Institutional Support for Academic Engagement in Online and Blended Learning Environments: Exploring Affective, Behavioral, and Cognitive Dimensions

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Abstract
In light of the disruptions caused by the COVID-19 pandemic, leaders of higher education institutions around the world have been contemplating ways to help their universities engage in a digital transformation that must have student engagement and learning as the foremost considerations. This study reports on the work conducted at a university in Colombia that created an evaluation instrument based on the Academic Communities of Engagement (ACE) framework (Borup et al., 2020) to examine how well the institution was supporting the affective, behavioral, and cognitive (ABC) dimensions of engagement in its online and blended learning course offerings. This survey, the ACE in Higher Education (ACE-HE), measures indicators of the ABC engagement dimensions as well as indicators of institutional support for those elements. The survey was completed by 1,295 university students representing a broad demographic profile. Structural equation modeling found good fit for both the model of ABC engagement dimensions and the model of institutional support for ABC engagement dimensions. Institutional support for

affective engagement showed strong relationships to affective, behavioral, and cognitive indicators of engagement, while institutional support for behavioral and cognitive engagement did not have the same outcome. This research provides access to both English and Spanish versions of the ACE-HE instrument. It also highlights ideas for institutions that want to improve their support for student ABC engagement dimensions in online and blended environments. Finally, several implications for making updates to the ACE framework are shared.

Keywords: student engagement, affective engagement, behavioral engagement, cognitive engagement, institutional support, online learning, blended learning, academic communities of engagement

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Student engagement is a topic that has been intensely studied by researchers and valued by institutions' practitioners because of its close association with positive outcomes like student achievement (Firat et al., 2019; Hughes et al., 2008; Kuh et al., 2007; Liu et al., 2022; Skinner et al., 1990) and satisfaction (Baloran et al., 2021; Chan et al., 2021; Filak & Sheldon, 2008; Kucuk & Richardson, 2019; Wefald & Downey, 2009). There are a diversity of frameworks and models that address student engagement and even more instruments that try to measure some aspect of the construct. In the educational psychology literature, it is common to think of engagement as having three core dimensions; affective, behavioral, and cognitive (Fredricks et al., 2004). Most of this research has focused on traditional in-person school environments and very little has explored engagement under the unique conditions of online or blended teaching environments (Martin & Borup, 2022). On the other hand, engagement in online learning research has focused heavily on environmental affordances and often uses related terms like interaction instead of engagement (Martin & Borup, 2022). The Academic Communities of Engagement (ACE) framework (Borup et al., 2020) was developed specifically with online and blended learning contexts in mind and frames engagement in terms of affective, behavioral, and cognitive (ABC) dimensions while focusing on how online and in-person communities facilitate or support students' engagement across these three dimensions. The ACE framework describes three categories of engagement facilitators/barriers that influence student engagement levels: learner background and characteristics, personal environment, and course environment.

In this research, we describe an instrument to measure ACE in higher education (ACE-HE) that can provide insight into levels of engagement as well as specific indicators of engagement support students are experiencing across the ABC dimensions in their online and blended learning experiences. We describe the development and implementation of the ACE-HE instrument that was designed to help a university measure the levels of student academic engagement in blended and online course offerings. Additionally, the ACE-HE measures a number of engagement facilitators/barriers including levels of institutional support for affective, behavioral, and cognitive engagement as well as eight external barriers that are part of students' personal environments. Specifically, we address the following research questions.

1. Is there good model fit for the ACE-HE model of affective, behavioral, and cognitive engagement?
2. Is there good model fit for the ACE-HE model of institutional support for affective, behavioral, and cognitive engagement?
3. What insights does the ACE-HE provide for understanding the relationships between institutional support for engagement and actual engagement?

Literature Review

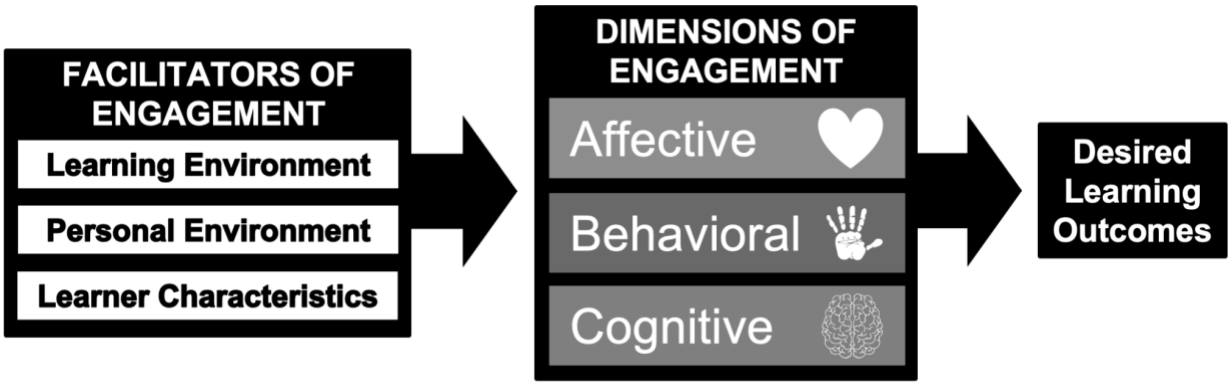
Defining and Understanding Learner Engagement

While researchers agree that learner engagement is multidimensional, there are disagreements on which dimensions should be included and defined (Christenson et al., 2012). However, recently some researchers have coalesced around the three dimensions of affective engagement, behavioral engagement, and cognitive engagement (Martin & Borup, 2022). For this research, we have adopted the following definitions provided by Borup et al. (2020; see Table 1).

> **Affective engagement:** "The emotional energy associated with involvement in course learning activities" (p. 813).
> **Behavioral engagement:** "The physical behaviors (energy) associated with the completing course learning activity requirements" (p. 813).
> **Cognitive engagement: "**The mental energy exerted towards productive involvement with course learning activities" (p. 813).

Online learners' ability to engage affectively, behaviorally, and cognitively can vary widely and is in part dependent on the learner's characteristics. For instance, those who are new to online learning can find it particularly challenging to engage in learning activities because they "not only need to learn a subject online but need to learn how to learn online" (Lowes & Lin, 2015, p. 18). Learning how to learn online can be problematic in environments that provide learners with flexibility in the time and pace of learning and require high levels of self-regulation (Landrum, 2020). Additionally, learning online can require that learners develop new communication skills using a variety of technology to effectively interact with peers and instructions. Technological competence has also long been cited as a requisite to learning online and those who are unable to effectively navigate and use online systems and tools will be unable to access learning materials and communicate with the instructor and others in the course (Hillman et al., 1994). Bempechat and Shernoff (2012) explained that learner engagement is malleable and highly influenced by the learning environment and support. Mahatmya et al. (2012) added that "development is situated within a set of overlapping and multifaceted environmental systems such as the home, school, neighborhood, and larger sociohistorical context that also interact to shape development" (p. 49). Similarly, Bronfenbrenner's (1977) comprehensive and foundational theory explained that learner development occurs in a complex, layered ecology of interconnected systems which includes home, school, workplace, and community environments. Appleton et al.'s (2006) influential framework placed student engagement within three contexts—family, peers, and school. More recently, Borup et al. (2020) categorized these environments as either the learning environment that is provided, curated, and designed for the course or the personal environment that is not affiliated with the online course or program. Borup et al. (2020) added that a learner's personal characteristics, learning environment, and personal environment are important facilitators of cognitive, affective, and behavioral engagement that lead to desired learning outcomes (see Figure 1).

Figure 1
Facilitators and Dimensions of Engagement



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In summary, a learner's ability to engage affectively, behaviorally, and cognitively can be limited or facilitated by the learner's characteristics as well as the learner's course and personal environment. In the following section, we will describe the ACE framework that describes how actors within the personal and course community can help to support and increase learners' engagement.

