

Empowering Leadership Alliance Members' Experiences of and Outcomes from the 2009 Richard Tapia Celebration of Diversity in Computing Conference

José Cossa & Lecia Barker

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EXECUTIVE SUMMARY

This evaluation summary presents the results of students' and professionals' attendance at the Tapia 2009 conference, based on a survey. It also discusses the long-term outcomes for persons who have participated in more than one Tapia conference in terms of relationships built and collaborations. One of ELA's methods of retaining minority computing students in majority institutions is by building a national support network of students and faculty. To enable community building, ELA brings students to the Tapia 2009 conference and prepares students for networking. *Building community is expected to increase student dedication to this career field and intention to complete their degree.* Bringing students to the conference also furnishes students with contacts and information related to jobs and graduate school.

Key issues to this report are the following: *community building/networking at and after Tapia* in which we address questions pertaining to communication during and after Tapia; *Outcome of Tapia 2009* (for students and for professionals) in which we address post-conference connections (to job, research, and graduate school), its impact on students' confidence to complete their degree, students' perception of advice received, students' feeling of connectedness to faculty and fellow students, students' dedication to complete their degree, and students' feeling that they are in the right career; *colleagues' perceptions of conferences with minority focus* in which we establish the faculty's and students' knowledge of their colleagues' or department's perceptions; and, *mentoring*, in which we gather information regarding mentor perceptions and protégé perceptions of mentoring experience and relationships.

Key findings in this report are the following:

- *Respondents successfully networked at and after Tapia 2009.* That is, almost all participants (professionals and students) met, for the first time, at least two other participants. After Tapia, a large number of students contacted at least one fellow student, an industry professional, and a faculty member that they met at Tapia 2009.
- *Participants valued the talks and exhibits.* Many students have searched for research articles written by Tapia presenters/speakers, searched for corporate careers, applied for an internship or research experience they found out about at Tapia, and applied for employment at a company or organization that had a table at Tapia.
- *Conference directly supported ELA retention goals.* Most students developed confidence that they will complete their degree, learned about computing career paths, felt connected with other students in their academic department, reaffirmed their belief that a computing career is a right fit for them, received valuable advice for getting through their educational program, increased their dedication to complete their degree, and connected to faculty in their academic department.
- *Mentors and protégés value their relationships.* The majority of mentors agreed that their protégé was responsive to them and that they feel comfortable contacting their protégé, which is supported by the fact that the majority disagreed that their protégé is too busy to be involved in their mentoring relationship. The majority of protégés agreed that the advice their mentor provides is useful, their mentor shares their knowledge and experiences, mentor appears to understand what they are trying to tell him/her, their

mentor is responsive to them, and they feel comfortable contacting mentor; this is supported by the fact that the majority disagreed that mentor is too busy to be involved in their mentoring relationship.

Acknowledging that ELA (through events like Tapia) already engages in some of the activities highlighted here, the key recommendations in this report serve as encouragement towards sustaining, and when applicable improving, what is already done. Our key recommendations are that ELA should continue to:

- *Nurture relationships between students and professionals.* Develop mechanisms aimed to encourage relationships established at Tapia between students and professionals (both those that have not witnessed follow up and those that have).
 - One way to do this is to have professionals (faculty and industry representatives) to initiate conversation with students either via e-mail or phone; students may appreciate having a role model, or someone they respect, contact them and find out how they are doing.
 - Investigate (through research) why some relationships, i.e., mentoring and general networking, established at Tapia celebrations work while others do not work over time.
- *Maximize on professional connections.* Take advantage of the fact that most professionals were very positive about the contribution of ELA. A large number of professionals claimed that participation in ELA gives them (a) a feeling that they can contribute to the success of minority students nationwide; (b) a better understanding of how to retain and advance under-represented students in computing; (c) an opportunity to give back to the community; and, (d) an opportunity to connected to students, post-docs, or future colleagues.
 - Keep the link between the value professionals see in ELA and practical ways they can contribute to ELA's mission.
 - Encourage students to apply for internships and employment in companies that have a table at Tapia
 - Encourage organizations/companies to organize small employment/internship presentations and screenings/interviews at the conference. These presentations and screenings can be on a pre-registration basis and students who participate can have the opportunity to receive advice on aspects such as how to present themselves when seeking a position, what strengths they have in their resume/vitae, and what specific sub-careers (that is, within computing) are they most likely to get hired for.
- *Create purposeful opportunities for all students to eventually experience degree completion, career paths, and connecting to faculty and other professionals.* Take advantage of professionals' positive view of participation in ELA and of students' positive experience at Tapia—confidence that they will *complete their degree*, learning about *computing career paths*, reaffirming their belief that a computing career is a right fit for them, receiving valuable advice for getting through their educational program, increasing their dedication to complete their degree, and *connecting to faculty*.

- *Consider alternative ways to reach non-Joiners.* Many students do not care to join groups whether related to minority issues or not, and perhaps for various reasons. We are concerned that the students who are presently part of ELA are not the most at risk for attrition.
- *Continue to work toward effective mentoring.* Encourage mentors to take the initiative to restore discontinued relationships and continue to nurture ongoing mentor-protégé relationships through the *ELA Online mentoring* and other available platforms. Continue to encourage more frequency of communication between mentor-protégé. The data suggest that a large number of mentors are not meeting the program's guideline of communicating weekly with their protégés, which may be a direct result of lack of set goals for the mentoring relationship. This could also mean that mentors sign up into the program, but do not follow up on their commitment.
- *Build Special Interest and Implementation Groups (SIIGs) in order to facilitate ELA in reaching its objectives.* Each SIIG will focus on specific goals such as participating in developing research-based materials to distribute to faculty, chairs, CS researchers, advisors, etc.; running student-professionals (academics and industry) networking sessions in conferences and beyond conferences; leverage research partnerships-by-interest among students, faculty, and industry-based researchers by serving as a research match-maker.
- *Investigate the reasons behind the low numbers of ELA facebook joiners and how to enhance the experience of those who join* in order to foster the building of an effective community through social networking.

