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Developing the Capacity of Faculty to Become Institutional Agents for Latinos in STEM

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This report was written by Dr. Estela Mara Bensimon, Professor and Co-Director of the Center for Urban Education, and Dr. Alicia C. Dowd, Associate Professor and Co-Director of the Center for Urban Education. The authors would like to thank Dr. Ricardo Stanton-Salazar, Dr. Brianne Davila, Roseanne Macias, and Linda Taing Shieh for their research support, and Dr. Greg Steirer and Emily Ogle for their editorial support.

In 2007, the Center for Urban Education began a three-year research grant funded by the National Science Foundation (Grant No. 0653280) to determine practical ways of increasing Latinos' access to and success in STEM fields, with Dr. Alicia C. Dowd as Principal Investigator and Dr. Estela Mara Bensimon as Co-Principal Investigator. Through this study, CUE is examining the features of exemplary STEM policies and programs to identify ways for institutions — both Hispanic-Serving Institutions (HSIs) as designated by the U.S. Department of Education, and non-Hispanic Serving — to increase the number of Latino STEM graduates.

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The growth rate of jobs in science, technology, engineering, and mathematics continues to outpace all other sectors other than healthcare. In the decade between 2008 and 2018, over 1 million new jobs and an additional 1 million jobs replacing retiring workers will open in STEM fields (Carnevale, Smith, & Melton, 2011). The high demand for workers in these jobs means that those qualified to fill them enjoy higher pay, lower rates of unemployment, and greater career mobility than those in other industries. Yet our nation's two-year and four-year colleges currently produce too few graduates qualified to meet the demand, and as a result the nation draws heavily on foreign-born workers to fill STEM jobs. Foreign-born workers currently hold 17% of STEM jobs in the US, compared to only 12% of jobs across the whole labor market (Carnevale, Smith, & Melton, 2011).

At the same time, racial and ethnic minority groups remain underrepresented among STEM graduates. Latinos, in particular, comprise the most rapidly growing segment of the college-aged population, but currently earn far less than a proportional amount of the STEM degrees awarded by colleges and universities each year.¹ In 2007, for example, Latinos comprised 11% of the total undergraduate population in the US (NCES, 2010, Table 235), but were awarded only 8.2% of degrees in sciences and engineering (NSF, 2009). Within that 8.2%, moreover, Latinos were more than twice as likely to major in fields not typically considered "STEM," including psychology and the social sciences.

By 2020, Latinos will comprise 25 percent of high school graduates in the US (WICHE, 2008). Given the rapidly increasing demand for college graduates qualified to fill STEM-related jobs, the Latinos and Latinas currently sitting in our high school and college classrooms represent an immense resource — and one critical to the nation's ongoing economic growth and vitality. Unless explicit action is taken to funnel more of these students into STEM majors and advanced degrees, however, this resource will remain under-utilized and the economic competitiveness of both the nation and Latinos and Latinas as a group will suffer.

In order to ensure greater involvement in STEM fields by Latinos and Latinas, institutions of higher education — and particularly Hispanic-Serving Institutions (HSIs) — will thus need to develop concrete policies and practices aimed at increasing STEM degree attainment. A difficult process at any time, the development of such policies and practices has been made even more difficult over the past few years as economic uncertainty has resulted in reduced institutional budgets and the disappearance of external funding sources upon which educational programs targeting minorities frequently rely. This report offers a solution to such difficulties by introducing an innovative model of organizational development and student advocacy. The practices of individual faculty at four-year institutions are illustrated to demonstrate the practices that have been developed by faculty with high commitment to Latino student success in STEM. These faculty act as institutional agents when they deploy their resources, networks, and positional authority to promote Latino student success. Drawing upon the Center for Urban Education's study of exemplary practices around Latino and Latino students in STEM, this report highlights the important role "institutional agents" play in increasing STEM degree attainment among Latino students. It also offers concrete recommendations on how to create, support, and retain institutional agents within colleges and universities. The application of the recommendations will

Latinos are the most rapidly growing segment of the college-aged population, but earn far less than a proportional amount of the STEM degrees awarded each year

This report highlights the important role institutional agents play in increasing STEM degree attainment among Latino students

¹ In this report, we use the terms Latina, Latino, and Hispanic to refer to persons who trace their origin to Mexico, Puerto Rico, Cuba, Spanish speaking Central and South American countries, and other Spanish cultures (Fry, 2008). In addition, rather than always subsuming the feminine to the masculine form, at times we use the expression "Latinas and Latinos" to be explicitly inclusive of Latinas and at times, for ease of reference, the expression "Latino" referring to both Latinos and Latinas.

enable colleges and universities to strengthen and build upon the resources they already have—namely, faculty, staff, and institutional leaders—in order to ensure the success of Latino students in STEM degree-programs and careers.

