questions: academic preparation and success, non-academic preparation, adjustment to college, and IB Diploma Programme preparation.

Academic Preparation and Success

To determine the extent to which IB/Honors students are academically prepared for college, EPIC researchers examined UO math placement test scores using a simultaneous regression analysis. As shown in Table 3, the results indicated a statistically significant relationship ($\beta = .12$, $p = .013$) between group membership (IB/Honors = 0, Non-IB/Honors = 1) and UO math placement scores after controlling for gender (male = 0, female = 1) and minority status (White = 0, non-White = 1). On average, IB/Honors students scored higher on the UO math placement test than their Non-IB/Honors peers. Additionally, though small, a greater proportion of variance in UO math placement test scores was associated

with IB/Honors or Non-IB/Honors membership ($sr^2 = .014$, $F[3, 474] = 3.28$, $p = .02$) than with gender ($sr^2 = .008$). In other words, being an IB/Honors student versus a Non-IB/Honors student contributed slightly more to performance on the UO math placement test than did a student's gender.

To determine the extent to which IB/Honors students are successful in college, researchers analyzed students' GPAs. Separate simultaneous regression analyses were conducted in which IB/Honors or Non-IB/Honors group membership predicted students' first-year, second-year, and cumulative GPA, while controlling for gender and minority status. Though gender was predictive of second-year ($\beta = .09$, $p = .003$) and cumulative GPA ($\beta = .05$, $p = .03$), and minority status predicted first-year ($\beta = -.08$, $p = .002$) and cumulative GPA ($\beta = -.07$, $p = .004$), researchers found no differences between IB/Honors and Non-IB/Honors students' GPAs after controlling for these background characteristics. See Table 3 for regression results.

Table 3
Multiple Regression Analysis Examining Contributions of Background Characteristics and Group to UO Math Placement Exam Score, First-Year GPA, Second-Year GPA, and Cumulative GPA

Variable	UO math placement (<i>n</i> = 478)				Year 1 GPA (<i>n</i> = 1,615)				Year 2 GPA (<i>n</i> = 1,210)				Cumulative GPA ^a (<i>n</i> = 1,615)			
	β	<i>t</i>	<i>sr</i> ²	<i>d</i>	β	<i>t</i>	<i>sr</i> ²	<i>d</i>	β	<i>t</i>	<i>sr</i> ²	<i>d</i>	β	<i>t</i>	<i>sr</i> ²	<i>d</i>
Background variables																
Gender	-.09	-1.91*	.008	0.15	.04	1.40	--	--	.09	2.95*	.008	.11	.05	2.18*	.003	.07
Minority	-.03	-0.68	--	--	-.08	-3.17*	.006	-0.14	-.04	-1.39	--	--	-.07	-2.90*	.005	.13
Group	.12	2.51*	.014	0.23	-.02	-0.61	--	--	.01	0.27	--	--	.01	0.43	--	--
Overall Model F	3.28*				4.03*				3.43*				4.20*			
	<i>R</i> ² = .020				<i>R</i> ² = .007				<i>R</i> ² = .008				<i>R</i> ² = .008			

Note. Simultaneous regression. β = standardized β coefficient; sr^2 = square of a semi-partial correlation of independent variable and the dependent variable after controlling for all other predictors; *d* = Cohen's *d*.

^aCumulative GPA is up to either graduation or point of withdrawal.

* $p < .05$

Table 4
Chi-Square Test of IB/Honors and Non-IB/Honors Students' College Persistence

Persistence	IB/Honors		Non-IB/Honors		χ^2	<i>p</i>
	<i>n</i>	%	<i>n</i>	%		
Persisted	192	98	1,359	91		
Did not persist	4	2	136	9	11.36	<.001

Note. Chi-square with Fisher's exact test was used in consideration of a cell count less than 5.

EPIC researchers also examined IB/Honors and Non-IB/Honors students' persistence as an indicator of college success. The results of a chi-square test for independence indicated that students' persistence in college was dependent on IB/Honors or Non-IB/Honors group membership, $\chi^2(1, N = 1,691) = 11.36, p < .001$. A greater proportion of IB/Honors students persisted through college in comparison to Non-IB/Honors students. See Table 4.

Non-Academic Preparation

To address students' non-academic preparation, EPIC researchers administered the postsecondary version of the CampusReady survey to both IB/Honors and Non-IB/Honors comparison students. Table 5 shows the non-academic preparation indicators, or CampusReady Key scores, by group. Key scores are averages across all corresponding subscale items. For all items, the response scale ranged from 1 (*not at all like*

me) to 5 (*very much like me*). The *t* test results for each Key indicated no statistically significant differences between IB/Honors and Non-IB/Honors students' scores across the four non-academic indicators measured by CampusReady. However, as seen in Table 5, the means for both groups were consistently around 4.0 on a 5-point scale and equivalent to a response of *a lot like me*, reflecting high degrees of affiliation with items depicting college readiness behaviors and attitudes. For example, average student responses were particularly high for Key Cognitive Strategies ($M = 4.20, M = 4.19$). On average, IB/Honors and Non-IB/Honors students affiliated with intellectual behaviors (e.g., problem solving, reasoning, precision) that facilitate development of skills and abilities needed for college success. Similarly high means across the other three Keys suggest that both groups of students perceive themselves as possessing the non-academic skills and behaviors needed as preparation for college.

