Undergraduate Research Mentoring: Obstacles and Opportunities

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Researchers and policy-makers in higher education increasingly espouse the view that undergraduate students should have the opportunity to learn about scholarship and research in the context of faculty-mentored research experiences. There is mounting consensus that mentored undergraduate research should be standard pedagogical practice in all undergraduate disciplines. Although high-impact, mentored undergraduate research, scholarship, and creative work (URSCW) requires significant resources, with faculty time and energy foremost among them. This article addresses the current gap between aspiration and effective execution of well-mentored URSCW, including the most prevalent obstacles (e.g. institutional, departmental, individual) to undergraduate mentoring. This article is written for academic leaders and institutional officers. It concludes with several specific recommendations for increasing the frequency of mentored URSCW experiences for undergraduates.

Keywords: undergraduate, mentoring, research, academic

Mentoring relationships are personal, often reciprocal, relationships in which a more seasoned professional acts as a guide, role model, teacher, and sponsor of a less experienced (often younger) student or junior professional (Johnson, 2015). A significant volume of research now confirms Kram's (1985) theory that effective mentors tend to provide two broad categories of mentoring functions (Ragins & Kram, 2007). *Career functions* (e.g. coaching, sponsorship, challenge) involve behaviors aimed at assisting a mentee prepare for academic or career success. *Psychosocial functions* (e.g. acceptance, friendship, counseling) build on interpersonal bonds and are designed to promote the mentee's personal growth, self-efficacy, and professional identity. A high-impact mentorship can be so important in the life of a young adult that two mentoring scholars have observed: "At its best, mentoring can be a life-altering relationship that inspires mutual growth, learning, and development. Its effects can be remarkable, profound, and enduring; mentoring relationships have the capacity to transform individuals, groups, organizations, and communities" (Ragins & Kram, 2007, p. 3).

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Researchers of meta analytic reviews have indicated that across professions and contexts, mentoring is associated with a number of career benefits including more rapid career advancement, higher rates of compensation, enhanced professional identity development, greater career and organizational commitment, and greater job and career satisfaction (Allen & Eby, 2003; Eby, Allen, Evans, Ng, & DuBois, 2008; Kammeyer-Mueller & Judge, 2008; Underhill, 2005). Moreover, strong mentorships serve as an essential route for the transmission of values, ethical principles, and cultural mores of various professions (Johnson, in press; Johnson & Ridley, 2008). By encouraging novices to strive for excellence and care for the ethical commitments and fundamental aspirations of their profession, mentorships have the capacity to strengthen professions and the welfare of the communities they serve (Nakamura & Shernoff, 2009).

In recent years, consensus appears to be coalescing within higher education that undergraduate students should have the opportunity to learn about scholarship and research in the context of a faculty-mentored experience (Healey & Jenkins, 2009). Fueled by formative reports from the Boyer Commission and the National Science Foundation that suggest well-mentored undergraduate research students are far more confident, competent, and able to communicate within an academic discipline, many leaders and policy makers in higher education have now created models for summer intensive or multi-year mentored undergraduate educational experiences (Boyer Commission on Educating Undergraduates in the Research University, 1998; National Science Foundation, 2000). These reports recommended that mentored undergraduate research should be standard pedagogical practice in all undergraduate disciplines.

Two news items within higher education in the past year have further piqued interest in the role of the undergraduate faculty mentor. First, the inaugural 2014 *Gallup Purdue Index Report* interviewed more than 30,000 college and university graduates to measure the degree to which graduates have "great jobs," through successful and engaging careers, and if they are leading "great lives," by thriving in their overall well-being. The Index identified that only about two in ten college students strongly agreed they had a mentor who cared about them and encouraged them in their goals (Gallup, 2014). Compared to their peers, this mentored minority was more engaged in their current jobs. Second, in the summer of 2015, administrators at Purdue University (West Lafayette, Indiana, U.S.A.), a Research I university known for its science and engineering programs, told the Purdue Board of Trustees that they plan to link academic promotion and tenure decisions – at least in part – to whether faculty can show evidence that they are active mentors to undergraduates, especially at-risk students (Jaschik, 2015). In an interview following this announcement, the current Purdue provost said, "research universities need to stop separating the student experience from the promotion of research excellence. The student experience must be central" (Jaschik, 2015). Purdue will soon base key promotion decisions, in part, on reviews of faculty mentoring engagement and success.

Although undergraduates always will be the largest proportion of students on campus, they are often significantly disadvantaged – in comparison to graduate students – when it comes to transformative relationships with faculty (Johnson, 2015). Yet, merely introducing more mentoring "programs" and labeling assigned undergraduate research, scholarship, and creative work (URSCW) advising or supervisory relationships as "mentorships" will not guarantee that these experiences reflect effective research supervision or academic advising, let alone mentoring. Not only are most undergraduates moving

through college without any important mentorship (Gallup, 2014), there is concerning evidence from research with graduate students that academic mentors sometimes are disrespectful, neglectful, coercive, and relationally incompetent (Braxton, Proper, & Bayer, 2011; Clark, Harden, & Johnson, 2000).

