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ePortfolios Reveal an Emerging Community of Underrepresented Minority Scholars

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We used ePortfolios to promote and assess identity change in a summer research program for 81 underrepresented minority community college students. We hypothesized that ePortfolios would increase students' development of academic identity, future orientation, and scholarly community. Students completed weekly ePortfolio journal entries and completed the Twenty Statements Test (in which students complete the statement "I am . . ." 20 times) during the first and final weeks of the program. We found that: (a) both ePortfolio entries and Twenty Statements Tests included increasing references to future orientation; (b) only ePortfolio entries included increasing references to academic identity and scholarly community; (c) changes reflected in ePortfolios were independent of changes evidenced in the Twenty Statements Tests; and (d) individual responses to both ePortfolios and the Twenty Statements Tests showed stability over time. We hypothesized that the inclusion of ePortfolios enhanced students' experience in our program. Similar types of identity shift are likely to be present in many high impact activities (e.g., internships, study abroad, learning communities). The use of ePortfolios in these contexts could have similar value.

> As a transfer, yes I have attended college before. The issue is that it was a community college . . . While Freshmen have activities and events to attend to acquaint them with living within what is basically a community, there wasn't much to guide me. (Response to Transfer Student Survey, 2012)

> We are the oddball add-ins who have to adjust quickly to things we don't exactly know or understand. (Response to Transfer Student Survey, 2012)

As is reflected in the quotes above, transferring can be stressful. Many transfer students struggle to form new friendships and navigate their new campuses. They may experience a temporary dip in grade-point average (GPA; Thurmond, 2007) and struggle to become engaged (Terris, 2009). Underrepresented minority (URM) students who transfer to schools that have a limited minority presence often struggle to acclimate (Lee, 2001). URM women transferring from community colleges to four-year institutions in the fields of science, technology, engineering, and math (STEM) appear to have an especially difficult period of adaptation (Reyes, 2011). The presence of a critical mass of URM students and faculty has been associated with higher levels of student success (Hagedorn, Chi, Cepeda, & McLain, 2007). Schools that lack critical mass must find other ways to support URM students. We explore the use of ePortfolios during an intensive summer program as a means of supporting URM students.

Participation in research is a high-impact activity that increases student learning as well as engagement with the sciences (Lopatto, 2010; Russell, Hancock, & McCullough, 2007). High impact experiences appear to be especially helpful in improving academic persistence among URM and first generation students (Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008). Participation in research improves the persistence of URM women who begin their studies at community colleges (Jackson, Starobin, & Laanan, 2013) and has been associated with higher levels of perceived support and academic persistence among students from underrepresented groups (Barlow & Villarejo, 2004; Maton & Hrabowski, 2004; Yelamarthi & Mawasha, 2008). Research experiences that are incorporated into academic courses can produce similar benefits (Lopatto, 2010; Nadelson, Walters, & Waterman, 2010). Research experiences help students to develop an academic identity, which increases URM student persistence in STEM disciplines (Jackson et al., 2013). We hypothesize that the creation of an enduring record, such as an ePortfolio, will stimulate the development of academic identity both during the summer experience and after it has been completed. Further, as students share their ePortfolios with others, social support for their emerging identities will follow.

ePortfolios are useful as a means of documenting learning from non-traditional activities, such as an intensive research experience (Wang, 2009) and are hypothesized to support reflection, engagement, and active learning (Yancey, 2009). There is evidence that ePortfolios help both students and faculty evaluate growth and reflect on students' academic achievements (Buzzetto-More, 2010). Skiba (2005) suggested that ePortfolios are useful as a means of encouraging students to assess their own strengths and weaknesses as they construct meaning from their academic experiences. Buzzetto-More (2010) found that 88% of students who had created an ePortfolio believed it encouraged them to think about what they had learned.

ePortfolios also appear to be well-suited to helping students develop future goals (Barrett, 2004). If used during a high impact experience that includes a majority of URM students, we hypothesize that ePortfolios will help students to establish a sense of belonging to an URM community of scholars.

