Instruction Across the High School–College Divide

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Introduction

In recent years, attention has focused increasingly on the quality of instruction in K–12 settings as research suggests the important role that instructors play in improving student achievement. There is general consensus that good teaching is perhaps one of the most essential school-based factors for improving student achievement (Bill & Melinda Gates Foundation, 2009; Darling-Hammond, 2000; Rivkin, Hanushek, & Kain, 2005; Sanders & Rivers, 1996) and studies are currently under way to identify empirically based tools that will measure quality teaching. This attention to instruction has reached a zenith in 2009 with Congress' use of federal stimulus dollars as a lever to improve student achievement through a commitment to "making improvements in teacher effectiveness" (ED, 2009). Also, the Bill & Melinda Gates Foundation plans to spend significant funds in a "quest to figure out what qualities make the best teachers and how to measure those qualities in the classroom" (Blankinship, 2009). Although public attention has focused on the quality of instruction in K–12 settings, little attention has been given to the quality of instruction in postsecondary settings. Yet, coupled with the intense focus on the quality of high school instruction is a focus on improving students' likelihood for college completion, a commitment formalized by the foundation's funding strategy specifically focused on improving college completion rates for underrepresented students (Bill & Melinda Gates Foundation, 2009). The Early College High School Initiative (ECHSI), which includes secondary and postsecondary institutions, is the perfect context for a careful look at instruction at both of these educational levels.

This report presents findings from high school and college instructional data collected during site visits to Early College School (ECS) classrooms in the 2008–09 academic year as part of the evaluation of the ECHSI. ECSs are intended to encourage high school graduation, college enrollment, and college persistence by enabling students to earn college credits while they are still in high school. Generally, ECSs in the ECHSI are expected to adhere to a set of Core Principles. Although none of the Core Principles explicitly addresses quality instruction, underlying two of the Core Principles is an assumption that the instruction students receive in high school will prepare them for success in college. These principles suggest that ECSs and their higher education partners should jointly develop an "integrated academic program" that leads to transferable college credit and that students should be provided with a comprehensive support system that "develops academic and social skills as well as the behaviors and conditions necessary for college completion" (JFF, 2008, p. 2).

Research indicates that there are multiple strategies to facilitate students' preparation for college. For instance, in a study assessing predictors of college success, Martinez and Klopott (2005) identified alignment of curricula between high school and college as one of the key practices associated with student success, and several states, such as Texas and South Carolina, are in the process of completing this alignment. In terms of instruction, Adelman's

(2006) work suggests that the academic challenge of high school classes should help prepare students for college instruction, which typically requires more independence. Yet a gap also exists between high school and college instructional practices and the different assumptions high school and college instructors have about students and about their own role as facilitators of learning.

This report addresses the following questions:

- Overall, what is the quality of instruction students receive in ECS classrooms?
- How does instruction in high school classes compare with instruction in college classes?

The report first describes the methods for collecting and analyzing the classroom data. Next, we present overall findings across both institutional contexts and findings for the high school and college contexts. The final section provides a discussion of implications for instruction in the ECHSI and reflections on the instruments used in this study to capture instruction across high school and college contexts.

Methods

CLASS-S Instrument

To assess instruction, trained site visitors used a classroom-quality tool developed by Robert Pianta and his colleagues (2007) called the Classroom Assessment Scoring System-Secondary (CLASS-S). We selected CLASS-S for its ability to capture the complexity of instruction that occurs in a variety of ECS environments. In addition, CLASS-S is based on research on effective instruction for adolescents and maps well onto the "3R's" (rigor, relevance, and relationships), a lens used to describe instruction in earlier ECHSI evaluation reports (AIR & SRI, 2007, 2008).

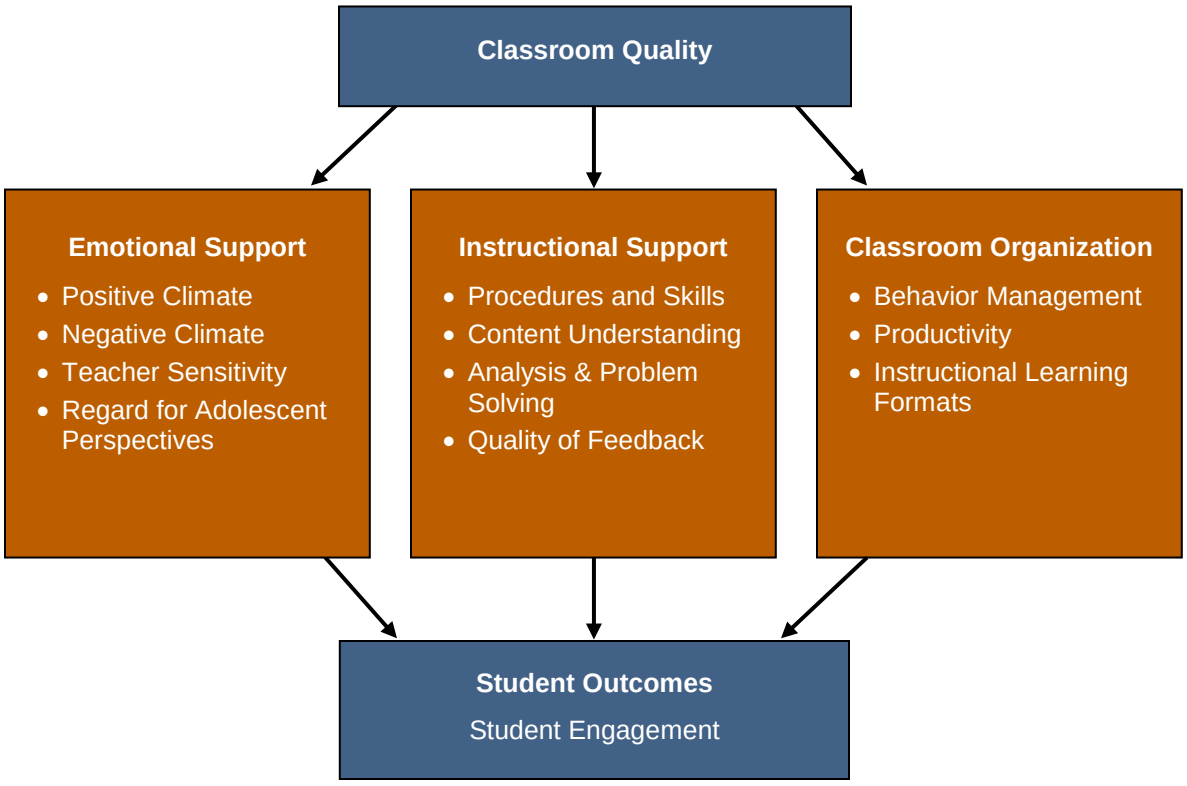
CLASS-S was adapted for the secondary context from the original Classroom Assessment Scoring System (CLASS), a tool first developed for early elementary classrooms. The pre-K and K–5 versions of CLASS are based on developmental theory and research indicating that learning results from meaningful interactions between teachers and students and between students and students in a supportive environment. CLASS-S also is based on research indicating that engaging in rigorous, meaningful activities in supportive environments results in positive outcomes for adolescents (Bransford, Brown, & Cocking, 1999; Eccles, 2004; Emmer & Strough, 2001; Evertson & Harris, 1999; NRC & IOM, 2004; Ryan & Deci, 2000; Ryan & Patrick, 2001). It is important to note that CLASS-S was not developed with college contexts in mind, and thus we make no judgments about what college instruction should look like. However, using the same instrument across both the high school and college contexts enabled us to identify potential gaps in instructional practices.

