

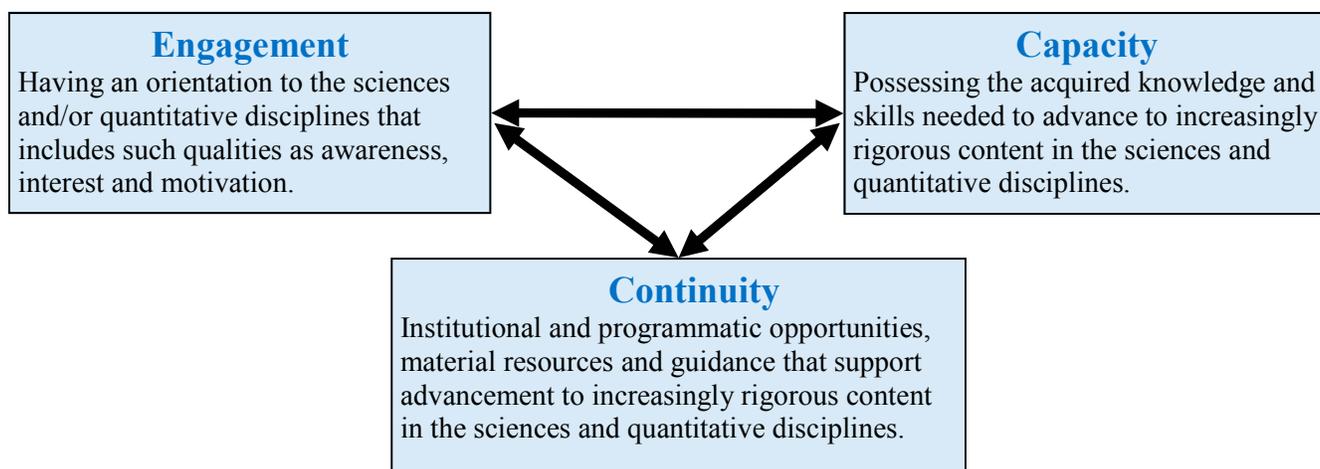
Engagement, Capacity and Continuity: An Overview of A Trilogy for Student Success

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Taken together, access to science and mathematical literacy are powerful predictors of economic success and gatekeepers for the broadest economic opportunities.

Fewer American students are going into the sciences, engineering and quantitative disciplines in college and beyond (NSF, 2004). Programmatic, instructional and curriculum successes have not led to expected increases in the numbers and diversity of those achieving at high levels and going into careers in the sciences and quantitative disciplines. We are winning some battles but losing the war. The Engagement, Capacity and Continuity Trilogy (ECC Trilogy) explores why our successes are not translating into more progress, and more importantly, proposes what different stakeholders can do about it.

The ECC Trilogy



The underlying assumption of the ECC Trilogy is that all three factors must be present for each student in order to ensure that student's success. Each of these factors is necessary but individually is not sufficient to ensure student continuation in the sciences and quantitative disciplines¹.

Copies of the full report, which was supported by the GE Foundation, can be downloaded from www.smm.org or www.campbell-kibler.com.

¹There are of course other factors not directly related to education and educational experiences that affect student success. Success is harder for the hungry student, the tired student, the unhappy student. Basic needs, such as fresh air, clean water, nutritious food, adequate sleep and safety, must be addressed in conjunction with educational factors for the trilogy to be successfully applied to most students (Maslow, n.d.).

The factors are interdependent. The absence of one can have an impact on the degree to which the others are present. For example, without knowledge and skills (Capacity) many individuals will not be able to take advantage of available opportunities and resources (Continuity). Correspondingly, Capacity is based at least in part, on earlier Continuity.

Previously Engagement, Capacity and Continuity have been addressed separately when, as the following examples indicate, they need to be considered together.

- ▼ If a student has succeeded in content mastery (Capacity) and an educational system supports her or his further advancement (Continuity) but the student has no interest (Engagement), she or he will most likely not continue on in the sciences and/or quantitative disciplines.
- ▼ If a student has the Capacity and Engagement but the system does not offer such opportunities as calculus, AP courses, or even information on colleges and financial aid (Continuity), then despite interest and ability the student is not likely to advance into the sciences or quantitative disciplines.
- ▼ If courses, information and academic supports (Continuity) are available and a student has a high interest (Engagement) but she or he doesn't have the requisite content mastery (Capacity) to move to the next level, then that student simply will not be able to advance.

