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GPA as a Product, Not a Measure, of Success in Honors

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BACKGROUND

Success and Equity

Defining success is challenging. Yet schools and colleges across the country, indeed, around the world, seek to do it in order to demonstrate value. While we know that success depends upon a variety of skills that individuals develop into competencies, these can be difficult to measure in an academic setting. For example, as educators, we hope that success is an outcome of lifelong learning, but the measurement of lifelong learning requires sophisticated approaches that can be difficult to deploy across a broad

population (Riley and Claris 2008). As a result, administrators and instructors will often gravitate toward more readily available measures of success such as individual grades, grade point averages (GPAs), or standardized test scores. While these measures can provide insight into performance in a particular setting, commonly a didactic instructional environment, they do not account for the variety of experiences that mold and shape an individual's capacity for success. In fact, some educators might argue that these limited measures ignore some of the most important aspects of potential for success, such as, for example, resilience.

One illustration of the lack of insight into student learning that grades are capable of providing can be found in the early development of the Force Concept Inventory (Halloun and Hestenes 1985). This test is designed to determine how students understand motion and is typically employed to pretest this knowledge so that an instructor can tailor a class to meet the needs of the enrolled students. During the development of this test, it was administered to 600 introductory physics students both before and after taking an introductory college physics course. Halloun and Hestenes (1985) found that students who received an A in the course were equally likely to have changed their understanding of motion after taking the course as students who received a C in the course. Thus, the students who earned an A did not necessarily understand motion better, but they were simply better at memorizing equations and plugging in values to get appropriate answers. The grade of A did not reflect their actual learning of the physical concepts, their knowledge, or their ability to apply this knowledge.

College admissions programs commonly use high school GPA and standardized tests such as ACT and SAT to predict success in making admission decisions, but several studies show these to be, at best, moderate predictors of college GPA and retention (Anastasi 1963; Daugherty and Lane 1999; DeBerard, Spielmans, and Julka 2004; Galicki and McEwen 1989; Wolfe and Johnson 1995). In terms of equity, the work of Banerji (2006) and others (National Research Council 1999) shows that standardized tests are biased against underrepresented minority and low socio-economic status populations. Thus, any effort to base admission on such a

test biases the admission standards against these groups. Interestingly, in a study of approximately 34,000 students from 30 colleges across the United States, Kobrin and Michel (2006) found that neither the SAT nor the high school GPA were definitively predictive of the first-year college GPA. Most studies of this nature explore the potential correlation between GPAs or test scores at two different times, spanning high school and college. While this can be instructive, we posit that college GPA remains a limited measure of a certain type of success and that this measure is not necessarily predictive of success in postgraduate endeavors.

Weerheijm and Weerheijm (2012) provide a compelling argument for the establishment of competency-based admission and performance standards that lead to the development of “excellent and successful professionals” (p. 229). In their survey of honors programs administered in a non-graded environment, they identify three key factors that are most likely to produce “professional excellence” in graduates: personal characteristics, motivation, and study environment (239). Personal characteristics include intelligence, creative thinking, openness to experience, desire to learn, drive to excel, and persistence. They suggest that honors admission programs consider evidence of these factors as criteria for admission. Motivation is perceived as a long-term construct: students who set long-term mastery goals for themselves are more likely to achieve educational success than students setting short-term performance goals. Fostering the development of these characteristics and motivation requires an environment that makes explicit the relevance of college learning to the workplace. Complementing this work, Mould and DeLoach (2017) encourage honors programs to identify program-specific measures of success that will lead to the identification of assessment tools aligned more directly with those measures.

Honors programs provide a crucial opportunity for addressing equity in higher education. Astin (2016) suggests that the American system of higher education inherently provides differential opportunities to students with differing levels of academic preparation. He blames this inequity on higher education’s fascination with grades and standardized tests and the use of these metrics as

gatekeepers for access. By extension, limiting participation in honors experiences in higher education to those with a high GPA or test score further disadvantages those who enter higher education at an already accumulated disadvantage. According to Kuh (2008) and Finley and McNair (2013), these are the very students who benefit the most from these types of engaging and productive experiences in college. Using NSSE data, Kuh revealed a generally positive relationship between high-impact or engaged experiences, the types of experiences often offered through honors programs, and measures of student learning and achievement. Interestingly, he found these effects were more pronounced for minority students and students with relatively low ACT scores. His results point to benefits of participation in these high-impact practices for all students, but especially for students from groups historically underrepresented in higher education and those least likely to have the opportunity to engage in them.

A LIBERAL EDUCATION APPROACH TO STEM EDUCATION

Michigan Technological University is a STEM-focused institution where 95 percent of undergraduate students pursue degrees in a science, technology, engineering, or mathematics field. While STEM education is increasingly viewed as the solution for our nation's economic decline (Olson and Riordan 2012) and our world's most pressing social and environmental challenges (Beatty, Greenwood, and Linn 1999), considering how STEM education prepares undergraduates for the 21st century is important. In this rapidly changing world, we must cultivate the skills that will drive success and satisfaction: integrating knowledge across contexts, lifelong learning, intercultural effectiveness, and leadership.

Common contemporary models of STEM undergraduate education focus on the delivery of content and assessment of learning via individual learning outcomes associated with specific products of the course environment (Olson and Riordan 2012). In some cases, schools and colleges reach beyond this environment to incorporate other learning or co-curricular contexts and assessment methods such as qualitative evaluation; however, adoption of these methods

is not widespread, and both program management and assessment can be time-consuming and costly (Sheppard, Macatangay, Colby, and Sullivan 2009). In addition, several high-profile STEM educators have called for the integration of liberal arts and STEM education, citing this integration as essential to the development of a competitive STEM workforce (e.g., the Annual Engineering and Liberal Education Symposium at Union College).

The Wabash National Study of Liberal Arts Education describes seven liberal arts learning outcomes commonly associated with the development of wisdom and the responsibilities of citizenship: (1) integration of learning, (2) inclination to inquire and lifelong learning, (3) effective reasoning and problem solving, (4) moral character, (5) intercultural effectiveness, (6) leadership, and (7) well-being (King, Brown, Lindsay, and VanHecke 2007). Strikingly, these seven outcomes are interdependent, each contributing to the holistic development of the individual. Furthermore, each outcome is viewed as multidimensional: the achievement of each outcome requires integration of abilities across cognitive (what and how one knows), intrapersonal (who one is and one's sense of identity), and interpersonal (how one relates with others) domains. For instance, consider how problem solving and leadership skills relate to each other and how both of these skill sets require maturity in intrapersonal and interpersonal domains as well as the cognitive domain.