Special Programs Alone Cannot Increase Latino Bachelor's Degree Attainment in STEM

As important as they are for correcting broad-based representational imbalances in STEM fields, special programs operating on college and university campuses are not by themselves sufficient to solve the specific problem of Latino underrepresentation. Programs such as the Federal TRIO Programs, Ronald E. McNair Scholars Program, Student Preparation for Academic Research Careers (SPARC), Minority Access to Research Careers Undergraduate Student Training in Academic Research (MARC*USTAR), Louis Stokes Alliance for Minority Participation (LSAMP), Minority Biomedical Research Support (MBRS), Research Initiative for Scientific Enhancement (RISE), California's Mathematics, Engineering, Science Achievement (MESA), and the Minority Engineering Programs (MEP) that exist at many private and public universities frequently suffer caps limiting the number of program participants; they are thus unable to reach large numbers of students. Too often, these programs also depend upon unreliable funding sources, such as federal and private grants, which impede long-term planning and expansion.

Furthermore, even while these programs may provide crucial support for some underrepresented minority students in the form of internships, summer programs, tutoring, academic advising, and career counseling, they do not address the underlying structural and institutional problems responsible for such underrepresentation. Special programs focus on compensating for unequal schooling by providing individual students with information, competencies, and experiences they did not have in high school or earlier. Most of these programs do not have as a goal, at least explicitly, strengthening the knowledge and cultural capacity of STEM faculty and departments in general, not just the few individuals who are affiliated with these programs.

Special programs may neglect the need to remediate the practices, structures, and culture of STEM departments.

For this reason, in particular, institutional leaders and STEM policy makers cannot rely upon special programs alone to increase bachelor's degree attainment in STEM fields among Latinos. For meaningful change to occur, these leaders must also dedicate their time and resources towards establishing an institutional culture genuinely committed to the success of Latinos and other underrepresented minority groups in these fields.

To create such a culture, institutional leaders need to change the way that faculty and staff at four-year institutions assess the qualifications of and interact with students. Too often, faculty and others working in higher education view the underrepresentation of minority students in STEM fields as unfortunate but not surprising because they attribute it to the poor educational preparation these students received in high school or the excessive number of familial and work-related responsibilities they must bear while in college. Special programs are often based on a similar conception of the problem, and thus neglect the need to remediate the practices, structures, and culture of STEM departments. Achieving a noticeable jump in the number of Latinos enrolling in STEM and persisting to graduation cannot be accomplished by special programs alone. It will require faculty

members who understand why these students may lack the academic preparedness and networks to be successful in STEM and take the responsibility to enable their success.

It is not enough for faculty to supply students with course-based content; they must also teach students how to navigate the cultures and discourses of STEM fields, enter and interact successfully in professional STEM networks, and they must map out for them the steps necessary to pursue a career or advanced degree in one of these fields.

Institutional Agents

To help institutional leaders better understand the potential impact faculty and academic administrators can have on the educational trajectory of Latino undergraduates, CUE researchers (Dowd, Bensimon, Gabbard et al. 2006; Pak, Bensimon, et al, 2006; Bensimon, 2007; Bensimon & Dowd, 2009; Dowd, 2010) have built upon the sociological concept of “institutional agents” (Stanton-Salazar, 1997, 2001, 2011), applying it to the roles key faculty and administrators play in integrating these students to specific STEM fields and providing them access to material resources and professional networks. Stanton-Salazar (2011) defines institutional agents as individuals occupying positions of power within institutions who use their substantial human, social, and cultural capital to advocate and provide additional resources for historically underrepresented students.

Though the advocacy institutional agents perform can and perhaps should be a professional cultural norm, the primary motivation of the institutional agents we identified through interviews at purposefully sampled HSI was ideological or ethical. Using their own professional resources and networks, institutional agents supplement the basic resources supplied by the school to help minority students access resources and opportunities that they would not have been able to access otherwise. Besides interacting directly with students, institutional agents work at both the system and campus levels of educational systems in order to generate increased opportunities for minorities, including special programs, enrollment in advanced coursework, industry relations, and transfer opportunities.