The ACE Framework

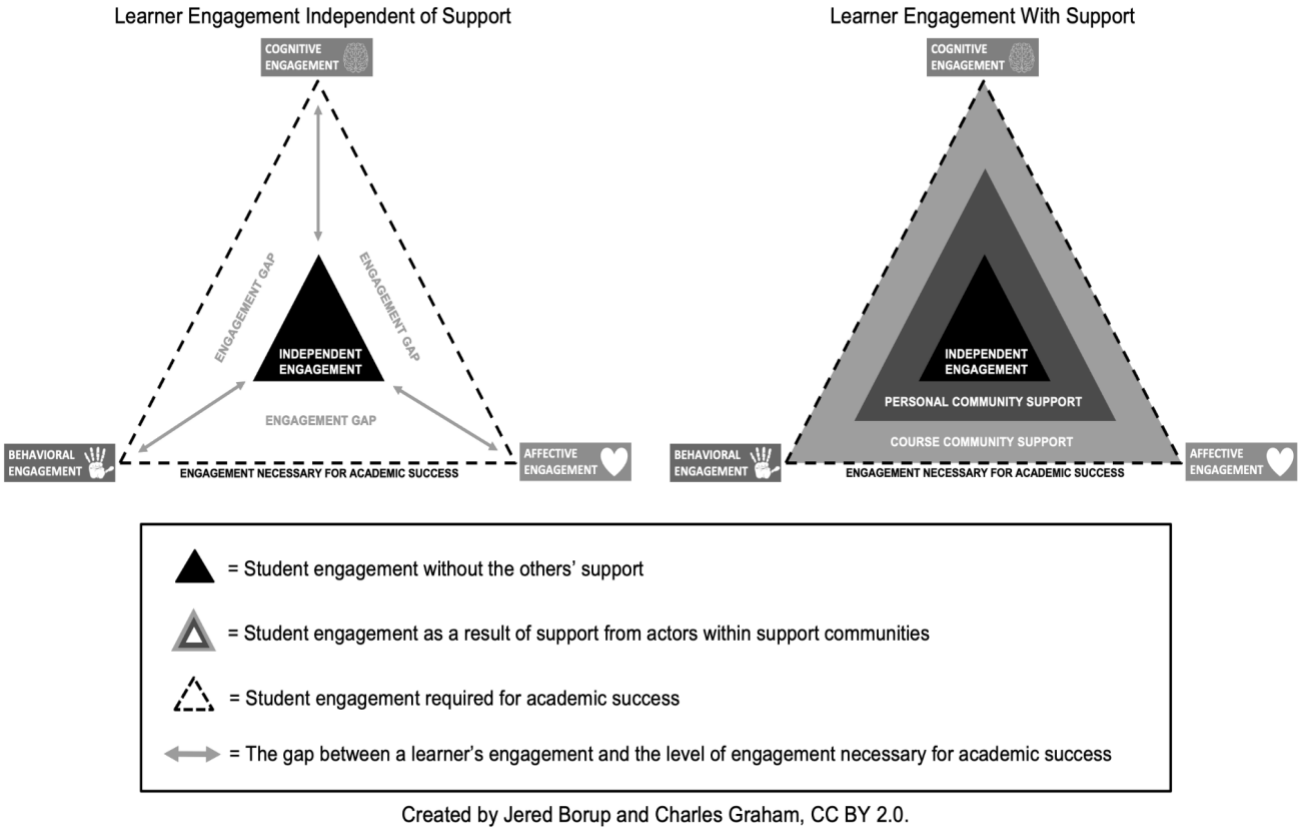
Borup et al. (2020) developed the ACE framework to explain how supports provided to online learners can help them to overcome the challenges commonly encountered when learning online and allow online learners to engage affectively, behaviorally, and cognitively more fully in learning activities. Additionally, the ACE framework acknowledges that to fully understand learner engagement, researchers need to surpass the supports that are provided to the student within a course or program. Specifically, while taking a course the learner can receive influential support from their personal community in addition to the course community. Support within learners' personal community can be especially important in an online course where much or all the learning occurs from home.

The ACE framework grouped support actors within the following two support communities: the course community of support and the personal community of support. Actors within the course community of support have a relationship with the learner because of the learner's enrollment in the course (e.g., instructors, support coaches, peers). In contrast, actors within the personal community of support have relationships with the learner independent of the learner's enrollment in the course. Often these relationships formed long before the learner enrolled in the course and can even extend the entire lifespan of the learner (e.g., family, friends, partners, community, and religious figures).

Corresponding to Vygotsky's (1978) Zone of Proximal Development, the main hypothesis of the ACE framework is that learners' ability to independently engage affectively, behaviorally, and cognitively in learning activities is limited and likely insufficient for academic success and requires support from their personal and course communities of support for academic success. While support from actors within the personal community is important, even with that support learners' level of engagement is likely insufficient and requires the critical support that is best offered by actors within the course community of support (see Figure 2).

Figure 2

Visual Representation of Independent Engagement and Two Communities of Support

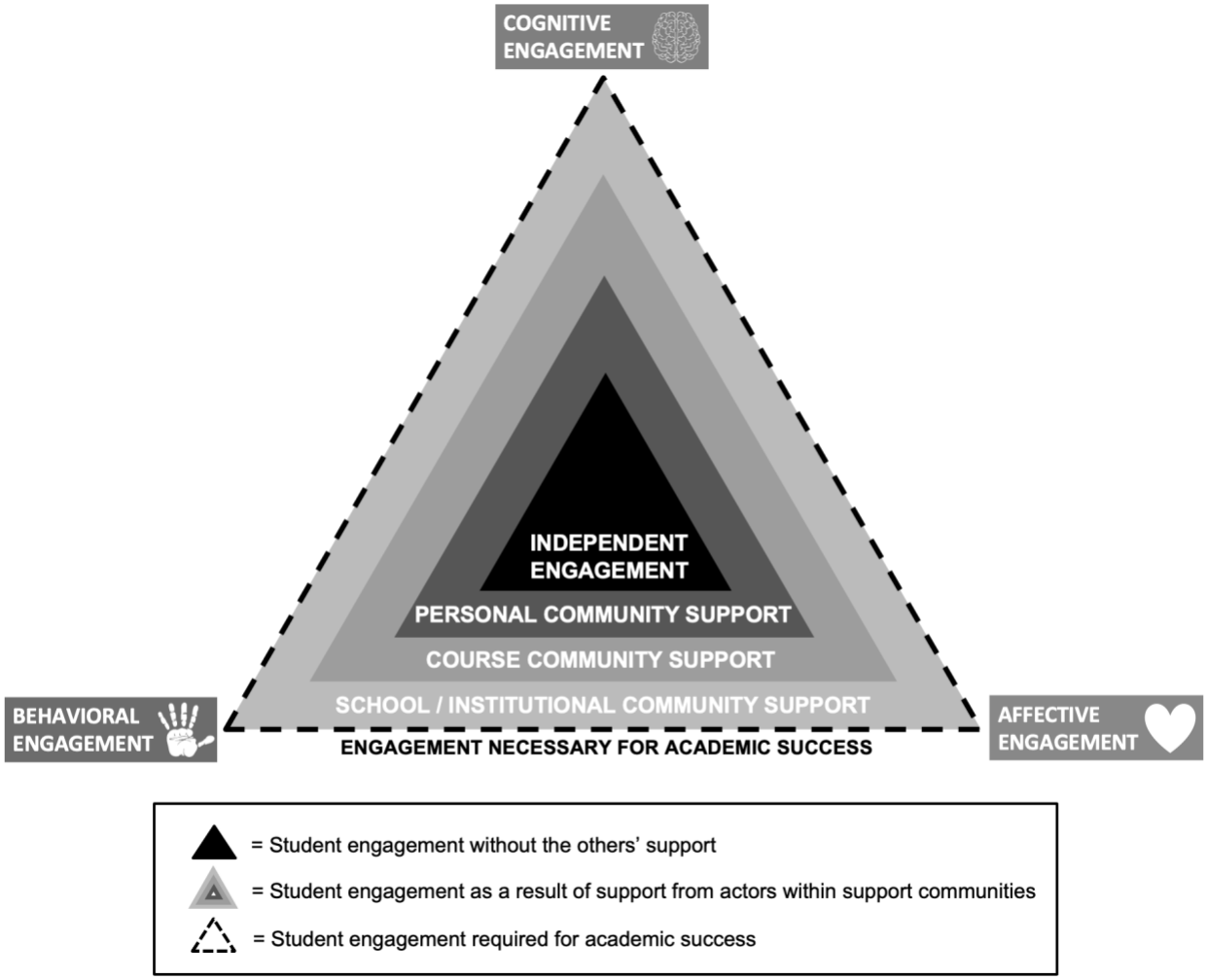


The ACE framework also aligned specific support elements to the dimension of engagement that they were most likely to impact. Specifically, instructing and collaborating support were aligned with cognitive engagement, troubleshooting/orienting, organizing/managing, and monitoring/encouraging progress were aligned with behavioral engagement, and facilitating communication, developing relationships, and instilling excitement for learning were aligned with affective engagement.

Whetten (1989) explained that when developing a framework there exists a tension between including all relevant factors (comprehensiveness) and the need to concentrate focus on the most important factors (parsimony). Once a framework has been developed, subsequent research can help to make it more comprehensive by adding additional factors or more parsimonious by deleting factors that have little value. Skinner and Pitzer (2012) explained that learner engagement occurs at the school level, the course level, and the activity level. The authors of the ACE framework stated, "The ACE framework considers engagement that is directly related to student involvement with academics (including engagement with course tasks and activities) rather than the institutional/school level" (Borup et al., 2020, p. 810). Because of this focus on learner engagement at the course level, the ACE framework also focused on support provided by actors within the course community. However, a more comprehensive understanding of support structures and actors can be gained by expanding the framework to include the institutional/school community of support (see Figure 3).

Figure 3

Visual Representation of ACE Framework with the School/Institutional Community of Support Dimension Added



Simply adding a construct to a framework is insufficient and efforts are needed to measure the construct in meaningful ways. When the ACE framework was first published, the authors stated:

> It is especially important for researchers to identify and create validated measures of affective, behavioral, and cognitive engagement in both online and in-person learning environments. These instruments and corresponding quantitative research could assist in identifying the types of community support that are most essential for various categories of students in specific types of learning arrangements. (Borup et al., 2020, p. 823)

In this research, we are the first to answer this call by developing and validating an instrument that measures learners' affective, behavioral, and cognitive engagement as well as the support provided by the institutional community to support learner engagement.

Methods

In this section we will outline the setting and participants for the study as well as the instrument development, data collection, and analysis procedures.