The Baccalaureate and Beyond Program

Since 2000, Purchase College of the State University of New York has offered the Baccalaureate and Beyond (B&B) program to support URM students as they transition from community colleges to four-year institutions. Initially established to improve the success of URM students in STEM disciplines, the B&B summer program expanded in 2007 to include students from all liberal arts disciplines. Each year, the program serves approximately 40 students from six community colleges. The students participate in a five-week residential summer program. To qualify, students must be from an URM group, have demonstrated financial need, or have parents who did not attend college. Additionally, students must be 18 or older, have completed at least one semester as a full-time student at a partnering community college, and have a minimum GPA of 2.8. Students are selected for the program after a review of their applications, which include transcripts, a personal essay, and a letter of recommendation. Participating STEM students work in small lab groups to conduct original research in biology, chemistry, cognitive psychology, computer science, environmental science, or neuropsychology. Humanities and social science students complete an upper-level interdisciplinary course on identity that is co-taught by a psychologist and a journalist. These students spend half of each day in a small seminar class and the remainder of the day working on an independent research project on a topic related to the theme of identity. Students meet individually with the faculty as they work on their independent projects. All students receive stipends that enable them to dedicate themselves full-time to the program. These intensive educational experiences are the first chance many of the students have had to fully immerse themselves in a scholarly pursuit.

Students are accepted into the program and attend a one-day orientation during the spring semester. At the orientation, students are welcomed to the program and told that it will be an opportunity for them to form a different sort of community—one that is centered around shared learning. During the summer program the development of scholarly community is encouraged during research meetings, field trips, and workshops. Group and individual advising sessions are designed to encourage academic planning, refinement of career goals, and preparation for transfer by providing a roadmap for success. The development of identity is stimulated by explicit reflection on the academic nature of the program. Students are encouraged to take academic risks and explicitly told that they will receive the support necessary to help them succeed. Since the summer of 2012, we have utilized ePortfolios to support and assess students' scholarly development and reflection. The program culminates with a conference at which students present their research, sharing their academic identity with family members, friends, and representatives from their home institutions.

The B&B program has served over 450 students, 73% of whom have transferred to four-year institutions. This transfer rate is substantially higher than rates generally reported for community college students. For example, Hossler et al. (2012) reported that only 26% of community college students transfer to four-year-schools within five years. This rate may have been depressed by the fact that many students at community colleges only plan to complete associate's degrees. However, even among students who express the intention to obtain a bachelor's degree, the transfer rate is only 36% (Mullin, 2012).

We have observed changes in academic identity and future orientation in our students. Five years ago, we began collecting data on identity shift using the Twenty Statements Test (Kuhn & McPartland, 1954). Students completed the phrase "I am" twenty times, once during the first week and once during the final week of the program. Students were instructed to complete the measure quickly; the only restriction was that they must finish the phrase differently in each of the twenty responses. We found that by the end of the program, students were more likely to describe themselves in academic ways (e.g., as "scholars," "lab rats," and "geeks") than they were at the beginning of the program. They were also more likely to describe their long-term goals (e.g., to "be a scientist," "make a difference," or "get my degree") than to focus on their current status (Singer-Freeman & Bastone, 2011, 2013; Singer-Freeman, Bastone, & Skrivanek, 2014). Miller and Morgaine (2009) found that the reflective practices embedded in ePortfolio creation helped students to develop an academic identity as they engaged in complex projects. Thus, the inclusion of ePortfolios into our program seemed likely to encourage the development of academic identity in our students.

The constructs of academic identity and future orientation are similar to those of academic self-efficacy and academic goals, which have been found to be moderately related to academic persistence (Robbins et al., 2004). We believe that the development of a sense of academic identity and future orientation will support students' identity as a member of a community of scholars. We hypothesize that these identity shifts will support persistence in the face of the difficulties

that students are likely to encounter upon transfer. Accordingly, we have sought other ways to develop and assess these characteristics.

In the current work, we describe our use of ePortfolios to support reflection and assess changes in students' identity. Although students included evidence of learning as well as reflective writing in their ePortfolios, we focus the current work on the reflective writing, as we believe that this constitutes a unique contribution to the existing literature on ePortfolios (see Bastone, 2013 for a summary of our learning outcomes data). We compare differences between identity shifts that are documented in ePortfolios to those seen in the Twenty Statements Test. We hypothesized that: (1) over time, students' ePortfolios would show increased evidence of academic identity, future orientation, and scholarly identity; (2) over time, students' Twenty Statements Tests would show increased evidence of academic identity and future orientation; (3) within individual measures, individual students would show continuity over time; and (4) individual students' responses to the two measures would be related.