CLASS-S measures four domains of instruction: emotional support, instructional support, classroom organization, and student engagement.

- ***Emotional support*** focuses on the social and emotional dimensions of the classroom, including climate and teacher sensitivity.
- ***Instructional support*** measures opportunities to engage in higher order thinking and the degree to which instructors help students understand how disciplinary concepts connect to prior learning and how they can be applied in real-world contexts.
- ***Classroom organization*** captures the rituals and routines of the classroom and the teachers' general management of time and behavior.
- ***Student engagement*** reflects the overall engagement of students during the lesson. Student engagement serves as an outcome variable embedded within the CLASS-S theoretical model, and it is a critical component of student academic outcomes (NRC & IOM, 2004).

Each domain, except for student engagement, includes three or four dimensions (see Figure 1 for a conceptual framework for CLASS-S and Appendix A for a more detailed description of each dimension).

Figure 1. CLASS-S Conceptual Framework (Pianta, Hamre, Haynes, Mintz, & LaParo, 2007)



Data Collection

The evaluation team collected instructional data as part of site visits to 20 ECSs conducted in winter/spring 2009. These sites were a representative sample of ECSs with 2- and 4-year institution of higher education (IHE) partners and of ECSs located on and off college campuses. When possible, site visit teams observed four classes at each site, representing both high school and college classes in English language arts (ELA) and mathematics. In total, we observed 77 classes. Although we observed each classroom only once, we were able to capture a snapshot of instruction across the ECHSI at a specific point in time. Table 1 displays the distribution of classes by subject area and level.

Table 1. Distribution of Observed ECS Classes

		Subject Area			
		Mathematics	English Language Arts	Other	Total
Level	High school	19	21	4	44
	College*	16	11	6	33
	Total	35	32	10	77

* Of the 33 college lessons observed, 26 were taught by college instructors and seven were taught by high school instructors with adjunct status.

Two trained site visitors observed each lesson: one coded the lesson using CLASS-S, and one wrote detailed descriptions of the lesson. At the end of every 20 minutes, the observer spent 10 minutes rating the lesson segment on each of the 12 CLASS-S dimensions.[1] The dimensions were scored on a scale of 1–7, with 1–2 in the low range, 3–5 in the midrange, and 6–7 in the high range.[2] In addition to the observations, site visitors interviewed each observed instructor. When possible, observers interviewed instructors prior to the observation to learn more about the instructors' goals and their students and after the observation to gather instructors' reflections on the lessons.

Data Analysis

Each 20-minute lesson segment received a score for each dimension, and scores were then averaged across all observed segments.[3] Then, each lesson received an average for each of the four domains for the entire observation period.[4] Analyses presented here include dimension and domain means, t-tests to identify significant mean differences, and correlations between domains. We used Atlas.ti, a qualitative data analysis program, to align the detailed descriptions of the lessons with the CLASS-S codes. This allowed analysts to examine lesson descriptions for each code. Analysts also consulted interviews to confirm or explain patterns that emerged from the instructional data.

[1] Observers continued taking notes during scoring segments. However, these segments were never scored.
[2] Roughly half (38) of the observed lessons had three segments that were coded, 37 had two lesson segments that were coded, and two lessons had only one segment that was coded. Lessons with only one coded segment included activities (like watching videos) with little instructional interactions between instructors and students or among the students themselves.
[3] Lessons were coded using whole points. Averages are reported using tenths.
[4] One dimension, negative climate, was reverse-coded before being averaged with the other dimensions.

Instruction in ECS Classrooms

Using CLASS-S, we examined both the overall quality of instruction in ECSs and the differences in instructional practices in high school and college credit classes.[5] Although the ECHSI originally did not intend to address the quality of college instruction, questions and concerns persist about the instruction that ECS students are receiving as they transition into college credit classes. In addition, if ECSs are designed to prepare students for success in college classes, it is important to understand precisely the kind of instruction for which they must be prepared. These findings illustrate how ECS classrooms provide students with both social-emotional and academic support, how instructors present and organize their lessons to facilitate student learning, and how those strategies compare across high school and college credit classes. [6]

CLASS-S Domain: Emotional Support

Emotional support reflects the nature of the classroom climate, how sensitive teachers are to the social and developmental needs of their students, and how teachers respond to and meet those needs. Findings indicate a relatively high degree of support provided to ECS students. Across all the observations, the average emotional support rating was 5.3 out of 7. Of the 77 classes, 43 percent scored "high" (a rating of 6 or 7) on emotional support. No lessons scored below a 3. Thus, all observed classes exhibited at least some form of emotional support for students. In the typical classrooms, teachers and students demonstrated mostly warm and respectful relationships. Exhibit 1 provides examples from lessons rated high and low for this domain.

[5] Rather than simply referring to high school and college classes, we make a distinction here between high school and college credit classes because of the variety of contexts in which ECS students can receive instruction. ECSs have adopted a number of models to provide students with college experiences. Some classes are taught by college professors on a college campus; others are taught by high school instructors who are qualified to teach college classes in a high school building. Some college classes include only ECS students, while others include both ECS and traditional college students.

[6] Unless otherwise noted, adjunct instructors of college credit classes—including some high school instructors—were included in the college sample. As presented later in this report, this may have actually narrowed the differences between high school and college instruction, since high school instructors tended to teach their college credit classes more like high school classes.

Exhibit 1. Examples of Different Levels of Emotional Support in ECS Classrooms

- **High (6)**

  In a high school English class, the instructor had students first read aloud four "thought questions" (i.e., "Bloom's questions" based on Bloom's taxonomy) to instigate their thinking about a short story. The instructor had high regard for students' perspectives, providing them with opportunities to share their thoughts on the story and drawing links to their own experiences. For example, after reading aloud the four thought questions, the instructor said, "Before we start, I want you to think about a journey you took. What was the purpose, what were the obstacles, and what were any hardships that were encountered? Think about it for a minute, and then you can tell me." After some discussion, the instructor provided an opportunity for meaningful peer-to-peer interaction by having students work in groups to read the story and create their own thought questions together. Groups then traded and answered each other's questions. In her interview, the instructor said she grouped students based on her knowledge of their skill levels and who she knew would work well together. She was able to anticipate who would struggle and provided support to those students by asking probing questions that connected to what they learned previously. The classroom had a positive climate, with the instructor and students sharing good rapport — students at one point joked with the instructor that she should have dressed up as a flapper for their theme day. Students generally seemed to respect the instructor, listening to her instructions and staying on task, and the teacher did not find reason to reprimand the students.