Setting and Participants

This study took place at a major private, not-for-profit university in Colombia, South America. The university has six colleges that offer 109 programs at the undergraduate and graduate levels. While the university traditionally offered primarily in-person courses, the COVID-19 global pandemic ushered in a time of retrospection and exploration of courses and programs in various modalities including blended, live-remote, and fully asynchronous online. The university leadership sought to understand how students were engaging academically in these online and blended modalities. They also wanted to better understand what personal barriers to blended and online learning students were experiencing and how the institution was supporting student online academic engagement. Stakeholders from the university helped develop, translate, pilot, and ultimately deliver the survey on institutional support for online academic engagement at the university. A total of 1,295 students (undergraduate = 1,165, graduate = 130) responded to the survey representing 14.2% of the university student population. The demographics of the survey included 714 female students, 569 male students, 2 non-binary students, and 10 people who declined to answer this question. Students reported their socio-economic status using the Colombian scale known as “estratos” (stratum), which is based on the diversity and quality of housing, using a 1 to 6 scale: 109 in stratum 1 (low-low class); 249 in stratum 2 (low class); 360 in stratum 3 (low-middle class); 357 in stratum 4 (middle class); 118 in stratum 5 (middle-high class); 70 in stratum 6 (high class), and 32 students who declined to answer.

Instrument Development

The survey items in the instrument focused on indicators for each of the three dimensions of engagement (Table 1) and three affective support elements (Table 2), three behavioral support elements (Table 3), and two cognitive support elements (Table 4) as identified in the ACE framework (Borup et al., 2020). Three or four items were developed to match descriptions of the indicators and support elements found in the original ACE framework paper. Survey developers included stakeholders from the host university as well as two of the original authors of the ACE framework. Items were translated from English into Spanish (see Appendix A) and piloted for comprehension and clarity with students from the host university. Some minor adjustments to survey items were made based on the pilot, prior to administering it university-wide.

Table 1

Online/Blended Engagement Indicators and Survey Items

Engagement Indicators	Survey Items*
Affective Engagement Indicators ● Boredom-enjoyment ● Anxiety/frustration-confidence ● Sadness-happiness ● Situational and personal interest	● (AE1) I highly enjoyed my online learning experiences. ● (AE2) I did not feel frustration while learning online. ● (AE3) I felt emotionally connected to others in my online learning experiences. ● (AE4) Overall, I felt highly interested in the topics covered in my online courses.
Behavioral Engagement Indicators ● Attendance/participation ● Completing/submitting work ● Following course procedures ● Time on task ● Self-regulation	● (BE1) I have been able to fully participate in my online learning experiences. ● (BE2) I have made good progress towards my learning goals by consistently completing my online work. ● (BE3) I have been able to spend the time needed to be successful in my online learning experiences. ● (BE4) I have been able to manage my own efforts when learning online.
Cognitive Engagement Indicators ● Attention ● Absorption/concentration ● Learning persistence ● Cognitive/metacognitive strategy use (questioning, exploring, note taking, checking for understanding, etc.)	● (CE1) I have been able to consistently focus my attention on the online learning tasks I am working on. ● (CE2) I have been able to exert the mental energy necessary to learn difficult concepts online. ● (CE3) I have been persistent (not given up) in my online learning experiences. ● (CE4) I have mastered effective online learning strategies (e.g., questioning, exploring, note taking, checking for understanding).

***** The stem and scale for these items was: "Rate your agreement with the following statements about your online learning experience this past academic year . . . (1 = strongly disagree to 6 = strongly agree)"

Table 2
Affective Support Elements for Online/Blended Engagement and Survey Items

Affective Support Elements	Survey Items*
Facilitating Communication	● (AS-FC1) feel comfortable communicating with others (e.g., instructors, advisors, classmates) online. ● (AS-FC2) have opportunities to communicate with others online. ● (AS-FC3) use a variety of online technologies to communicate with others (i.e., synchronously and asynchronously).
Developing relationships	● (AS-DR1) feel accepted by others while learning online. ● (AS-DR2) I feel like an important part of the online learning community. ● (AS-DR3) develop relationships with others (e.g., instructors, advisors, classmates) online.
Instilling excitement for learning	● (AS-IE1) enjoy online learning activities. ● (AS-IE2) get excited to learn new things in my online learning experiences. ● (AS-IE3) increase my interests in the subjects/topics I am learning online.

* The stem and scale for these items was: "I have a support community at the university (e.g., instructors, advisors, classmates) that helps me to… (1=strongly disagree to 6=strongly agree)"

Table 3
Behavioral Support Elements for Online/Blended Engagement and Survey Items

Behavioral Support Elements	Survey Items*
Troubleshooting and Orienting	● (BS-TO1) troubleshoot technological issues related to my online learning. ● (BS-TO2) learn the digital platforms I need to be successful in my online learning experience. ● (BS-TO3) know what it takes to be successful in online learning experiences.
Organizing and Managing	● (BS-OM1) develop time-management skills for online learning ● (BS-OM2) use online technologies to track projects and due dates. ● (BS-OM3) learn how to keep my online environment organized.
Monitoring and Encouraging Progress	● (BS-ME1) keep working on my online assignments even when it's difficult. ● (BS-ME2) meet online assignment deadlines. ● (BS-ME3) recover following academic setbacks such as missing assignments or getting a poor grade.

**Note.* The stem and scale for these items was: "I have a support community at the university (e.g., instructors, advisors, classmates) that helps me to… (1=strongly disagree to 6=strongly agree)"

Table 4
Cognitive Support Elements for Online/Blended Engagement and Survey Items

Cognitive Support Elements	Survey Items*
Instructing	● (CS-I1) learn new concepts online in a way that I can understand. ● (CS-I2) find answers to difficult concepts when I have questions related to online learning activities. ● (CS-I3) get useful feedback on my online assignments.
Collaborating	● (CS-C1) work with others to understand online course material. ● (CS-C2) collaborate with others to complete a course assignment online. ● (CS-C3) learn from online interactions with others.

***** The stem and scale for these items was: "I have a support community at the university (e.g., instructors, advisors, classmates) that helps me to… (1 = strongly disagree to 6 = strongly agree)"

Data Collection

Data for the study came from a survey administered to all students with online courses at the university. Table 5 contains a summary of the survey constructs. English and Spanish versions of specific items can be found in the appendix. Participant responses were completely anonymous.

Table 5

Summary of constructs in the Institutional Support for Academic Engagement Survey

Data Collected	Description
Online/Blended Academic Engagement	● Affective Engagement (4 items) ● Behavioral Engagement (4 items) ● Cognitive Engagement (4 items)
Institutional Support for Online/Blended Academic Engagement	● Affective Engagement Support (9 items) ● Behavioral Engagement Support (9 items) ● Cognitive Engagement Support (6 items)
External Barriers	● Transportation difficulties (cost, access, travel time, etc.) ● Internet access/speed in student's home ● Access to a good computer ● Access to affordable housing in the metropolitan area ● Access to technical support ● Family environment (childcare, care for parents, etc.) ● Work schedule complications
Demographic Data	● Gender ● Age ● Socio Economic Level ● Academic Level (undergraduate, graduate) ● Year in school ● Academic Program ● Level of Work While in School

* We collected data related to academic success (enrollments, withdrawal rates, failures, and satisfaction). Unfortunately, due to some faulty logic in the survey, there were inconsistencies in the success data that made it unacceptable to report.

Data Analysis

RQ1: Academic Engagement & RQ2: Institutional Support for Academic Engagement

As described in the literature review, we have a strong theoretical framework to base our models for Academic Engagement and Institutional Support for Academic Engagement. Thus, we tested these theoretical models with confirmatory factor analysis (CFA) to see if the model hypothesized will reproduce the covariance matrix created by the data. If the model is defensible,

it will have acceptable fit statistics (RMSEA < .08, CFA > .90, TLI > .90, SRMR < .08; Wang & Wang, 2019). If these fit statistics cutoffs are not met modification indices will be investigated to see if any small correction to the model (e.g., correlating residual variances of the items) could correct the problem. If not, exploratory confirmatory factor (EFA) analysis will be run. As mentioned in the findings section the assumptions for CFA were checked. All analyses were run in Mplus 8.7. Mplus allows the full information maximum likelihood (FIML) method for dealing with missing data that has been shown to be more effective than listwise deletion or other missing data methods (Allison, 2003).

RQ3: Relationships Between Institutional Support Elements and Engagement

Once the measurement models (Academic Engagement and Institutional Support for Academic Engagement) were made and found to be defensible, the two new models with regression elements between the latent variables were run as seen in Figures 4 and 5. Combining both the formation of the latent variables and the causal structural elements, this new model is called a structural equation model (SEM). Like in the previous step's CFAs fit indices are still calculated and reported but are less important as the focus is on the causal links between the constructs. As with the CFAs, the SEMs have assumptions that were checked. All analyses were run in Mplus 8.7 using FIML for missing data.

Findings

RQ1: Academic Engagement—Affective, Behavioral, and Cognitive

Figure 4 below represents the measurement model for the online and blended learning (OL/BL) Academic Engagement model based on the ACE Framework and described in the literature review section. We tested the OL/BL Academic Engagement data for the assumptions of normality (linearity, independence, normality, no extreme multicollinearity, and no outliers), and we found that these assumptions held true through scatter plots and other diagnostics we ran in SPSS. We then ran the CFA for the model, and it met the cutoffs for all of the fit statistics as can be seen in Table 6. This means that this model is a defensible way to reproduce the covariance matrix of the data. Given that this structure was hypothesized through the ACE framework as reflected in the literature review section, we find this to be strong evidence that the model reflects reality well.