INSTITUTIONAL AGENTS

Individuals who occupy high status positions within their institution or organization and who know how to access high value resources, navigate complex systems and take effective action, have the potential to be institutional agents.

They possess human, cultural and social capital.

It is only when these individuals use their capital to transmit high value resources — opportunities, privileges and services—to underserved students that they become institutional agents. Because every potential institutional agent possesses different resources the actions they take to use those resources on behalf of their students will be different. Potential agents might not be aware of how they can use their resources to aid students if they occupy a position not normally associated with direct student support.



Though institutional agents act in a variety of ways to promote the success of minority students, their actions can usually be categorized as one of four different types of end-oriented behaviors shown in Figure 1: direct support, integrative support, system developer, and system linkage/networking support.

Figure 1: Institutional Agent Types

There are 14 institutional agent roles, which are divided into four types.



All of these behaviors are valuable, but the different institutional positions occupied by faculty and academic administrators within their specific institutions and fields may make some more feasible than others. Deans, for instance, are in a better position to develop programs, lobby for external funding, and engage in other activities associated with system development than they are to provide direct support to individual students. Faculty, by contrast, are well positioned to provide such direct support as advising, student advocacy, and network coaching.

Figure 2: Institutional Agent Roles and Characteristics

DIRECT SUPPORT
<p>Resource Agent</p> <ul style="list-style-type: none"> Provides or utilizes personal and positional resources to students
<p>Networking Coach</p> <ul style="list-style-type: none"> Teaches students how to network with key institutional agents Models appropriate networking behavior Develops relationships with important and influential people
<p>Advocate</p> <ul style="list-style-type: none"> Promotes and protects “their” students
<p>Knowledge Agent</p> <ul style="list-style-type: none"> Accesses or provides knowledge pertinent to navigating the system Knows the system
<p>Advisor</p> <ul style="list-style-type: none"> Promotes and guides effective decision making Helps students gather information Assesses problems and possible solutions in a collaborative manner
INTEGRATIVE SUPPORT
<p>Integrative Agent</p> <ul style="list-style-type: none"> Coordinates students’ integration and participation in networks and professional venues (professional associations, department, school, etc.)
<p>Cultural Guide</p> <ul style="list-style-type: none"> Guides students through new social situations in a particular cultural sphere Teaches students to identify and interact with key people in a particular cultural sphere
SYSTEM DEVELOPER
<p>Program Developer</p> <ul style="list-style-type: none"> Develops programs that embed students in a system of agents, resources, and opportunities
<p>Political Advocate</p> <ul style="list-style-type: none"> Joins political action groups that advocates for social policies and institutional resources that would benefit targeted groups of students
<p>Lobbyist</p> <ul style="list-style-type: none"> Lobbies for organizational resources to be directed toward recruiting and supporting
SYSTEM LINKAGE & NETWORKING SUPPORT
<p>Recruiter</p> <ul style="list-style-type: none"> Actively recruits students into program, department, etc.
<p>Bridging Agent</p> <ul style="list-style-type: none"> Introduces students to institutional agents Has a strong social network Knows what key players do
<p>Institutional Broker</p> <ul style="list-style-type: none"> Negotiates introductions and agreements between two or more parties Knows what resources are available and who controls or possesses them
<p>Coordinator</p> <ul style="list-style-type: none"> Assesses students’ needs Identifies resources to address need Provides or accesses institutional resources on behalf of students Ensures students utilize resources effectively

Direct Support roles take place when the institutional agent takes action directly on behalf of the student, usually in the form of knowledge sharing.

Integrative Support is when an institutional agent helps students integrate into to the cultural world of the institution or to the professional world they would need to understand once they leave higher education.

System Developer roles take place when an institutional agent uses their resources, particularly their position within the institution to create programs and lobby for their students. Institutional Agents who take on System Developer roles may not have direct contact with students.

System Linkage and Networking Support roles are seen when institutional agents work both directly with students and within the larger institution to connect to other resourceful people and groups. Example actions include recruiting under-represented students into an academic program.