Table 5
t Tests for Differences Between IB/Honors and Non-IB/Honors CampusReady Survey Results, Average Key Scores

Four Keys	IB/Honors (<i>n</i> = 60)		Non-IB/Honors (<i>n</i> = 65)		<i>t</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Key Cognitive Strategies (KCS)	4.20	.38	4.19	.44	0.23	.82	.04
Key Content Knowledge (KCK)	3.82	.30	3.87	.37	-0.87	.38	.16
Key Learning Skills and Techniques (KLST)	4.05	.43	3.96	.50	1.08	.29	.19
Key Transition Knowledge and Skills (KTKS)	3.93	.69	3.98	.65	-0.45	.65	.08

Note. *d* = Cohen's *d*.

Table 6
Common Themes From Student Profile Activity

	IB/Honors	Non-IB/Honors
When you are feeling overwhelmed or confused, how do you reach out for help?	<ol style="list-style-type: none"> 1. Talk with peers and friends ($n = 13$) 2. Reach out to professors ($n = 12$) 3. Trial and error; struggle through ($n = 5$) 4. Internet ($n = 4$) 	<ol style="list-style-type: none"> 1. Talk with peers and friends ($n = 16$) 2. Reach out to professors ($n = 12$) 3. Seek help from parents/family ($n = 10$) 4. Internet ($n = 9$)
What drives your class selection decisions?	<ol style="list-style-type: none"> 1. Interests ($n = 9$) 2. Requirements ($n = 9$) 3. Smaller classes with discussions ($n = 4$) 	<ol style="list-style-type: none"> 1. Interests ($n = 8$) 2. Requirements ($n = 8$) 3. Classes with direct life application ($n = 6$)
What makes you unique or distinctive from your peers?	<ol style="list-style-type: none"> 1. Enjoy learning for the sake of learning ($n = 8$) 2. Enjoy playing the devil's advocate; seeing multiple perspectives ($n = 5$) 3. Think about how my classes connect ($n = 4$) 	<ol style="list-style-type: none"> 1. Hard work and ambition ($n = 5$) 2. Bilingual ($n = 3$) 3. Have more work or internship experience than peers ($n = 3$)

Researchers obtained additional information on non-academic preparation as part of the design charettes. Students were asked to complete student profile posters on how they view themselves as students, including how they reach out for help, what they enjoy about being a student, what types of classes they choose, and what differentiates them from their peers (see Figure 2). Table 6 depicts the most common themes and responses from the student-created posters. The responses show commonalities on some of the questions, but also reveal points of contrast.

Facilitators asked both groups of students to articulate how they reach out for help in college. The two groups both responded that they discuss with peers/friends, reach out to professors, and use the Internet to find resources. Both groups collaborate with peers by forming study groups and contact professors through office hours or via email. One distinctive difference was the 10 Non-IB/Honors students who mentioned

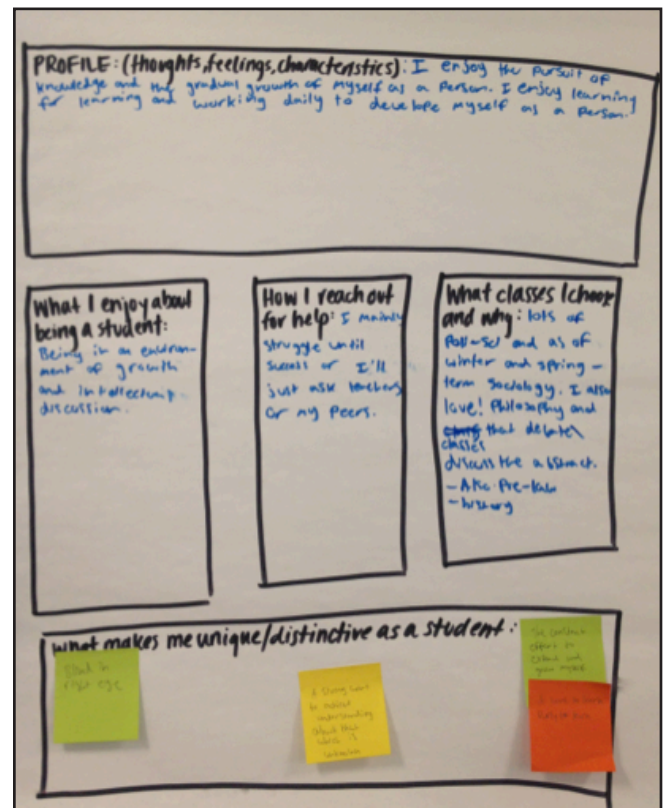


Figure 2. Example student profile.

parents and family, making it the third most frequently mentioned support, while only two IB/Honors students mentioned family. IB/Honors students mentioned working through problems independently, using trial and error, struggling until they succeed, or not reaching out at all. These findings suggest that the IB/Honors students rely less on their family for academic support and are more academically independent. They use risk and experimentation strategies to overcome challenges and take ownership over their learning.

The IB/Honors and Non-IB/Honors students also had similar responses to the question about class selection. Both groups responded that they primarily choose their classes based on their interests and on which classes are required for their major. Four IB/Honors students also mentioned the importance of having small, discussion-based classes as opposed to large lecture-style classes. Follow-up inquiry revealed that these students enjoyed the spirit of debate and the close-knit community of smaller courses in college because they are similar to the structure of IB Diploma Programme courses in

high school. Six Non-IB/Honors students stated that they choose classes that are applicable, useful, and provide direction in life. No students in the IB/Honors group mentioned this direct life application as a rationale for choosing courses.