Figure 4

Model of Academic Engagement with Affective, Behavioral, and Cognitive Dimensions (Values are Standardized Factor Loadings; all p < .001, n = 1,253)

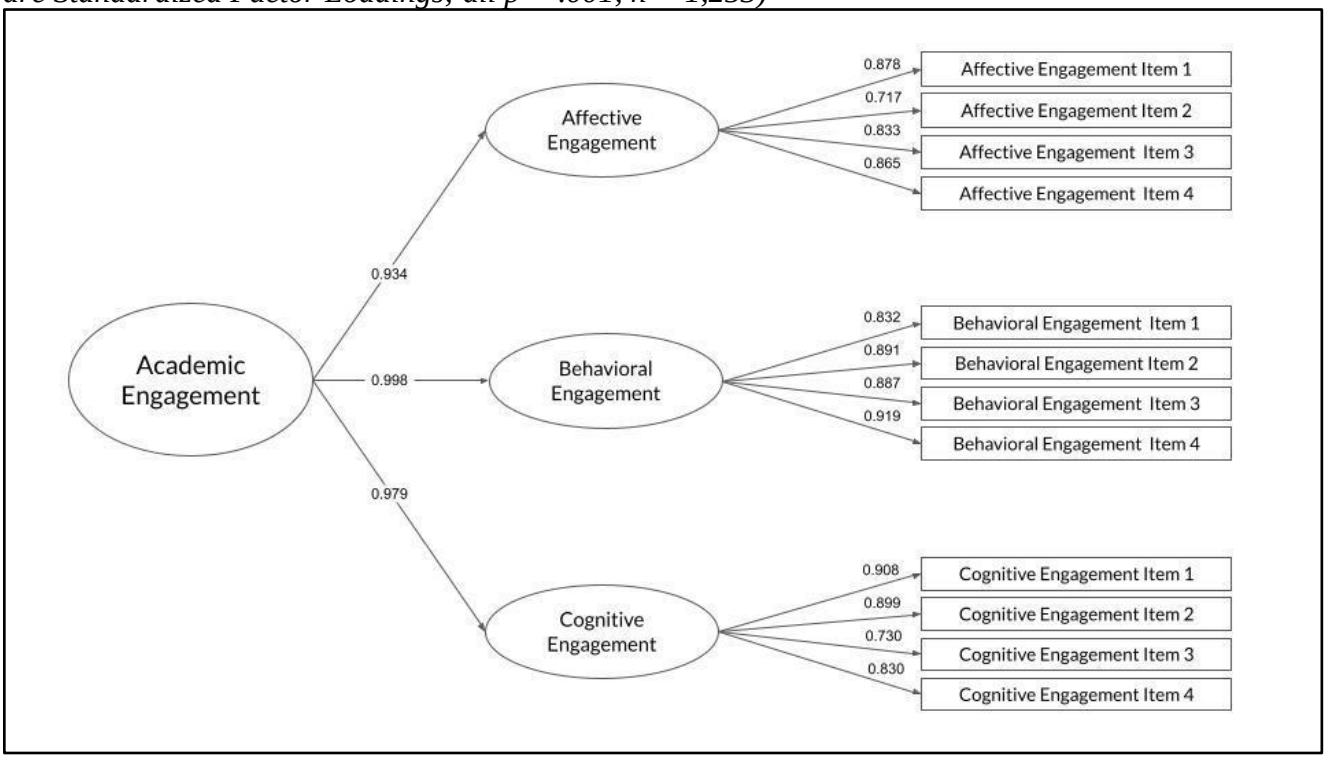


Table 6

Fit Statistics and Cutoffs for the OL/BL Academic Engagement Model

Fit Statistics	Score	Needed*
CFI	0.966	>0.9
TLI	0.956	>0.9
RMSEA	0.067	<0.08
SRMR	0.024	<0.08

*Cutoffs as described by Wang & Wang (2020)

As can be seen in Figure 4 the standardized factor loadings for all the superfactor Academic Engagement are statistically significant ($p < .001$). Additionally, the magnitude of the factor loadings for the superfactor Academic Engagement are all high and at similar magnitudes (about .9); this shows that each of the subfactors Affective Engagement, Behavioral Engagement, and Cognitive Engagement contribute relatively equally to the overall superfactor. This pattern of

results is replicated with the subfactors Affective Engagement, Behavioral Engagement, and Cognitive Engagement. As in the superfactor all the factor loadings are statistically significant. The magnitude of the factor loadings for the subfactor of Affective Engagement (.7 to high .8s) have higher variability than the factor loadings for the superfactor; nevertheless, they are high and still very similar showing that there is not one of the manifest items that are overwhelming the other in the subfactor. This is true for the subfactors Behavioral Engagement and Cognitive Engagement.

The superfactor Academic Engagement has only three indicators (the subfactors Affective Engagement, Behavioral Engagement, and Cognitive Engagement). This means the model at this second level is just identified, meaning that there is no empirical way to distinguish the model that has the superfactor and a model that does not. Both of these possibilities (superfactor or just subfactors) are thus considered in the final two SEMs as discussed subsequently.

RQ2: Institutional Support for Academic Engagement—Affective, Behavioral, and Cognitive

Figure 5 below represents the measurement model for the Institutional Support for OL/BL Academic Engagement model built on the ACE Framework and described in the literature review section of this paper. We tested the Institutional Support for OL/BL Academic Engagement data for the assumptions of normality (linearity, independence, normality, no extreme multicollinearity, and no outliers), and we found that these assumptions held true. We then ran the CFA for the model, and it met the cutoffs for all of the fit statistics as can be seen in Table 7. As with RQ1, this model meets the fit statistics cutoffs, and the model was theoretically derived. This provides strong evidence that the model is defensible. This means that this model is a defensible way to reproduce the covariance matrix of the data. Given that this structure was hypothesized through the ACE framework as reflected in the literature review section of this paper, we find this to be strong evidence that the model reflects reality well. As with RQ1, all standardized factor loadings are statistically significant and of similar high magnitude (greater than .9). This shows that each higher composite is composed equally of all its indicators.

Figure 5

Model of Institutional Support for Academic Engagement With Affective, Behavioral, and Cognitive Dimensions (Values are Standardized Factor Loadings; all p < .001, n = 1253)

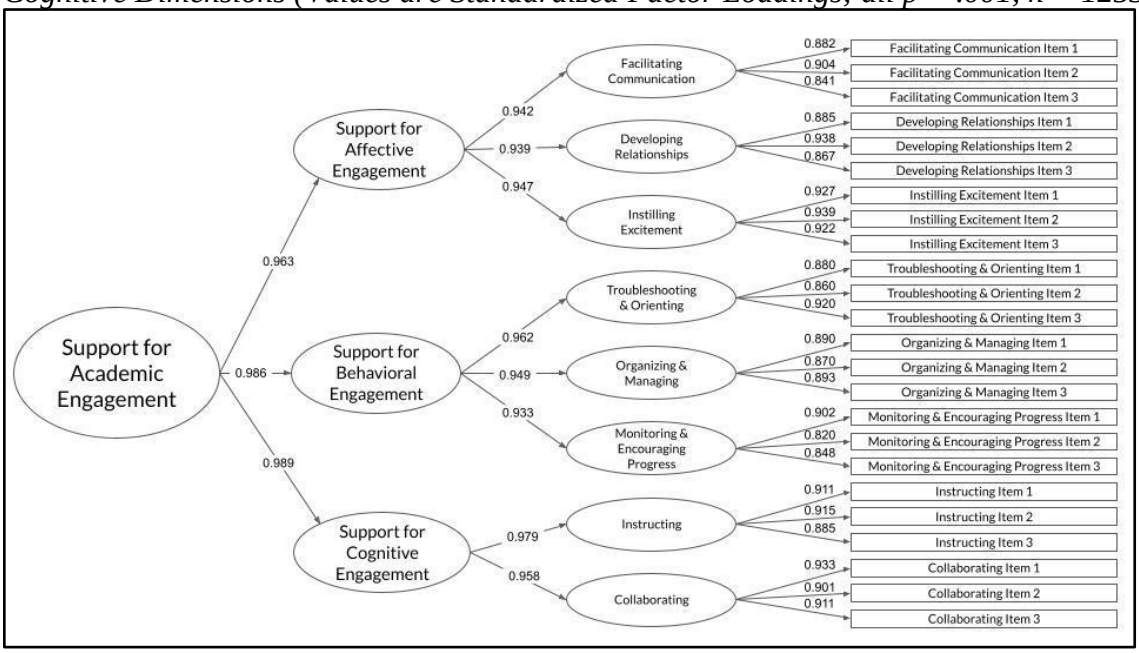


Table 7

Fit Statistics and Cutoffs for the Institutional Support for OL/BL Academic Engagement Model

Fit Statistics	Score	Needed*
CFI	0.963	>0.9
TLI	0.957	>0.9
RMSEA	0.048	<0.08
SRMR	0.027	<0.08

*Cutoffs as described by Wang & Wang (2020)

As with the RQ1, the superfactor Support for Academic Engagement has only three indicators, which as with RQ1 means the model is just identified at the third level. This gives no empirical way to judge between the model that specifies the superfactor and the model that does not. Thus, both possibilities are investigated in the two SEMS that will be discussed subsequently. This pattern continues with the superfactors at the second level (Support for Affective Engagement, Support for Behavioral Engagement, and Support for Cognitive Engagement) where the first two superfactors have three indicators each and the last (Support for Cognitive Engagement) has only two as hypothesized by the ACE framework. Support for Cognitive Engagement is technically

under-identified and if run in isolation would have no unique solutions to the parameter estimates. Nevertheless, in the context of the larger CFA the extra degrees of freedom provided by having several levels estimated simultaneously allows the estimation to be completed.