1. INTRODUCTION

The Empowering Leadership Alliance (ELA) has the goal of retaining every minority computing student in a majority institution in the United States. One of ELA's methods of retaining minority computing students in majority institutions is by building a national support network of students and faculty. To enable community building, ELA brings students to the Tapia 2009 conference and prepares students for networking. Building community is expected to increase student dedication to this career field and intention to complete their degree. Bringing students to the conference also furnishes students with contacts and information related to jobs and graduate school. This evaluation summary presents the results of students and professionals' attendance at the Tapia 2009 conference, based on a survey. It also discusses the long-term outcomes for persons who have participated in more than one Tapia conference in terms of relationships built and collaborations. The survey link was sent to respondents, for the first time, 15 days after the conference. Five reminders were sent to those who did not respond, with the last being sent on May 3, 2009.

In the body of the report we have included only tables 1 to 8; all other tables are in the appendix. Please note that the order of the cross-referenced tables in the body of the report results from this selective inclusion of tables (e.g., Table 8 is cited before Table 1 because Table 8 was placed in the appendix yet it is relevant to material in the early part of this report).

1.1. Overall satisfaction was high

Table 12 (see Appendix) shows that most respondents were satisfied (71% were very satisfied and 25% were somewhat satisfied) with Tapia 2009 and only three percent were somewhat unsatisfied. Consequently, given the right timing and availability of funds, the majority of respondents were likely to attend Tapia 2011 (74% were very likely and 20% were somewhat likely) and only three percent were somewhat unlikely and two percent not at all likely to attend. In addition, the data shows that the majority were likely to recommend attendance of Tapia 2011 (80% were very likely and 18% were somewhat likely) and only two percent were somewhat unlikely. *This data show that Tapia celebration should continue to be held in the future.*

1.2. Profile of ELA Respondents

This report is based on the Tapia Conference survey responses provided by the 95 ELA members of which 65 percent were students and 35 percent were professionals. Figure 1 shows that among professionals, 55 percent were faculty at academic institutions, 18 percent were non-academic scientists, and 27 percent were sponsors, recruiters, and organizers. Among students, 31 percent were undergraduates, 21 percent were working on their master's or professional degree, and 48 percent were Ph.D. students. For tabular data, see Appendix, Table 9 and Table 10. In terms of age, 34 percent of respondents were within the 18-24 age group, 38 percent within the 25-35 group, 13 percent within the 36-45 group, six percent within the 46-55, and nine percent were over 55.

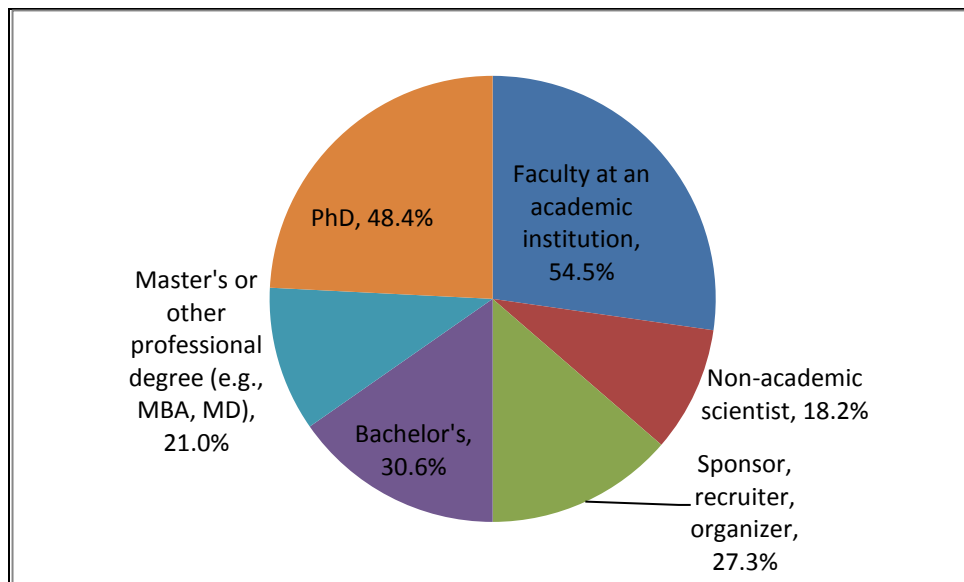


Figure 1: ELA Survey Respondents' Occupations

Respondents were almost evenly split along gender lines for both students and professionals (see Table 11). In regards to race/ethnicity, 32 percent of the respondents were Hispanics and 69

percent were non-Hispanic. Specifically, respondents' race/ethnicity (see Figure 2) composition was 41 percent African American, 28 percent Mexican or other Latin American, 30 percent white, three percent American Indian or Alaskan native, one percent Asian Indian, two percent other Asian, and seven percent another race or ethnicity. In regards to country of citizenship, 83 percent of the students were citizens of the United States and 17 percent from countries other than the United States (Mexico, The Commonwealth of Dominica, Dominican Republic, Laos, El Salvador, Italy, Guatemala, Greece, Ecuador, Canada, and France).

Among the students, 55 students claimed feeling connected with other students in their academic department and 46 students claimed to have connected to faculty in their academic department. This raises the question of whether the ELA reached the students who most need help with retention and has led us (the evaluation team) to recommend the ELA to make the best possible attempt to reach beyond the present population because we argue that *many students do not care to join groups whether related to minority issues or not, and perhaps for various reasons. We are concerned that the students who are presently part of ELA are not the most at risk for attrition. Consequently, raise two fundamental questions for reflection: How will ELA reach the non-joiners? Given that students who attended Tapia claimed to be connected in their departments, is there an alternative to reaching them through advisors, faculty, and fellow students, etc.?*