Method

Participants

The B&B program included 45 students in 2012 and 42 students in 2013. We included in our analyses all participants who either: (a) produced at least one journal entry during the first two weeks of the program and one entry during the final two weeks of the program; or (b) completed both Twenty Statements Tests. This resulted in a sample of 81 students (54 females and 27 males), with 41 students from 2012 and 40 from 2013. Forty-three participants were working in laboratory groups and 38 were enrolled in the interdisciplinary class. Our sample included 41 African Americans, 24 Latinos, 12 Caucasians, three Asians, and one Native American. Of the 81 students in our sample, 74 completed the Twenty Statements Tests and 60 completed the ePortfolio journal entries. Fifty-four students completed both measures at both times. This subset included 21 students from 2012 and 33 students from 2013 (29 working in laboratory groups and 25 enrolled in the interdisciplinary class).

Procedure

ePortfolios. We introduced the program cohort to the Mahara ePortfolio system during the second day of the summer program in 2012 and 2013. We suggested that ePortfolios could become students' social media pages for their scholarly identities. At the initial ePortfolio workshop, students created ePortfolio pages, wrote journal entries describing their first few days in the program, and uploaded the program learning goals (see Table 1 for science learning goals). Following the first meeting, we held weekly workshops in which students wrote journal entries and uploaded evidence of their learning, such as annotations of research articles, written assignments, lab notes, current résumés, photographs and videos of their lab work and projects, and PowerPoint presentations. In 2013, during the first ePortfolio meeting we also asked students to write a reflective essay describing the best class they had ever taken and reminded students to journal at each subsequent meeting. In all other ways, the same protocol was followed both years.

The Twenty Statements Test. Both years, students completed the Twenty Statements Test on the second and the third-to-last days of the program. Students were encouraged to complete the measure as quickly as they could and were asked to describe themselves as they would to a person they were meeting for the first time. In 2012, students completed paper versions of the test. The first test was completed during a scavenger hunt (the same protocol that had been used in previous years), and the final version was completed during a group meeting. In 2013, students completed both tests electronically in a computer lab. The first test was completed at the same time as a reflective survey, and the final test was completed during the final ePortfolio session.

Coding. Students produced between zero and nine journal entries. There was a great deal of variability in the first date of journaling and the initial frequency of journaling. Accordingly, we averaged responses to all entries that occurred within the first two weeks of the program to create an Initial score and entries that occurred in the final week to create a Final score. We coded journal entries for the number of times they referred to: (a) academic identity, through references to scholarly thoughts or accomplishments; (b) future orientation, reflected in statements describing long-term goals and plans; and (c) scholarly community, indicated by statements describing relationships in the context of learning. Every sentence clause was coded as a single element. A single clause could be counted as an instance of more than one coding category. For example, "I am going to do better in school next year" would be coded as evidence of both academic identity and future orientation. Several students included the research abstract that was published in our conference program in their final journal entry. This was coded as a single reference to academic identity in order to avoid inflating academic identity references in the final journal entries.

We calculated initial and final scores for the Twenty Statements Test. Responses were coded into 30 categories that were then collapsed into two variables of interest: (a) academic identity, including references to

Table 1
Learning Outcomes for Science Students

Portfolio sections	Competencies/learning outcomes	Types of evidence
Foundations	Identifies hopes and goals for experience	Reflective journal entry
	Identifies relevant prior coursework and other experiences	
Research design	Understands goals of the project	Interim and final reports
	Understands research design	Entries in journal
	Articulates research hypothesis being tested	
	Understands how design allows hypothesis to be tested	
Literature	Is familiar with important research in the area	Annotations
	Understands contribution to existing knowledge	Interim and final reports
Research skills	Acquires hands-on lab skills	Experimental results
	Successfully uses more complicated equipment	Interim and final reports
	Demonstrates appropriate lab behavior and safety	
	Demonstrates good lab notebook skills	
	Performs calculations for making samples	
	Organizes and interprets data, communicates results	
Drafts/revisions	Works with team to draft research abstract	Abstract
	Works with team to draft final presentation	Interim and final reports
	Uses faculty feedback to revise work	Submissions to conferences
Final presentation	Presents work orally with confidence and clarity	Final report
Scholarly identity	Masters lab/field work etiquette	Journal entries
	Develops collaboration skills	Interim and final reports
	Develops confidence in sharing ideas in group	
	Makes plans for academic future	
	Refines ideas about possible careers	
	Identifies learning and insights from experience	
	Identifies impact of experience on future plans	

academic skills and academic roles; and (b) future orientation, reflected in statements describing long-term goals and plans. As was the case for the ePortfolio coding, a single clause could be counted as an instance of more than one coding category. Our coding criteria for academic identity and future orientation were designed to measure the same underlying constructs in ePortfolios and the Twenty Statements Test. However, scholarly community was only examined in the ePortfolio journal entries.