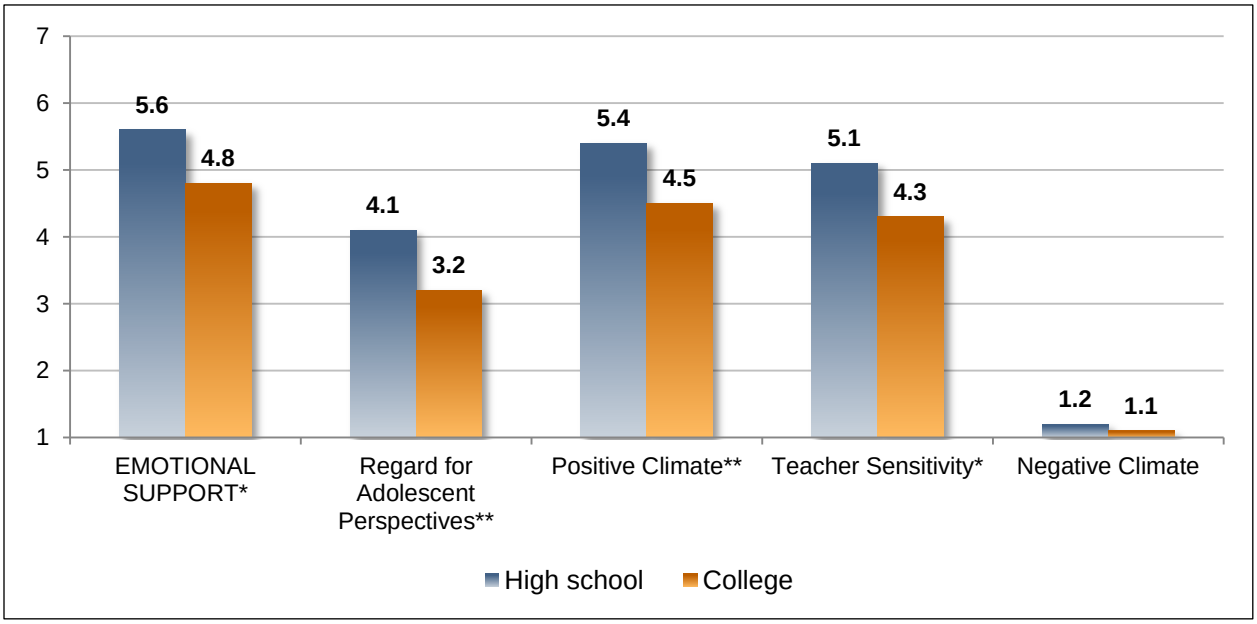
- **Low (3)**

  In a college trigonometry class, the instructor first answered students' homework questions by solving them on the board, and then used the rest of the class to solve equations on the board, occasionally giving students 2 to 3 minutes to try to solve the equations themselves. Throughout the lesson, he moved along very quickly and although he asked questions, he rarely waited long enough for a student to answer before he gave the answer himself. The observer noticed very few personal or warm interactions between the teacher and students; however, there were no negative interactions either. The instructor's approach of teaching at the board left little opportunity for students to offer input or work with their peers, and the instructor did not monitor for or respond to students' needs. In his interview, the instructor said that when he notices struggling students, he encourages them to come to see him during his office hours or go to the tutoring center on campus. He said, "The best thing I can tell them is come and see me, because in the class, there are so many students. If they come and see me, definitely I can understand your personal problem, I can describe that part, and I can make them understand it. And that's a good option; but I don't know, they're not coming, I don't know the reason."

When comparing high school and college credit classes, we discovered significant differences in the level of emotional support provided. On average, high school classes were scored 5.6 and college credit classes were scored 4.8 (see Figure 2). This difference appears to be related to the different expectations that college instructors and high school instructors

bring to their teaching. The key evidence for this comes in comparing high school and college instructors who are both teaching college credit courses. College credit classes taught by high school instructors resembled high school credit classes in terms of emotional support, with a mean of 5.6. However, college classes taught by college instructors averaged a full point less (4.6) on emotional support.

Figure 2. Emotional Support Domain and Dimension Means for High School and College Credit Classes



* p = < .05; ** p = < .01; *** p = < .001
N's: High school credit classes = 44; college credit classes = 33
Note: See Appendix B for analysis statistics.

The significant differences observed for the domain of emotional support are due to differences in the underlying dimensions. High school credit classes scored significantly higher than college credit classes in three of the four emotional support dimensions: regard for adolescent perspectives, positive climate, and teacher sensitivity (see Figure 2). It is not surprising that high school instructors created positive classroom environments and were sensitive to students' needs and opinions. Many ECS high school instructors reported that they know students outside the context of a single course. Sometimes, ECS high school instructors have taught students over the course of multiple years, know students from other ECS-related activities outside the classroom, and even know ECS students' families. As one ECS high school instructor said, "I don't just *teach* kids. I know where they work. I know

High school classes scored higher than college credit classes on emotional support. This difference is likely due to the relationships high school instructors are able to form with their students and the focus high school instructors place on making lessons relevant and meaningful for students.

who their parents are. I know who their brothers and sisters are. I know what they did this weekend. I know who their girlfriend is. I know most stuff about them. It's just very different. A lot of kids have my cell phone number." College instructors, however, may not have opportunities to get to know students outside of the context of their classes. Typically, colleges are large academic environments, and students likely only encounter most college instructors for one class. College instructors see office hours as a way to get to know students, but this mechanism usually relies on student initiative. One college instructor who said she does not know her students well explained, "The best that I can say is that those students who take me up on office hours and get a more one-on-one kind of instruction, those are the folks that typically tell you more about themselves." Thus, high school instructors are more attuned to students' personal lives and needs and can use this knowledge to better anticipate students' social/emotional needs, which also helps them address students' academic needs.

In addition to differences in relationships with their students, high school instructors and college instructors also have different expectations for what should take place during class. These differences were reflected in the mean scores of high school and college credit classes on regard for adolescent perspectives (4.1 in high school and 3.2 in college). This dimension represents the degree to which instructors promote autonomy during instruction, link the content of the lesson to students' perspectives, draw upon and challenge students' ideas to deepen conceptual understanding, and promote meaningful collaboration with peers during the lesson. It focuses not simply on the degree to which instruction is relevant for students, but also the degree to which students take responsibility for their own learning during the class. Because high school instructors are trying to not only prepare students for college, but also ensure that they stay in high school and graduate, many high school instructors reported paying particular attention to including activities and materials that will be seen as relevant and valuable to the students. One high school instructor said, "As far as my lesson plans, I just try to do a lot of stuff that I feel is interesting, because I don't want to be there and be bored to death, because that's probably the reason that a lot of kids leave school. … They feel the stuff they're doing is not important, and they're not going to need it." Part of what high school instructors report doing in ECSs is developing lessons that engage students and making clear to them how the content and skills they are learning will be necessary in college.

Another difference is that in many college contexts, instructors generally do not provide time during lessons for the sort of peer-to-peer interactions that are defined by CLASS-S as important indicators of regard for adolescent perspectives. Instead, many college instructors assume students already know how to take responsibility for deepening their own learning, either through their participation in classroom discussions that help students co-construct meaning or through peer-to-peer interactions outside of formal class time. Theoretically, then, if high school instructors are scaffolding students' opportunities to make decisions

about their own learning in a supportive classroom environment, the students will be ready to do that on their own once they are in college. Occasionally, college instructors reported facilitating students' learning from each other. For example, one college English instructor organized her students into "pods," or groups that worked together throughout the semester. They exchanged phone numbers and relied on each other for support outside of class. The instructor said, "These are the people you [get] to know intimately at the beginning of the semester. So if somebody is absent, you can call your pod member and say, 'What happened in class today?' If someone in your pod needs you to look at their outline, it's like a buddy system."

The differences in regard for adolescent perspectives between high school and college credit classes appear to be driven primarily by differences in mathematics classes. English classrooms in high school averaged 4.5, whereas college English classes averaged 4.0 on regard for adolescent perspectives, a minor difference. High school mathematics instructors, on the other hand, averaged 3.4 whereas college mathematics instructors averaged only 2.5. College mathematics instructors more frequently relied on lecture and rote procedures in class and expected students to look for support on their own outside of class (e.g., from textbook-related compact discs, Web sites, or labs). Given the difference in approaches on regard for adolescent perspectives, ECSs should be aware of how their high school classes prepare students to take responsibility for their own learning both during instructional time and outside of class.