RQ3: Relationships Between Institutional Support Elements and Engagement

As mentioned previously, the model formally run in RQ1 and RQ2 imposed a superfactor for Support for Academic Engagement at the second level and Academic Engagement at the third model. The ACE framework would suggest that as Support for Academic Engagement increases so would Academic Engagement. This is found to be true as seen in Figure 6 where the causal regression path from Support for Academic Engagement and Academic Engagement is statistically significant ($p < .001$) and of a high magnitude ($\beta = 0.915$). The value .915 signifies that for every one standard deviation increase of Support for Academic Engagement there is a predicted increase of Academic Engagement of .915 standard deviations. By all standards, this is an extremely strong effect, which is expected by theory.

In Table 8 the fit statistics of the overall SEM are shown to meet all the cutoff criteria for measurement models. These are very encouraging results considering the complexity of the model. Figure 6 only shows the structural elements of the model. Not shown in Figure 6 are the measurement parts of the model that are reflected in Figures 4 and 5. We are more than doubling the number of parameters in the model and yet the fit statistics support the model which shows the framework is solid.

Figure 6

Model of the Structural Relationship Between Support for Academic Engagement and Academic Engagement with Standardized Beta ($p < .001$; $n = 1253$)

Table 8
Fit Statistics and Cutoffs for the Relationship Between Support for Academic Engagement and Academic Engagement

Fit Statistics	Score	Needed*
CFI	0.951	>0.9
TLI	0.947	>0.9
RMSEA	0.046	<0.08
SRMR	0.031	<0.08

*Cutoffs as described by Wang & Wang (2020)

As mentioned in the previous section, the models where the superfactors Support for Academic Engagement and Academic Engagement are just identified at their respective levels meaning there is no empirical way to distinguish the model with the superfactor estimated and the hypothetical model where no super factor is estimated. Since these two models (model with superfactor and model without superfactor) are mathematically equivalent we ran an alternate SEM where no superfactors are estimated and the structural elements run directly from the support subfactors (Support for Affective Engagement, Support for Behavioral Engagement, and Support Cognitive Engagement) to the engagement subfactors (Affective Engagement, Behavioral Engagement, and Cognitive Engagement) as shown in Figure 7. Table 9 also shows that the fit statistics for the SEM meet all the cutoff criteria. As above, Figure 7 is showing only the structural elements of the model, the measurement parts as shown in Figure 4 and Figure 5 (but no super factor is estimated in either) are not shown. This analysis will allow us to discover if there is nuance between the support latent variables and engagement latent variables. The results are surprising. The ACE framework would suggest that each support latent variable would strongly predict its respective engagement latent variable. This is only true of the direct regression path from Support for Affective Engagement to Affective Engagement ($\beta = 1.163$, $p < .001$). This relationship is extremely strong. Unexpectedly, Support for Behavioral Engagement does not predict Behavioral Engagement ($p > .1$) and Support for Cognitive Engagement does not predict Cognitive Engagement ($p > .1$). Instead, Support for Affective Engagement also predicts Behavioral Engagement ($\beta = 0.802$, $p < .001$) and Cognitive Engagement ($\beta = 0.589$, $p < .001$) albeit less strongly than it predicts Affective Engagement. Support for Behavioral Engagement predicts Cognitive Engagement ($\beta = 0.537$, $p < .05$) with moderate strength. Support for Cognitive Engagement does not predict any of the Engagement latent variables ($p > .1$). The implications of these surprising results, both from a measurement and substantive point of view will be unpacked in the discussion section.

Figure 7

*Model of Relationship Between Institutional Support Dimensions and Engagement Dimensions (**p < .001, *p < .05, dotted lines p > .1; n=1253)*

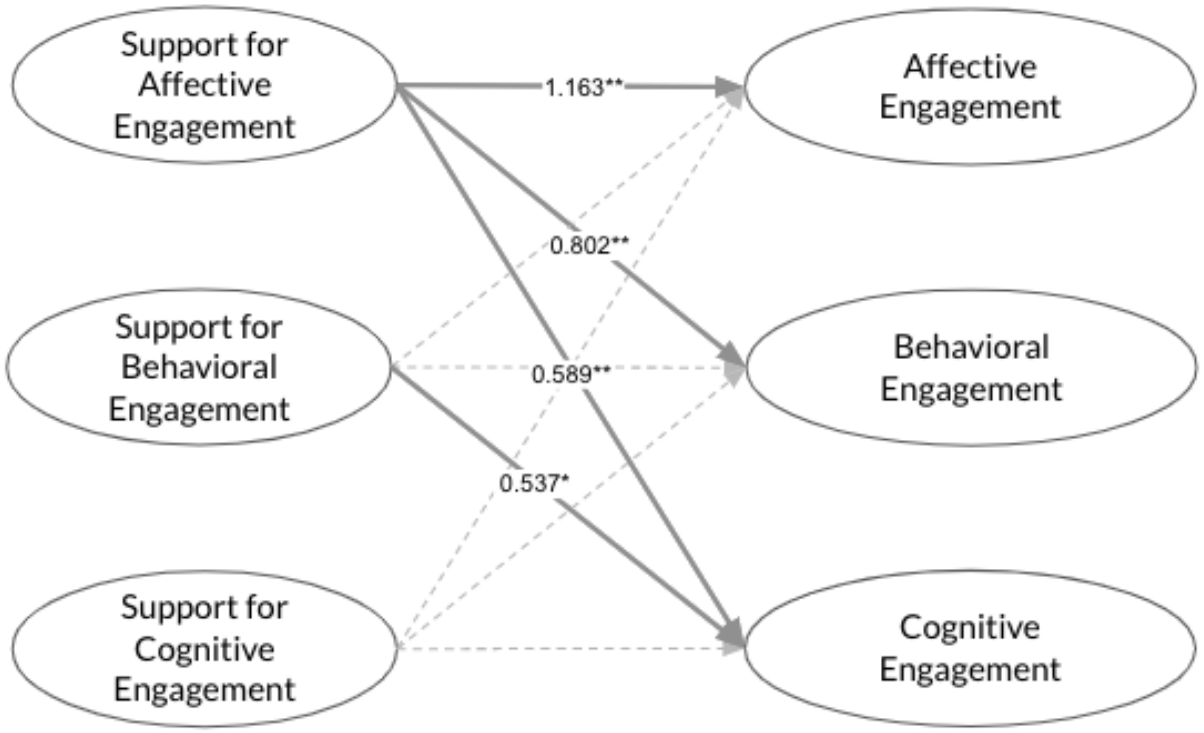


Table 9

Fit Statistics and Cutoffs for the Relationship Between Affective, Behavioral, and Cognitive Support for Academic Engagement and Affective, Behavioral, and Cognitive Engagement

Fit Statistics	Score	Needed*
CFI	0.966	>0.9
TLI	0.956	>0.9
RMSEA	0.067	<0.08
SRMR	0.024	<0.08

*Cutoffs as described by Wang & Wang (2020)

Discussion and Implications

In this discussion we first address how this research has helped prompt an update to the ACE framework in important ways. Then we discuss the implications of our findings for the SEM model of Learner Engagement and Institutional Support Engagement Facilitators. Finally, we explore implications for the more complex findings connecting engagement facilitators and indicators in the SEM models.

Implications for Updating ACE Framework

When the ACE framework was originally proposed, it was based on a review of existing literature and frameworks as well as case studies conducted by the framework authors and their colleagues in various types of online and blended learning environments at the secondary and higher education levels (Borup et al., 2020). This research primarily focused on the course level as opposed to the school or institutional levels identified by Skinner and Pitzer (2012). This focus on course-level engagement was also reflected in the ACE framework that focused on academic engagement "with academics (including engagement with course tasks and activities) rather than the institutional/school level" (Borup et al., 2020, p. 810). Similarly, the ACE framework included the Course Community of Support but not support provided by the school or institution. Since a course is situated within a school or institution, there is expected to be a significant level of overlap between the course community and the school community actors and the support that they offer. This would be especially true in small schools or institutions where actors are likely to fulfill roles in both communities. However, both conceptually and in practice the distinction can prove helpful. For instance, when developing and validating measures of a sense of community, Rovai and colleagues (Rovai, 2002; Rovai et al., 2004) made distinctions between course community and school community. Similarly, Thorpe (2002) categorized support systems for online learners within the "institutional context and the course or teaching context" (p. 110). Trespalacios et al. (2023) added: "Regarding institutional context, students need to have support regarding admission, registration, scholarship, research, and student life issues. However, students also need support when it comes to their courses such as completing assignments, understanding the instructional or assessment materials" (p. 39).

We argue that a similar distinction within the ACE framework provides a broader and more nuanced understanding of both the communities of support including the types of support and the actors providing that support. A strong school or institutional support community might involve a pattern of multiple strong interconnected course communities that you might see in well-designed online programs. A school or institutional support community might also entail support structures that typically reside outside of individual courses and provide access to technical support, library resources, mental health and wellness resources, academic advising, study skills, etc. As a result, we have revised Figures 1 and 3 (see Figures 8 and 9) to include the school/institutional environment and community and the support that is provided within them. Environmental facilitators are represented by the circle that encompasses the model, community facilitators are represented by the support triangles in the model, and learner characteristics are represented within the central black triangle of the model.

In Figure 9, we used a circle to emphasize that academic engagement as well as the support communities should be understood within the context of the environments in which the learner and the communities are situated. There are unique environmental facilitators and barriers at different levels. For example, Spricigo et al. (2023) identified facilitators/barriers in the personal study environment (e.g., computer access, internet access, study space, time availability) as well as course design elements in the course environment (e.g., clear organization, helpful materials, accurate assessments, relevant activities, interesting activities).