Results

ePortfolios

The average number of times students referred to academic identity, future orientation and scholarly community in ePortfolios are reported as a function of program and time in Table 2. As can be seen in Table 2, students in both programs (lab and class) increased in the expression of all measured variables over the course of the program. It is also clear that references to academic identity are more common than references to future orientation or scholarly community. We calculated a mixed between-within subjects analysis of variance (ANOVA) to assess the impact of the two programs (lab, class) on each of our three identity variables (academic identity, future orientation, scholarly identity) across the two time periods (initial, final) during the two years in which ePortfolios were created (2012, 2013). We also calculated correlations to assess the relationship between individual references to our variables across time and tasks (see Tables 3 and 4).

Academic identity. There were no significant interactions among time, program, and year. We observed a main effect for time, Wilks' Lambda = .90, $F(1,56) = 6.12$, $p < .05$, partial eta squared = .10, with the average number of references to academic identity rising from 3.9 to 4.75. We also observed a main effect for year, $F(1,56) = 6.20$, $p < .05$, partial eta squared = .10, with the average number of references to academic identity being higher in 2013 (4.58) than in 2012 (3.78). Not surprisingly, we observed a significant correlation between references to academic identity in the ePortfolios during the initial and final weeks, $r(60) = .46$, $p < .001$. There was continuity in the extent to which individual students expressed academic identity over time. However, there was no observed relationship between expressions of academic identity in the Twenty

Table 2
References to Academic Identity, Future Orientation, and Scholarly Community in ePortfolios

	Initial		Final	
Measure	*M*	*SD*	*M*	*SD*
Academic Identity	3.90	2.23	4.75	2.41
Lab Students (*n* = 30)	3.84	2.51	5.00	2.81
Class Students (*n* = 31)	3.95	1.96	4.52	1.99
Future Orientation	.32	.57	.61	.87
Lab Students (*n* = 30)	.33	.57	.66	1.08
Class Students (*n* = 31)	.31	.42	.56	.63
Scholarly Community	.48	.64	1.27	1.21
Lab Students (*n* = 30)	.59	.73	1.69	1.31
Class Students (*n* = 31)	.37	.53	.87	.97

Table 3
Correlations over Time within Measures

Measure		Initial-Final	*p* value
ePortfolio	Academic identity	.46	< .0001
	Future orientation	.22	.09
	Scholarly community	.20	.14
Twenty Statements	Academic identity	.35	.003
	Future orientation	.32	.005

Table 4
Correlations between Measures

Measure		ePortfolio-Twenty Statements	*p* value
Academic Identity	Initial	-.08	.57
	Final	.11	.44
Future Orientation	Initial	.24	.08
	Final	-.04	.75

Statements Test and similar expressions in the ePortfolios (see Table 4).

Future orientation. There were no significant interactions among time, program, and year. We observed a main effect for time, Wilks' Lambda = .91, $F(1,56) = 5.62$, $p < .05$, partial eta squared = .09, with the average number of references to future orientation rising from .32 to .61. There were no other significant main effects. Future orientation, as expressed in the ePortfolio during the initial weeks, was not related to expressions of future orientation in the ePortfolio during the final week or to responses reflecting a future orientation in the Twenty Statements Test (see Tables 3 and 4).

Scholarly community. There were no significant interactions among time, program, and year. We observed a main effect for time, Wilks' Lambda = .70, $F(1,56) = 23.58$, $p < .001$, partial eta squared = .30, with the average number of references to scholarly community rising from .48 to 1.27. We also observed a main effect for program, $F(1,56) = 6.98$, $p < .01$, partial eta squared = .11, with the average number of references to scholarly community being higher in students who were engaged in lab science (1.11) than in those who were in the interdisciplinary class (.61).