When analyzing data about what makes a student unique, it was clear that the IB/Honors students enjoy learning for the sake of learning and are less concerned with grades. They appreciate that learning promotes greater understanding and personal growth. Furthermore, they report deeper understanding of the structure of knowledge, large concepts, and how content connects across disciplines. Several students provided examples of interdisciplinary learning from high school, specifically connecting world events in IB History courses with analysis of literary impacts surrounding those same events in IB English. The IB/Honors students are able to take multiple perspectives on the same issues, play the devil's advocate, and are more comfortable with revising their positions. All of these common responses indicate that the IB/Honors students carry an appreciation for learning and higher-order thinking skills into college. On the contrary, the Non-IB/Honors students were more likely to mention concrete experiences and skills as what defined them as students (e.g., took a trip to France, finished all readings, was organized, speaks Spanish).

Adjustment to College

While these data provide a snapshot of students' academic and non-academic preparation and success in college, EPIC researchers used the Adjustment Continuum activity to delve deeper into the differences between how IB/Honors and Non-IB/Honors students adjust to college academically, socially, and emotionally.



Qualitative data from the design charettes suggest that students who participate in the IB Diploma Programme during high school are more academically adjusted to the rigor and expectations of college courses. One artifact that demonstrates evidence of this adjustment is the Adjustment Continuum posters, shown in Figures 3 and 4. Facilitators asked students to place three stickers on an adjustment scale, one for academic (green), one for social (yellow), and one for emotional (blue). Every student who participated in the IB Diploma Programme agreed that they were academically adjusted the moment they stepped on campus. The Non-IB/Honors group had more mixed attitudes and declared that their levels of academic adjustment ranged from adjusted to still adjusting. Follow-up questions revealed reasons for the differences in adjustment self-ratings:

- The IB/Honors students' responses suggest they were not intimidated by the heavy workload required in college honors courses. The IB Diploma Programme had taught them how to balance coursework and manage their time.
- The IB/Honors students had experience with one final exam accounting for their entire course grade; therefore, they were not surprised by the similar grading structure in college.
- The Non-IB/Honors students in the comparison group indicated that they felt less adept at managing their time or studying for culminating exams.

Both groups of students felt that emotional and social adjustment took more time due to finding

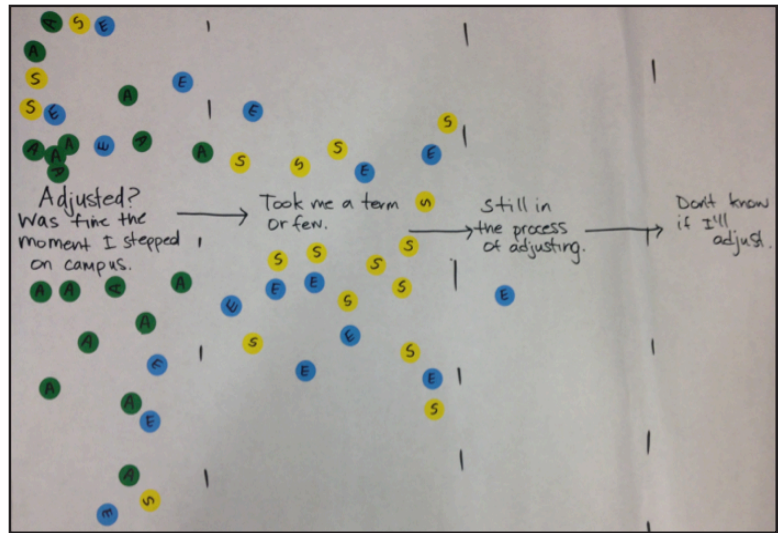


Figure 3. IB/Honors students: Academic, social, and emotional adjustment continuum.

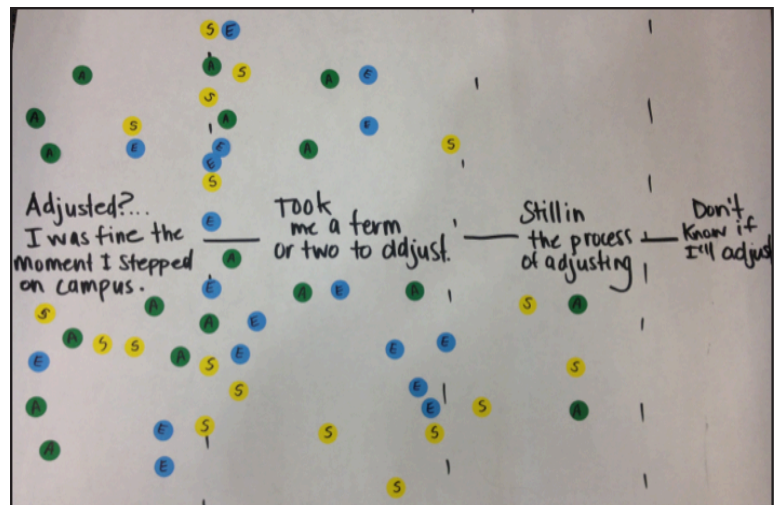


Figure 4. Non-IB/Honors students: Academic, social, and emotional adjustment continuum.

new social groups, solidifying their college identity, and being away from home for the first time.

IB Diploma Programme Preparation

To further explore the aspects of the IB Diploma Programme that prepare students for college success and adjustment, all students participated

in three activities (T-Chart, Index It, and Attribute Sort). For the T-Chart activity, facilitators provided students with basic instructions for this activity, but students were allowed to add any academic and life experiences that shaped their high school experiences. Students listed everything from specific high school courses to extracurricular activities to summer internships to traveling abroad. Facilitators specifically asked the IB/Honors students to include components of the IB Diploma Programme on their T-Chart. Although not all students used the exact same components,

the charts provided some interesting insight into students' perceptions about which components of high school, and the IB Diploma Programme in particular, were valuable and useful in preparing them for college. Follow-up questions resulted in discussion about why students placed components where they did on the chart. Trends that emerged around the value and challenge level of IB Diploma Programme components can be seen in Figure 5 and Appendix A, and are described on the following pages.