Summary

Our analysis found that

- Overall, emotional support is high in ECS classrooms.
- Emotional support was higher in high school classes than in college credit classes, pointing to the differences in how well high school and college instructors are able to know their students and the extent to which student perspectives are taken into account.
- Differences in emotional support between high school and college credit classes appear to be due to instructor background and training more than content level. High school instructors who taught college credit classes tended to exhibit emotional support levels similar to those in high school classes.
- Regard for adolescent perspectives was particularly lacking in college mathematics environments.

CLASS-S Domain: Instructional Support

Instructional support considers teacher knowledge of and effectiveness at translating "big ideas" for students, teaching of procedures and skills, emphasis on and approaches to higher-order thinking, and the quality of feedback teachers provide to students.[7] Scores for instructional support fell in the middle of the CLASS-S scale with a mean of 4.0. Only one observed classroom received the highest score of 7, and only four received a 6. Although few lessons scored high, few also scored particularly low: No lessons were scored as a 1, and only four were scored as a 2. (See Exhibit 2 for an example of a class that scored high for this domain and one that scored low.) In typical lessons, instructors only occasionally provided opportunities for students to engage in deep thinking or meaningful understanding. More often, activities focused students' attention on arriving at a correct answer using a defined set of procedures rather than deeper conceptual understanding of content. Feedback was usually limited to evaluations of students' answers ("That's correct!" or "Did anyone come up with a different answer?") rather than the rich exchange of ideas. These lessons also only occasionally built upon students' prior knowledge, connected material to real-world contexts, or identified a variety of examples, multiple perspectives, or alternative-solution pathways.

Overall, there was little difference in the scores for instructional support between high school and college credit classes (means of 4.1 and 3.9, respectively; see Figure 3). While it is not clear from the findings in this domain what level of instructional support is optimal in high school or college classes, they point to an issue that deserves further investigation. That is, what level of instructional support is needed in high school both to ensure students master rigorous content and to prepare them for success in college credit classes? High school instructors often grapple with the tension between providing enough instructional support to get students to the level where they can enroll in non-remedial college credit classes and providing limited supports in order to teach students the self-advocacy skills they will need for college credit classes. There are no external values with which to compare these results, only the CLASS-S designations of high, medium, and low. These means could be higher than what one might observe in other school environments and could indeed be adequate. In the absence of such external comparisons, though, it is interesting that there are very small differences between high school and college credit classes.

[7] This domain does not measure the challenge of the material per se. Rather, it assesses whether content is presented as discrete sets of facts or is integrated among key concepts within academic disciplines. Thus, a course could include challenging material without scoring high in instructional support.

Exhibit 2. Examples of Different Levels of Instructional Support in ECS Classrooms

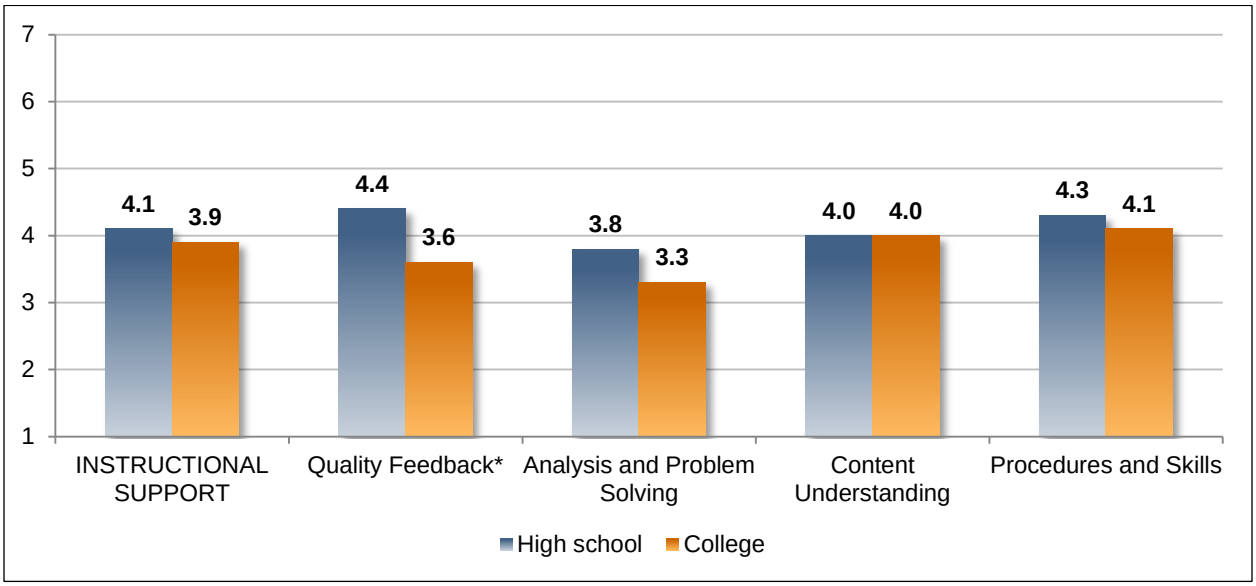
- **High (7)**

  In one school that serves a high number of minority students, a high school English instructor and students were engaged in a discussion of racism during which they tried to tease apart the meaning of discrimination, prejudice, ignorance, and injustice. Students worked in groups on a PowerPoint presentation and paper related to this topic. When introducing the assignment, the instructor laid out her expectations clearly and explained how they aligned with what would be expected in college. Her questions about racism encouraged students to think deeply and required more than a yes or no response. At the same time, she linked the discussion to what the students experience every day. For example, the instructor asked the class, "What do people invoke to justify racism? What was the example? It's in our back yard. … Why is it … in our back yard and not in Canada? [Is it] prejudice? [Is it] ignorance?" The instructor reported in an interview that her higher-order thinking questions were based on her knowledge of what students would need for college and the kinds of questions they will need to ask. While the students were working on their presentations, the instructor circled the room and monitored student work, repeatedly urging students to use their "creativity" and provide examples and quotations from their own experiences and asking probing questions about the topics they had chosen.

- **Low (2)**

  During this high school geometry class, students spent the majority of time working in pairs through a note-taking activity on the properties of various shapes. Students used the textbook or a Web site to complete a note-taking worksheet. Throughout the lesson, the instructor made no effort to say why the topic was important, how it connected to prior lessons, or what the larger takeaway of the lesson was. Although there was an attempt at having students discover new information (i.e., the instructor told students to create their own notes about diagonals after trying to find the diagonals of rectangles themselves), the teacher provided no guidance or feedback that would lead to greater understanding of the material. At the end of the class period, the instructor tried to bring the main ideas back together by having students write them on papers on the front board, but students' attention was drifting, and there was no discussion of the lesson's importance. The interview provided insight into the structure of the class. The instructor said her first objective was to make sure students could identify the properties of rectangles and squares, and then later they would be able to solve problems and apply concepts of geometry to different subjects. Future lessons may result in more critical thinking by the students, but the instructor did not make it clear how this particular lesson would connect to later lessons or larger ideas.

Figure 3. Instructional Support Domain and Dimension Means for High School and College Credit Classes



* Significance level: p = < .05
N's: High school credit classes = 44; college credit classes = 33
Note: The CLASS-S instrument is designed so that only certain lessons receive codes for the procedures and skills dimension. Many of the lessons observed received a "no-code" score on that dimension because the lessons were not designed to present specific procedures to students.