Source: Stanton-Salazar, R. D. (2011). “A social capital framework for the study of institutional agents and their role in the empowerment of low-status youth.” *Youth & Society* 43(3): 1066-1109

Profiles of a Dean and Professor who Act as Institutional Agents for Latinos in STEM

In our research study, we identified several faculty and academic leaders who acted as institutional agents for Latino students. These individuals worked in science, engineering, and mathematics departments in community colleges and public universities. In what follows, we offer profiles of two of these institutional agents, both working at universities and each of whom took specific actions — one at the system level and one at the campus level — to increase the number of Latino students graduating with degrees or majors in STEM fields at their institutions. These profiles demonstrate the kind of activities faculty members undertake to ensure that Latinos have the resources necessary to succeed in STEM fields.

Dean Armando Gomez

“If the relationship between the largest community college and the major university is not good, then we are disenfranchising the students in the area.”

Armando Gomez is a newly appointed dean in the College of Science and Engineering at a large, four-year state university located in a predominantly Latino community in the Western US. He has been a dean at this Hispanic-Serving Institution for less than a year, but served previously as a faculty member and department chair for several years at a similar institution. Like many of the students with whom he works, Gomez was a first-generation Latino college student; he thus understands the many obstacles these students face while pursuing a STEM degree.

Upon first arriving at the university, Gomez analyzed data about incoming students majoring in STEM fields, including freshmen entering directly from high school and students transferring from community colleges. Discovering that the transfer numbers from the primarily Hispanic-serving local community college were low — 80 students transferred from a community college that enrolled 20,000— he formed connections with his counterpart from that college and worked collaboratively with her to build the relationship between the two institutions and increase the transfer rate. Led by Gomez, the two institutions together set a goal of doubling the Latino transfer population over five years.

To begin the process of meeting this goal, Gomez set up and hosted several meetings between STEM faculty and administrators from both institutions. The goal was to develop a joint STEM curriculum that would lay out a clear pathway for community college students to transfer into the university’s STEM programs. The process took several months and the collaboration of faculty and administrators from both schools, but eventually resulted in a coordinated curriculum in science and mathematics that met both institutions’ educational goals and the course requirements for transfer.

As a newly appointed Dean, Gomez used the power of his position to create a working relationship with the local community college. Rather than focus solely upon fostering change at his own institution, Gomez used his influence and authority to create a formal curricular relationship between the two schools for the benefit of Latino students in the area. Curricular articulation agreements are notoriously difficult to draft because of academic governance practices and the sheer number of stakeholders involved; they

thus require substantial commitment on the part of institutional leaders who must, as Gomez did, mobilize others to reach agreements and complete the necessary work. As an institutional agent, Gomez successfully worked to make changes at the system-level so that more Latino students could have the chance to succeed.

Armando Gomez as a Bridging Agent and Institutional Broker

As shown in Figure 1 and Figure 2, there are many institutional agent roles. Institutional agents take on different roles depending on the situation, their personal and professional resources. The following text discusses the institutional agent roles Dean Gomez played.

Dean Gomez's determined efforts to build productive relationships in order to promote the advancement of Latina and Latino STEM students in the local community are reflective of the actions and commitment level of a bridging agent and an institutional broker. A bridging agent acts as a bridge between individuals and key institutional agents who are often gate-keepers in educational institutions. A bridging agent must have well developed social connections and knowledge about how these resources will benefit individuals, particularly students. Dean Gomez acts as a bridge between the needs of underrepresented students and important influential actors who impact their educational opportunities. He initiates and hosts meetings with faculty and administrators from different departments at his university. He encourages them to learn about each other and their programs, and work with faculty and administrators from their local community college to discuss articulation agreements to support transfer students into the university.

An institutional broker is an extension of a bridging agent and has thorough knowledge about resources within the relevant context (i.e. community college, four-year university, and the local community) available to support students. An institutional broker is an extension of a bridging agent when he/she takes an active role in negotiating agreements between key players and accessing resources on behalf of students and their educational needs. Dean Gomez does not hesitate to contact influential leaders like the Dean from the local community college to discuss ways to work together to support Latina and Latino students transfer to a four-year college. Dean Gomez's determined efforts to draw the support of his fellow deans and administrators reflect his ability to utilize his resources and contacts in order to advocate for the needs of Latina and Latino students and bring them into the STEM fields.

Professor David Ramirez

"I think that connecting with the students makes a big difference. I cannot connect with the hundreds of students in my mathematics class that I teach, but I can connect with my students in my STEM support program."

David Ramirez has worked as a mathematics professor for over fifteen years at a large four-year Hispanic-Serving Institution in the Southwest. He currently serves as the chair of the mathematics department. In addition to teaching undergraduates and providing administrative services for the department, Ramirez runs several STEM-focused programs designed to help Latino students excel in their STEM majors. Like Gomez and many of the Latino students at his institution, Ramirez was a first-generation college student.