Twenty Statements Test

The average number of times students referred to academic identity and future orientation in response to the Twenty Statements Test are reported as a function of year and time in Table 5. As can be seen in Table 5, it appears that the results differed as a function of Year. When compared to the ePortfolio entries, there appears to be less of an emphasis on academic identity and more frequent expressions of future orientation. We calculated a mixed between-within subjects ANOVA to assess the impact of the two programs (class, lab) on each of our two variables (academic identity, future orientation) across the two time periods (initial, final) during the two years in which ePortfolios were created (2012, 2013).

Academic identity. There were no significant interactions among time, program, and year. We observed

Table 5
References to Academic Identity and Future Orientation in Twenty Statements Test

	Initial		Final	
Measure	*M*	*SD*	*M*	*SD*
Academic Identity	2.55	1.72	2.74	1.77
2012 (*n* = 38)	2.11	1.35	2.50	1.74
2013 (*n* = 36)	3.03	1.95	3.00	1.79
Future Orientation	.91	1.27	1.72	1.87
2012 (*n* = 38)	.26	.60	1.34	1.48
2013 (*n* = 36)	1.58	1.44	2.11	2.16

observed a significant main effect for year, $F(1,70) = 4.60$, $p < .05$, partial eta squared = .06, with the average number of references to academic identity being higher in 2013 (3.01) than in 2012 (2.31). We did not observe an effect of time. Responses showing academic identity were not significantly higher in the final week (2.74) than the initial week (2.55). Not surprisingly, we observed a significant correlation between references to academic identity in the Twenty Statements Test during the initial and final week, $r(74) = .35$, $p < .01$. Students who expressed academic identity during the initial week were more likely to express similar sentiments during the final week. There was no observed relationship between expressions of academic identity in the Twenty Statements Test and similar expressions in the ePortfolios (see Table 4).

Future orientation. There were no significant interactions among time, program, and year. We observed a main effect for time, Wilks' Lambda = .84, $F(1,70) = 13.41$, $p < .001$, partial eta squared = .16, with the average number of references to future orientation rising from .91 to 1.72. We also observed a significant main effect for year, $F(1,70) = 13.82$, $p < .001$, partial eta squared = .17, with the average number of references to future orientation being higher in 2013 (1.85) than in 2012 (.82). There were no other significant main effects. As expected, we observed a significant correlation between references to future orientation in the Twenty Statements Test during the initial and final week, $r(74) = .32$, $p < .01$. Students who expressed future orientation during the initial week were more likely to express similar sentiments in the final week.

Sex Differences in ePortfolios and Twenty Statements Test

In order to examine whether sex influenced responses, we calculated the average number of times men and women referred to academic identity, future orientation, and scholarly community in ePortfolios and Twenty Statements Tests (see Table 6). We calculated a mixed between-within subjects ANOVA to assess the impact of sex (female, male) on each of our three identity variables (academic identity, future orientation, scholarly identity) across the two time periods (initial, final) in ePortfolios. We failed to observe any significant main effects of sex or interactions involving sex. We calculated a mixed between-within subjects ANOVA to assess the impact of sex (female, male) on each of our two identity variables (academic identity, future orientation) across the two time periods (initial, final) in the Twenty Statements Tests. We failed to observe any significant main effects of sex or interactions involving sex.

Discussion

In the current work, we used ePortfolios and the Twenty Statements Test to assess changes in URM community college students' identities over the course of a 5-week summer program. As hypothesized, we found evidence that ePortfolios documented increases in academic identity, future orientation, and scholarly community. We observed continuity in the ePortfolios over time in individual students' sense of academic identity, but not future orientation or scholarly community.

It is not surprising that those who were more academically oriented when the program began would remain so at the end of the program. However, for many, the program offers a first opportunity to develop an identity as a member of a community of scholars. We also provide workshops and individual advising that support students as they refine their future goals. Our finding that students received very low scores for future orientation and scholarly identity during the initial weeks raises the possibility that as the program progresses, these aspects of identity may develop for the first time in many of our students. The nature of journaling may also influence the patterns of continuity and discontinuity observed in individual responses. Because journaling involves reflection on present experiences, entries created at the beginning of a program are less likely to express a focus on a future beyond the program than are later entries. Thus, our

Table 6
Women's and Men's Responses to ePortfolios and the Twenty Statements Test