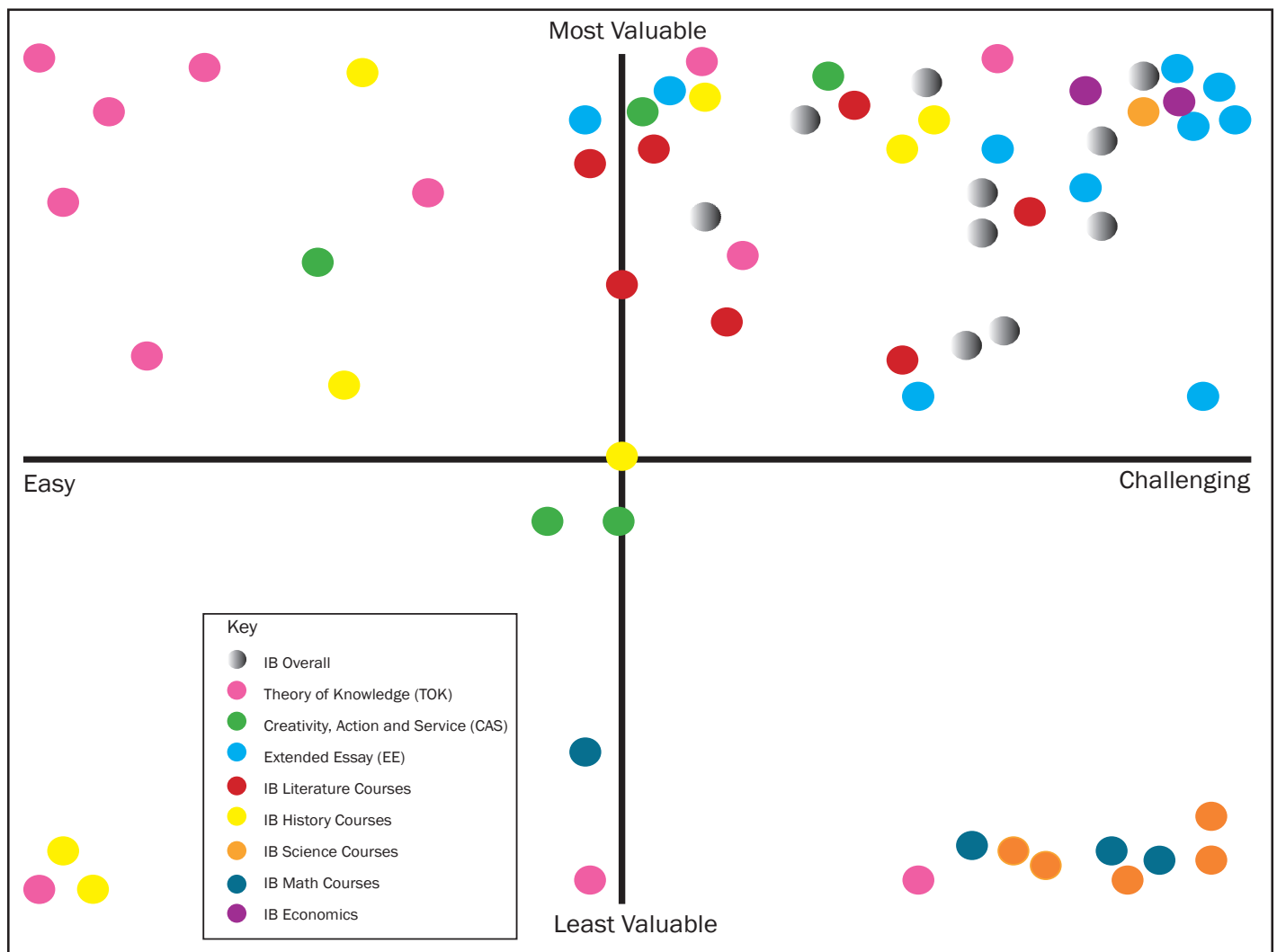
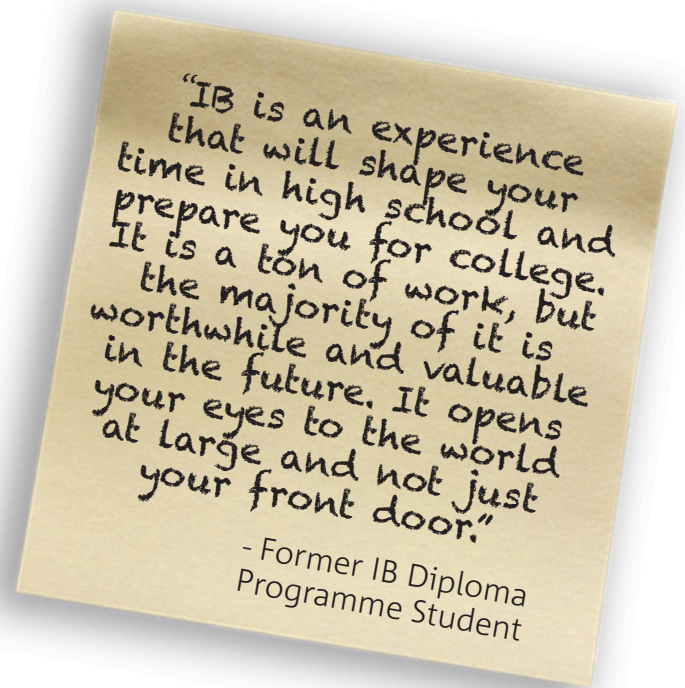


Figure 5. T-Chart of IB Diploma Programme components.