Frustrated by the small number of Latinos/Latinas in STEM professions and faculty positions across the country, and alarmed by how few STEM degrees had been historically awarded

Dean Gomez acted as an institutional agent in the following ways:

- **Personal understanding of/identification with the challenges under-represented students face**
- **Analysis of data disaggregated by race and ethnicity**
- **Creating relationships with STEM faculty at the community college**
- **Generating STEM-focused transfer plans**
- **Creating concrete goals for increasing Latina and Latino transfer student population**
- **Implementing system level changes that enhanced Latino students chances to succeed**



to Latinos and Latinas at his own institution, Ramirez took it upon himself to increase their participation in STEM fields at his school. One thing he noticed is that Latino students often lack the technical skills needed to work in STEM labs. He also found that his colleagues easily got frustrated if they spent any instruction time teaching foundational lab skills and rules that some Latino students had never been introduced to previously. In order to address the issue, Professor Ramirez coordinated the creation of an interdisciplinary “Summer Lab Boot Camp” to expose Latina and Latino students to computer science, biology, chemistry and physics labs. Students are placed in a lab appropriate for their major, where they get hands-on experience with equipment and procedures, and learn to be scientists. This program gives students the opportunity to learn lab skills prior to enrolling in a lab course. Professor Ramirez understands that not all faculty members may have the patience, awareness, or interest to assist students who need the extra support. The program created by Ramirez initiates students into the culture of science and gives them a headstart.

Professor Ramirez acted as an institutional agent in the following ways:

- ***Creating a STEM support group***
- ***Noticed his colleagues’ impatience with under-prepared students and took steps to build the academic and cultural confidence that students need to become integrated into the unique culture of STEM.***
- ***Relied on his social networks to connect students to individuals who could serve as mentors and facilitate their entry into graduate school or STEM jobs.***
- ***Used his resources to create a sense of community among Latino students***

Research experiences like these are invaluable for giving students the chance to interact with faculty on a personal basis, apply science and math skills in formal experiments, and engage with the research of others. They also increase students’ chances of being accepted into top graduate programs in STEM fields. Ramirez strongly encouraged his Latino students to take advantage of these opportunities to assist them in seeing their potential for graduate education in a science-related field.

Drawing upon his academic and industrial contacts, he created learning communities where students could meet and network with Latino graduate students in STEM programs and professionals working in STEM industries. He also hosted informal gatherings in his home and invited former students who were now in Ph.D. programs or in professional positions to meet with his undergraduates. By interacting with these groups, students learned more about graduate school and the types of jobs available to STEM degree holders. Because Ramirez’s Latino students traditionally have few opportunities to interact with STEM professionals, these interactions were especially important for them.

Professor Ramirez as Integrative Agent and Program Developer

Professor Ramirez took on the role of integrative agent in that he created formal and informal opportunities to help Latinos’ enter professional and academic networks that extended beyond the classroom and brought them into contact with graduate students who shared their background and with whom they could identify. Somehow Professor Ramirez sensed that it was important to show these students their possible future by connecting them to Ph.D. students who at one time had been much like themselves.

Ramirez stood out from other professors in our study because he conducted the duties officially assigned to him as professor and department chair, with attention to increasing the number of Latino students pursuing STEM degrees. He is a program developer because he used his personal and positional resources to create programs that would expose Latino students to careers in STEM fields and provide them with the research experiences and professional contacts necessary to succeed. Without these experiences, Latino students would have had the opportunity to take STEM classes, but not the necessary experiences to envision themselves as nascent scientists and to consider careers in STEM fields.

Conclusion

What distinguishes institutional agents from other well-intentioned faculty and staff who take on mentoring roles and provide direct support to students is that the former understand how the administrative policies and organizational cultures of institutions of higher education present greater obstacles to minority students than to others. These agents possess a critical awareness of how ostensibly neutral policies and practices contribute to longstanding patterns of inequity with respect to Latinos and Latinas and other underrepresented minority students. Unlike other faculty and staff working on behalf of these students, institutional agents approach inequality in higher education as a structural or systemic problem and thus labor to reform policies, change organizational culture, and build alternative communication networks. Because such work requires great creativity and is difficult to standardize, it typically goes beyond the duties formally outlined in job descriptions. Those individuals who undertake this work, like Armando Gomez and David Ramirez, thus do so for ethical or ideological reasons often related to their own personal experiences as minorities. This personal element motivates them to draw upon their own resources and institutional authority in non-traditional ways in order to ensure minority student success.