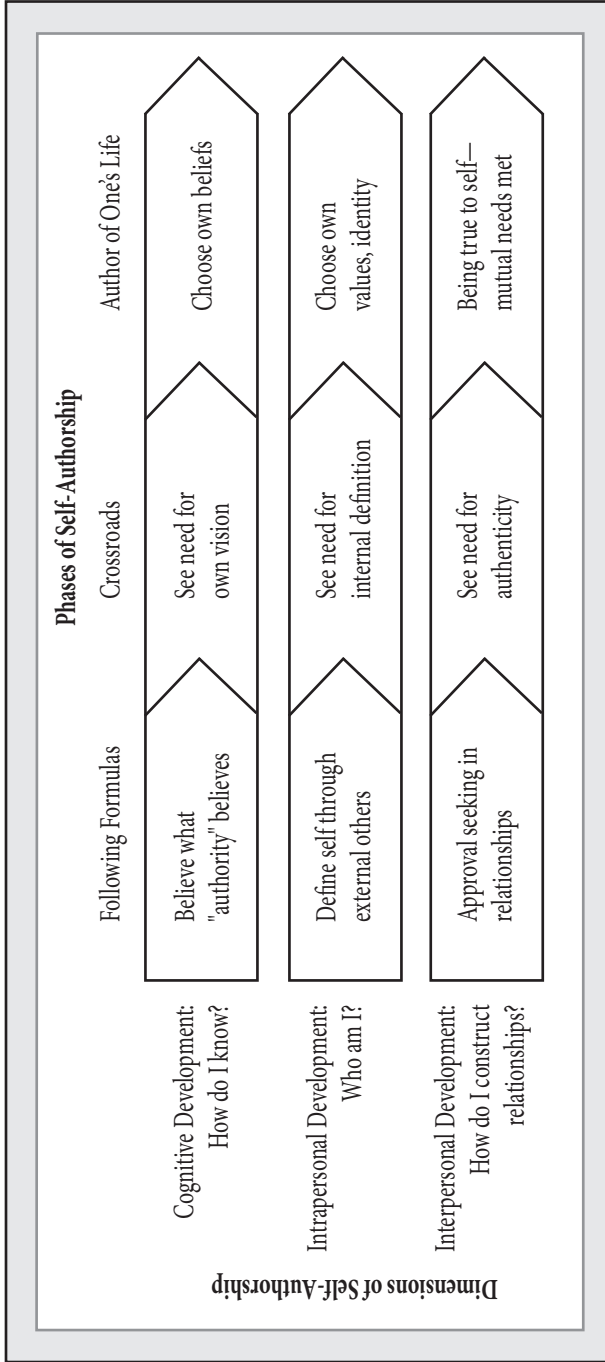
The concurrent development of students across cognitive, intrapersonal, and interpersonal domains is described by the theory of self-authorship. Baxter Magolda (2008) provides a succinct description of self-authorship as "the internal capacity for an individual to define one's beliefs, identity and social relations" (p. 269). This theory is rooted in the work of Kegan (1994), who argues that this development provides a necessary foundation for individuals to meet the expectations of adulthood. Baxter Magolda's 21-year longitudinal study of young adults age 18 to 39 supports this claim (Baxter Magolda 2001). In this study, she found that participants' roles and responsibilities required them to analyze data, explore and evaluate diverse perspectives, understand context and others' frames of reference, and negotiate competing interests. Each

of these steps is useful for weighing alternatives and arriving at a judgment. Executing these tasks requires self-authorship to ensure that individuals are not overwhelmed by external influence, are confident in their ability to make defensible decisions, and are able to collaborate productively with colleagues.

Specific examples of the need for self-authorship abound in society. For instance, in today's global/social context, adults engage collaboratively with multiple diverse others. The development of productive relationships requires intercultural maturity, which depends on cognitive, intrapersonal, and interpersonal development. According to a 2007 report by the Association of American Colleges and Universities (AAC&U), industry increasingly expects higher education to encourage this development in undergraduate students, stressing teamwork, intercultural competence, and a greater emphasis on complex problem solving (AAC&U 2007). Indeed, higher education itself emphasizes social responsibility as a key outcome for addressing the challenges of the 21st century.

Self-authorship requires the individual to shift from being uncritically dependent on external authorities for values, beliefs, identities, and loyalties to defining these elements internally. Individuals develop self-authorship when they are encouraged to construct and explain their views in learning environments that provide opportunities to explore alternative interpretations and that are emotionally supportive of the challenges of the knowledge-construction process (Baxter Magolda 2001; Kegan 1994; Pizzolato 2005). Figure 1 presents a diagram of the levels of self-authorship. In the movement from "Following Formulas" to entering the "Crossroads," individuals begin to experience and respond to tensions associated with continued reliance on external formulas as a means of defining themselves, their relationships, and their beliefs. As individuals move into the crossroads, they more openly question external authorities and begin to construct, listen to, and cultivate their internal voice. Once self-authored and ultimately internally defined, individuals trust the internal voice; build upon that foundation; and become secure in their identities, relationships, and beliefs. It is important to note that the development of self-authorship is not a linear experience and that the course of development

FIGURE 1. DEVELOPMENTAL STAGES OF SELF-AUTHORSHIP



Note: Based on work presented by Baxter Magolda (2001).

rarely unfolds smoothly from one level or way of making meaning to the next. Rather, the developmental trajectory is punctuated with meanders, sprints, and setbacks. Nevertheless, identifiable milestones do exist.