Figure 8

Expanded Facilitators and Dimensions of Engagement

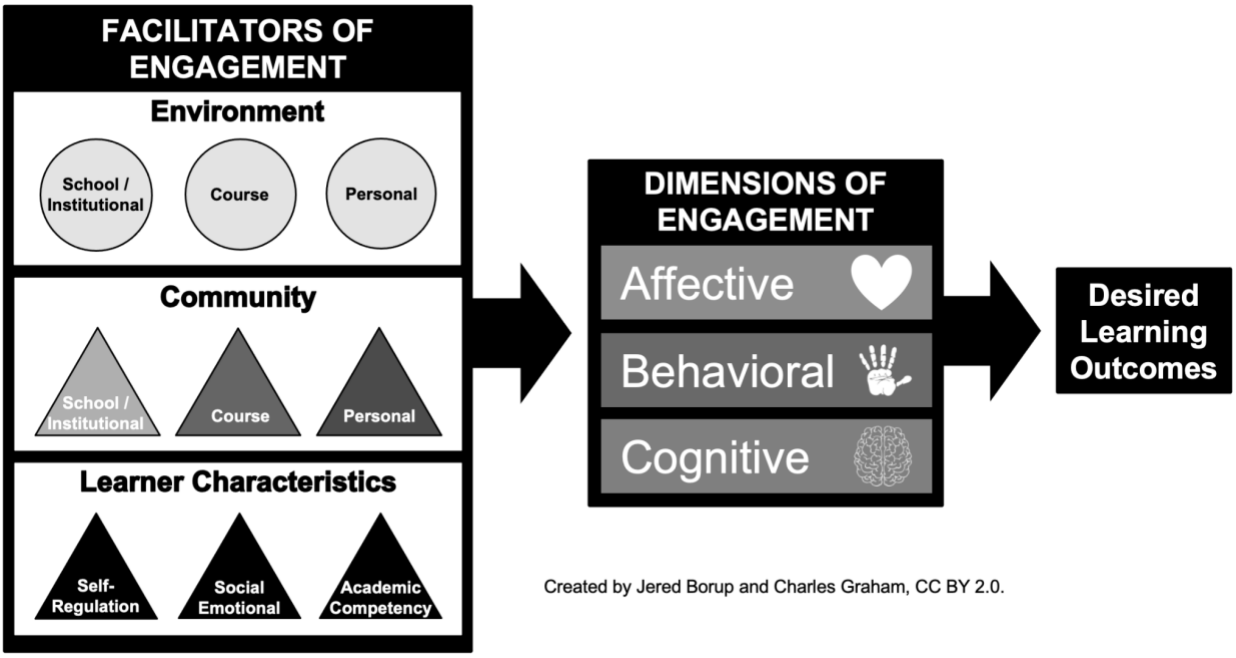
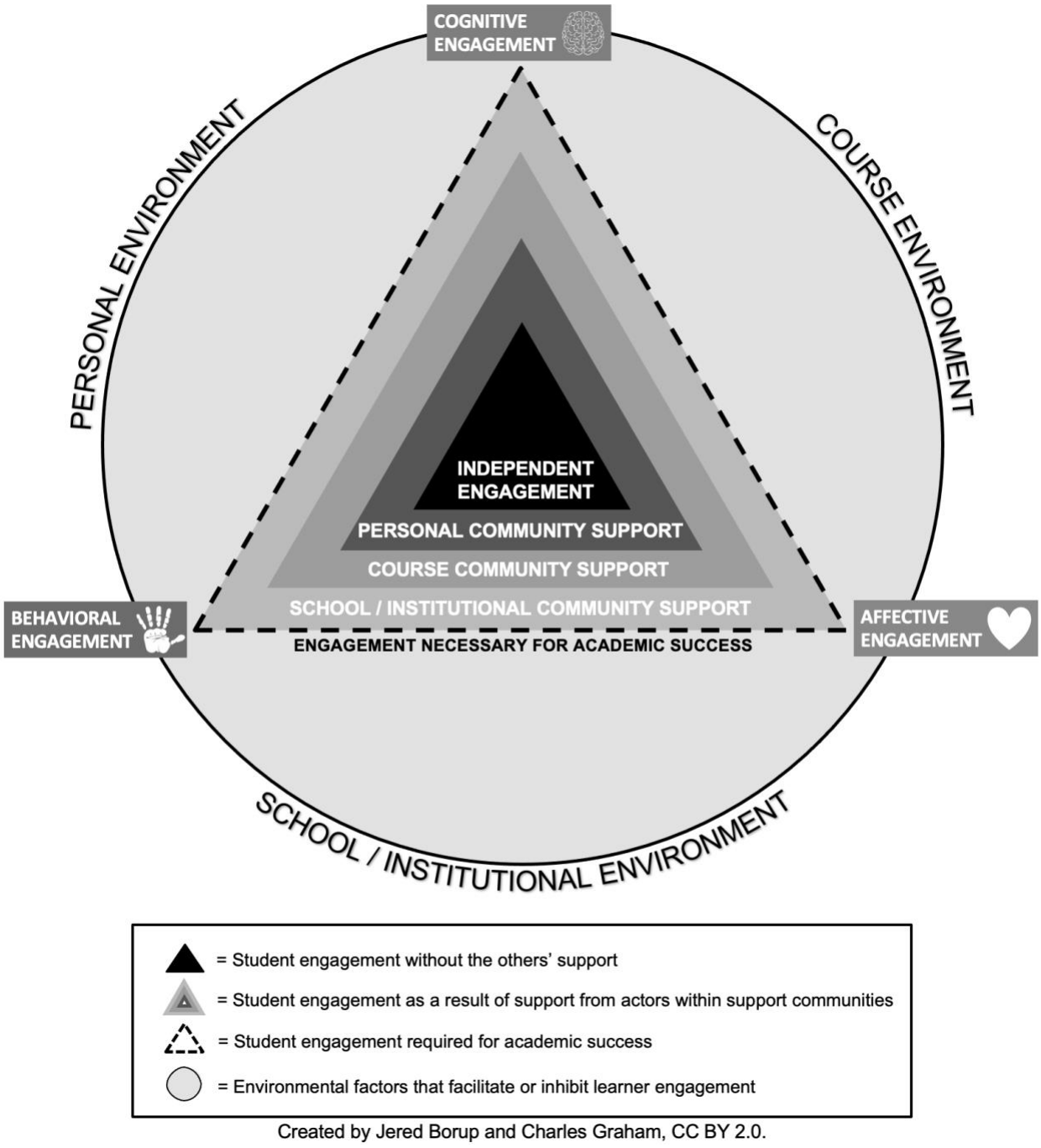


Figure 9

Academic Communities of Engagement (ACE) Framework with Expanded Environmental Facilitators and Support Communities



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Models for Engagement Indicators and Institutional Support Facilitators

Previous research as well as the ACE framework have made a distinction between the *indicators* and *facilitators* of ABC engagement dimensions. Facilitators and barriers are opposite sides of a coin. When a support element (e.g., technical support, internet access, etc.) is present it *facilitates* engagement and when it is absent it becomes a *barrier* to engagement (Spricigio et al., 2023). This research has presented solid evidence for a model that measures *indicators* of ABC engagement (see Table 1 and Figure 4). It also presents evidence of a model for measuring *facilitators* based on the support structures identified in the original ACE framework (see Tables 2 through 4 and Figure 5). The support structures in the model mostly focus on supporting community at the course level. Institutions have an important role to play in setting expectations and supporting the communities that directly impact the course level learning. However, the expanded model (see Figure 9) highlights additional areas that institutions might consider in trying to support student engagement. For example, future research might also explore the institutional role in providing support in some of the following areas:

- **Environmental Facilitators/Barriers**—it is common for the institution to consider facilitators/barriers in classrooms and study spaces on campus. Because online learning can take place anywhere, barriers in the personal environment can be a hindrance to learner engagement. The institution can also play a role in understanding and helping to mitigate these personal environmental barriers. Tuiloma et al. (2022) and Spricigio et al. (2023) have identified various personal barriers to student engagement related to transportation, computer and internet access, technical support, study environment, etc.
- **Institutional Community Facilitators**—many institutions have on-campus access to communities that support academic learning, for example, general writing support labs, counseling offices, learning skills opportunities, academic clubs, etc. These are community supports that are not attached to any specific course and may not be easily accessible to online students.
- **Learner Characteristics Facilitators/Barriers—**learners come to higher education with a wide range of characteristics that influence their ability to engage in learning activities. In Figure 8 we hypothesize that the following three learner characteristics are particularly influential in determining a learner's ability to engage in learning activities without the support from others: self-regulation abilities, social-emotional skills, and academic competency. The university's ability to support students in these personal areas can have a positive impact on students' ability to engage in their learning. This is a type of facilitator/barrier that is the least well-explored in our new model (see Figure 8) and is an area where additional research and development is needed.

Relationship Between the ABC Dimensions of Engagement and Support Indicators

In this research we adopted a model of learner engagement that contained the three dimensions of affective, behavioral, and cognitive. Like others before us, we acknowledge that these dimensions overlap substantially (Ainley, 2012; Pekrun & Linnenbrink-Garcia, 2012). Ainley (2012) explained that these overlaps "highlight the need for close scrutiny of these constructs and the relations between them" (p. 285). Betts (2012) explained that the multidimensionality of learner engagement and "the great deal of overlap between the different types of engagement" makes developing an instrument to measure engagement "quite difficult" (p. 786).

Despite these challenges, when measuring the ABC dimensions of engagement, we found strong evidence that our measurements reflected reality well. We also found that each of the dimensions of engagement contributed relatively equally to the overall superfactor of Academic Engagement. We view this as an important contribution to the field.