		Initial		Final	
Measure		*M*	*SD*	*M*	*SD*
ePortfolios	Academic Identity				
(*n* = 60)	Females (*n* = 42)	4.19	2.21	4.89	2.61
	Males (*n* = 18)	3.22	2.18	4.42	1.91
	Future Orientation				
	Females (*n* = 42)	.33	.62	.70	.97
	Males (*n* = 18)	.28	.43	.39	.53
	Scholarly Community				
	Females (*n* = 42)	.48	.63	1.36	1.14
	Males (*n* = 18)	.47	.67	1.06	1.36
Twenty	Academic Identity				
Statements Test	Females (*n* = 51)	2.31	1.63	2.71	1.83
(*n* = 74)	Males (*n* = 23)	3.09	1.83	2.83	1.67
	Future Orientation				
	Females (*n* = 51)	.88	1.29	1.53	1.46
	Males (*n* = 23)	.96	1.26	2.13	2.55

observed increase in future orientation may have been an artifact of our coding criterion, which only classified statements as future orientation if they referred to long-term goals and plans.

We only partially replicated our previous findings using the Twenty Statements Test. We observed continuity over time in individual students' expressions of academic identity and future orientation. This consistency is not surprising; given that The Twenty Statements Test was designed to measure self-attitudes, some stability is to be expected (Kuhn & McPartland, 1954). We found evidence of increased future orientation but not of academic identity. We also found that there were more references to both academic identity and future orientation in 2013 than in 2012. Responses were probably influenced by the way in which the test was administered. In 2012, students wrote responses in sessions that did not include any other writing or reflection. In 2013, students responded on computers as a part of sessions that included a reflective survey (during the first session) and ePortfolio journaling (during the final session). Administering the test in a more academic context (on computers in a classroom) may have evoked higher levels of academic orientation during the initial session than we had seen previously. In our prior research, initial academic orientation scores had hovered around two and had increased to numbers approaching three in the final week (Singer-Freeman & Bastone, 2011, 2013). Comparing our current results to our previous findings, we believe that the major difference is an elevation of the initial sense of academic identity in 2013. We hypothesize that presenting the Twenty Statements Test in an academic context encouraged a more elaborated sense of academic identity. Alternatively, it is possible that the academic context functioned as a demand characteristic, evoking a larger number of academic self-descriptions that do not reflect true identity.

We hypothesized that ePortfolios would both provide new evidence of scholarly community and replicate evidence of academic identity and future orientation. Unexpectedly, the ePortfolios and the Twenty Statements Test reflected different student identities. Students' responses to both measures included evidence of both academic identity and future orientation. However, individual students responded in dissimilar ways to the ePortfolios and the Twenty Statements Test, suggesting that together the two may paint a more accurate picture of student growth than either would have alone. As expected, the ePortfolios provided evidence of a developing sense of scholarly community, which was not reflected in responses to the Twenty Statements Test. The public nature of ePortfolios may encourage reflection on community in ways that the relatively private Twenty Statements Test does not. It should be noted, however, that because all students completed ePortfolios, we do not have a comparison group. Thus, we cannot conclude that the creation of ePortfolios caused or increased the development of scholarly identity. Further, if ePortfolios enhance students' academic identity or future orientation, we might expect to see a larger increase in the expression of these constructs in the Twenty Statements Test in the current time period than we had seen previously. Although we did not compare responses to the measure in the current time period to the responses obtained prior

to the introduction of ePortfolios, the final rates of academic identity and future orientation are very similar to earlier rates. Thus, it does not appear that ePortfolio creation increases students' sense of academic identity or future orientation. In order to examine more fully the impact of ePortfolio journaling on identity shift, it would be useful to compare the responses of the students in the current study to a group of students who created ePortfolios over five weeks in which they were not in an intensive summer program and to a group of students who kept private journals over the five weeks in which they participated in our intensive summer program.

We hypothesize that ePortfolios may contribute to students' developing sense of scholarly community. Students in both programs made increased references to scholarly community by the end of the program. Interestingly, science students made more frequent references to scholarly community than did students in the identity course. Students working on science projects worked intensively with three other students and a faculty member. Their efforts were united by a common goal. This setting may be particularly conducive to the formation of a scholarly community. In 2012, four out of six science lab groups chose to create group pages in addition to their individual pages. In 2013, we explicitly discouraged the creation of group pages in order to encourage attention to individual pages. However, students continued to review each other's pages, sharing images within lab groups and teaching each other ways to improve page design and content. Because only a small percentage of program alumni transfer to our college, the maintenance of a sense of scholarly community is best achieved electronically. Although we have not yet collected data that allow us to assess changes in scholarly community, we have observed increased activity on our program's social media page over the last two years. This increased online presence suggests that our recent alumni continue to benefit from and actively maintain their membership in a community of scholars.