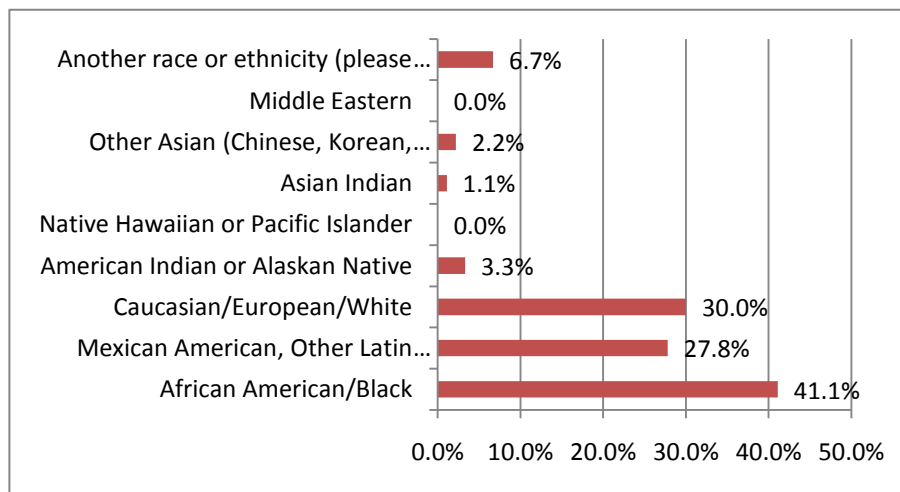


Figure 2: Race/Ethnicity

1.3. Reasons for Attending

The majority, i.e., 55 percent of respondents, attended Tapia for the first time, 22 percent had attended one in addition to Portland, ten percent had attended two, six percent had attended three, and another six percent had attended four (see Appendix, Table 13). *The high percentage of repeat participation suggests that the conference is meeting the needs of a considerable number of participants.* Table 14 (see Appendix) shows that most respondents reported that their most influential reason for attending Tapia was to meet professionals in the field (24%), followed by those who claimed that their most influential reason was to meet other students who are

underrepresented in computing (23%); 16 percent claimed that a professor encouraged them to attend; six percent wanted to meet recruiters for internships, jobs, post-docs, etc.; six percent to see technical presentations, three percent to see keynote; three percent to participate in robotics competition; two percent to attend the doctoral consortium; and, two percent in response to a friend's invitation. *The data suggests that respondents' reason for participating is compatible with the conference's aim of creating opportunities for networking.*

2. COMMUNITY BUILDING/NETWORKING AT AND AFTER TAPIA

Community building is measured by determining how many people one met during the conference, held authentic conversations¹ with, or contacted since the conference. The ELA attendees who responded to the survey seem to have met and conversed with many people they did not already know at Tapia 2009, as shown in Table 1. Both students and professionals newly met and conversed with three or more people—86 respondents met three or more faculty, non-academic researchers, or industry members (in general); 94 respondents met with at least three students for the first time; 81 met with faculty, non-academic researchers, or industry members not from their home department/organization; 87 percent met with at least three students, not from their home institution, for the first time. Not surprisingly, professionals held significantly more conversations with other professionals than did students [$t(81)=3.007, p=.004$].

Table 1: People met and held conversations with at Tapia 2009

	None that I know of	1-2	3-4	5 or more
How many faculty, non-academic researchers, or industry members did you meet for the first time at Tapia 2009?	1	8	24	62
How many students did you meet for the first time at Tapia 2009?	0	1	10	84
With how many faculty, non-academic researchers, or industry members not from your home department/organization did you have a conversation* at Tapia 2009?	1	12	22	59
With how many students not from your home department/organization did you have a conversation* at Tapia 2009?	0	7	12	75

The results in Table 15 (see Appendix) indicate that there is a statistically significant difference between the mean for *authentic conversation with students not from home department/organization* for Hispanics and non-Hispanics ($t = -.979, p = .040$). In other words, non-Hispanic students have a statistically significant higher mean score (3.75) on authentic conversation than Hispanic students (3.62).

¹ Having a conversation was defined explicitly in the survey as “That is, more than ‘hi, nice to meet you’ but truly engage each other about some topic of mutual interest, career or educational goals, etc.”

Survey responses (see Table 2) were received between 15 and 29 days after the conference.² The survey asked what kinds of contacts people had made after they left Portland, with what frequency, and about different purposes. Most professional ELA members, i.e., 29 out of 32 respondents, had gone back to their home institution or organization and talked to their colleagues about it and many, i.e., 19 respondents, had contacted a researcher they met for the first time at Tapia 2009 (19/32). Many had post-conference involvement with students they met in Portland—for instance, 19 communicated with a student about graduate school and 19 had communicated with students about internships. While only six assisted students with graduate application, three invited a student to collaborate on a research project or paper presentation, seven communicated about scholarships, this had happened on numerous occasions.

Table 2: ELA Professional Survey Respondents' Post-Conference Contacts

	Yes, more than once	Yes, on one occasion	No	Not Applicable	Response Count
Spoken to colleagues at my home institution/organization about Tapia 2009.	24	5	2	1	32
Contacted an academic or non-academic researcher I first met at Tapia 2009.	12	9	10	1	32
Communicated with a student I met at Tapia 2009 who is interested in graduate school.	12	5	12	3	32
Assisted a student I met at Tapia 2009 with the graduate school application process.	4	2	22	4	32
Invited a student I met at Tapia 2009 to work with me on a paper/presentation/research project.	1	2	25	4	32
Helped a student I met at Tapia 2009 to find or apply for a scholarship.	4	3	21	4	32
Communicated with students I met at Tapia 2009 about internship opportunities.	11	8	11	2	32

As shown in Table 16 (see Appendix), student respondents were also actively seeking out each other and professionals they had met at the conference. By the time of the survey, more than half of the student respondents had contacted a faculty member they had met at Tapia 2009 and nearly 80 percent of students had contacted a student member they met at least once. More than half of students also reported having contacted industry professionals. It is not possible to know

² There is no statistical difference in responses in comparing the time difference in response.

whether the contact is ongoing, but the relationships have been brokered as a result of participating in the conference.

Overall, the data suggest that Tapia has a very positive impact toward community building among ELA members. Most respondents had told others in their home institution/organization about Tapia and/or communicated with more than one person they had met at Tapia. This is an important landmark and serves as a word-of-mouth advertisement of ELA activities and a possible gateway to widen the community. ELA should maximize on the use of this vehicle by purposefully requesting members to continue to talk to their institution/organizations about ELA activities, in general.

3. PERCEPTIONS AND OUTCOMES FROM TAPIA CONFERENCE ATTENDANCE

Overall, Table 17 (see Appendix) shows that respondents successfully networked at Tapia 2009. That is, close to 100 percent of the professionals and students met, for the first time, at least two other participants (e.g., faculty, non-academic researcher, industry member, and/or student from home institution or not from home institution).