Extended Essay (EE). All ten IB/Honors students who placed the Extended Essay on their chart rated it as a valuable component of the IB Diploma Programme. In discussions, students indicated that doing an extended research project in high school was one of the more valuable skills they now use in college. Students noted that the skills they learned from the Extended Essay (e.g., finding relevant sources, determining the credibility of sources, organizing information, producing a coherent extended paper, and citing sources) are very useful in college and that they feel more prepared to do research than do many other students in their classes.

As a graduation requirement, students in the Honors College write a culminating thesis focused on their primary field of study. The thesis process requires students to engage in independent research; to pursue a subject in depth; to work with university faculty members; and to use analysis, synthesis, and communication skills (University of Oregon, Robert D. Clark Honors College, 2013). Several IB/Honors students mentioned feeling less intimidated by and more prepared for their college thesis due to the experience of working with a mentor, conducting in-depth research, and writing their Extended Essay.

Creativity, Action, Service (CAS). CAS received mixed responses on the T-Chart in terms of its value and challenge level. Further questioning and discussion revealed that many IB/Honors students thought that CAS is good in theory and strives to make students well rounded, but that it often feels like an add-on, rather than an integrated part of the IB Diploma Programme. Some students (25%) expressed frustration with the administrative hoops they felt they had to jump through to meet CAS requirements. Students felt that they were already doing these activities, and that CAS was disconnected from the curriculum.



Theory of Knowledge (TOK). TOK appeared in all four quadrants of the T-Chart, indicating that students had very different experiences with the course. Further questioning revealed that the value and challenge level of TOK is highly dependent on the teacher. Some students had more effective teachers and felt challenged and engaged, while others reported having less effective teachers and considered the course to be a poor use of time. The largest cluster of TOK placement is in the Most Valuable/Easy quadrant. Discussion showed that students placed it there because the course builds critical thinking skills and its discussion-based nature reflects the structure of college classes, but it does not have as heavy a workload as the other IB Diploma Programme courses.

IB Literature. All students who included IB Literature on their charts rated it as valuable. In follow-up discussions, students indicated that they learned many skills in their literature courses that have helped them in college, including writing quality essays, learning how



to handle a heavy load of reading assignments, using academic sources, and being comfortable presenting in front of the class.

IB History. Similar to TOK, IB History courses received mixed ratings and appeared in three of the four quadrants, indicating a variety of student experiences with the courses. Follow-up questioning showed again that the effectiveness of the teacher had a significant impact on the student experience with these courses. Several students attributed their positive IB History experience to having teachers who were engaging and who frequently tied the history lessons to studies from the IB Literature courses. Such connections helped students understand the context of the novels and short stories they were reading and helped pique their interest in the history of the various time periods. Other students mentioned less positive experiences with their IB History teachers, indicating they had instructors who seemed unprepared and lacked enthusiasm for the subject.

IB Math and Science. IB Math and Science were primarily categorized in the Least Valuable/Chal-

lenging quadrant. During discussion, students offered multiple reasons, including less effective teachers, content not relevant to their interests, and the belief that it did not adequately prepare them for IB tests. While the students participating in the charettes represented 16 different programs of study, almost half were pursuing majors in the social sciences and only three students were pursuing a major in a math/science-related field.

IB Overall. Ten IB/Honors students also placed the IB Diploma Programme as a whole on their T-Chart. All ten placed it in the Most Valuable/Challenging category. The placement was echoed in conversation, where students consistently mentioned the value of their IB Diploma Programme education overall and their firm belief that it has contributed to their success in college.

The Non-IB/Honors group placed high school events and other accelerated learning opportunities on the T-Charts. Of the 18 Non-IB/Honors students, 15 placed AP on their charts, and 13 of them placed AP in the Most Valuable/Challenging quadrant. Follow-up questions revealed that students attributed AP's value to the AP tests and the fact that they received college credit for participation. While several IB/Honors students mentioned the benefit of receiving college credit for IB tests, they did not perceive this as the most important or valuable aspect of the IB Diploma Programme. Seven out of 18 Non-IB/Honors students placed the SAT on their T-Charts, and all seven placed it in the Least Valuable/Challenging quadrant. No IB/Honors students placed the SAT on their T-Charts. The IB/Honors students did not feel that the SAT was a formative part of their high school experience; instead, they saw it as something they "had to do" to apply for college.

The next activity, Index It, was designed to examine the value students placed on their experience in an accelerated learning opportunity in relation to preparing them for college (see Figure 6). Overall, 16 out of 18 IB/Honors students recommended that other students participate in the IB Diploma Programme. A few students added the caveat that the programme was not for everyone and that students need to be committed and motivated. Students stated that the IB Diploma Programme requires a lot of work, but is worthwhile. Students made comments such as “Graduation will mean way more to you” and “What I like about IB is you have a lot of independent learning which I think is imperative to growing as a student, researcher, or learner.”

The IB/Honors students expressed the belief that the IB Diploma Programme encouraged them to grow into a well-rounded person who looks at the world differently. The programme built a sense of community—students felt they were working

with peers who care about and value education. They had a sense of pride and accomplishment from completing challenging work. Students in the comparison group, who predominately had experience with AP courses, generally recommended that students only pursue AP classes if they planned to take the AP test to receive college credit. More than half of the students in the comparison group indicated that “AP is just preparing for a test.”