It is important to note that increased academic identity and future orientation may be most useful when coupled with increased awareness of the steps that must be taken to meet academic goals. Oyserman, Bybee, Terry, and Hart-Johnson (2004) found that at-risk high school students benefitted most from the generation of academic possible selves when these possible selves could be used as self-regulators (e.g., increasing study time). Students also benefitted from feedback on current abilities and information about how to reach their academic goals. Although we did not measure students' developing strategies, our program is designed to encourage students to develop their own roadmaps for academic success. The supportive workshops and advising that are at the core of our program probably increase the effects of the identity shifts that we have seen. The use of ePortfolios to create academic roadmaps has been successfully piloted at Salt Lake City Community College (Hubert, 2013), and has the potential to help our students to actualize their academic goals. In future work, we plan to promote strategy development more fully by having students incorporate individualized academic roadmaps into their ePortfolios.

The inclusion of ePortfolios appears to have enhanced URM students' experience in the program and has provided us with another window into their developing identities as they engage in undergraduate research, one high-impact practice promoted by the Association of American Colleges and Universities (Kuh, 2008). It is worth noting that we saw identity shifts in students regardless of the program in which they were participating. There is evidence showing the efficacy of intensive summer research programs in encouraging transfer and graduation among URM community college students (Jackson et al., 2013). Less is known about the effects of other types of intensive summer experiences on URM students. We believe that key elements of both programs include complete academic immersion, encouragement of academic risk taking, focus on developing a community of scholars, and advising sessions that encourage academic planning. Identity shifts similar to those evidenced by our students might be present in other high-impact activities (e.g., internships, diversity/global learning, and learning communities), and the use of ePortfolios could have similar value in these contexts.

In the future, we plan to test our hypothesis that identity shifts are associated with increased academic persistence and success. We are hopeful that students will return to their ePortfolios and continue to feel connected to the community of scholars documented therein. Should this sense of connection be maintained, we hypothesize that it will support students as they transfer to institutions that lack a critical mass of URM students and faculty. An enhanced sense of academic identity and future orientation may buffer students against the challenges they are likely to face upon transfer to four-year institutions that lack critical mass (Jackson et al., 2013).

References

Barlow, A. E. L., & Villarejo, M. (2004). Making a difference for minority students; evaluation of an educational enrichment program. *Journal of Research in Science Teaching, 41*, 861-881.

Barrett, H. (2004). *Electronic portfolios as digital stories of deep learning*. Retrieved from http://electronicportfolios.org/digistory/epstory.html

Bastone, L. (2013, July). *Intended and unintended consequences of using e-portfolios to document and*

assess DQP applied learning outcomes. Paper presented at the Association of American State Colleges and Universities Academic Affairs Summer Meeting, Baltimore, MD.

Buzzetto-More, N. (2010). Assessing the efficacy and effectiveness of an e-portfolio used for summative assessment. *Interdisciplinary Journal of E-Learning and Learning Objectives, 6,* 61-85.

Hagedorn, S., Chi, W., Cepeda, R., & McLain, M. (2007). An investigation of critical mass: The role of Latino representation in the success of urban community college students. *Research in Higher Education, 48*(1), 73-91. doi:10.1007/s11162-006-9024-5

Hossler, D., Shapiro, D., Dundar, A., Ziskin, A., Chen, J., Zerquera, D., & Torres, V. (2012). *Signature report: Transfer and mobility: A national view of pre-degree student movement in postsecondary institutions*. Retrieved from http://pas.indiana.edu/pdf/Transfer%20&%20Mobility.pdf

Hubert, D. (2013). E-portfolios in student roadmaps at Salt Lake Community College. *Peer Review, 15*(2), 25-26.

Jackson, D. L., Starobin, S. S., & Laanan, S. L. (2013). Shared experiences: Facilitating successful transfer of women and underrepresented minorities in STEM fields. *New Directions for Higher Education, 162,* 69-76. doi:10.1002/he.20058

Kuh, G. D. (2008). *High-impact educational practices: What they are, who has access to them, and why they matter*. Washington, DC: Association of American Colleges and Universities.