Without an intentional intervention, most undergraduate students—and even college graduates—define themselves through external formulas rather than self-authoring their beliefs (Baxter Magolda 1992, 2001; Baxter Magolda, King, Taylor, and Wakefield 2012; Belenky, Clinchy, Goldberger, and Tarule 1986; Kegan 1994; King and Kitchener 1994; King and Mayhew 2002). Evidence shows, however, that with appropriate support this tendency can be changed. Several types of experiences produce higher degrees of self-authorship among undergraduates (King, Baxter Magolda, Barber, Brown, and Lindsay 2009; Barber, King, and Baxter Magolda 2013). These include experiencing dissonance in academic settings, being challenged to evaluate knowledge claims and take ownership of beliefs, encountering diverse perspectives, and addressing tragedy or complex personal relationships. Also essential is the identification of a community of support where processing of these challenging experiences occurs. Unfortunately, this demand often occurs post-graduation, leaving individuals to face significant challenges with insufficient preparation and potential risk to themselves, the people around them, and the organizations and systems they are trying to improve (Flores, Matkin, Burbach, Quinn, and Harding 2012). To foster the growth of self-authorship in an academic setting, a supportive environment can be created through what Hodge, Baxter Magolda, and Haynes (2009) refer to as the “Learning Partnership Model.”

LEARNING PARTNERSHIP MODEL

Designed as a practical approach to transform both curricular and co-curricular learning, the learning partnership model (Baxter Magolda and King 2004) grows out of the theory of self-authorship. To empower individuals to explore the complex landscape of knowledge, identities, and relationships, the learning partnership model incorporates three key principles:

1. *Validating learners as knowers.* Ensure that students know their voices are important and encourage them to share ideas and viewpoints while muting the voice of faculty as “the” authority, thus helping students to see the instructor as human, approachable, and concerned;
2. *Situating learning in learners’ own experience.* Recognize and acknowledge that students bring their personal experiences into the classroom, explain the relevance of material to students’ daily lives, avoid marginalizing students, and provide opportunities for self-reflection to help students become clearer about what they know, why they hold their beliefs, and how they want to act on them; and
3. *Defining learning as mutually constructing meaning.* Frame learning as something experienced together when both the instructor and the student share perspectives; students see that the instructor is continuing to learn through their work together and demonstrates lifelong learning.

The key to a successful learning partnership is the balance of challenge and support necessary to push students toward self-authorship without triggering a reliance on old ways of constructing identity, relationships, and knowledge. Educators and administrators have used this model to design effective learning partnerships for learners in many situations, such as orientation programs, undergraduate courses, and internships. (Detailed examples can be found in Taylor, Baxter Magolda, and Haynes 2010; however, there is little evidence that this model is used much in the undergraduate STEM educational setting.)

THE PAVLIS HONORS COLLEGE EDUCATIONAL FRAMEWORK

The educational framework of the Pavlis Honors College at Michigan Technological University is designed to encourage the development of self-authorship by exposing students to a challenging educational setting in a supportive learning environment. As students encounter and traverse the crossroads, the framework

reflects the levels of self-authorship that students should encounter, as well as the learning partnership necessary for this development. The Pavlis Honors College (PHC) framework is an adaptation of that proposed by Taylor and Haynes (2008) for the honors college at Miami University of Ohio. The framework articulates incoming student traits, developmental goals, student learning outcomes, faculty and staff expectations for engaging with students, and identification of learning experiences where development is enabled. Table 1 summarizes the current framework for the first year of the program (year two for a traditionally enrolled college student).

The program structure follows a tiered model of educational development associated with both the cognitive and affective domains of Bloom's taxonomy (Bloom, Engelhart, Furst, Hill, and Krathwohl 1956; Krathwohl, Bloom, and Masia 1973) and the self-authorship theory described above. The program integrates Baxter Magolda and King's (2004) learning partnership model across three major elements: (1) a series of developmental seminars, (2) a set of required co-curricular activities with structured reflection, and (3) advising support. These elements provide opportunities for students to foster self-authorship: increasingly complex ways of making meaning about one's identity, relationships, and beliefs. Students collaborate with faculty during seminars to explore concepts related to personal and social identities, cultural maturity, empathy, mindfulness, collaboration, and communication via dialogue. Students also define an academic enhancement (e.g., minor, certification), an immersion experience in which they apply their skills and knowledge in a new and unfamiliar context (e.g., an internship, international experience), an honors project that reflects their learning, and a leadership or mentorship activity. All program elements involve guided or semi-structured reflection with a faculty mentor designed to provide the students a platform through which to reflect on their learning and make meaning of their experiences and to encourage the development of self-authorship. Figure 2 presents a diagram of the elements of the Honors Pathways Program.

PRELIMINARY ASSESSMENT

Self-Authorship

In order to determine if students are moving through the stages of self-authorship, a rubric was developed to score students' reflective essays. Specifically, the first and final reflections of Seminar I were scored to illuminate differences in the ways in which students make meaning of their experiences from the beginning to the end of one semester in the program after engaging with the honors college curriculum. The following will explain the process for initially creating the rubric as well as how it was used to score students' reflections throughout the course.

The rubric went through several iterations before being used to score student responses to reflective prompts. The first stage of development was to align three prominent student development theories: "self-authorship," focusing on intrapersonal development (Barber and King 2014); "developmental trajectory of social justice allies," focusing on interpersonal development (Waters 2010); and the "reflective judgment model," focusing on cognitive development (Kitchener and King 1990). Waters (2010) and Kitchener and King (1990) were incorporated because those frameworks gave a more focused picture of how students typically progress through the interpersonal and cognitive domains of development. Waters' theory (2010) specifically focuses on how students relate to each other in diverse settings (interpersonal development), and Kitchener and King (1990) focus on the ways in which students make decisions (cognitive development). While self-authorship theory encompasses development in all three domains of development (interpersonal, intrapersonal, and cognitive), the other two theories served to better inform the developing rubric by giving myriad examples of student responses that indicate various levels of development. Incorporating these three frameworks into the rubric allowed for a more comprehensive view of PHC student development throughout the semester.