Dean Gomez and Professor Ramirez were without question mentors and positive role models to the Latino students in their departments. But their commitment to Latino success also led them to go beyond these roles and pursue change at the institutional level. Though their different professional positions and institutional relationships with students provided them with different resources, they mobilized these resources for the same goal of increased success for Latino students in STEM fields. Recognizing that community colleges are the gateway to obtaining a bachelor's degree in a STEM field for many Latino students, Gomez leveraged his position as Dean to create change at the system level. By collaborating with staff and faculty from two institutions to better standardize the educational pathway for STEM majors, he put into motion a reform process that eventually succeeded in removing one of the major barriers to STEM success for Latino students in his community.

Ramirez, by contrast created opportunities for his Latino students to engage with STEM professionals outside of class, thereby effectively incorporating them into these networks and enabling them to conceive of themselves as young professionals. Recognizing that educational and work requirements limit the ability of many Latino students to take part in non-credit summer programs, he mobilized other faculty at his institution to offer credit-granting summer research courses, thus ensuring that low-income Latino students would have the same opportunities in STEM as other, higher-income students. Unlike most STEM faculty, who see their role as classroom-situated and rooted in the delivery of content, Ramirez also conceived of his responsibility to students in terms of network development and identity creation; by getting his students to interact regularly with scientists and think of themselves as scientists, he increased their motivation, social capital, and sense of belonging within STEM fields.

Institutional agents possess a critical awareness of how ostensibly neutral policies and practices contribute to long standing patterns of inequity with respect to Latinos and Latinas and other underrepresented minority students



Although we have highlighted Gomez and Ramirez as self-motivated individuals acting on behalf of their students, institutional agents cannot act effectively in isolation. Both Gomez and Ramirez were able to mobilize support among peers and subordinates, both within and outside of their respective institutions, and in so doing introduced long-lasting change into their schools' institutional cultures. If faculty members in particular are to have a sustained and meaningful impact on the educational outcomes of Latino students in STEM, they need the support of leaders within the department and institution, particularly department deans and chairs.

We have highlighted individuals who possessed sufficient know-how and motivation to function effectively as institutional agents within their institutions, but institutional agents can and must also be deliberately created. Institutional agents can be developed by institutions through the availability of training and educational resources and the implementation of incentives that reward faculty and departments for minority success. Indeed, the development and support of a core group of institutional agents needs to be a priority within STEM departments and institutions.

Figure 3: A Self-Assessment Tool for Developing Institutional Agents

Statements from the STEM Toolkit Leader Self-Assessment

As a leader of (department name) I ...

Use of Data

I gather data on Latinas and Latinos.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
I gather data on Latinas and Latinos to assess where they're underrepresented.	<input type="checkbox"/> Yes	<input type="checkbox"/> No

The Role of Faculty

I recruit and hire faculty members that have experience teaching and working with Latina and Latino students.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
I organize an annual workshop for faculty on how to establish mentoring relationships with their Latina and Latino students.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
I consider the number of times faculty have included Latina and Latino students in the authorship of presentations and publications as part of their formal evaluation process.	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Use of Collaborations

I collaborate with professionals in industry in order to place Latina and Latino students in professional internships.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
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Community College Partnerships

I organize workshops for my faculty to meet with their community college counterparts in order to discuss curriculum alignment that will facilitate transfer for Latina and Latino students.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
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The STEM Toolkit is available online: http://cue.usc.edu/our_tools/stem_toolkit.html

Figure 3 provides an excerpt from a self-assessment tool that is part of CUE's STEM Toolkit for Increasing Latino and Latina STEM Baccalaureates. Academic leaders and faculty who wish to spur the development of institutional agents on their campus can initiate attention to the necessary roles by asking themselves whether they engage in the behaviors listed — and by asking their peers to do the same.

Recommendations

The brief portrayals of Dean Gomez and Professor Ramirez are drawn from a larger database of 60 interviews with leaders, faculty members, and staff, from two- and four-year Hispanic-Serving Institutions. Like Gomez and Ramirez, we found that individuals who met the criteria of institutional agents supported Latinos by intervening in three areas: 1) recruitment, assessment, admissions, and program development; 2) science identity formation through professional development and networking experiences; and 3) brokering support within the university and across educational systems. Clearly, to meet the challenge of increasing Latinos in STEM fields we need to develop more deans and professors to intervene as Gomez and Ramirez did in their institutions. To do so, policy makers and federal program directors, institutional leaders and faculty can take specific actions.