These descriptions suggest that students perceive the IB Diploma Programme as providing an increased focus on building social and emotional metacognitive skills, whereas AP focuses more on the academic content acquisition necessary to pass the exam. There was a clear distinction between the two programs: Students viewed the IB Diploma Programme as a holistic program to develop strong learners, while they viewed AP as a means to obtain college credit in high school.

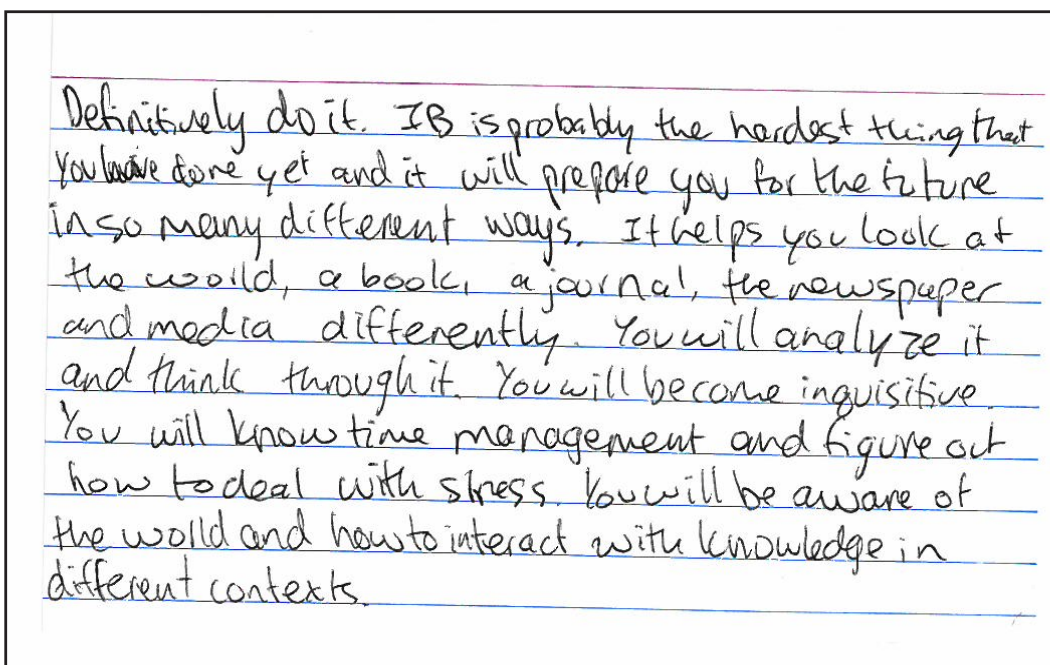
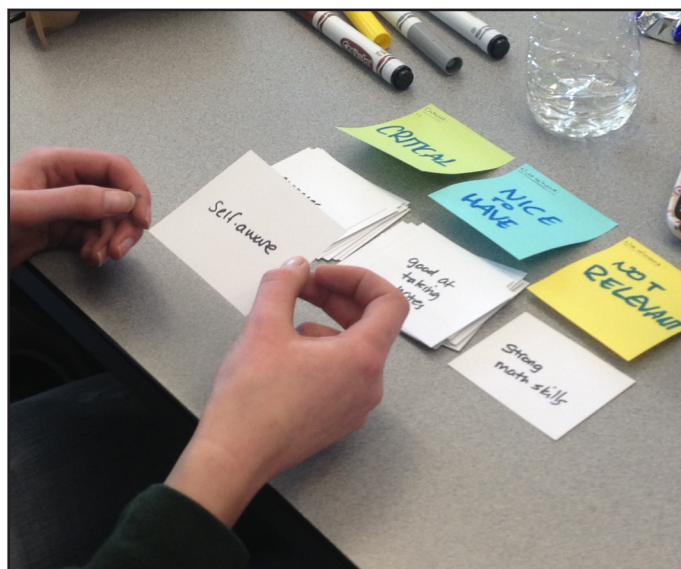


Figure 6. One student’s description of the IB Diploma Programme.

In the third activity, all students completed the Attribute Sort task. Facilitators asked students which skills and behaviors were critical to their success as students and which were not necessary. These data, summarized in Table 7, describe how students attributed their academic preparation and success (see Appendix B for full results). Both groups of students believed that time management was one of the more important attributes for success. IB/Honors students also highly rated problem solving and strong reading skills as most critical to college success. Follow-up questions revealed these distinctions between the two groups:

- Similar to the results of the Adjustment Continuum activity, IB/Honors students attributed their strong time management skills to the challenging and rigorous workload of the IB Diploma Programme. Due to the design of the programme, students have to balance high-level courses, a culminating exam schedule, an Extended Essay, and the hours required to complete CAS requirements.
- IB/Honors students know how to determine what information they need to read thoroughly and what they can just skim, and they have practice with close reading and text annotation.



- Non-IB/Honors students attributed their success to strong writing skills and the ability to persist.
- The students in the Non-IB/Honors comparison group indicated they were not prepared for the amount of reading required of them at the college level.

Another insight that emerged during the design charettes was that IB/Honors students frequently mentioned that IB Math was not relevant to them. They saw success in math in high school as a way to improve college eligibility, but did not find the math as valuable as other courses and they did not see connections to other coursework. Because many of these students were still in their first year of college, and most were not math or science majors, this low valuation of math may result from IB/Honors students not having been exposed yet to the college-level coursework that integrates math skills (e.g., biochemistry, statistics for social sciences, or accounting for business).