In this article, we address the current gap between aspiration (Boyer Commission on Educating Undergraduates in the Research University, 1998; Nakamura & Shernoff, 2009; National Science Foundation, 2000) and effective execution of well-mentored URSCW. We have written for academic leaders and institutional officers searching for ways to better understand both the obstacles and promising pathways toward excellent student–faculty mentoring experiences. We conclude with several specific recommendations for increasing the frequency of mentored URSCW experiences for undergraduates.

On Mentoring Undergraduates

Arnett's theory of *Emerging Adulthood* contends that most 18–25-year-olds in Western societies don't see themselves as adults and are still in the process of obtaining education, are unmarried, and are childless (Arnett, 2000). They are no longer correctly described as adolescents, yet have not arrived at the life solidity characteristic of young adults. According to Arnett, emerging adulthood is a crucial developmental phase – located squarely in the most common developmental period for undergraduate education, a period in which adolescents become more independent and explore life possibilities. Mentors to emerging adults must remain sensitive to their mentees' struggles with identity exploration, life instability, and feelings of being stuck between life phases (Arnett, 2000).

Recently, Johnson (2015) encouraged higher education faculty to consider several salient mentoring tasks when engaging undergraduates in developmental relationships. These include: (a) *Interact with students outside of class* – research on college students' out-of-class interaction with faculty confirms that the single most important thing a professor can do for a student is to engage him or her informally (Rice & Brown, 1990); (b) *Provide active advising* – because academic advising is often the gateway to developing a mentorship, faculty must be intentional about using advising moments to engage advisees in meaningful interactions; (c) *Provide psychosocial support early on* – providing encouragement and emotional support early in a student's academic journey may be pivotal in helping him or her to bond with both the mentor and the institution; (d) *Be vigilant for expressions of a career/life "dream"* – excellent undergraduate mentors are attentive to helping undergraduates identify, shape, and then encourage and promote fledgling visions of an ideal career and life structure; (e) *Be mindful that one can never avoid some measure of re-parenting* – because nearly all students bring with them to college some unmet needs and imperfect family legacies, some mentees will need to use mentorships with faculty (as both parent figure and professional exemplar) to create a corrective interpersonal experience or developmental second-chance (Mehlman & Glickauf-Hughes, 1994). To these salient developmental tasks, we would add delivery of knowledge and development of skills relevant to the research methods and topical content of the mentored URSCW project itself.

In light of the unique developmental station of the typical undergraduate student, including an often rapid transition in his or her sense of self, higher education faculty have an opportunity to profoundly shape both a college student's life and career path.

One of the most promising areas in which to enact salient mentoring tasks is URSCW experiences, either during the academic year or summer. The intense faculty–student relationship over a period of time creates out-of-class space for active disciplinary-specific advising, support, and attention. Such activity includes focused discussion of research methodologies and design, presence of both faculty and student in the laboratory, archive, or studio as collaborators, conversation about career paths, and faculty who offer their expertise and experiences as a professional in the field of the URSCW project to an interested novice.

Certainly, the call for increased intentional mentoring in URSCW may suggest an increase in workload, particularly given calls for an increased number of students involved in URSCW. These faculty workload concerns are important considerations and must be responded to by institutions. In our Recommendations to Academic Leaders in Undergraduate Institutions section of this article, we offer several specific strategies to address costs to faculty. For those faculty who do mentor undergraduate students, some of the significant benefits to faculty who actively mentor students in URSCW include fulfillment of generativity needs, receipt of help and support from mentees and a subsequent increase in productivity, improved reputation based upon mentee successes, development of creative synergy, and opportunities to engage in positive emotional connections (Allen, 2007; Lunsford, Baker, Griffin, & Johnson, 2013).

Of course, it is also clear that undergraduate students benefit substantially from mentoring relationships with faculty. Researchers consistently report that mentored students – in comparison to those who are not mentored – are more likely to persist to degree completion, report higher educational aspirations, greater academic achievement, and greater engagement with their institution and ultimately, a profession (Larose et al., 2011; Lunsford, 2012; Russell, Hancock, & McCullough, 2007; Schmidt, Marks, & Derrico, 2007; Taraban & Logue, 2012; Thomas & Gillespie, 2008). Mentored undergraduates are significantly more satisfied with their academic major and tend to be more loyal alumni (Koch & Johnson, 2000). Mentored students are also more inclined to mentor other students themselves (Pascarella, 1980). The massive 2014 Gallup Survey of college graduates shows that those who reported support, care, and encouragement from a professor were far more likely to be engaged in their jobs and thriving in life (Gallup, 2014). Finally, well-mentored undergraduate research experiences appear to have positive economic implications. The ability to offer a robust and effectively mentored URSCW experience is increasingly seen by institutions as giving them an edge in student recruiting (Bauer & Bennett, 2003).