Recommendations for Federal STEM Policy Makers and Program Administrators

- Require that applicants provide baseline data of participants in STEM and their outcomes, disaggregated by race and ethnicity, including community college transfer students and commit to specific improvement goals in access, retention, and completion by STEM field.
- Require that applicants conduct an institutional self-assessment, with a specific focus on STEM departments/divisions and identify practices in admissions and recruitment, financial aid and work study, curriculum, professional development, student services, and academic support that need to be remediated to be more culturally inclusive for Latinos.
- Include criteria in program solicitations and annual evaluation reports to assess the number of STEM faculty members by race and ethnicity and identify their level of involvement in the proposed activities.
- Require that applicants for programs and funds targeted for Hispanic Serving Institutions specify how proposed activities will benefit Latino students.
- Develop and deliver a professional development and technical assistance program to build a community of institutional agents across STEM programs in Hispanic Serving Institutions.

Recommendations for Institutional Leaders

- Engage STEM faculty in an examination of departmental culture and interrogate how it supports Latino student success, including transfer students.
- Give priority in faculty hiring to individuals whose background, experiences, values, and aspirations make them identifiable as institutional agents. This means hiring more Latino STEM faculty and faculty of other racial and ethnic backgrounds who demonstrate commitment and capacities of institutional agents.

- Reward (materially or symbolically) and highlight faculty who act as institutional agents in support of Latino students and students from other racial and ethnic groups outside of the classroom. Provide release time or other kind of support to write grant applications for special programs, provide small amounts of funds to encourage faculty members to provide academic support through social gatherings to Latino students, including transfer students (e.g., pizza parties).
- Use institutional agent characteristics as criteria for faculty performance assessment and evaluation. Criteria for assessment can be based on the extent that faculty incorporate Latino students in undergraduate research opportunities, collaborate with them on academic papers or conference presentations, provide networking opportunities with STEM alumni and professionals, or develop academic support programs to help Latino STEM students advance in their majors.
- Use the Center for Urban Education’s STEM Toolkit tools that help teams and individuals reflect on how their own actions and behaviors, as well as institutional practices and resources, affect Latina and Latino students’ success. The tools include additional profiles of faculty and administrators for analysis and discussion, self assessments, and informational resources. The toolkit can be used to develop the capacity of STEM faculty and academic leaders to enact institutional agent roles.
- Use the STEM Faculty Supplemental Interview Questions, one of the tools in the STEM Toolkit, when interviewing faculty. *See Appendix A for a description of the STEM Toolkit and the full STEM Faculty Supplemental Interview Question tool.*
- Assess the culture of STEM departments by identifying the number of faculty who play one or more of the 14 institutional agent roles.
- Establish collegial relationships with leaders of feeder community colleges and together regularly assess the “state of transfer” for STEM majors, disaggregated by race and ethnicity, and identify structural, curricular, cultural, informational, and economic barriers to transfer access for Latinos.
- Create structures to make collaboration on pedagogy and curriculum development routine among STEM university faculty and community college faculty.
- Routinely disseminate and discuss transfer admissions data and transfer student STEM degree completion data, disaggregated by race and ethnicity, with key campus groups and individuals as well as local and regional community colleges.
- Review data on applications, admissions, and enrollment, in STEM, by race and ethnicity, and set specific goals to increase degrees in STEM for Latinos.

- Create summer bridge programs to prepare Latino students from under resourced high schools and community colleges to learn how to navigate the academic culture of the STEM classroom and lab.
- Insist on inclusive recruitment activities that target high-minority community colleges or high schools and monitor applications, admissions, and enrollment from these institutions.
- Monitor the distribution of financial aid by race and ethnicity to determine equitable distribution.

Recommendations for Faculty

- Reflect on the actions associated with the 14 institutional agent roles and intentionally enact them.
- Identify Latino students, including community college transfers, become familiar with their life histories, and provide them with the resources and experiences to develop a science identity.
- Invite Latino students to become a research assistant and participate in science-related activities beyond the classroom.
- Become familiar with federally funded programs to support Latinos in STEM and collaborate with other faculty members to write grant applications.
- Participate in faculty search committees and develop methods to identify individuals who are knowledgeable of Latino students and possess the characteristics of institutional agents.
- Provide science role models for Latino students by inviting guest speakers, such as former students who have gone on to graduate school or professional positions; share intangible strategies about succeeding in STEM.