Table 7
Most Frequently Selected Skills and Behaviors From Attribute Sort

Level of necessity	IB/Honors (n = 18)	Non-IB/Honors (n = 18)
Most critical for success	<ol style="list-style-type: none"> 1. Time management 2. Problem solving 3. Strong reading skills 	<ol style="list-style-type: none"> 1. Persistence 2. Strong writing skills 3. Time management 4. Juggling priorities
Not necessary for success	<ol style="list-style-type: none"> 1. Creativity 2. Strong math skills 3. Feeling connected to school 	<ol style="list-style-type: none"> 1. Engaging in social activities 2. Leadership skills 3. Creativity 4. Financial literacy

Overall, this study found that the IB/Honors students were better prepared for college on both academic and non-academic factors. Although EPIC detected no differences in GPAs between groups, IB/Honors students who had completed four or more IB Diploma Programme courses in high school were more likely to persist to complete college. The qualitative data suggest that students who participate in the IB Diploma Programme during high school are more academically adjusted to the rigor and expectations of college courses once they arrive at campus. More specifically, the IB/Honors students were better able to cope with the heavy workload required in college honors courses than Non-IB/Honors students. They reported that their IB Diploma Programme courses had taught them how to better manage coursework and their time. In addition, the IB/Honors students had experience with taking one final exam that accounted for their entire course grade and were better prepared for taking the end-of-term final exams they encountered in many college courses. Students in the comparison group reported feeling less able to manage their time efficiently and less prepared when studying for culminating exams than IB/Honors students. Overall, the IB/Honors students indicated they held the IB Diploma Programme in high regard and would recommend it to their fellow students. They indicated the programme was key in preparing them for success in college.

The results of this study contribute to the significant and growing body of evidence about the positive effects and value of the IB Diploma Programme as a means to prepare students for postsecondary learning (IBO, 2013). The findings of this study reinforce those contained in an earlier study (Coca et al., 2012). Both studies compare two different student populations. The study by Coca et al. examines students

who graduated from Chicago's neighborhood high schools from 2003 through 2007. In each case the findings were similar: IB Diploma Programme students achieved better postsecondary academic outcomes, and IB Diploma Programme students reported stronger non-academic skills development (i.e., metacognitive skills or academic behaviors and mindsets).

These studies provide evidence that the IB Diploma Programme not only enables students to acquire necessary content knowledge, but that students also develop critical non-academic skills that enable them to manage their own learning. This emerging body of research is demonstrating that the IB Diploma Programme is developing what has been described elsewhere as perhaps the single most important factor to student success, namely "the degree to which students take ownership of their learning and are allowed to do so" (Conley, 2014, p. 73). The findings from this study illustrate some of the ways in which the IB Diploma Programme provides a more comprehensive and effective approach to preparing students for postsecondary success than other types of curricula that students encounter at the upper end of the academic spectrum in high school honors courses.

Some of this occurs as a direct result of IB Diploma Programme components such as Theory of Knowledge or the Extended Essay, but the results are remarkable in part because the programme does not explicitly teach the non-academic skills that students indicate they are acquiring in the programme. It may be worth noting that the IB Diploma Programme could likely magnify the degree to which students acquire these key learning skills by explicitly teaching them and letting students know that they are developing them as an intentional result of the IB Diploma Programme. As it stands now, students are

aware that they have developed these skills, but may not know exactly how they acquired them or may indicate that they acquired them without explicit instruction.

This multimethod study sought to answer a complex question about student readiness. As in any study that delves deeply into an issue that has not been well studied, the study's results should be interpreted with attention to several important limitations. First, the generalizability is limited by the study's exclusive focus on IB students who attended the University of Oregon's Robert D. Clark Honors College from 2005 to 2012. Second, the study should be viewed through the lens of case study research models and methods. Third, response rates to CampusReady restrict generalizability of the findings when viewed in isolation from other data sources contained in the study. Fourth, the study does not control for implementation variation of the IB Diploma Programme at the local high school level nor high school teacher effectiveness among IB and non-IB courses.

This study reveals limited but meaningful positive effects of the IB Diploma Programme on the UO Honors College students who previously participated in IB in high school. This study set a high bar by comparing students in the Honors College

who participated in IB to other students in the Honors College who did not. All were students in a selective honors program, and differences here were perhaps less likely to be found. Comparisons between IB students and the general college population tend to find more striking differences (Coca et al., 2012; Halic, 2013; Shah, Dean, & Chen, 2010).