Long-term benefits of participating in Tapia conferences are evident in the fact that those who participated in more than one Tapia conference recognize others (not only from Tapia conferences, but also from other professional or technical events). This sense of lasting benefits of participation is one of keys to building a sense of community and can, if intentionally directed, become a vehicle for the integration of new participants (particularly students) who are just starting to feel this larger community. Table 18 shows that 35 respondents (35/43) felt like they knew someone in Tapia 2009 because they had connected with at least one person at previous Tapia conferences—or had known someone from other professional or technical conferences—and could recognize and talk to them at Tapia.

Another evidence of community resulting from pre-Tapia 2009 networking is seen in the fact that 35 respondents (35/43) had given career or academic advice to at least one person, 32 respondents (32/42) made social plans with at least one person, 32 respondents (32/43) sought career or academic advice from at least one person, 31 respondents (31/43) contacted at least one person about job opportunities, 30 respondents (30/42) contacted at least one person about educational opportunities, one half of respondents (21/42) collaborated in another way—e.g., co-chaired a conference committee—with at least one person, and 24 respondents contacted at least one person about academic employment opportunities. *While the number of collaborations may seem small, given the nature of efforts involved, it is noteworthy that 14 respondents (14/43) collaborated in research, ten respondents co-authored a published research article, 12 respondents co-authored a grant proposal, and seven co-authored another type of published article. This is not to say that the low number of collaborations are the desirable outcome, but to point out that ELA is on the right track in regards to engaging its members in research and grant collaborations.*

4. OUTCOME OF TAPIA 2009

4.1. Students Valued Talks and Professional Connections

Table 3 shows that, as a result of attending the Tapia conference, 32 students claimed to have searched for research articles written by Tapia 2009 presenters/speakers at least once; 32 claimed to have searched for corporate careers; 19 claimed to have applied for employment at a company or organization that had a table at the conference; 22 claimed to have applied for internship or research experience; 18 UG/Masters' students claimed to have inquired about graduate school opportunities. On the other hand, only one UG/Masters' student claimed to have applied to graduate school; and, only two Ph.D. students claimed to have applied for a post-doc opportunity.

Table 3: Post-Conference Connections to Jobs, Research, and Grad School

	More than once	Once	No
Student: I have searched for research articles written by Tapia 2009 presenters/speakers.	12	20	30
Student: I have searched for corporate careers based on information received at Tapia 2009.	22	10	30
Student: I have applied for employment at a company or organization that had a table at Tapia 2009.	6	13	40
Student: I have applied for an internship or research experience I found out about at Tapia 2009.	6	16	37
UG/Masters: I have inquired about graduate school opportunities based on information obtained at Tapia 2009.	14	4	7
UG/Masters: I have applied for graduate school based on information from Tapia 2009.	--	1	21
PhD: I have applied for a post-doc opportunity I found out about at Tapia 2009.	--	2	21

Pertaining to post-Tapia 2009 activities (see Appendix, Table 19), 49 students claimed to have contacted at least one fellow student that they met at Tapia 2009, 37 claimed to have contacted an industry professional they first met at Tapia, 33 claimed to have contacted a faculty member they first met at Tapia, 32 students claimed to have searched for research articles written by Tapia presenters/speakers, 32 claimed to have searched for corporate careers, 22 claimed to have applied for an internship or research experience they found out about at Tapia, and 19 claimed to have applied for employment at a company or organization that had a table at Tapia.

Overall, students valued the presentations at Tapia and showed interest in learning more about the subjects covered by presenters. They also valued the professional connections and sought professional opportunities, as a result. There is still work to be done in regards to motivating students to pursue a graduate degree.

5. CONFERENCE ATTENDANCE CONTRIBUTES TO ELA RETENTION GOALS

Another important outcome of Tapia 2009 can be measured through, among other things, (a) its impact on students' confidence to complete their degree, (b) students' perception of advice received, (c) students' feeling of connectedness to faculty and students, (d) students dedication to complete their degree, and (e) students feeling that they are in the right career. From Table 4 we derive that outcomes of Tapia were that 61 students developed confidence that they will complete their degree; 53 students claimed to have learned about computing career paths; 54 students claimed that technical talks were easy to understand, which implies that the intended messages were communicated effectively between presenters and students; 55 students claimed that Tapia reaffirmed their belief that a computing career is a right fit for them; 51 students claimed to have received valuable advice for getting through their educational program; and 49 students claimed to have increased their dedication to complete their degree.

Table 4: Level of Agreement/Disagreement with the Impact of Tapia

	Disagree strongly	Disagree	Agree	Agree strongly	Don't know/Not applicable	Response Count
I am confident that I will complete my degree.	0	0	7	54	1	62
The technical talks at Tapia 2009 were easy for me to understand.	0	7	25	29	1	62
I received valuable advice at Tapia 2009 for getting through my educational program.	0	3	24	27	7	61
I learned about computing career paths at Tapia 2009.	1	3	29	24	4	61
I feel connected to faculty in my academic department.	2	11	28	18	2	61
I feel connected with other students in my academic department.	1	8	30	22	0	61
Attending Tapia 2009 increased my dedication to complete my degree.	0	6	15	34	5	60
Attending Tapia 2009 reaffirmed my belief that a computing career is right for me.	0	1	23	32	5	61

Out of 32 respondents, there were 14 who inquired about graduate school based on information obtained at Tapia and none applied for graduate school; four inquired about graduate school and one applied (see Appendix, Table 20). Out of 30 respondents (see Appendix, Table 21), seven percent applied once to a post-doctorate and the rest had either not applied (70%) or the question was not applicable to their situation (23%). *This data suggest that there is great need to make students aware of pathways towards graduate school and post-doctoral opportunities. It is*

ELA's intention to increase the numbers of minorities with graduate education in computing, thus focusing on making students aware of graduate and post-graduate opportunities is crucial.

5.1. Professionals

Out of 92 respondents (see Appendix, Table 22), most were very positive about the contribution of ELA. Seventy-eight claimed that participation in ELA gives them a feeling that they can contribute to the success of minority students nationwide; 70 claimed to get a better understanding of how to retain and advance under-represented students in computing; 76 claimed to get an opportunity to give back to the community; and, 75 claimed to get connected to students, post-docs, or future colleagues.