Each aforementioned theory has its own development scales, each organized into stages that represent various levels of development. As noted above, self-authorship theory has three stages: the

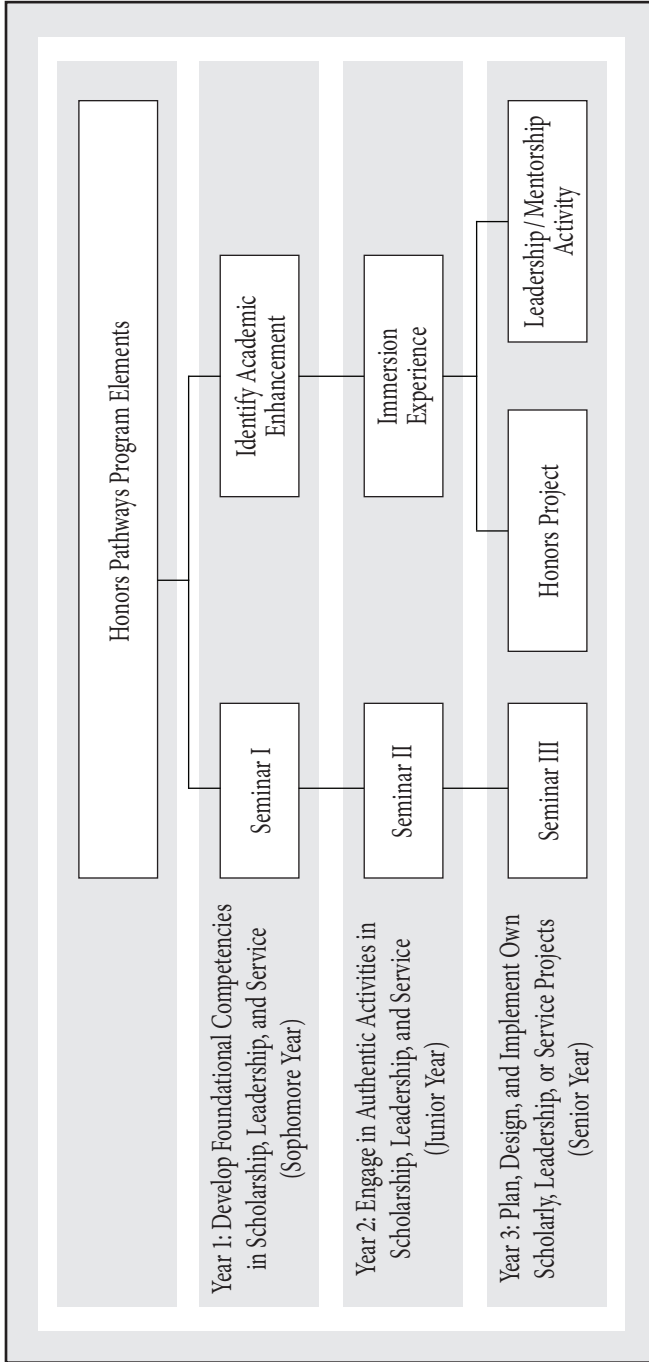
TABLE 1. PAVLIS HONORS COLLEGE EDUCATIONAL FRAMEWORK FOR STUDENT DEVELOPMENT DURING THE FIRST YEAR OF THE PROGRAM

Student Traits	Developmental Goals	Student Learning Outcomes	Faculty/Staff Expectations	Learning Experiences
<ul style="list-style-type: none"> • Knowledge viewed as certain • Reliance on authorities (parents, faculty, textbooks) • Externally defined value system and identity • View differences as a threat to identity • Relate to others for approval • Lack understanding of different cultures—perspectives of different others are wrong • Externally driven choices 	<ul style="list-style-type: none"> • Begin to question how authorities create knowledge • Acknowledge uncertainty in making a knowledge claim • Begin to question reliance on others for self-definition and approval • Develop awareness of own personal and social identities and culture • Acknowledge the existence of differing perspectives 	<ul style="list-style-type: none"> • Describe personal and social identities and respectfully acknowledge different others • Summarize differing individual or cultural perspectives on a common experience, idea, or object • Construct personal insights from experiences through reflection • Identify own personal and professional goals and begin to act on them • Recognize and reproduce written and oral communication styles that clearly convey meaning 	<ul style="list-style-type: none"> • Cultivate a safe climate for honest exchange of ideas • Validate students' capacity to know and learn • Build on students' experiences; connect academic learning to their experiences • Provide multiple valid perspectives on topics • Model critical self-reflection and offer regular feedback 	<p>Honors Seminar 1</p> <p>Action on goals:</p> <ul style="list-style-type: none"> • Become active in an organization with an international theme or travel abroad • Join Enterprise Team and participate in design project • Explore innovation or entrepreneurship activities on or off campus • Research internships or fellowships for 1–2 semesters or over summer with enriching research workshops

<ul style="list-style-type: none"> • Acting in own best interest without consideration of others' interests or needs (egocentric) • Reflection is habitual action without personal insights, often seeking approval of authority 	<ul style="list-style-type: none"> • Develop reflective voice that shares personal insights independent of authority 	<ul style="list-style-type: none"> • Describe respectful relationships within a diverse group work setting 	<ul style="list-style-type: none"> • Sequence material to cultivate students' research or discovery-oriented skills 	<ul style="list-style-type: none"> • Join a service organization and volunteer time • Experiential opportunity of own design
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Note: Adapted from Taylor and Haynes (2008), King and Baxter Magolda (2005), and Baxter Magolda and King (2004).

FIGURE 2. DIAGRAM OF THE CURRICULAR AND CO-CURRICULAR ELEMENTS OF THE PAVLIS HONORS COLLEGE



initial following formulas stage, the intermediate crossroads stage, and finally the self-authorship stage (Barber and King 2014). In similar fashion, the other two theories incorporate their own stage-style rubric, moving from less-developed to more-developed ways of thinking. Waters' theory has three stages—initial, intermediate, and mature—and the reflective judgment model has seven stages that indicate increasingly mature and developed ways of decision making (Waters 2010; Kitchener and King 1990). Relying primarily on the self-authorship stages outlined by Barber and King (2014), we created an initial rubric and then tested it against the first week's reflective responses. Quotations were selected from the first round of reflections and organized from least to most developed. This process revealed that a finer gradation of development was needed to capture smaller distinctions in student developmental trajectories. Therefore, each level was expanded to include sub-levels that fully encompassed the nuanced differences in students' methods of making meaning from their experiences. This process resulted in a nine-level progressive scale including three levels (early, mid, and advanced) within each of the three self-authorship stages. Seven of these levels were represented within the sample set. A description was included for each level that details the characteristics of student responses at each stage. The final iteration of this self-authorship rubric provided examples of student responses indicative of the various levels of development. Table 2 provides a summary of the rubric levels represented within the data set, characteristics sought in the reflections, and representative reflection quotations.