High school classrooms in ECSs are expected to have a strong focus on engaging students in the content and skills that they need to be successful in college courses. However, high school instructors reported that they struggled with the fact that they must cover a lot of material to also prepare students for high-stakes state tests, sometimes resulting in a focus on breadth rather than depth. One instructor has tried using deeper explorations in her class, but said, "I'm torn because I know this is a better way of teaching, and, especially with these small classes, it's possible, but the timeframe, the explorations take longer. It's better learning, but I can't cover everything if I do it like that." Similarly, in college classes, regardless of the presentation format, one would expect to see material presented using a variety of examples from multiple perspectives and that students would have opportunities to participate in higher-order thinking and analysis. The slightly lower score for instructional support in college credit classes than high school classes may suggest that college instructors expected students to be able to apply their knowledge and reasoning and integration skills on assignments completed outside of class.

High school classes received higher scores on quality of feedback than college credit classes (see Figure 3). This difference may be related to the ways in which feedback was often provided in college. In college classes, feedback would more likely be given by instructors in writing — in response to an essay, a quiz, or midterm, for example — which CLASS-S does not capture. In contrast, high school instructors often tried to engage in conversations with students that would stimulate deeper understanding of the material. For example, a high

school English teacher engaged her entire class in a discussion about satire. Students wrote their own proposals using Jonathan Swift's "A Modest Proposal" as a model. During a whole-class discussion on individual proposals, the teacher engaged students in feedback loops to lead them to understand why the proposals met the criteria for a satire or why they didn't. For example, the instructor asked, "How is this proposal like Jonathan Swift's?" A student responded that "It was outrageous. … It could work. … You could do it, but you really wouldn't want to." Then the instructor asked, "What is the satire in the proposal?" Another student responded: "Even though no one would think of that solution, it still would work." The instructor probed further, pointing students to the criteria they had developed for satire: "Where was the irony in the proposal? Two of our criteria mention irony, don't they? You have to examine the reason a problem exists in order to propose a solution. … These need to be solution-driven as opposed to consequence-driven. … I don't think we've tapped into our creativity the way we could. We need to think outside the box." Following an instructor-guided, whole-class discussion, students ultimately agreed that the first group's paper did not meet the criteria for satire. In this process, the instructor's questions deepened students' understanding of irony and its role in effective satire, which was visible in the presentations of groups that followed. In this case, the feedback was not only direct feedback that addressed the creativity of solutions proposed, but also the guiding questions that led students to deeper understandings of satire and irony.

High school instructors provided more frequent quality feedback loops than college instructors. Leading high school students to deeper thinking helps prepare them for the level of discussions expected in college classes. In contrast, college instructors tended to provide less proximal feedback. Feedback that was provided was often focused on correctness rather than deeper engagement with complex concepts.

These types of discussions in high school classes also help prepare students for the types of discussions that characterize some college instruction. In general, with the guidance of high school instructors, students need to learn how to participate in whole-class discussion and to build upon one another's comments to deepen their understanding of disciplinary content beyond initial reactions to material. One college lesson modeled this flexible exchange of ideas in a discussion of an essay by Emerson about education. By engaging student-generated ideas and questions that emerged during the discussion, the college instructor allowed students to co-construct a more nuanced understanding of the ideas presented in the text. However, learning to distill the "lesson" from such a discussion requires support for and practice with independent reflection beyond simply knowing how to take notes during a lecture.

The overall averages for the domains in high school and college mask some interesting differences based on the type of instructor and the subject area. First, the instructional

support provided in college credit classes looked different depending on who taught them, particularly in the opportunities instructors provided for analysis and problem solving: college credit classes taught by high school instructors averaged 4.8, whereas those taught by college instructors averaged just 2.8. These findings parallel a similar pattern noted in emotional supports and indicate that instructional support is more a matter of the approach of instructors than the challenge of content per se. In other words, high school instructors maintain their pedagogical approaches in the classes they teach, regardless of the level.

High school instructors who teach college credit classes employ similar instructional support strategies as those used in high school classes. Thus, the background of the instructor seems to matter for the support students receive.

Second, college mathematics classes tended to score low on quality of feedback, scoring a full point lower than high school mathematics classes (mean of 3.3 versus 4.3, respectively). Whereas high school mathematics instructors gave a mix of feedback that was focused both on increasing student understanding and correctness, college instructors were more likely to provide perfunctory feedback. The high school and college mathematics lessons that were coded low were characterized by lecture — with little attention to the specific needs of students in the class — or by instructors working through solutions to problems at the board. Mean scores in college credit and high school English classes, however, were closer (4.1 and 4.4, respectively). This likely reflects the nature of the content and the type of discussions that material in English classes can stimulate.

Finally, on analysis and problem solving, there was very little difference in the scores in mathematics classes (means of 3.4 and 3.3 in high school and college credit lessons, respectively), both relatively low and likely due to the high prevalence of rote problem solving. However, English classes looked less similar on this dimension. High school English classes scored a mean of 4.0 and college English classes scored a mean of 3.3. There are several possible explanations for this finding. First, high school instructors are tasked with teaching students the necessary analysis skills (e.g., for writing an essay) that they will need for college classes. College instructors may see or assume that students already have those skills and expect analysis and problem solving to occur outside of regular instructional time (e.g., in a research paper or problem sets). Similarly, college instructors may have structured their classes so that students learn those skills in supplementary labs or discussion sections, which we did not observe. If college instructors assume the work of analysis and problem solving occurs outside regular instruction, a tool like CLASS-S that focused only on in-class instruction would not capture that work. Another possible explanation is that the expectations for analysis and problem solving are lower in the college credit classes observed than in the high school classes.

Summary

Our analysis found that

- Overall, both high school and college credit classes scored average in the instructional supports provided. However, it is hard to judge this aspect of instruction without an external standard of comparison.
- High school classes scored higher than college credit classes on quality of feedback. This difference was largely based on the disparity in mathematics classes.
- Mathematics classes across the board scored low on analysis and problem solving. When taking into account who taught the college credit classes, high school instructors teaching college credit classes looked more like other high school instructors than college instructors in analysis and problem solving, indicating that the former used approaches similar to those implemented in high school classes.

CLASS-S Domain: Classroom Organization

Classroom organization reflects how well teachers handle student misbehavior, how productively instructional time is used, and how teachers present lessons (e.g., instructional strategies, activities, and materials). The mean score for this domain was in the midrange on the CLASS-S scale (5.3 on a 7-point scale), indicating that classes were generally productive and had minimal disruptions to instruction because of student behavior issues or lack of teacher preparation.

More than 40 percent of the lessons observed were particularly well-managed and organized, and scored a 6 or 7. In these classes, learning time was maximized due to well-organized lessons and clear tasks and expectations for students, proactive and effective behavior management practices, and the use of varied activities and materials that engaged students. None of the observed classrooms scored low (1 or 2). The lowest score was a 3; these lessons exhibited loss of instructional time due to student misbehavior and ineffective teacher responses and were less organized, with sometimes unclear objectives and few different modalities for presenting the material. Exhibit 3 provides examples of classes in our sample that represent the high and low range of scores for this domain.

Exhibit 3. Examples of Different Levels of Classroom Organization in ECS Classrooms

- **High (7)**

  In a high school English class, the instructor implemented several modalities, including using nine different workstations to review grammar for an upcoming state test, engaging in a lively whole-class discussion with students about the book they were reading, and watching a video adapted from the book. Before each new activity, the instructor gave clear directions to the students, resulting in little confusion or wasted time during the transitions. In an interview, the instructor said that the smaller classes of the ECS model enable her to diversify her instruction: "I've had more opportunity for cooperative learning, to do groups, to relax myself and not rely on me so much, and put their learning in their laps and make it their responsibility. So as far as me not being the teacher but being more of the facilitator and letting them discover it not on their own, but guiding them to the discovery." Students in this class appeared to respond well to this approach and were engaged and productive throughout the lesson.