If the ECC Trilogy is correct, then as long as social and health needs are being addressed where they exist, programs, reforms and even school districts, that support all three factors should be successful. Efforts that focus on one or two of the three factors for students who already have the remaining factor(s) also should be successful. The ECC Trilogy is based on an assessment of the degree to which each of the factors is present for each student, not on average scores for groups or subgroups of students.

Implications of the ECC Trilogy for Different Populations

Educational Policy Makers

- ▼ Educational policy makers can use the ECC Trilogy to help ensure that their policies and grant programs have better chances for success by clearly addressing all three areas of the ECC Trilogy in their efforts. To do this, policy makers can refer to the three factors in their policies.

Sponsors

- ▼ Those who fund projects and programs can explicitly address the ECC Trilogy by requiring that any proposed project or program include a needs assessment of targeted populations addressing areas of Engagement, Capacity and Continuity. They also can review funded projects to determine if project partners have the skills and resources to address student needs in ECC Trilogy factors.

Curriculum/Program Developers

- ▼ Prior to the design of any program, an assessment, disaggregated by race/ethnicity and sex, should be done of the target population's needs focusing on Engagement, Capacity and Continuity. The results of the assessment should be used to determine program

components. The program should meet target student needs as identified by the assessment, or, if student needs can't be met through programming, by partnerships established to extend the program's capabilities.

Evaluators

- ▼ The ECC Trilogy can help to frame evaluation designs and contribute to our understanding of “what works for whom in what context.” Having ECC indicators at the individual student level can help explain why some students are positively affected by some projects and others aren't. Regardless of the focus of the program being evaluated, the evaluation should include measures of all three factors and should periodically reassess the program and participants to look for impact as well as to determine if needs have changed.
- ▼ Studies designed to look at the effects of promotion and retention policies, standards-based reform programs, summer programs, and teacher reforms and professional development can be strengthened if the three ECC factors are included in the data collection and the results used to help understand why different policies and reforms are or are not working.

District/School Administrators

- ▼ The ECC Trilogy has implications for district/school administrators, both programmatically and in terms of accountability. Programmatically they need to ensure that efforts they support address all three areas of the ECC Trilogy; that students participating in their educational system have easy and equal access to the resources that support each factor, and that students utilize those resources. Any accountability system needs to include data from all three factors as well.

Teachers

- ▼ Teachers can apply the ECC Trilogy in their classes, assessing where individual students are in the ECC Trilogy and using that information in curriculum and other decision making. They can use the ECC Trilogy to help answer such questions as:
 - Which of my students are engaged in what areas?*
 - Do my students have the skills and knowledge to continue on in the area?*
 - Do I have the skills and resources, including content knowledge, curriculum materials and teaching skills, needed to move my students up to the next level?*

Museums and Other Informal Science Institutions

- ▼ Museums and other informal science institutions are often seen as focusing primarily on Engagement. While this can be the case, they also have the potential to support student Continuity and create student Capacity.
- ▼ Informal science programs can coordinate programming with others skilled in addressing different ECC factors. For example, a museum can present engaging activities that are intentionally related to a student's school-based core subject and can work with others to bring mentors into the school to increase student Continuity.

In Closing

“If my intentions are good and my heart is pure, then I must be doing the right thing.”²

The “pure of heart model” often speaks to what motivates and inspires many of us in education reform. We have for decades wanted to do the right thing, to inspire, to teach and to create pathways and opportunities for every child’s success. Enough passion, in the right circumstance, can lead to success but too often it does not. The passion that drives educational reform must be matched by a will to assess and cooperatively deliver an environment in which every child, regardless of race/ethnicity or sex, has the Engagement, Capacity and Continuity necessary to succeed.

We’ve often said to children, “You can be whatever you want, as long as you work hard enough.” But children need access and support in order for that to happen. The ECC Trilogy focuses on not just the child’s will, but on the structures that are needed to support that will, to ensure that all children do get to become whatever they want.

We don’t need to do it all, but we must see that it all gets done.

References

- Maslow, Abraham. (n.d.) As cited in: Gwynne, Robert. Maslow’s Hierarchy of Needs. Retrieved on May 27, 2004, from: <http://web.utk.edu/~gwynne/maslow.HTM>.
- NSF (National Science Foundation, Division of Science Resources Statistics). (2004). *Women, Minorities and Persons with Disabilities in Science and Engineering 2004*. Arlington, VA: Author (NSF 04-317).

²The pure of heart model was developed by Tom Kibler to help explain why so many people are hesitant to collect and use data about the programs they love.



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