Once the rubric had been finalized, it was then used to evaluate the honors college pilot cohort students' first and last reflections of the semester. Specific quotations were chosen from each reflection that were indicative of a certain level in the rubric along the interpersonal, intrapersonal, and cognitive domains. Each student was given a score for each dimension of development, and scores from their initial reflection were then compared to those in their final reflection at the end of the semester. It is important to note that not all student responses included enough content for evaluation along all three dimensions; in these cases, students were given scores only for the dimensions that could be evaluated.

TABLE 2. SUMMARY OF DEVELOPMENTAL SELF-AUTHORSHIP LEVELS ASSESSED IN PILOT COHORT

Level	Characteristics of Written Reflection	Sample Quotation and Reasoning
Following Formulas	Mid Surface reflection. No deeper understanding or critical analysis. Knowledge from observation and authority. Values/identities solely formed through influence of authority figures.	<p>“I think it could have been beneficial to create a community service assignment in which we find ways to do little things around town, something as simple as picking up trash, handing out hot coca [sic], entertaining animals at the humane society.”</p> <p>Explanation: Student failed to dig deeper into the need for these types of assignments. While they are worthwhile activities, the reasoning behind them or the foreseen societal/personal impact is left undiscussed.</p>
	Advanced Some deeper reflection but largely ignores cultural differences, leaves values and identities unexamined. Knowledge from authority or what feels right. Values and identities formed through influence of authority figures.	<p>“I wouldn’t say that I see myself, my goals, and my success differently. I am pretty firm in those beliefs, although I have enjoyed exploring these topics more in depth.”</p> <p>Explanation: Student started to think about the foundation of his/her/their goals and beliefs. While they haven’t changed, the student is thinking more about how they were constructed.</p>
Crossroads	Early More mention of roots of values/identities. Mentioned cultural differences or existing differences between identity groups and how they influence people’s actions and ideas but is assuming equality. Slight move away from authority.	<p>“I choose [sic] Diwali Night and it is clear to me I’ve been missing out on it for the past three years. I just thank my lucky stars I was able to attend at least once, it was loud, colorful, and simply beautiful. I was exposed to a new culture where no judgment was passed and I learned a lot about something new.”</p> <p>Explanation: Student is starting to see the value of multiculturalism and dealing with the ambiguity of entering a new cultural environment. Stopped short of explaining the impact this experience had on the student’s outlook or identity.</p>

	Mid	<p>Deeper analysis of identities/values, mentions details of how formed and changed. Student exhibits colorblindness, but gives rationale. Larger distance from authority. Claims are assumed to be idiosyncratic to the individual.</p>	<p>“Every person in the class is completely different, and that diversity to the discussion and I fit into that with my own thoughts, beliefs, and identities. There were many times that I spoke wrong, however, rather than being shunned, the thought was considered and discussed. With this, I allowed myself the freedom to think deeper both inwardly and outwardly.” Explanation: Deeper look into why different people have different ideas but still puts all ideas as equal and worthy of discussion; fails to recognize potential microaggressions and does not unpack the history and cultural significance of particular views.</p>
Crossroads	Advanced	<p>Reluctant to acknowledge differences between identity groups, but more critical of lenses through which race and culture are seen. Seriously considering how identity influences interactions. More developed reasoning behind move away from authority. Knowledge is contextual and justified through inquiry.</p>	<p>“Before this course I had never really tried to define my own personal values, instead I just accepted a mold of other values that had been impressed on me. After contemplation I realized that while some of these values are true to me there are also some that don't apply to me as I thought they had. I also learned that I have other values that I hadn't previously considered. This is important to learn as early as you can, as well as to acknowledge that they are dynamic and can change based on experiences therefore it is an important activity to do periodically.” Explanation: Students are thinking about how they have developed particular views and values. They are working to move away from values espoused by their authority figures but are incorporating them into a new set of values of their own. Speaking to the dynamic nature of worldviews is important and shows that the student is more capable of incorporating new ideas into their own view.</p>

TABLE 2. CONTINUED

Level	Characteristics of Written Reflection	Sample Quotation and Reasoning
Self-Authorship	<p>Begins to understand social construction of identity; begins to challenge inequality; voluntarily participates in allyhood, leadership, and mentorship activities. Student actively constructs knowledge.</p>	<p>“From the discussions we’ve had in class, I felt like I could help speak to these issues while suspending judgement and trying to get other students to empathize and understand the effect these events had on certain students. I had several discussions with people who were [sic] believed the [Yik Yak] threat was “just a joke” and the student received too harsh of a punishment, and encouraged them to see how they would feel if someone had threatened their life. Several people were able to shift their point of view and understand on a deeper level.”</p> <p>Explanation: Student is actively unpacking identity-charged events happening around them with a social justice lens. They are starting to participate in allyhood activities and are working to help others understand differing perspectives.</p>
	<p>Exhibits extremely high level of reflection on identities, how knowledge is constructed, and how society constructs social identities. Student actively coordinates, seeks out, or participates in allyhood, leadership, mentorship.</p>	<p>No PHC Example: response would include detailed explanations of how the student came to understand certain topics or came to particular important decisions. Students should mention relevant stakeholders in their decisions/actions and how the students were able to take differing opinions into account but still come to their own decision. A discussion of the student’s social identity and how that identity relates to others in the room/world should be present.</p>

Grade Assessment

Since our program does not consider GPA as a metric for admission or retention, we were interested in understanding whether our applicants possessed a broader range of GPA than one might expect in an honors college. In other words, we wondered if we still were attracting students with high GPAs despite our goal of appealing to students from a range of academic performance levels. To answer these questions, we collected semester GPAs for our pilot cohort and calculated mean values and individual differences.