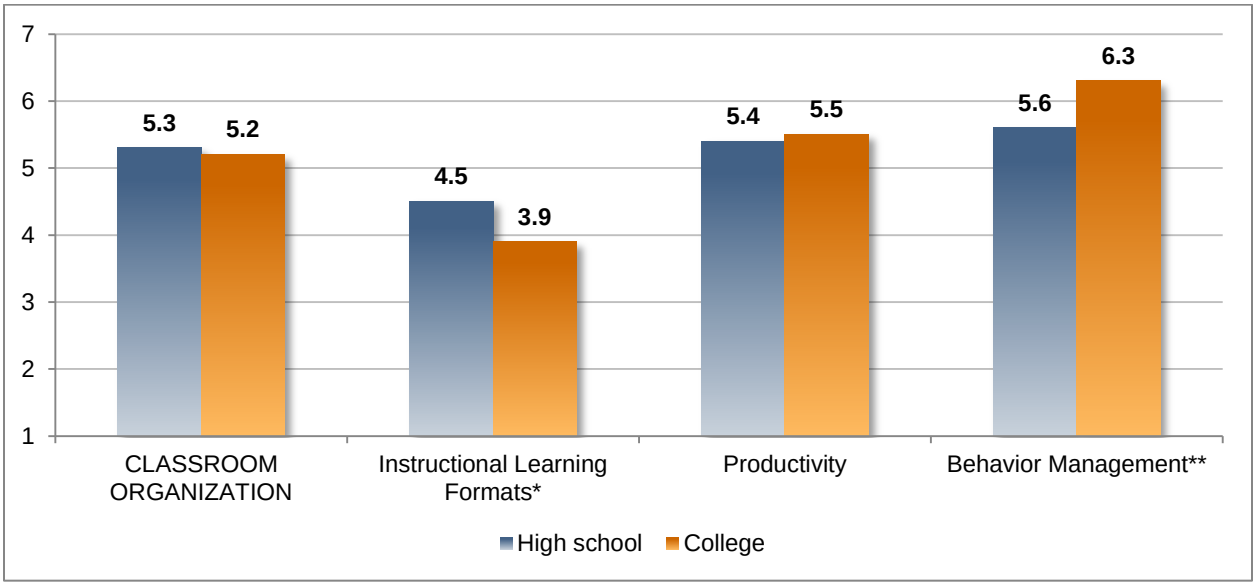
- **Low (3)**

  In a high school English class, students worked on a five-paragraph essay. The instructor pre-sented the lesson using only one modality — having students use a worksheet to brainstorm ideas for an essay. The instructor did not let students start writing the essay until she individually reviewed each of their ideas, which limited students' time for writing. As the instructor worked with individual students, the other students quickly and often got off-task. At several points, the instructor reacted to the distracted students, but she was unable to keep them focused on the task for prolonged periods of time. However, the instructor's approach to this lesson seemed to be dictated by the wide range of skill levels of the students and the difficulty students had sitting through a 90-minute class.

When comparing high school and college credit classes, there were no significant differences between the mean scores on classroom organization (5.3 in high school classes and 5.2 in college credit classes), indicating that both high school- and college-level classes are fairly organized. However, average scores of two dimensions within classroom organization were significantly different (see Figure 4). Behavior management was significantly higher in college credit classes compared with high school classes (mean of 6.3 and 5.6, respectively), and instructional learning formats received a significantly higher mean score in high school classes compared with college credit classes (4.5 and 3.9, respectively). The absence of behavior problems was scored as a 7; thus, the higher behavior management score in college classes indicates that, in general, students in college credit classes tended to exhibit high levels of maturity and engage in less sophomoric behaviors that require classroom management skills from the instructor. High school classes incorporated a greater variety of activities within their classrooms than college classes, which tended to use one primary format (typically lecture or whole-group discussion). However, college credit classes taught by high school instructors averaged a mean score of 5.0 on instructional learning formats

versus 3.6 in classes taught by college instructors, suggesting that high school instructors taught college credit classes with activity variation similar to what they used in high school classes.

Figure 4. Classroom Organization Domain and Dimension Means for High School and College Credit Classes



* Significance level: p = < .05; ** Significance level: p = < .01
N's: High school credit classes = 44; college credit classes = 33.

Summary

Our analysis found that

- There was little difference in overall classroom organization between high school and college credit classes.
- We found that college credit classes needed to pay less attention to behavior management, which speaks to the behavior of the students rather than the nature of the instruction. Students in college classes exhibited more maturity than students in high school classes.
- High school classes scored higher than college credit classes on instructional learning formats, indicating that high school instructors employed more activities in class. This finding fits with the traditional picture of college instruction, in which instructors use primarily one mode (typically lecture or whole-class discussion).

CLASS-S Domain: Student Engagement

The theory underlying CLASS-S posits that the instructional attributes described above matter because they relate to student engagement. The CLASS-S framework treats student engagement as the outcome of quality instruction, which, in turn, should lead to improved academic achievement. Research has shown that teacher and student interactions make a difference for student outcomes (Hamre, Pianta, Mashburn, & Downer, 2006; Pianta, Belsky, Vandergrift, & Houts, 2008). In CLASS-S, student engagement is identified by the number of students who are actively engaged, volunteering information, responding to teacher questions and prompts, and participating in discussions or activities, as well as the frequency with which active participation is observed.

In general, students were highly engaged in the lessons observed, with a mean of 5.2. Overall, 95 percent of classroom observations were scored 4 or higher in student engagement; nearly half (45 percent) were scored 6 or 7. Exhibit 4 includes examples of lessons coded high and low on this domain. As predicted by the theory underlying the instrument, the three instructional domains — emotional support, instructional support, and classroom organization — were all significantly correlated with student engagement (see Appendix B for correlation coefficients). This supports the theory that classrooms that exhibit strong emotional support, instructional support, and classroom organization also are more likely to have more engaged students.

Exhibit 4. Examples of Different Levels of Student Engagement in ECS Classrooms

- **High (7)**

  In a college engineering class, students worked together to build a machine that would sort marbles into different groups using photocells. Students had written programs in a prior lesson that would do the sorting and were now being asked to build a machine that would actually apply the logic of the programs that they had written. After looking at two different models, students went right to workstations to begin their work. Although students were at various stages in completing their projects, all were actively engaged — either in pairs or working alone. Throughout the lesson, students worked on completing their written programs, gathering materials, and building their sorting machines. The conversation in the room was almost exclusively related to the project — "How many photocells do you think we need?" asked one student. "I don't know, let's think about it some," replied his partner. Two other students discussed a challenge they faced with a transistor that did not seem to operate according to their plan. When a couple of students finished early, they went right to work on another project doing some soldering. Students in this class had to be reminded that class was nearly over and that they needed to stop working so they could clean up before they left.

- **Low (3)**

  In a college mathematics class, an instructor worked through problems at the board that he took from the textbook. Throughout the lesson, the instructor posed questions for students, asking what steps should be done next, but did not wait long enough for students to respond to his questions before completing the step. Observers noted that some students were texting on cell phones and other students had their heads down on their desks. Some students copied the solutions from the board into their notebooks and others occasionally flipped through their textbooks. There was no opportunity for discussion among students about the content of the lesson, nor was there any opportunity for students to work through some problems independently.