In regards to their overall participation at Tapia 2009 (see Appendix, Table 23), all nine professionals (recruiters/sponsors) who responded to this question agreed to have achieved their goals, six agreed that students valued their organization's sponsorship, seven agreed that conference organizers valued their organization's sponsorship, five agreed college/university faculty valued their organization's sponsorship, and all nine agreed that they would encourage their organization to participate in Tapia again.

Faculty perceived their great accomplishments to include networking, making real connections, seeing students enjoy the conference, seeing students realize the value of their research, etc.. Table 5 provides a summary of faculty perception of their accomplishments at Tapia 2009.

Table 5: Faculty's Perception of Their Great Accomplishment at Tapia 2009

What was your greatest accomplishment at Tapia?
Networking
I made a real connection with a student here at my home university, who I had heard of but hadn't actually met before. She's interested in getting involved in another conference that I'm a part of, not only as a participant but an organizer.
Meeting a McNair student from Kean University, and establishing a relationship with their McNair program. They will be coming to Tufts in the summer for a visit.
UT sponsored 20 students to attend, so I was really happy that the students enjoyed the conference and got so much out of it. A few students have secured summer research program through Tapia.
I think I convinced a graduate student that the position she has been offered at a teaching college could allow her to creatively and productively involve students in authentic, meaningful research that would benefit both the students and her own research agenda.
speaking with the few computational biology students about options

6. INSTITUTIONAL PERCEPTIONS OF CONFERENCES WITH MINORITY FOCUS

One of our concerns, which led us to asking Ph.D. students and academic faculty about perceptions of respondents' colleagues in home institution/organization, was the fact that going to such conferences often draws negative attention to student participants, i.e., such students are seen as "extra needy" and ones that merit "hand-downs." Knowing how their colleagues

(students and faculty) perceive attending minority focused conferences can tell us about the local climate and further our understanding of what it is like to be a minority student, and faculty who supports minority efforts, in majority institutions.

6.1. Faculty Knowledge

Table 6 shows that most faculty members, i.e., 14 out of 23 respondents, claimed that a minority of their colleagues believe that such initiatives are important for helping with their (institution/organization) diversity goals and nine faculty members claimed that it is a majority of their colleagues who believe such initiatives to be important for their diversity goals. Eleven claimed that a minority of their colleagues believe that there is need for such initiatives, while only four claimed that it is a majority who saw the need and seven claimed that none of their colleagues saw the need for such initiatives. Eleven claimed that a minority of their colleagues believe that such initiatives take away attention from a research career, while seven claimed that it was a majority who saw such initiatives as taking away attention from research career and only four claimed that none of their colleagues saw initiatives as taking away attention from research career. Thirteen faculty members claimed that a minority of their colleagues believe that the department/organization should fund travel to these conferences, while six claimed that it is a majority of their colleagues who believe that the department/organization should fund these conferences and only three claimed that none of their colleagues believe that the department/organization should fund the conferences. *The data is evidence that a lot more work needs to be done among faculty in order to mobilize support for diversity efforts. This may be addressed through the ELA SIIGs as they disseminate research-based findings about the scientific contribution that a diverse community of researchers can bring to computing.*

Table 6: Faculty’s Knowledge, Colleagues’ Perceptions of Minority-Centered Conferences

To your knowledge, what are your home institution/organization colleagues' perceptions of conferences intended to retain/advance underrepresented students? My colleagues believe ...					
Answer Options	None of my colleagues	A minority of my colleagues	A majority of my colleagues	All of my colleagues	Response Count
Such initiatives are important for helping with our diversity goals.	0	14	9	0	23
There is no need for such initiatives.	7	11	4	0	22
Such initiatives take away attention from a research career.	4	11	7	0	22
The department/organization should fund travel to these conferences.	3	13	6	0	22

6.2. Students’ Knowledge

Table 7 shows that students are evenly divided in regards to whether a minority or a majority of their peers believe that such initiatives are important for helping with their (institution/organization) diversity goals, four claimed that none of their peers believe such initiatives to be important for their diversity goals, and one claimed that all colleagues believe them to be important. Ten students claimed that a minority of their peers believe that there is need for such initiatives, six claimed that it is a majority who saw the need, seven claimed that none of their peers saw the need for such initiatives, and two claimed that all their peers saw a need for the initiatives. Eleven claimed that a minority of their peers believe that such initiatives take away attention from a research career, five claimed that it was a majority who saw such initiatives as taking away attention from research career, seven claimed that none of their peers saw the initiatives as taking away attention from research career, and three claimed that all their colleagues saw the initiatives as taking away attention from a research career. Eleven claimed that a minority of their peers believe that the department/organization should fund travel to these conferences, five claimed that it is a majority of their peers who believe that the department/organization should fund these conferences, seven claimed that none of their peers believes that the department/organization should fund the conferences, and four claimed that all their peers believe that the department should fund the conference. *While students seem positive about the importance of minority-focused initiatives, the small numbers show that there is still work to be done to bring more students aboard.*

Table 7: Students' Knowledge, Colleagues' Perceptions of Minority-Centered Conferences

To your knowledge, what are your home institution/organization peers' perceptions of conferences intended to retain/advance underrepresented students? They believe ...					
	None of my peers	A minority of my peers	A majority of my peers	All of my peers	Response Count
Such initiatives are important for helping with our diversity goals.	4	11	11	1	27
There is no need for such initiatives.	7	10	6	2	25
Such initiatives take away attention from a research career.	7	11	5	3	26
The department/organization should fund travel to these conferences.	7	11	5	4	27

7. MENTORING

7.1. Mentor Perceptions

Among the nine who responded to the question about mentoring relationship with one or more students in computing, two claimed to have a mentoring relationship and seven to not have a mentoring relationship. Among the 24 who responded to the question about formal mentoring relationships, 20 claimed to have a mentoring relationship and four to not have a mentoring relationship. In regards to non-advisee protégés, five claimed to have more than three protégés, two claimed to have three, five claimed to have two, nine claimed to have one, and one reported

to have none. When asked whether mentors had met their protégé(s) in person, 18 claimed to have met and three to have not.