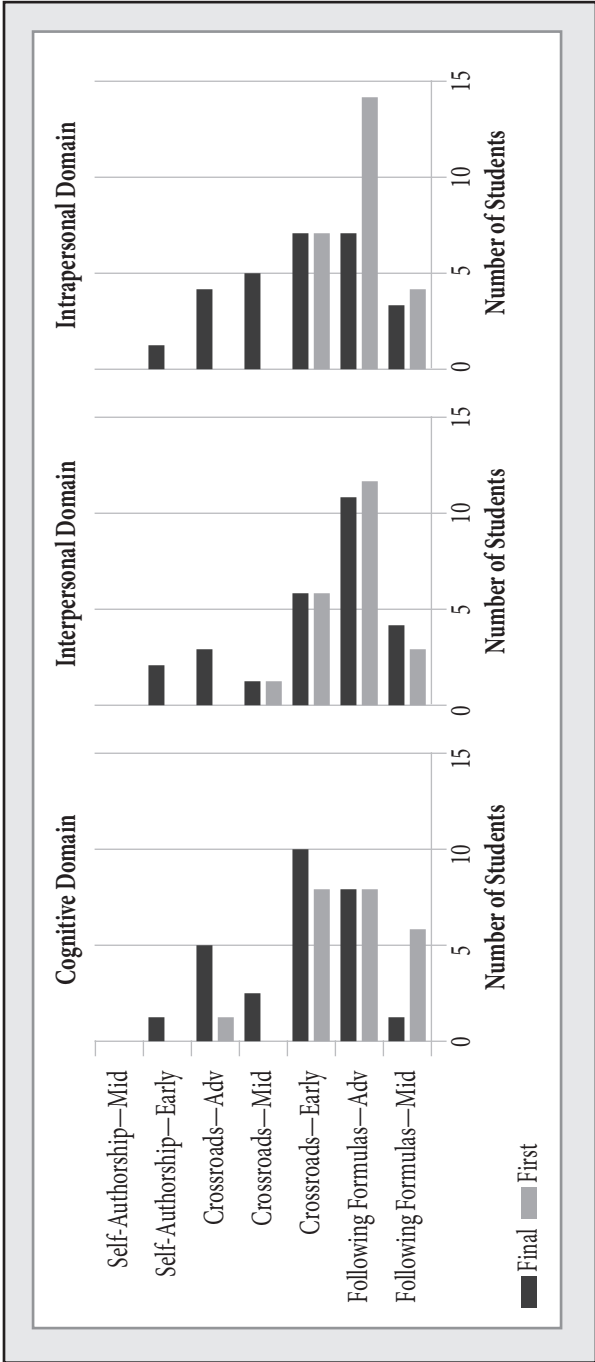
RESULTS AND DISCUSSION

Self-Authorship Assessment Results

During the pilot year of the program, 31 students agreed to have their written reflections coded for self-authorship characteristics. Of these, 26 completed both reflection assignments. These students were second- through fourth-year students who self-selected into the honors college and enrolled in the first honors seminar, which was a one-credit course designed specifically to advance self-authorship. Each written reflection was scored to indicate the level of self-authorship development within the interpersonal, intrapersonal, and cognitive domains. Figure 3 presents the results of applying the self-authorship rubric to the first and final reflections. Each graph shows the number of students coded into each developmental level for the first and final reflections over the three domains. As one moves vertically along the y-axis of each graph, the level of self-authorship becomes more advanced. The graphs show an overall shift of the distribution of the entire student population toward demonstrating higher levels of self-authorship (upwards) in all three dimensions over time. It is important to note that missing bars in these graphs indicate that no students in the data set fell into this level of development for this dimension.

To reveal individual changes in self-authorship development within all three domains, we performed an individual analysis of each student in the pilot cohort. This analysis revealed three main categories of developmental change occurring in students over the

FIGURE 3. RESULTS OF ANALYSIS OF SELF-AUTHORSHIP IN THREE DOMAINS FOR PILOT COHORT



course of the semester. These three categories of change are shown in Table 3, where we share our coding for three different students.

Subject #21 shows an early stage developmental trajectory: the student is still following formulas but shows some growth in one or more domains. Six students coded into this category. At this developmental stage, students are resisting challenges to their externally defined self-concept. One student in this stage of development wrote in the final reflection:

I wouldn't say that I see myself, my goals, and my success differently. I am pretty firm in those beliefs, although I have enjoyed exploring these topics more in depth. (Subject #8)

Another student found little value in the reflections:

It was very frustrating to do the weekly reflections, because I don't really feel that I got anything out of it. I tried to really consider the questions and dig deep to answer them, but I still don't really feel like I got much out of them. (Subject #5)

A second developmental trajectory revealed students actively encountering the boundary between following formulas and self-determination (see Subject #1, for example). For these students, the uncertainty of defining oneself creates a significant barrier that is difficult to overcome. There were 10 students who fell into this trajectory. One student marvels at the development of self-awareness:

As far as how I look at myself, I am a little more critical of my own views and my own contributions. I have learned to take a step back and actually think about my views, what the motivations are behind those views, and how to analyze and learn from past experiences. (Subject #18)

A second student in this category reflects on learning to withhold judgment:

This class has also made me better at letting others show me who they are rather than to just pick an identity for them based on what they look like. (Subject #16)

TABLE 3. SAMPLE CASES SHOWING THREE TYPES OF STUDENT DEVELOPMENTAL TRAJECTORIES EVIDENT IN FIRST AND FINAL REFLECTIONS

Subject	Domain	Following Formulas			Crossroads			Summary
		Early	Mid	Adv	Early	Mid	Adv	
21	Cogn	1		2				Still following formulas, but demonstrating some growth (6 students) <i>Developmental Levels of Change: 1 + 0 + 1 = 2</i>
	Intra	1	2					
	Inter	1		2				
1	Cogn			1	2			Encountering the boundary between following formulas and self-determination (10 students) <i>Developmental Levels of Change: 1 + 1 + 0 = 2</i>
	Intra			1	2			
	Inter			1	2			
15	Cogn			1			2	Demonstrating significant growth, approaching self-authorship (11 students) <i>Developmental Levels of Change: 3 + 2 + 2 = 7</i>
	Intra				1		2	
	Inter				1		2	

Note: A value of “1” in the formulas or crossroads columns indicates the level of development demonstrated in the first reflection, and a value of “2” similarly indicates the level of development demonstrated in the final reflection.

In the third category of developmental trajectory, 10 students exhibited significant growth in self-authorship, as exemplified by Subject #15. Here, students are advancing two or more stages in at least two domains. Most of these students are demonstrating thought processes consistent with the mid- to advanced-crossroads stages. In a final reflection, one student wrote about learning to construct a new worldview:

I learned how to better suspend judgement and look at all different sides before forming an opinion. I also learned to take into account the lens that I look at the world through in my everyday life. The lenses can consist of all of the experiences, values, and ideas that you have about the world. Overall learning to have a more balanced opinion and taking time to learn about other points of view has made me a better person and that these experiences will help me significantly in the future. (Subject #22)

Another student reflected on discovering being externally defined and found value in developing more self-awareness:

Before this course I had never really tried to define my own personal values, instead I just accepted a mold of other values that had been impressed on me. After contemplation I realized that while some of these values are true to me there are also some that don't apply to me as I thought they had. I also learned that I have other values that I hadn't previously considered. This is important to learn as early as you can, as well as to acknowledge that they are dynamic and can change based on experiences therefore it is an important activity to do periodically. (Subject #23)

Overall, when assessed in this manner, the majority of students in this pilot study demonstrated higher levels of self-authorship in their final reflection as compared to their first reflection. There was little difference based on year in college, with second-year students showing a distribution of developmental trajectories similar to third- and fourth-year students.