High school and college credit classes did not differ significantly in student engagement: The mean score for student engagement in high school classes was 5.3, versus 4.9 in college credit classes. Although not significant, the differences are in the expected direction; high school classes were scored the same or higher than college credit classes on all CLASS-S domains, leading to the expectation that students should be more engaged in high school than college classes. However, this expectation is based on the assumption that the model underlying CLASS-S is appropriate for examining college-level instruction. We did not design a study that could validate these assumptions, but some preliminary findings support

Both high school and college credit classes exhibited relatively high levels of student engagement. Findings support the theory that strong emotional support, instructional support, and classroom organization will lead to higher student engagement.

it: Correlations between each of the domains and student engagement for high school and college credit lessons separately indicate that although the strength of the relationships may vary, the expected correlations are there for all dimensions for both high school and college credit lessons (see Appendix B).

Conclusions

Our study of high school and college instruction within the ECHSI has implications for the initiative specifically and for measuring instruction across high school and college contexts more generally. Although this study built upon earlier analyses of instruction in the ECHSI, through these analyses we were able to examine instruction more systematically than in previous years. This approach enabled us to draw more conclusions about instruction across the ECHSI and its various contexts and to reflect on the use of an instrument to discuss instructional quality in high school and college settings.

Importantly, we compared high school to college credit lessons, and found numerous differences. Those differences are summarized in Table 2. While these differences demonstrate that high school classes are providing superior learning environments to college credit classes based on the model underlying CLASS-S, it is not clear that this model effectively portrays adult learning. Therefore, it is not clear from our analysis whether high school instruction is better than college instruction, but we have demonstrated that is it different. It is possible that the instruction students receive in college is well-suited for college-level students. It is also possible that high school instruction was more suited to a tool like CLASS-S.

Table 2. Summary: High School Classes Compared to College Credit Classes

Emotional support	**+**
Regard for adolescent perspectives	**+**
Teacher sensitivity	**+**
Positive climate	**+**
Negative climate	**NS**
Instructional support	**NS**
Quality of feedback	**+**
Analysis and problem solving	**NS**
Content understanding	**NS**
Procedures and skills	**NS**
Classroom organization	**NS**
Instructional learning formats	**+**
Productivity	**NS**
Behavior management	**–**
Student engagement	**NS**

+ = The mean for high school classes was significantly higher than the mean for college credit classes.

– = The mean for high school classes was significantly lower than the mean for college credit classes.

NS = Means for high school classes and college credit classes were not significantly different from each other.

Reflections on Instruction in ECSs

ECSs might benefit from more explicit attention to instructional quality. In general, this analysis confirms the findings of past ECHSI evaluation reports that suggest that more explicit attention could be devoted to instructional quality. Many intermediaries have been in discussions with their schools about what quality teaching should look like. And yet, given the investment of resources, the small size of ECSs, and their ambitious goals, one might expect to see more high-quality instruction that focuses on higher-order thinking, analysis, and problem-solving skills and feedback that engages students in the learning process. The means for such dimensions as content understanding, analysis and problem solving, and quality of feedback reveal that these strategies occurred with only low to mid frequency. These findings point to the need for continued attention across the ECHSI on those attributes of instruction that research suggests make a difference in student achievement.

Gaps exist between high school and college credit instruction. When comparing instruction in high school with instruction in college credit classes, it is clear that gaps exist — in terms of both the kinds of instruction that students experience and the preparation that students receive to be successful in college contexts. Those gaps point to the need for alignment, not only of curriculum but also of instructional expectations. Instructional alignment implies not

only potential adjustments in high school instruction, but adjustments to instruction in IHE partner sites as well. Although the ECHSI includes examples of collaborations between high school and college instructors that have resulted in faculties more closely aligning expectations for students,[8] such work is not common (AIR & SRI, 2009). While concerns persist about the quality of college instruction, ECSs reported feeling they have little control over instruction in college classes. However, these findings suggest that ECSs and their college partners may want to explore opportunities for collaboration on issues related to instruction. ECSs might consider the greater use of a strategy we have observed in some sites where high school and college instructors co-teach courses. In addition, ECSs can re-examine the ways in which ECS students are enrolled in college classes to ensure students are in classes in which this instructional alignment is more likely to occur. However, ECSs also need to consider the realities of the kinds of instruction students are likely to encounter as they transition beyond the ECS partner institution and prepare students for those realities. ECS instructors need to strike a balance between supporting students and teaching them to be independent learners who can handle a variety of instructional styles.

ECSs should explore strategies for teaching students to take increasing responsibility for their own learning. Our analysis points to a gap in the degree to which high school and college instructors expect students to take responsibility for their own learning and how and when emotional or academic support is provided. College instructors expect students to do much of the real work of the course — the deep learning — outside of the classroom, either independently or with their peers. College instructors were much more likely than high school instructors to introduce new material in class and then expect students to master it on their own, and they frequently encouraged students to seek support outside of class as necessary.

ECSs should consider the importance of who teaches college classes for the student experience. An interesting intersection existed in the cases where high school instructors taught college classes. We observed that these instructors used similar pedagogical approaches to those used in high school classes. Further, CLASS-S does not measure the content level of lessons, so it is possible that high school instructors of college material may not be reaching the same level of rigor as traditional college instructors. It is important to note differences between these instructors and college instructors if students need to be prepared for traditional college classes taught by college instructors once they leave the ECS. Will students have unrealistic expectations of college if they are used to taking college classes taught by high school instructors? Or is it enough that students have exposure to college-level material, regardless of the instructor? This issue should continue to be discussed as we think about the type of instruction students receive in preparation for their post-ECS experiences and outcomes. Students who enroll in college classes that are taught by

[8]See, for example: Matthews, R.S. (2009). *The power of partnership: How early college creates rich contexts for engaging faculties*. Princeton, NJ: Woodrow Wilson National Fellowship Foundation.

high school instructors with adjunct status may not be experiencing what a traditional college student might experience.

Reflections on Measuring Instruction

Examining instruction within the ECHSI posed the challenge of finding an instrument that would capture both high school and college instruction. CLASS-S is still in the process of being validated as an instrument for measuring secondary instruction, and it was not designed for use in the higher education context. Its strength was that it enabled us to capture uniform, consistent data across high school and college contexts and to identify gaps between high school and college instruction. Our experience using this instrument thus can provide insight on the applicability of such an instrument in both contexts.

Given that CLASS-S was not designed for the ECHSI context, we encountered several challenges in capturing the many important aspects of this unique blending of high school and college instruction. Perhaps most importantly, it remains unclear whether the elements of quality instruction are the same in high school as they are in college. In other words, do the best college classes have instructional contexts that are similar to the best high school classes, or is the model for understanding instruction different between these two contexts? It is possible that while adults can learn in what we think of as more typical college classes, they, like adolescents, might learn even better in environments that resemble the high school classroom. However, this possibility is part of a larger debate about the quality and relative effectiveness of college instruction, particularly for students who are underrepresented in higher education. Those issues will not be resolved in this report, but are important to consider as we weigh the effectiveness of CLASS-S as an instrument for assessing college instruction.

