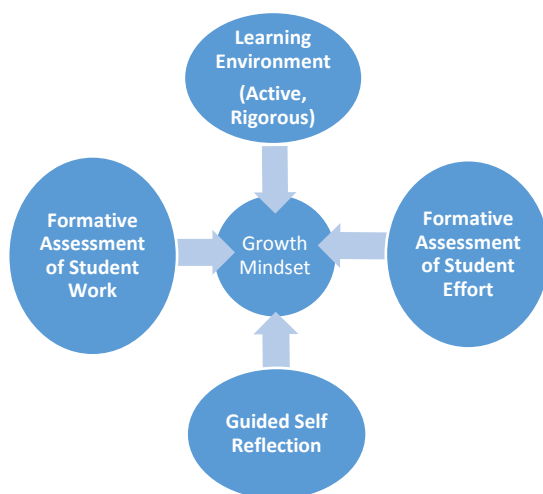# Growth Mindset Development Model
3.28.2018

i. Generation of Knowledge. The BCC Department of Institutional Research, Planning, and Assessment, headed by Dr. Nancy Ritze, will design and conduct a mixed methods study that will test the project's "Growth Mindset Development Model" (see Figure 1, below) designed to foster the development of growth mindsets in minority, low-income STEM students and positively impact their resiliency, academic performance and persistence. This study will: (1) evaluate the fidelity with which the model's dimensions (*i.e.,* active learning environments, formative and constructive assessment of student work and effort, and guided self-reflection) are implemented; (2) examine the individual and collective impact of these dimensions with actual changes in growth mindsets among students, faculty and staff; and (3) measure the indirect and direct impact of mindset development activities on growth mindsets and student academic performance and persistence.

Figure 1: Developing the Growth Mindset model.

While there is ample evidence in the literature regarding the impact of growth mindsets on academic performance, there is scant evidence regarding the efficacy of specific strategies (and the measurement of their implementation fidelity) on changes in growth mindsets, academic performance and persistence among underrepresented STEM students. This study will address the following research questions:

1. To what extent (and in what specific ways) are the high-impact practices identified in our model (*i.e.,* active learning environments, formative and constructive assessments of student work and effort, and guided self-reflections) implemented?
2. To what extent do well-implemented, high-impact practices (dimensions of our Growth Mindset Development Model) independently and collectively contribute to the development of growth mindset in underrepresented STEM students?
3. What are the indirect and direct impacts of the Growth Mindset Development Model dimensions on both growth mindset and academic performance and persistence of underrepresented STEM students?

The study design will include multiple qualitative and quantitative research approaches, including interviews, focus groups and surveys, classroom observations, document review (including assignments, student work, and faculty feedback) and appropriate statistical analyses of measures of growth mindsets and academic performance and persistence.

Implementation fidelity of each of the model's dimensions will be measured according to a quality framework which will be developed in conjunction with the PIs and based on literature about those dimensions. Specific sections of classes and supplemental instructional sessions will be assigned implementation fidelity scores demonstrating the level of implementation fidelity as high, medium, or low for each of the Model's dimensions. These ratings will be based upon observations and document reviews along with the survey, focus group and interview data.

Growth mindset will be determined through pre-post assessments using validated instruments such as the Mindset Works Mindset Assessment Tool. These assessments will be administered to S-STEM scholars before and after specific activities that represent dimensions of our model. Similar instruments will be modified for faculty and staff to be administered before and after professional development for participation in the program.

Summative assessments will include multivariate analyses, including implementation fidelity ratings for each of the model's dimensions, growth mindset metrics and academic metrics (which will be collected after each semester, including grades, credit accumulation, persistence, transfer, and graduation.). Appropriate statistical procedures (such as multiple regression analysis) will be utilized to assess the impact of well-implemented, high-impact practices and activities (reflected in our model) on growth mindsets, changes in a growth mindsets and academic performance and persistence.