Grade Assessment Results

Among our 31-student pilot cohort, the average student GPA in the semester of application to the honors college was 3.55 out of 4.00 with a median of 3.69 and a range from 2.12 to 4.00. This distribution is skewed with the weight of scores toward higher GPAs. If we had applied a cutoff GPA of 3.50, seven of these students would not have been admitted to the honors college. By the end of the first seminar, these same students exhibited a mean semester GPA of 3.61, median of 3.66, and a range of 2.76 to 4.00. For each student, we calculated the difference between the GPA during the semester of enrollment in the first seminar (enrollment semester) and the GPA during the prior college semester when the student applied for admission to the honors college (application semester). Table 4 compares these GPAs averaged for groups of students sorted by GPA quartile. Among the top three GPA quartiles, we see a small downward shift in GPA, less than or equal to 0.18. For these students, the downward shift is sufficiently small such that they maintain an average GPA of over 3.50. Interestingly, however, students in the lowest quartile demonstrate an average increase in GPA of 0.28. Thus, while students with high GPAs continued to maintain high GPAs, those students at the greatest risk for not being admitted to an honors program demonstrated significant gains in GPA while exposed to an environment designed to advance self-authorship.

At the end of the first seminar, six students had a semester GPA below 3.50. Two of these students experienced an academic

TABLE 4. SEMESTER GPA CHANGES BY QUARTILE

Quartile	GPA Range	GPA Average		
		Semester of Application to Honors College	Semester of Enrollment in First Seminar	Difference
Highest	4.00	4.00	3.91	-0.09
Third	3.71 to 3.99	3.82	3.60	-0.18
Second	3.44 to 3.70	3.55	3.51	-0.04
Lowest	< 3.44	2.95	3.23	0.28

setback pushing them below this threshold; the other four were on an upward trajectory. This analysis reveals that some of our highest GPA students can experience individual setbacks in any given semester while some of our lowest GPA students can exhibit dramatic increases in their individual GPA. The consequences of these shifts can be disastrous for students in a program that institutes a GPA cutoff for retention. If we had placed a GPA threshold on the program, only 24 out of 31 students would have been admitted and 2 of those 31 students would have been asked to leave after the first semester. This dismissal would have occurred without consideration of their demonstrated learning related to the key outcomes of self-authorship.

Combining Data Sets

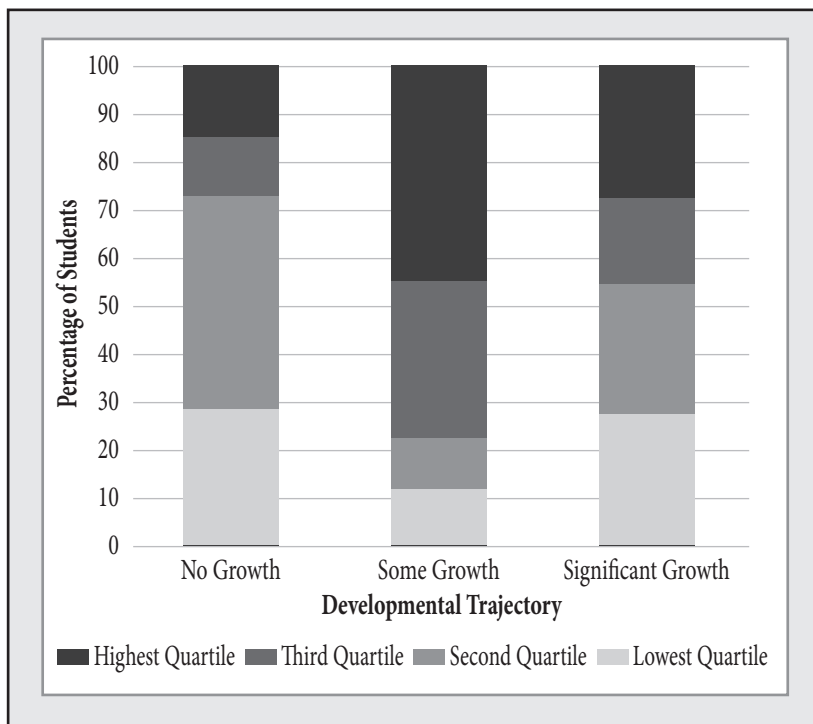
To examine the relationship between self-authorship development and academic achievement as expressed by grades, we first explored the relationship between incoming levels of self-authorship and academic achievement. We ranked all students in the cohort by their semester GPA upon application to the honors college as well as by their demonstrated level of self-authorship across the three domains. A Spearman correlation ($r = .24$) of data revealed little to no relationship between GPA and level of self-authorship development.

To examine how academic achievement might be related to self-authorship development, we summed the developmental levels of change across all three dimensions of self-authorship for each student. In Table 3, we have provided examples of the summed developmental stages calculated for each subject. For example, Subject #21 advanced one level—from mid following formulas to advanced following formulas—in the cognitive domain, did not advance in the intrapersonal domain, and advanced one level in the interpersonal domain. The resultant developmental level of change for this individual is the sum of these three values: two. We then categorized our participants by GPA quartile and identified the associated percentage of students who had demonstrated no growth (still following formulas), some growth (entering the

crossroads), and significant growth (approaching self-authorship). The results are presented in Figure 4. This analysis shows that students of any GPA can achieve the highest level of self-authorship development, or the lowest.