The ACE framework (Borup et al., 2020) identified support indicators and aligned them to one of the ABC dimensions of engagement. As a result, our instrument also attempted to measure the support indicators as identified by the ACE framework. Specifically, support for affective and behavioral engagement both had three indicators, and support for cognitive engagement had two indicators. Similar to our attempt at measuring the ABC dimensions of engagement, our analysis of the support indicators provided strong evidence that the model was defensible.

While our efforts to measure the dimensions of engagement and the supports for engagement were largely successful, we did experience difficulties as predicted by Betts (2012) when addressing the hypothesis that those support indicators are positively correlated with a particular dimension of engagement. We were surprised to see that only Support for Affective Engagement was strongly associated with the measure for Affective Engagement and similar associations were not found between Support for Behavioral Engagement and Behavioral Engagement or between Support for Cognitive Engagement and Cognitive Engagement. In fact, Support for Affective Engagement was associated with all three of the ABC dimensions of engagement. This finding underlines the importance of support for affective engagement. Other frameworks such as the Community of Inquiry (Garrison et al., 2000) also highlighted the importance of affective elements, such as social presence, to online learners' ability to participate in and learn from course activities such as online discussions. In fact, in an earlier version of the ACE framework, Borup et al. (2014) recognized a sense of closeness and social presence as *enabling variables* because they allowed for support efforts to be more successful.

While we did not find all the expected relationships, we did find that the overall support for academic engagement had an extremely strong effect on overall academic engagement. As a result, we recommend that the current instrument be used for measuring overall supports for academic engagement. We also call on additional research to better understand which support indicators are particularly impactful for each of the ABC dimensions of engagement.

Conceptually we and other researchers have made distinctions between the dimensions of engagement and aligned supports to specific dimensions but in practice, there are considerable overlaps. As a result, when support is offered to increase one dimension of engagement it will likely have an impact on the other dimensions. As Betts (2012) explained, any effort to measure the dimensions of learner engagement and the supports that impact them will encounter obstacles. Success in this area will prove elusive and will likely require collaborative and iterative approaches to research. We see this research study and instrument as an important step in the process but also recognize that a large amount of work remains.

We also call on researchers to replicate this research using the Spanish version of the ACE-HE instrument in other Spanish-speaking countries as well as the English version of the ACE-HE instrument using data collected in the United States and other countries where English is the primary language spoken. Learner engagement and the support provided by community actors is fundamentally a social experience that is highly influenced by culture. Additional research conducted culturally different contexts may result in different findings. Similarly, validating the English version of ACE-HE instrument is important prior to widely using that version of the instrument. While the structural equation modeling found good fit for both the model of ABC engagement dimensions and the model of institutional support for ABC engagement dimensions

using the data collected with the Spanish version of the ACE-HE instrument, this validation should not be applied to the English version of the instrument considering the imperfect nature of translation from one language to another.

Conclusion

The ABC dimensions of learner engagement are important for positive outcomes in online courses and their absence has been highlighted as contributing factors for online learning's attrition rates that tend to be higher than those in in-person courses. When learner engagement is low, support from others can help. However, online programs need better measures of learner engagement so that they can identify and respond to low learner engagement. Repeated measures of learner engagement can also help online programs see the impact of their support efforts. Building on the ACE framework, the data collected using our new instrument was found to be a good fit for both the model of the ABC dimensions of engagement and the model of institutional support for ABC dimensions of engagement. However, the correlations between the support elements and their intended dimension of engagement did not entirely follow the model hypothesized by the ACE framework. These results are insightful but should be understood with the context and limitations of this research. Mainly, this research was conducted at a single university in Colombia and additional research within other universities, countries, and cultures may have different findings. Additionally, more research is needed examining the correlations between specific support indicators and the dimensions of engagement.

Declarations

The authors declare no conflicts of interest associated with this study.

Collection of data from human subjects was conducted under institutional guidelines of data protection and confidentiality reviewed by the General Secretary Office at UNAB.

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Appendix A

Institutional Academic Community of Engagement (ACE) Survey 1.0
University Support for Academic Engagement—Higher Education
English-Spanish Translation

English	**Spanish**
In 2020, UNAB University implemented a hybrid/blended education model, which promotes flexibility by combining face to face interactions with video conferences via Microsoft Teams, classrooms set up for broadcasting, and virtual platforms such as Moodle and Canvas for asynchronous moments. The purpose of this survey is to understand students' needs and visualize institutional support actions to improve hybrid education at UNAB.	La Universidad Autónoma de Bucaramanga ha implementado a partir del 2020 un modelo de educación híbrida, conocido también como Ambientes Híbridos de Aprendizaje -AHA-, el cual privilegia la flexibilidad combinando la presencialidad con espacios tales como las aulas virtuales de Microsoft Teams, los salones de clase acondicionados como Teleclases para las interacciones sincrónicas (con horario definido); y las plataformas virtuales TEMA y CANVAS para las interacciones asincrónicas (no sujetas a horario). Esta encuesta tiene como objetivo, conocer las necesidades de los estudiantes y las oportunidades de mejora en el apoyo institucional para seguir consolidando el modelo de educación híbrida en la UNAB. La encuesta está compuesta por 5 secciones, tiene un tiempo estimado de diligenciamiento de 15 minutos y evaluará la experiencia durante el primer semestre de 2021.

English	Spanish
1. Academic Success ● How many courses did you take the first semester of 2021 in the online/blended modality? ○ 0 courses ○ 1 course ○ 2 courses ○ 3 courses ○ 4 courses ○ 5 courses ○ 6 courses ○ 7 courses ○ 8 courses ○ More than 8 courses	**1. Desempeño académico** ● ¿Cuántos cursos matriculó el primer semestre de 2021 en ambientes híbridos/virtuales en la UNAB? ○ 0 cursos ○ 1 curso ○ 2 cursos ○ 3 cursos ○ 4 cursos ○ 5 cursos ○ 6 cursos ○ 7 cursos ○ 8 cursos ○ Más de 8 cursos
● How many online/blended courses did you withdraw from before the end of the first semester of 2021? ○ 0 courses ○ 1 course ○ 2 courses ○ 3 courses ○ 4 courses ○ 5 courses ○ 6 courses ○ 7 courses ○ 8 courses ○ More than 8 courses	● ¿Cuántos cursos dio de baja en el primer semestre de 2021 en ambientes híbridos/virtuales? ○ 0 cursos ○ 1 curso ○ 2 cursos ○ 3 cursos ○ 4 cursos ○ 5 cursos ○ 6 cursos ○ 7 cursos ○ 8 cursos ○ Más de 8 cursos
● How many online/blended courses in the first semester of 2021 did you score less than a 3 grade (3.5 grade for graduate courses)? ○ 0 courses ○ 1 course ○ 2 courses ○ 3 courses ○ 4 courses ○ 5 courses ○ 6 courses ○ 7 courses ○ 8 courses	● ¿Cuántos cursos culminó en el primer semestre de 2021 en ambientes híbridos/virtuales con nota menor a 3.0? (3.5 para posgrados)? ○ 0 cursos ○ 1 curso ○ 2 cursos ○ 3 cursos ○ 4 cursos ○ 5 cursos ○ 6 cursos ○ 7 cursos ○ 8 cursos

○ More than 8 courses	○ Más de 8 cursos
● How satisfied were you with your overall experience in your online/blended courses during the first semester of 2021? ○ 0=very unsatisfied ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6=very satisfied	● ¿Qué tan satisfecho estuvo con la experiencia en general de los cursos en el primer semestre de 2021 en ambientes híbridos/virtuales? ○ 0=muy insatisfecho ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6=muy satisfecho

English	**Spanish**
2. Academic Engagement **STEM:** Rate your agreement with the following statements about your online learning experience this past academic year . . . (1=strongly disagree to 6=strongly agree)	**2. Compromiso académico** **Instrucción:** Evalúe los siguientes enunciados con relación a su experiencia en ambientes híbridos/virtuales durante el semestre pasado. (1=totalmente en desacuerdo hasta 6=totalmente de acuerdo)
● I highly enjoyed my online learning experiences. ● I did not feel frustration while learning online. ● I felt emotionally connected to others in my online learning experiences. Overall, I felt highly interested in the topics covered in my online courses.	● Disfruté en gran escala mi experiencia de aprendizaje en ambientes híbridos/virtuales ● No sentí frustración en mi experiencia de aprendizaje en ambientes híbridos/virtuales ● Me sentí emocionalmente conectado con otros en mi experiencia en ambientes híbridos/virtuales En general, sentí gran interés por los temas abordados en los cursos en ambientes híbridos/virtuales

● I have been able to fully participate in my online learning experiences. ● I have made good progress towards my learning goals by consistently completing my online work. ● I have been able to spend the time needed to be successful in my online learning experiences. ● I have been able to manage my own efforts when learning online.	● He logrado participar activamente en mis experiencias de aprendizaje en ambientes híbridos/virtuales ● He obtenido un progreso notable en el logro de mis aprendizajes, al terminar constantemente las tareas en ambientes híbridos/virtuales ● He sido capaz de dedicar el tiempo necesario para tener éxito en mis experiencias de aprendizaje en ambientes híbridos/virtuales ● He sido capaz de enfocar mis esfuerzos personales para aprender en ambientes híbridos/virtuales
● I have been able to consistently focus my attention on the online learning tasks I am working on. ● I have been able to exert the mental energy necessary to learn difficult concepts online. ● I have been persistent (not given up) in my online learning experiences. ● I have mastered effective online learning strategies (e.g., questioning, exploring, note taking, checking for understanding).	● He sido capaz de enfocar constantemente mi atención en las tareas en ambientes híbridos /virtuales ● He sido capaz de destinar la energía mental necesaria para aprender conceptos difíciles en ambientes híbridos/virtuales ● He sido persistente (no me he rendido) en mis experiencias en ambientes híbridos/virtuales ● Domino eficazmente estrategias de aprendizaje en ambientes híbridos/virtuales (por ejemplo, indagar, explorar, tomar notas, verificar comprensión, etc)