Kuh, G. D., Cruce, T. M., Shoup, R., Kinzie, J., & Gonyea, R. M. (2008). Unmasking the effects of student engagement on first-year college grades and persistence. *Journal of Higher Education, 79*(5), 540-563. Retrieved from http://www.jstor.org/stable/25144692

Kuhn, M. H., & McPartland, T. S. (1954). An empirical investigation of self-attitudes. *American Sociological Review, 19*(1), 68-76. doi:10.2307/2088175

Lee, W. (2001). Toward a more perfect union: Reflecting on trends and issues for enhancing the academic performance of minority transfer students. *New Directions for Community Colleges, 114*, 39-44. doi:10.1002/cc.19

Lopatto, D. (2010). Undergraduate research as a high-impact student experience. *Peer Review, 12,* 27-30.

Maton, K. I., & Hrabowski, F. A., III. (2004). Increasing the number of African American PhDs in science and engineering. *American Psychologists Association, 59*(6), 547-556. doi:10.1037/0003-066X.59.6.547

Miller, R., & Morgaine, W. (2009). The benefits of e-portfolios for students and faculty in their own words. *Peer Review,* 11(1), 8-12.

Mullin, C. M. (2012, October). Transfer: An indispensable part of the community college mission (Policy Brief 2012-03PBL). Washington, DC: American Association of Community Colleges. Retrieved from http://www.aacc.nche.edu/Publications/Briefs/Documents/AACC_Transfer_to_LUMINA.pdf

Nadelson, L. S., Walters, L., & Waterman, J. (2010). Course-integrated undergraduate research experiences structured at different levels of inquiry. *Journal of STEM Education, 11*(1-2), 27-44.

Oyserman, D., Bybee, D., Terry, K., & Hart-Johnson, T. (2004). Possible selves as roadmaps. *Journal of Research in Personality, 38*, 130-149. doi:10.1016/S0092-6566(03)00057-6

Reyes, M. (2011). Unique challenges for women of color in STEM transferring from community colleges to universities. *Harvard Educational Review, 81,* 241-263.

Robbins, S. B., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. *Psychological Bulletin, 130*(2), 261-288. doi:10.1037/0033-2909.130.2.261

Russell, S. H., Hancock, M. P., & McCullough, J. (2007). Benefits of undergraduate research experiences. *Science, 316,* 548-549. doi:10.1126/science.1140384

Singer-Freeman, K. E., & Bastone, L. (2011, May). *I am . . . a college graduate: Summer bridge programs cause identity shifts.* Poster presented at the 23rd Annual Convention of the Association for Psychological Science, Washington DC.

Singer-Freeman, K. E., & Bastone, L. (2013, May). *Oh the places you'll go: Identity shift in a summer research program.* Poster presented at the 25th Annual Convention of the Association for Psychological Sciences, Washington, DC.

Singer-Freeman, K. E., Bastone, L., & Skrivanek, J. (2014). Using e-portfolios to support transfer student success. *Diversity and Democracy, 17,* 14-15. Retrieved from www.aacu.org/diversitydemocracy/vol17no1/singer-freeman_bastone_skrivanek.cfm

Skiba, D. J. (2005). E-portfolios, webfolio, and e-dentity: Promises and challenges. *Nursing Education Perspectives, 26*(4), 246-247. Retrieved from http://www.questia.com/library/journal/1P3-869718301/e-portfolios-webfolio-and-e-dentity-promises-and

Terris, B. (2009, November 8). Transfer students are less likely to take part in "high impact" activities. *Chronicle of Higher Education*. Retrieved from http://chronicle.com/article/Transfer-Students-Are-Less/49070/

Thurmond, K. C. (2007). *Transfer shock: Why is a term forty years old still relevant?* Retrieved from

http://www.nacada.ksu.edu/Resources/Clearinghouse/View-Articles/Dealing-with-transfer-shock.aspx

Wang, S. (2009). Inquiry directed organization of e-portfolio artifacts for reflection. *International Journal of E-Learning and Learning Objectives*, 5, 421-433.

Yancey, K. (2009). Electronic portfolios a decade into the twenty-first century: What we know, what we need to know. *Peer Review, 11*(1), 28-32. Retrieved from https://www.aacu.org/peerreview/pr-wi09/Yancey.cfm

Yelamarthi, K., & Mawasha, R. (2008). A pre-engineering program for the underrepresented, low-income and/or first generation college students to pursue higher education. *Journal of STEM Education, 9*, 5-15.

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