Appendix A: The Center for Urban Education's STEM Toolkit: Tools for Increasing Latino and Latina STEM Baccalaureates

http://cue.usc.edu/equity_model/stem_focus.html

The Center for Urban Education's STEM Toolkit, featuring tools developed out of the Center for Urban Education's NSF funded study Pathways to STEM Bachelor's and Graduate Degrees for Hispanic Students and the Role of Hispanic-Serving Institutions, develops competencies that facilitate Latina and Latino student success in STEM, by helping both campus teams and individuals understand the issues facing Latina and Latino STEM students.

The Tools

CUE's STEM Toolkit features tools that help teams and individuals reflect on how their own actions and behaviors, as well as institutional practices and resources, affect Latina and Latino students' success.

- **Institutional Agents:** this informational tool helps practitioners understand who an institutional agent is and introduces the idea of the institutional agent as the basis for student success.
- **Institutional Agents in Action:** this activity tool features vignettes of practitioners acting as institutional agents and guides readers through an interpretation of their attitudes and actions.
- **Self-Assessment Inventories:** these activity tools feature self- and team-assessments for practitioners that help them think critically about their actions and attitudes.
- **Hiring STEM Faculty:** this tool includes supplemental interview questions and a tool to analyze hiring processes.

Who should use the toolkit?

CUE's STEM Toolkit is designed for use by instructors, administrators, counselors and campus leaders who are interested in increasing Latina and Latino STEM student enrollment and success. It is also intended to assist Hispanic-Serving Institutions in becoming more effective at serving their Latina and Latino STEM students. Every practitioner on every campus — whether it's a four-year public or private university, a two-year community college, or one with a smaller Latina and Latino student population — has the potential to be an institutional agent.

How do you use the toolkit?

The tools are most effective when they are used by a team of people from across the campus. Working in a team encourages organizational learning which can lead to campus-level change. External facilitators can be valuable to a constructive self-assessment process, particularly when addressing issues of racial-ethnic equity.



Using the Toolkit on Campus

Here are some ways you can use the toolkit at your institution.

- Equity and Diversity Initiatives
- Strategic Planning
- Professional Development
- Departmental/Staff Meetings
- Accreditation Self-Study
- Program Evaluations
- Leadership Development

Who should be on the team?

Here are some examples of key campus players who should be invited to be part of a team using the toolkit.

- Faculty Members
- Student Support Personnel
- STEM Program Coordinators
- Vice President of Academic Affairs
- Vice President of Student Affairs
- Institutional Researchers
- Diversity Officers
- Transfer Coordinators

STEM Toolkit Tool: Faculty Interview Questions to Identify Institutional Agents

Supplemental Interview Questions for STEM Faculty

The following questions are intended to supplement questions posed at a job candidate's interview for a STEM faculty position at a Hispanic-Serving Institution. The questions are designed to emphasize the unique skills and motivation a candidate should possess (or seek to develop) in order to successfully instruct and mentor Latina and Latino students in STEM fields. A successful candidate will be able to provide specific examples in their previous work with Latina and Latino students.

- 1. Briefly describe your previous roles or experiences (committee, classroom, etc.) as they relate to Latina and Latino students in STEM fields.**
 - In what specific ways are you involved with Latina and Latino students in STEM fields?
 - How did you get involved?
 - What have been the most gratifying aspects of your involvement? What have been the challenges?
 - In what ways do you facilitate the success of Latino students, both within and outside the classroom?
- 2. Can you describe one or more situations in which you provided assistance to Latino students?**
- 3. What do you need to learn in order to be more effective in facilitating the success of Latinos in STEM?**
- 4. Based on your knowledge of the academic culture of STEM fields, what would a Latina and Latino transfer student in STEM need to know in order to succeed?**
 - How would you help transfer students learn what they need to know?
 - In what ways have you worked with community colleges and transfer students?
 - How do you know if you are being an effective instructor with Latino students and students from other racial and ethnic underrepresented groups?
 - Have you participated in minority-related conferences? Which ones?
 - Have you included Latinos in research projects?

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The Center for Urban Education (CUE) leads socially conscious research and develops tools needed for institutions of higher education to produce equity in student outcomes.

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