In addition to limitations in measuring college instruction, we encountered other challenges in capturing all of the nuances of students' experiences. First, as mentioned above, CLASS-S does not measure the content level of lessons, so it cannot determine whether certain types of instruction are more rigorous than others. Secondly, although research suggests that teachers' specialized knowledge of content is an important factor in providing the kind of instructional support students might require (Ball, Thames, & Phelps, 2008), CLASS-S data provided a very limited view of that aspect of teacher knowledge. Thirdly, CLASS-S does not include measures for some non-academic goals that are particularly relevant to the ECHSI, such as how high school instructors prepare students for the social and cultural aspects of the college environment or changes in student attitudes about learning. Fourthly, CLASS-S relies on student engagement as the sole outcome measure, but that can be difficult for an observer to detect. Students can look as if they have "checked out" but are still in fact retaining information. In addition, a lack of negative behaviors in a secondary classroom is not necessarily a function of quality instruction; unlike some younger students, many adolescents have mastered the ability to behave appropriately without being engaged. Finally, CLASS-S

does not measure the degree to which instruction attends to students' linguistic needs and teaches them the language of a discipline. While such instruction benefits all students, this is particularly the case for students whose native language is not English or who may be the first in their family to attend college — precisely the population ECSs are designed to serve.

Despite the challenges of measuring instruction across the unique ECS context, CLASS-S has contributed to our understanding of instruction in the ECHSI. The findings from this study suggest instructional strategies on which ECSs may want to focus as they continue to develop their instructional programs. Our experience using the CLASS-S instrument also may help inform the field as it continues to develop valid and reliable measures of instruction.

Although instruction is not explicitly mentioned as one of the Core Principles of the ECHSI, it is clear that quality instruction is essential to student learning. This report points out some of the gaps that exist between high school and college instruction. To help bridge these gaps, high school and college instructors would both benefit from collaboration. While we acknowledge the limitations of CLASS-S, it can be used as a tool for ECHSI key stakeholders to engage in deeper discussions about quality instruction. For example, what should high school and college instruction look like and what kind of alignment is appropriate? More specifically, what approach should ECSs take to prepare students for the college classroom? It is still unclear whether students would benefit from stronger instruction and support in high school, which may leave them unprepared for instruction in college that provides less in-class support and requires more independence, or whether students would be better served by high school instruction that reflects the college instructional style and thus eases the transition, possibly at the expense of a more supportive and engaging learning environment. Clearly, more research is warranted that would identify which dimensions of instruction are most powerfully linked to student learning in postsecondary settings. In the meantime, ECSs must decide whether their goal is to prepare students in high school for the instruction they are likely to encounter in college, to change the instruction students receive in college, or both.

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Appendix A. Description of CLASS-S Dimensions

Emotional Support	
Regard for adolescent perspectives	Extent to which instructors recognize and build upon the academic and social development needs of students. This includes building in opportunities for students to take responsibility for their own learning.
Teacher sensitivity	Extent to which instructors respond to the academic and social/emotional needs of students. This includes both the entire class and some evidence of individualization according to student need.
Positive climate	Overall tone of the classroom. This includes the relative warmth and respect of the instructor's interactions with students and between students themselves.
Negative climate	Extent to which negative climate is present in the classroom. This includes relative level of disrespect between instructors and students and between the students themselves.
Instructional Support	
Quality of feedback	The formative, not simply summative, feedback and the degree to which that feedback extends student learning and deepens conceptual understanding, rather than focusing solely on correctness. This includes provisions for peer feedback.
Analysis and problem solving	Extent to which students are provided opportunities to analyze and apply knowledge to novel problems, generate hypotheses, and synthesize and integrate knowledge.
Content understanding	The extent to which instruction develops conceptual understanding as opposed to a discrete set of facts, how new knowledge is linked with prior learning and its significance within a broader context, and whether ideas are presented from a variety of perspectives.
Procedures and skills	Degree to which procedures and skills are presented in an accessible, logical way for students. Not always coded, depending on the nature of activities.
Classroom Organization	
Instructional learning formats	The modalities through which materials are presented and the organization and pacing of activities.
Productivity	The rituals and routines of the classroom, as well as the provision of activities that minimize loss of instructional time. Addresses instructor's preparation for the lesson as well as transitions between activities.
Behavior management	Clear behavioral expectations and proactive monitoring of student behavior to minimize loss of instructional time.
Student engagement	Relative active versus passive engagement of students.

Appendix B. Tables

CLASS-S Domain and Dimension Means for Domains and Dimensions, Overall, for High School and College Credit Classes, and for ELA and Mathematics Classes

Domains and Dimensions	Overall Mean (SD)	High School Mean (SD)	College Mean (SD)	t-values (df)	ELA Mean (SD)	Math Mean (SD)	t-values (df)
Emotional support	5.3 (.9)	5.6 (.7)	4.9 (1.0)	t(75) = 3.8***	5.5 (.6)	4.9 (.9)	t(75) = 3.1**
Regard for adolescent perspectives	3.7 (1.4)	4.1 (1.3)	3.2 (1.4)	t(75) = 2.8**	4.3 (1.3)	3.0 (1.1)	t(75) = 4.6***
Teacher sensitivity	4.8 (1.3)	5.1 (.9)	4.3 (1.5)	t(50.7) = 2.6*	5.0 (1.2)	4.5 (1.3)	t(75) = 1.4
Positive climate	5.0 (1.3)	5.4 (1.0)	4.5 (1.5)	t(75) = 2.9**	5.4 (1.1)	4.6 (1.4)	t(75) = 2.6*
Negative climate	1.1 (.4)	1.2 (.4)	1.1 (.3)	t(75) = .5	1.2 (.4)	1.1 (.3)	t(55.7) = 1.2
Instructional support	4.0 (1.0)	4.1 (1.0)	3.9 (1.0)	t(75) = 1.0	4.2 (1.2)	3.8 (.9)	t(75) = 1.3
Quality of feedback	4.1 (1.3)	4.4 (1.1)	3.6 (1.4)	t(75) = 2.6*	4.3 (1.3)	3.8 (1.3)	t(75) = 1.4
Analysis and problem solving	3.6 (1.4)	3.8 (1.2)	3.3 (1.6)	t(75) = 1.5	3.8 (1.6)	3.3 (1.1)	t(55.5) = 1.3
Content understanding	4.0 (1.2)	4.0 (1.2)	4.0 (1.1)	t(75) = 0.0	4.3 (1.4)	3.6 (.8)	t(51.3) = 2.4*
Procedures and skills	4.2 (.8)	4.3 (.8)	4.1 (.8)	t(75) = .8	4.2 (.9)	4.2 (.8)	t(75) = –.1
Classroom organization	5.3 (.8)	5.3 (1.0)	5.2 (.6)	t(75) = 4	5.5 (.9)	5.1 (.8)	t(75) = 1.8
Instructional learning formats	4.3 (1.1)	4.5 (1.0)	3.9 (1.2)	t(75) = 2.2*	4.5 (1.2)	4.0 (.9)	t(56.9) = 2.0
Productivity	5.4 (1.1)	5.4 (1.1)	5.5 (1.1)	t(75) = –.5	5.5 (1.1)	5.4 (1.1)	t(75) = .3
Behavior management	5.9 (1.1)	5.6 (1.2)	6.3 (.8)	t(74.1) = –2.9**	6.0 (1.0)	5.7 (1.3)	t(75) = 1.1
Student engagement	5.2 (1.1)	5.3 (1.1)	5.9 (1.1)	t(75) = 1.5	5.4 (.9)	4.8 (1.2)	t(65) = 2.1*

* p = < .05; ** p = < .01; *** p = < .001
Sample sizes: Overall *n* = 77; high school lessons *n* = 44; college credit lessons *n* = 33; English language arts (ELA) lessons *n* = 32; mathematics lessons *n* = 35

Correlations Between Each of the Domains and Student Engagement

	Emotional Support	Instructional Support	Classroom Organization
Overall	.64	.65	.65
High school lessons	.59	.59	.72
College credit lessons	.69	.70	.55

Sample sizes: Overall *n* = 77; high school lessons *n* = 44; college credit lessons *n* = 33