In regards to actual activities surrounding these mentoring relationships, 13 of the 22 mentors claimed to have set expectations such as frequency of communication, while nine had no expectations set; among those who had set expectations in regards to frequency of communication, six reported to communicate weekly, two to communicate bi-weekly, 11 to communicate once or twice a month, and one to communicate less than once a month. Twelve had set goals, while ten had no goals set; in regards to the time frame of their relationship, one claimed that their relationship was for a lifetime, four set a one year time frame, one set a six months time frame, and 14 did not set a time frame. *The data suggest that a large number of mentors are not meeting the program's guideline of communicating weekly with their protégés, which may be a direct result of lack of set goals for the mentoring relationship. This could also mean that mentors sign up into the program, but do not follow up on their commitment.*

Overall, the majority of mentors agreed that their protégé was responsive to them (20 out of 21 responses) and that they feel comfortable contacting their protégé (19/21), which is supported by the fact that the majority disagreed that their protégé is too busy to be involved in their mentoring relationship (18/21).

Pertaining to configuration of mentoring relationship, 12 of the mentors described a one mentor to one protégé while eight described a one mentor to more than one protégé. Ten claimed that their mentoring relationships were arranged by ELA and 12 claimed that theirs were not.

7.2. Protégé/Student Perceptions

Among the 32 students, 25 percent claimed to have a formal mentoring relationship and 75 to not have a mentoring relationship. Communication with mentor took place via e-mail (67%), in person (17%), and Facebook (6%). All protégés reported to have sought their mentors for help with career advice, 41 percent sought help with relational issues, 47 percent sought help with time management, 29 percent sought help with issues related to race/ethnicity or gender, and 29 percent sought help with relational issues with their advisor. *The high percentage of students who claimed to have no mentoring relationship suggests that there is a need to establish mentoring relationships for more students.*

Thirty-three percent of protégés reported that their formal mentoring relationship was with someone other than their academic advisor, they were evenly split in regards to whether their relationship included set expectations, or not, and 39 percent reported to have set goals in their mentoring relationship. Pertaining to frequency of communication, 22 percent reported to have communicated less than once a month, 39 communicated once or twice a month, 11 percent bi-weekly, 17 percent weekly, and 11 percent never communicated. In terms of time frame of mentoring relationship, 11 percent claimed a lifetime time relationship, 28 percent claimed a six months duration, and 56 claimed to have not set a time frame. Seventy-eight percent have met mentor in person and 22 percent have not. *This data is corroborated by the information provided*

by mentors and confirms the need to work on more effective mentoring that hinges on motivating mentors to keep their commitment to the ELA mentoring guidelines.

Overall, in terms of protégé-mentor relationship, the majority of protégés agreed that the advice their mentor provides is useful (15 out of 18 responses), their mentor shares their knowledge and experiences (15/18), mentor appears to understand what they are trying to tell him/her (15/18), their mentor is responsive to them (15/18), and they feel comfortable contacting mentor (14/17); which is supported by the fact that the majority disagreed that mentor is too busy to be involved in their mentoring relationship (11/18).

Pertaining to configuration of mentoring relationship, 50 percent of protégés described a one mentor to one protégé, 22 percent described a one mentor to more than one protégé, and 17 percent described a peer mentoring configuration. Forty-six percent of mentoring relationships were arranged by ELA and 54 percent were not.

Most students claimed to have used the tips and suggestions sent in e-mail from Dr. Phoebe Lenear, but the majority had not used any of the mentoring resources listed on the ELA website. Students suggested improvements to the mentoring program that included: (a) sharing mentoring the “how to” content; (b) matching students with mentors by research interests; (c) better communication between mentors and protégés; and, (d) continuous update about opportunities.

Overall rating of the value of ELA ranges from fair to excellent. Most students (47%) attribute a rate of *excellent*, 37 percent attribute a rate of *good*, and 10 percent attribute a rate of *fair*.

8. PARTICIPATION IN ELA: QUESTIONS FOR ELA MEMBERS ONLY

8.1. Costs and Benefits of ELA Participation

Fifty-one percent estimated to have spent less than one hour (to none) per month participating in ELA activities, 25 percent estimated to have spent between 1-3 hours per month, 10 percent estimated 4-6 hours, 4 percent estimated 7-9 hours, one percent estimated 10-12 hours, and nine percent estimated more than 12 hours per month.³

The cost of participation in ELA activities was measured by the time taken away from regular responsibilities. Most respondents disagreed that ELA activities took time away from their regular responsibilities. Forty-five percent disagreed that ELA activities took their time away from research; 49 percent disagreed that it takes their time away from participating fully in their school, department, or organization; and, 56 percent disagreed that it takes away their time from their personal life. *Consequently, ELA activities are not a hindrance to members' fulfillment of their regular responsibilities.*

8.2. Use and Perception of ELA Web Presence

³ Reading email, mentoring/being mentored, going to ELA events, planning events, etc.

In regards to visits to ELA website, 16 percent reported to have never visited the ELA website, 37 percent reported visiting the ELA website only when they signed up, 34 percent reported to visit it once a month, six percent reported to visit it once every two weeks, four percent reported to visit it once a week, and two percent reported to visit it daily. Those students who claimed to have used Facebook praise it as a good start toward ELA's greater online presence. Frequency of visits to ELA Facebook showed that 67 percent never visited the site, 25 percent visited it once a month, five percent visited it once every two weeks, one percent visited it once a week and one percent visited it daily. *It is common knowledge that Facebook is one of the most frequently (on a daily basis) used media today, the low numbers of visitors suggest that there may be something uninviting about the site and the high number of those who never visited suggests a lack of awareness of the site's existence or a lack of interest in joining the network for a reason not expressed in the survey. As an effort that is supposed to enhance community building through social networking, it is important to assess further the reason for the low numbers joining ELA's facebook and how to enhance the experience of those who join.*

Various media were used to disseminate ELA activities. A majority (33%) of respondents learned about ELA activities at another conference; followed by those who learned through e-mail announcement from a broadening participation in computing (BPC) group (27%); conversation with a student at their home institution (22%); academic department announcement (18%); conversation with a professor at their home institution (16%); informal conversation at Tapia 2009 conference (15%); formal announcement at Tapia 2009 conference (11%); and, those who learned through an Internet search (5%). For a list of additional sources of dissemination, see comments in appendix (Table 24). Seventy-four respondents manifested interest in receiving e-mail news about ELA members' successes.⁴

9. SUGGESTED IMPROVEMENT

Respondents provided the following suggestions for improvement that would encourage greater industry and sponsor support of Tapia celebration:

- Earlier contact with them.
- Clearly explain the difference between Tapia and Hopper. There is a big difference.
- Give them a less-isolating space than this year's.
- I am not sure. With the economy being what it is, everyone is cutting back. If there is any way to decrease the price that supporters pay in tabling fees and registration costs, that may get a few more people to consider coming. We want to participate in the next conference, and maybe by then financially things will be back to normal, but if not we will have to think hard about attending.