English	**Spanish**
3. Academic Support for Engagement **STEM:** I have a support community at the university (e.g., instructors, advisors, classmates) that helps me to… (1=strongly disagree to 6=strongly agree)	**3. Apoyo institucional para el compromiso académico** **Instrucción:** Relacione esta frase “Cuento con una comunidad de apoyo en la universidad (por ejemplo, profesores, consejeros, compañeros de clase), que me ayudan a…”, con las siguientes opciones. (1=totalmente en desacuerdo hasta 6=totalmente de acuerdo)

● feel comfortable communicating with others (e.g., instructors, advisors, classmates) online. ● have opportunities to communicate with others online. ● use a variety of online technologies to communicate with others (i.e., synchronously and asynchronously).	● Sentirme cómodo en la comunicación con otros (por ejemplo, profesores, consejeros, compañeros de clase) en ambientes híbridos/virtuales ● Tener oportunidades de comunicación con otros en ambientes híbridos/virtuales ● Usar una variedad de tecnologías digitales para la comunicación con otros (por ejemplo, sincrónica y asincrónicamente).
● feel accepted by others while learning online. ● feel like an important part of the online learning community. ● develop relationships with others (e.g., instructors, advisors, classmates) online.	● Sentirme aceptado por otros mientras aprendo en ambientes híbridos/virtuales ● Sentirme parte importante de una comunidad de aprendizaje en ambientes híbridos/virtuales ● Mejorar relaciones interpersonales en ambientes híbridos/virtuales (por ejemplo, con profesores, consejeros, compañeros de clase)
● enjoy online learning activities. ● get excited to learn new things in my online learning experiences. ● increase my interests in the subjects/topics I am learning online.	● Disfrutar las actividades de aprendizaje en ambientes híbridos/virtuales ● Sentir entusiasmo por aprender nuevas cosas en ambientes híbridos/virtuales. ● Incrementar mi interés por los temas aprendidos en ambientes híbridos/virtuales
● feel comfortable communicating with others (e.g., instructors, advisors, classmates) online. ● have opportunities to communicate with others online. ● use a variety of online technologies to communicate with others (i.e., synchronously and asynchronously).	● Sentirme cómodo en la comunicación con otros (por ejemplo, profesores, consejeros, compañeros de clase) en ambientes híbridos/virtuales ● Tener oportunidades de comunicación con otros en ambientes híbridos/virtuales ● Usar una variedad de tecnologías digitales para la comunicación con otros (por ejemplo, sincrónica y asincrónicamente).

● feel accepted by others while learning online. ● feel like an important part of the online learning community. ● develop relationships with others (e.g., instructors, advisors, classmates) online.	● Sentirme aceptado por otros mientras aprendo en ambientes híbridos/virtuales ● Sentirme parte importante de una comunidad de aprendizaje en ambientes híbridos/virtuales ● Mejorar relaciones interpersonales en ambientes híbridos/virtuales (por ejemplo, con profesores, consejeros, compañeros de clase)
● enjoy online learning activities. ● get excited to learn new things in my online learning experiences. ● increase my interests in the subjects/topics I am learning online.	● Disfrutar las actividades de aprendizaje en ambientes híbridos/virtuales ● Sentir entusiasmo por aprender nuevas cosas en ambientes híbridos/virtuales. ● Incrementar mi interés por los temas aprendidos en ambientes híbridos/virtuales
● troubleshoot technological issues related to my online learning. ● learn the digital platforms I need to be successful in my online learning experience. ● know what it takes to be successful in online learning experiences.	● Resolver problemas tecnológicos relacionados con el aprendizaje en ambientes híbridos/virtuales ● Conocer adecuadamente las plataformas digitales para tener éxito en la experiencia de aprendizaje en ambientes híbridos/virtuales ● Saber lo que se requiere para tener éxito en ambientes de aprendizaje híbridos/virtuales
● develop time-management skills for online learning ● use online technologies to track projects and due dates. ● learn how to keep my online environment organized.	● Desarrollar habilidades de manejo del tiempo para el aprendizaje en ambientes híbridos/virtuales ● Usar herramientas digitales para hacer seguimiento a proyectos y cumplimiento de plazos ● Aprender a mantener organizado el entorno para el aprendizaje en ambientes híbridos/virtuales
● keep working on my online assignments even when it's difficult. ● meet online assignment deadlines. ● recover following academic setbacks such as missing assignments or getting a poor grade.	● Seguir trabajando en las tareas en ambientes híbridos/virtuales, incluso cuando éstas sean difíciles ● Cumplir con los plazos de entrega de tareas en ambientes híbridos/virtuales ● Recuperarse de retrocesos académicos, tales como incumplir con una tarea u obtener una mala nota

● learn new concepts online in a way that I can understand. ● find answers to difficult concepts when I have questions related to online learning activities. ● get useful feedback on my online assignments.	● Aprender y comprender bien nuevos conceptos en ambientes híbridos/virtuales ● Encontrar respuestas a conceptos difíciles cuando se tengan preguntas sobre actividades en ambientes híbridos/virtuales ● Obtener retroalimentación efectiva en las tareas realizadas en ambientes híbridos/virtuales
● work with others to understand online course material. ● collaborate with others to complete a course assignment online. ● learn from online interactions with others.	● Trabajar con otros en comprender los materiales y recursos dispuestos en los ambientes híbridos/virtuales ● Colaborar con otros en culminar las tareas en ambientes híbridos/virtuales ● Aprender del relacionamiento con otros en ambientes híbridos/virtuales

English	**Spanish**
4. Demographic Data	**4. Información Demográfica**
● Please identify your gender. ○ Female ○ Male ○ Non-binary ○ Prefer not to say	● Favor identificar su género ○ Femenino ○ Masculino ○ No-binario ○ Prefiero no responder
● Please identify your age (in years). ○ Select numbers from pulldown list ○ Less than 17 years ○ 17 years ○ 18 years ○ … ○ 99 years	● Favor identificar su edad (en años). ○ Menos de 17 años ○ 17 años ○ 18 años ○ 19 años ○ … ○ 99 años ○ Más de 99 años
● Please identify your socio-economic level. ○ Level 1 ○ Level 2 ○ Level 3 ○ Level 4 ○ Level 5 ○ Level 6	● Favor seleccionar su estrato socio-económico. ○ Estrato 1 ○ Estrato 2 ○ Estrato 3 ○ Estrato 4 ○ Estrato 5 ○ Estrato 6

● Please identify your academic level. ○ Undergraduate ○ Graduate	● Favor identifique el nivel que está estudiando. ○ Pregrado ○ Posgrado
● Please identify the semester you are enrolled in. (options) ○ Semester 1 ○ Semester 2 ○ Semester 3 ○ Semester 4 ○ Semester 5 ○ Semester 6 ○ Semester 7 ○ Semester 8 ○ Semester 9 ○ Semester 10	● Favor identifique el semestre que está cursando actualmente. ○ Semestre 1 ○ Semestre 2 ○ Semestre 3 ○ Semestre 4 ○ Semestre 5 ○ Semestre 6 ○ Semestre 7 ○ Semestre 8 ○ Semestre 9 ○ Semestre 10
● Please identify the academic program you are enrolled in. ○ UNAB provided graduate or undergraduate options based on student answer to the previous question “academic level” (programs listed underneath alphabetically) ○ Other	● Favor identifique el programa académico en el que se encuentra matriculado. ○ UNAB proporcionó opciones de posgrado o pregrado según la respuesta del estudiante a la pregunta anterior "nivel académico" (los programas se enumeran debajo en orden alfabético) ○ Otro
● How would you describe your employment status? ○ Not employed ○ Part-time work ○ Full-time work	● ¿Cuál es su situación laboral actual? ○ No me encuentro trabajando actualmente ○ Trabajo parcialmente ○ Trabajo tiempo complete

Identify how much of a barrier each of the following are to your participation in your online learning . . . (Scale: 0=no barrier to 6=very large barrier) ● Transportation difficulties (cost, access, travel time, etc.) ● Internet access/speed in my home ● Access to a good computer ● Access to affordable housing in the metropolitan area ● Access to technical support ● Family environment (childcare, care for parents, etc.) ● Work schedule complications	Valore las siguientes situaciones como posibles obstáculos para su efectiva participación en ambientes híbridos/virtuales. (Escala: 0=no es un obstáculo a 6=es un gran obstáculo) ● Dificultades de transporte (costo, acceso, tiempo de desplazamiento, etc.) ● Acceso y velocidad de Internet en casa ● Acceso a un buen computador ● Acceso a residencia económica en el área metropolitana de Bucaramanga ● Acceso a apoyo técnico ● Ambiente familiar (cuidado de niños, cuidado de adultos mayores,etc.) ● Conflicto de horarios por obligaciones laborales

English	**Spanish**
5. Open-ended Question Please share any comments or ideas you have about how the university can better support your academic engagement in online/blended environments?	**5. Pregunta abierta** A continuación, te agradecemos compartir comentarios o sugerencias sobre ¿cómo puede la universidad apoyar mejor tu compromiso académico en ambientes híbridos/virtuales?