Complementing these results, we calculated the average demonstrated levels of advancement in self-authorship for students in each GPA quartile. Results are presented in Figure 5. We find that students in the lowest GPA quartile exhibit the highest average growth in self-authorship, while students in the third quartile exhibit the lowest. It is interesting to note that students in the lowest GPA quartile also exhibit the largest increase in GPA from their application semester to the end of the first honors seminar, while students in the third quartile exhibit the largest mean decrease in

FIGURE 4. PERCENTAGE OF STUDENTS DEMONSTRATING THREE DIFFERING DEVELOPMENTAL TRAJECTORIES BY GPA QUARTILE



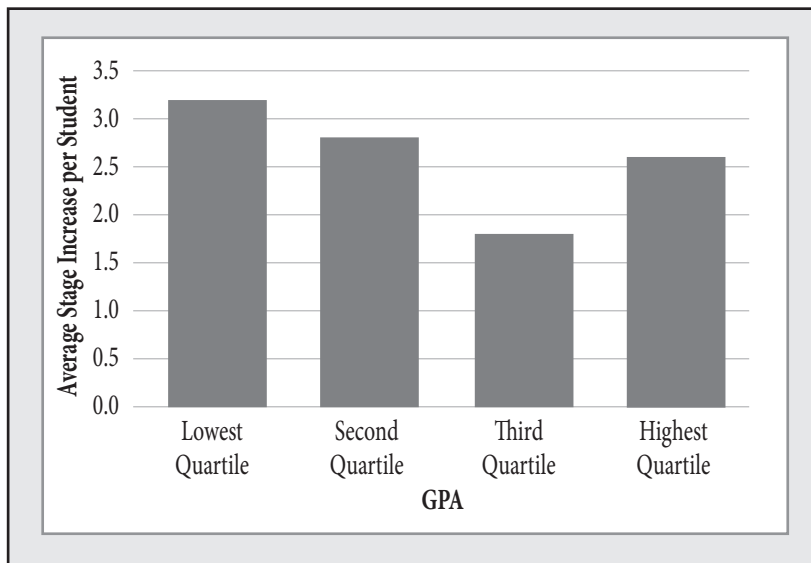
Note: Highest Quartile: 4.00; Third Quartile: 3.71–3.99; Second Quartile: 3.44–3.70; Lowest Quartile: < 3.44.

GPA. It may be that the challenges that students in the third quartile were facing in terms of their academics were presenting a barrier to non-cognitive development; however, this assertion would require further study.

A Spearman correlation of the individually ranked GPA and demonstrated overall change of level in self-authorship development ($r = -.54$) suggests a moderately negative relationship such that a higher GPA correlates to lower demonstrated self-authorship development. Thus, GPA is not a clear measure of learning in the context of our honors college learning goals.

Just as Halloun and Hestenes (1985) found that “A” and “C” students were equally likely to have changed their understanding of motion after taking introductory physics, we find that some of our top GPA students lack development in self-authorship, while some of our lower GPA students exhibit high levels of development. Since we believe that development of self-authorship is a key to post-graduate success, our data suggest that GPA is not a clear

FIGURE 5. AVERAGE STUDENT INCREASE IN SELF-AUTHORSHIP BY STAGE SUMMED ACROSS THREE DIMENSIONS BY GPA QUARTILE



Note: Highest Quartile: 4.00; Third Quartile: 3.71–3.99; Second Quartile: 3.44–3.70; Lowest Quartile: < 3.44.

indicator of future self-authorship development or, by extension, post-graduate success.

LIMITATIONS AND FUTURE WORK

Reliable assessment of self-authorship is typically conducted through the use of an interview protocol specifically developed for this purpose (Baxter Magolda and King 2012). While many researchers have attempted to identify alternative methods for self-authorship assessment, none has proven to be as robust as the interview. In developing the protocol for this assessment, we consulted with Patricia M. King, an expert in self-authorship, who suggested a potentially effective alternative: assessment of student reflections in answer to prompts specifically designed to elicit responses addressing each of the three domains of development. Thus, our results are limited by the use of a new and as yet unvalidated method of assessment. Despite this limitation, we were able to identify developmental stages for most students in the cohort who completed both the first and final reflections. Future work on the use of a written reflection protocol should include a thorough comparison of this new protocol with the accepted self-authorship interview protocol and refinement of the reflection prompts to assure that the reflections elicit from participants a well-rounded and thorough discussion of their level of development across all three domains.

As a pilot study designed to provide insight for the planning and development of a new honors college, the study has a low number of participants. Further, results are not compared to a control group who did not enroll in the honors seminar. In addition, the participants self-selected into the program, making them an exceptional group for whom the messaging of the college resonated and for whom one might expect to see development. As the honors college continues to grow, new students will be added to this assessment program, thus increasing the number of participants. In this study we used a pre- and post-assessment to study individual development. To learn if the honors college is truly making a

contribution to self-authorship development among undergraduates, we will need to add to the study a set of students who do not enroll in the honors college but exhibit similar characteristics to those of our students, including those characteristics known to affect self-authorship development such as gender, race-ethnicity, and age.

CONCLUSIONS

Self-authorship development has been shown to produce graduates who are better prepared to manage adversity and change, make meaningful decisions, benefit from their educational experiences, and learn deeply throughout their adult lives. Yet college students in the United States rarely advance beyond following formulas to the crossroads (Barber and King 2014; Baxter Magolda 2007, 2014). In our pilot study, we found that a focus on the learning partnership model in our courses correlates with a shift among a majority of our students to higher demonstrated levels of self-authorship in one semester.

This pilot study also offered promising results indicating that GPA is not a strong measure of learning in the context of self-authorship development. In fact, the GPA for this cohort was moderately negatively correlated with demonstrated level of self-authorship development, and students of all GPA levels demonstrated a variety of levels and development of self-awareness (intrapersonal domain), relationship development (interpersonal domain), and knowledge construction (cognitive domain). This study also offered insight into the potential for a written reflection protocol to be used as an assessment for self-authorship. While more work is needed, the results shown here suggest that focusing our honors college on specific learning goals and using these as measures of success other than GPA provide a framework for our curriculum and assessment and also create an environment in which students may find a deeper connection between their self-defined future and their coursework such that GPA becomes a product of engagement with the honors college rather than a measure of potential for success.

As honors programs and honors colleges evolve and develop to become more diverse and inclusive, there is significant value in identifying learning goals based on educational theory and practice rather than relying on screening processes that employ metrics that place many promising students at a disadvantage. Theory and supporting practices can be used to guide admission policies, learning goals, instructional approaches, and assessment tools that create a welcoming environment for a diverse student body and encourage development of competencies that prepare students not only for work in their field of interest but for life in the 21st century.

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