⁴ Grants awarded, degrees awarded, students passed comps, etc.

- Show a video of the enthusiasm of the attendees. It's probably the most fun conference of the year, though it might tie with SACNAS. Both achieve a strong sense of community that makes their conferences strong positive experiences for the attendees.

10. RECOMMENDATIONS

- Develop mechanisms to encourage relationships established at Tapia between students and professionals, but that have not witnessed follow up. One way to do this is to have professionals (faculty and industry representatives) to initiate conversation with students either via e-mail or phone; students may appreciate having a role model, or someone they respect, contact them and find out how they are doing.
- Develop mechanism (not at the level of the current *ELA Online mentoring* platform, but perhaps at an informal level) to nurture relationships established at Tapia between students and professionals that have witnessed some follow up.
- Take advantage of the fact that most professionals were very positive about the contribution of ELA. A large number of professionals claimed that participation in ELA gives them (a) a feeling that they can contribute to the success of minority students nationwide; (b) a better understanding of how to retain and advance under-represented students in computing; (c) an opportunity to give back to the community; and, (d) an opportunity to connected to students, post-docs, or future colleagues. Nurturing this feeling by continuing to engage professionals in ELA activities will keep the link between the value they see in ELA and practical ways they can contribute to ELA's mission.
- Taking advantage of professionals' positive view of participation in ELA, continue to encourage students to apply for internships and employment in companies that have a table at Tapia, but also encourage organizations/companies to organize small employment/internship presentations and screenings/interviews at the conference. These presentations and screenings can be on a pre-registration basis and students who participate can have the opportunity to receive advice on aspects such as how to present themselves when seeking a position, what strengths they have in their resume/vitae, and what specific sub-careers (that is, within computing) are they most likely to get hired for.
- Taking advantage of professionals' positive view of participation in ELA and taking advantage of students' positive experience at Tapia—confidence that they will *complete their degree*, learning about *computing career paths*, reaffirming their belief that a computing career is a right fit for them, receiving valuable advice for getting through their educational program, increasing their dedication to complete their degree, and *connecting to faculty*—ELA should continue to focus on these efforts, i.e., *degree completion, career paths, and connecting to faculty and other professionals*, and create purposeful opportunities for all students to eventually have these experiences.
- Encourage mentors to take the initiative to restore discontinued relationships and continue to nurture ongoing mentor-protégé relationships through the *ELA Online mentoring* and other available platforms. Continue to encourage more frequency of communication between mentor-protégé. The data suggest that a large number of mentors

are not meeting the program's guideline of communicating weekly with their protégés, which may be a direct result of lack of set goals for the mentoring relationship. This could also mean that mentors sign up into the program, but do not follow up on their commitment.

- Consider alternative ways to reach non-Joiners. Many students do not care to join groups whether related to minority issues or not, and perhaps for various reasons. We are concerned that the students who are presently part of ELA are not the most at risk for attrition.
- Build Special Interest and Implementation Groups (SIIGs) in order to facilitate ELA in reaching its objectives. Each SIIG will focus on specific goals such as participating in developing research-based materials to distribute to faculty, chairs, CS researchers, advisors, etc.; running student-professionals (academics and industry) networking sessions in conferences and beyond conferences; leverage research partnerships-by-interest among students, faculty, and industry-based researchers by serving as a research match-maker.
- Investigate (through research) why some relationships, i.e., mentoring and general networking, established at Tapia celebrations work while others do not work over time.
- Investigate the reasons behind the low numbers of ELA facebook joiners and how to enhance the experience of those who join in order to foster the building of an effective community through social networking.

APPENDIX

Table 8: Are You a Student?

	Response Percent	Response Count
Yes	65.3%	62
No	34.7%	33

Table 9: Role at Tapia

	Response Percent	Response Count
Faculty at an academic institution	54.5%	18
Non-academic scientist	18.2%	6
Sponsor, recruiter, organizer	27.3%	9

Table 10: Degree Pursuing

	Response Percent	Response Count
Bachelor's	30.6%	19
Master's or other professional degree (e.g., MBA, MD)	21.0%	13
PhD	48.4%	30

Table 11: Gender

Are you male or female?		
	Response Percent	Response Count
Female	51.1%	47
Male	48.9%	45

Table 12: Satisfaction (Tapia 2009); Likelihood to Attend and to Recommend (Tapia 2011)

Satisfaction with Tapia 2009	
Not at all satisfied	0.0%
Somewhat unsatisfied	3.2%
Somewhat satisfied	25.5%
Very satisfied	71.3%
Likelihood to Attend Tapia 2011	
Not at all likely	2.1%
Somewhat unlikely	3.2%
Somewhat likely	20.2%
Very likely	74.5%
Likelihood to Recommend Tapia 2011	
Not at all likely	0.0%
Somewhat unlikely	2.1%
Somewhat likely	18.1%
Very likely	79.8%

Table 13: Additional Tapia Conferences Attended⁵ and Recommended Growth in Attendance

Additional Conferences	
None: Tapia 2009 in Portland was my first Tapia Celebration of Diversity conference.	54.7%
1 in addition to Portland	22.1%
2 in addition to Portland	10.5%
3 in addition to Portland	6.3%
4 in addition to Portland	6.3%
Recommended Growth in Attendance of Tapia Celebration	
None: it's just the right number of people	29.5%
25-50%	49.5%
75%-100%	11.6%
More than 100%	9.5%

⁵ Prior conferences were held in Orlando (2007), Albuquerque (2005), Atlanta (2003), and Houston (2001).