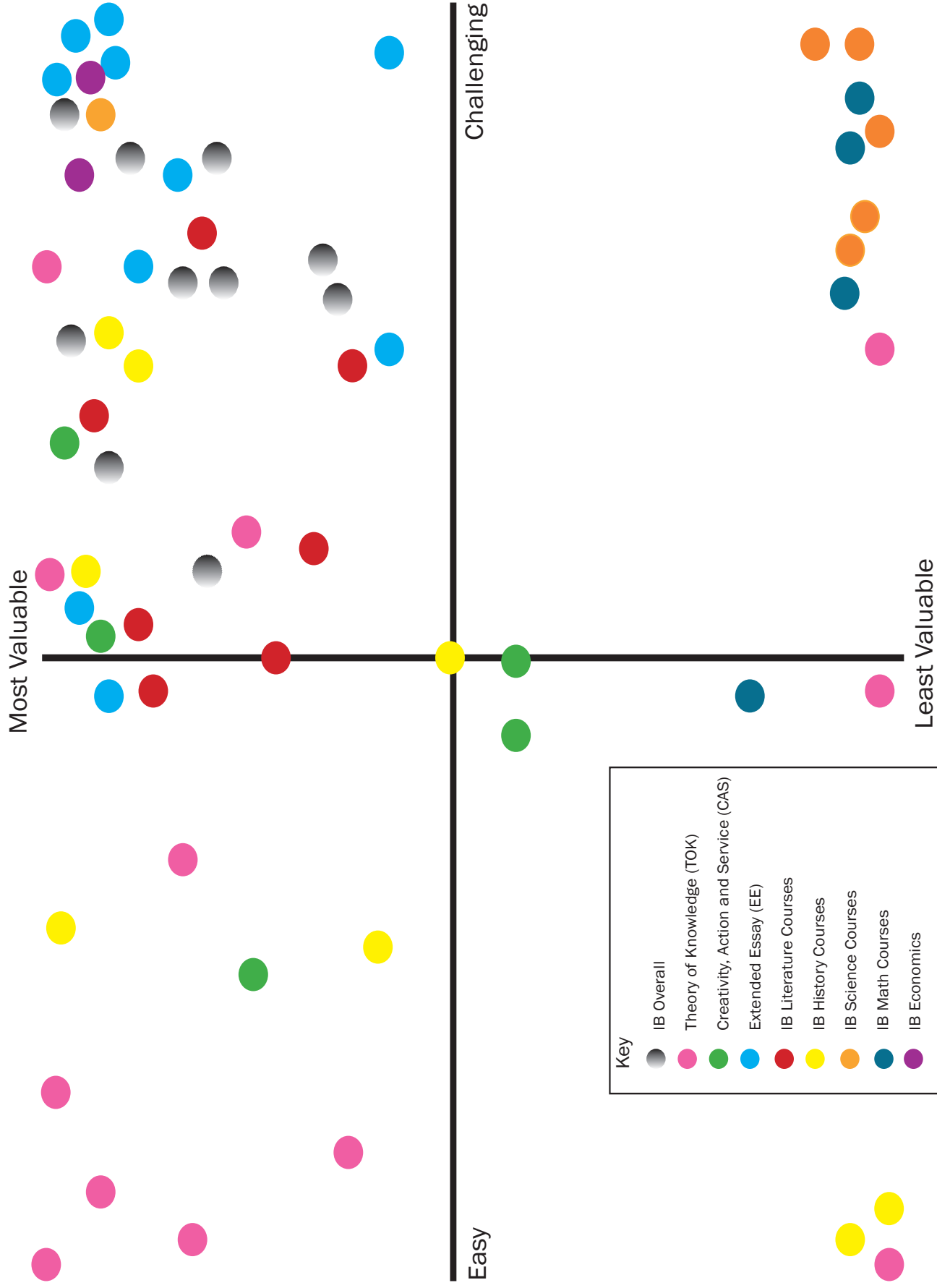
Given the fact that improving college and career readiness rapidly has become a national educational policy priority in the United States and an issue that many states are struggling to address, understanding and sharing why and how the IB Diploma Programme enables students to succeed in college could inform state policy and local educational practice in ways that enable more students to be college and career ready. The IB Diploma Programme is one of a handful of interventions with a demonstrated track record and research base that indicates it addresses the key variables associated with college readiness. In the case of IB, these include many skills not taught or developed explicitly in most high schools or in honors programs. Policymakers would be well advised to examine the IB Diploma Programme as one strategy that will help more students acquire the full set of skills necessary to succeed in postsecondary education and progress successfully to a bachelor's degree.

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Appendix A: T-Chart of IB Diploma Programme Components



Appendix B: Attribute Sort Responses

IB/Honors students (<i>n</i> = 18)			
Attribute	Critical to success	Nice to have	Not necessary for success
Time management	15	15	0
Problem solving	14	14	1
Strong reading skills	13	13	0
Juggling priorities	12	12	0
Persistence	12	12	1
Keeping up with work	12	12	1
Strong writing skills	11	11	0
Self-awareness	10	10	2
Interest in coursework	7	7	1
Goal setting	7	7	1
Study skills	7	7	2
Ability to work in teams	7	7	3
Independence	6	6	1
Project management	6	6	2
Feeling connected to school	6	6	4
Research skills	5	5	0
Knowing how to access resources	5	5	0
Punctuality	5	5	2
Making friends	4	4	0
Note taking	4	4	2
Cultural competence	4	4	2
Engaging in social activities	4	4	2
Creativity	4	4	4
Engaging with professors	2	2	2
Leadership skills	2	2	3
Financial literacy	1	1	2
Strong math skills	0	0	4

Appendix B: Attribute Sort Responses

Non-IB/Honors students (<i>n</i> = 18)			
Attribute	Critical to success	Nice to have	Not necessary for success
Persistence	15	2	1
Strong writing skills	14	4	0
Time management	14	4	0
Juggling priorities	14	3	1
Keeping up with work	13	5	0
Strong reading skills	13	4	1
Independence	11	5	2
Self-awareness	10	7	1
Study skills	9	9	0
Knowing how to access resources	9	8	1
Goal setting	8	9	1
Ability to work in teams	8	6	4
Interest in coursework	6	11	1
Project management	6	10	2
Research skills	6	10	2
Problem solving	5	12	1
Punctuality	5	11	2
Note taking	5	11	2
Cultural competence	5	10	3
Making friends	5	9	4
Financial literacy	5	8	5
Engaging in social activities	4	7	7
Engaging with professors	3	13	2
Feeling connected to school	3	12	3
Strong math skills	2	13	3
Creativity	2	11	5
Leadership skills	1	11	6