Table 14: Most Influential Reason for Attending Tapia 2009

	Response Percent
To meet professionals in the field	24.2%
To meet other students who are underrepresented in computing	22.6%
A professor encouraged me to attend	16.1%
Other (please specify)	14.5%
To meet recruiters for internships, jobs, post-docs, etc.	6.5%
To see the technical presentations	6.5%
To hear a keynote speaker	3.2%
The robotics competition	3.2%
Doctoral consortium	1.6%
A friend was going and I wanted to go along with her/him	1.6%

Table 15: Students' Conversation at Tapia 2009—Two Independent Sample t-Test

	Are you Hispanic?	N	Mean	Std. Deviation	Std. Error Mean					
With how many students not from your home department/organization did you have a conversation* at Tapia 2009?	Yes	29	3.62	.728	.135					
	No	61	3.75	.537	.069					
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI of the Difference Lower Upper	
With how many students not from your home department/organization did you have a conversation* at Tapia 2009?	Equal variances assumed	4.328	.040	-.979	88	.330	-.133	.136	-.404	.137
	Equal variances not assumed			-.880	43.036	.384	-.133	.152	-.439	.172

Table 16: ELA Student Survey Respondents' Post-Conference Contacts

Type of post-conference contacts (students)	More than once	Once	No
Student: I have contacted a faculty member I first met at Tapia 2009.	19	14	29
Student: I have contacted a student I first met at Tapia 2009.	30	19	13
Student: I have contacted an industry professional I first met at Tapia 2009.	19	18	25

Table 17: Networking at Tapia 2009

	None that I know of	1-2	3-4	5 or more	Response Count
How many faculty, non-academic researchers, or industry members did you meet for the first time at Tapia 2009?	1	8	24	62	95
How many students did you meet for the first time at Tapia 2009?	0	1	10	84	95
With how many faculty, non-academic researchers, or industry members not from your home department/organization did you have a conversation* at Tapia 2009?	1	12	22	59	94
With how many students not from your home department/organization did you have a conversation* at Tapia 2009?	0	7	12	75	94

Table 18: Networking Resulting from Other Tapia Conferences

	0	1	2	3	more than 3	Response Count
Conducted research?	29	8	1	3	2	43
Co-authored a published research article?	33	4	2	2	2	43
Co-authored another type of published article?	36	2	4	1	0	43
Co-authored a grant proposal?	31	5	3	4	0	43
Collaborated in another way (e.g., co-chaired a conference committee)?	21	7	6	3	5	42
Contacted about job opportunities?	12	9	8	6	8	43
Contacted about educational opportunities?	12	14	4	6	6	42
Contacted about academic employment opportunities?	18	9	4	4	7	42
Sought career or academic advice?	11	11	10	6	5	43
Given career or academic advice?	6	8	6	6	15	41
Connected with at other conferences, and felt like you knew someone there?	8	5	12	5	13	43
Made social plans (e.g., meet for dinner, etc.)?	10	9	5	3	15	42

Table 19: Students' Post-Tapia Activities

	Yes, more than once	Yes, on one occasion	No	Not Applicable	Response Count
I have contacted a faculty member I first met at Tapia 2009.	19	14	29	0	62
I have contacted a student I first met at Tapia 2009.	30	19	13	0	62
I have contacted an industry professional I first met at Tapia 2009.	19	18	25	0	62
I have searched for research articles written by Tapia 2009 presenters/speakers.	12	20	30	0	62
I have searched for corporate careers based on information received at Tapia 2009.	22	10	30	0	62
I have applied for employment at a company or organization that had a table at Tapia 2009.	6	13	40	3	62
I have applied for an internship or research experience I found out about at Tapia 2009.	6	16	37	2	61

Table 20: Inquired/Applied to Graduate School (Post-Tapia 2009)

	Yes, more than once	Yes, on one occasion	No	Not Applicable	Response Count
I have inquired about graduate school opportunities based on information obtained at Tapia 2009.	14	4	7	7	32
I have applied for graduate school based on information from Tapia 2009.	0	1	21	10	32

Table 21: Applied for Post-Doctorate

	Response Percent	Response Count
Yes, more than once	0.0%	0
Yes, on one occasion	6.7%	2
No	70.0%	21
Not Applicable	23.3%	7

Table 22: Level of Agreement/Disagreement about Participation in the ELA

ELA participation gives me...						
	Disagree strongly	Disagree	Agree	Agree strongly	Don't know/Not applicable	Response Count
A feeling that I can contribute to the success of minority students nationwide.	0	2	40	38	12	92
A better understanding of how to retain and advance under-represented students in computing.	1	6	34	36	15	92
An opportunity to give back to the community.	1	2	33	43	13	92
Connections with students, post-docs, or future colleagues.	1	2	30	45	12	90

Table 23: Professionals' (Recruiters/Sponsors) Perceptions about Their Overall Participation at Tapia 2009

	Disagree strongly	Disagree	Agree	Agree strongly	Don't know/Not applicable	Response Count
I achieved my goals with respect to participation at Tapia 2009.	0	0	5	4	0	9
Student attendees at Tapia 2009 valued my organization's sponsorship.	0	0	0	6	3	9
Conference organizers valued my organization's sponsorship at Tapia 2009.	0	0	3	4	2	9
College/university faculty valued my organization's sponsorship at Tapia 2009.	0	0	4	1	4	9
I would encourage my organization to participate in Tapia again.	0	0	5	4	0	9

Table 24: ELA Dissemination, Comments

Other (please specify)
Cynthia Lanius
Directly contacted by ELA
Conversation with a student at another institution
A conversation with Levon Thomas who goes to MIT but is on a break.
a staff from Tapia conference recommended me to apply
an email to the grad student list at my research center
Existing relationships with ELA organizers
I'm not sure. I think it was through an internet search on Tapia and they were somehow linked. I also received an email, but I think this was after I knew about it.
I know the organizers, personally.
I was with ELA from the start.
Eval
My advisor, Richard Tapia
Investigator
Press release on HPCWire
I'm at UT, and we are one of the leadership schools.
Communication with ELA leadership team
Friend
Previous Tapia connection
leadership team