Despite mounting evidence pointing to the profound benefits of mentored URSCW for undergraduates, calls for greater faculty engagement in URSCW, and the proliferation of undergraduate research offices and programs, it is clear that aspirations are not always – or even often – translated into practice. Institution-specific studies indicate that undergraduate student reports of mentoring relationships with faculty hover around 25% (McCarthy & Mangione, 2000). Yet, most recently, only a disheartening 22% of college alums affirmed the statement, "I had a mentor in college who encouraged me to pursue my goals and dreams" (Gallup, 2014). Moreover, nonmentored students often report regret about not being mentored and believe they have missed out on something important (Baugh, Lankau, & Scandura, 1996). In the next section, we consider some of the most persistent obstacles to well-mentored URSCW experiences.

Persistent Obstacles to Undergraduate Research Mentoring

It is a poorly-kept secret in higher education that high-quality undergraduate mentoring takes time, often significant amounts of time (Dolan & Johnson, 2009). With persistent demands for grant-writing, publication, university service, and teaching, thoughtful, energetic, and engaged mentorship of undergraduate students may be challenging, particularly when faculty/student ratios are high. Lunsford and colleagues developed a typology of the costs of mentoring for faculty (Lunsford et al., 2013). Significant costs to faculty mentors include time, expenditure of emotional energy, and relationship-induced stress. In the current academic reward system, it is often the case that time spent mentoring may increase the risk for burnout, decreased productivity, and subsequent difficulty with promotion milestones. Recently, Johnson (2015) identified three distinct categories of obstacles to mentorship in higher education. Each is briefly summarized here.

Institutional Obstacles

Although institution size and mission may shape the unique obstacles to URSCW mentorship, there are a number of shared characteristics of contemporary institutions of higher education that stand in the way of robust and prevalent faculty–student URSCW mentoring (Lunsford et al., 2013). Chief among these are systems of promotion, tenure, and annual faculty evaluations that seldom consider quality advising or mentoring. Certainly, many glossy college brochures and eloquent institutional leaders trumpet the engaged relationships prospective students can expect with faculty, but bottom-line resourcing and faculty promotion criteria suggest different priorities. Grant-funded scholarship and publication frequency remains king. Although teaching efficacy is often a factor in promotion and tenure decisions, it is quite rare for a tenure committee to scrutinize a faculty member's track record as a mentor (Johnson & Zlotnik, 2005).

Another institutional obstacle to high-quality URSCW mentoring is the proliferation of part-time or adjunct faculty appointments. Part-time faculty now account for at least 50% of college faculty nationwide and this percentage is growing (American Association of University Professors, 2014). Despite the real-world experience adjunct faculty often offer to students, they are simply less accessible outside of class, less engaged with the university culture, less capable of effectively guiding students through a degree program, and less often available for substantive developmental relationships with students (Bippus, Brooks, Plax, & Kearney, 2001).

A final institutional obstacle to high-quality mentoring of undergraduates is the rapid growth of online degrees and professionally oriented degree programs. Professional and distance programs are often geared toward practitioner careers, often exist external to brick and mortar institutions, and rely heavily upon part time professional faculty (Johnson, 2015). Owing to the fact that these programs often admit more students per faculty member, encourage part-time or evening programs, and often have shorter durations and fewer requirements for research, it is not surprising that graduates of such programs often report less mentoring than graduates of more traditional academic programs (Clark et al., 2000).

Departmental Obstacles

Institution-wide factors aside, academic departments themselves occasionally undermine development of an academic culture conducive to mentoring. For instance, there is

evidence that department chairs and academic program directors often overestimate the extent to which students are actually being mentored by faculty (Dickinson & Johnson, 2000). Department chairs may erroneously conclude that an advising assignment is equivalent to mentorship.

Second, some academic departments exude a competitive climate that fosters fierce competition among students for scarce resources such as faculty time and mentorship of URSCW experiences. Such an academic milieu discourages students from cooperating and also makes faculty reticent to invest fully in a student until he or she has "survived" the initial competition among peers. Further, as is true with institutions writ large, some academic departments fail to appropriately reward excellent mentors to undergraduate students. Performance in the mentor role is seldom considered when assigning teaching and service loads to faculty.

Finally, some academic departments fail to deliberately work at constructing a diverse faculty. Although the population of undergrad students has clearly become more heterogeneous, most senior faculty continue to be white males. Failure to recruit and retain talented faculty who are also diverse in terms of race, ethnicity, gender, and sexual orientation may limit the potential for students to find a good match among prospective faculty mentors (Johnson, 2015).

Individual Faculty Obstacles

At times, the obstacles to engaged and effective mentored URSCW experiences are located in the person of the faculty member. Experience and research evidence show that not all college professors have the requisite attributes, attitudes and competencies to mentor effectively (Johnson, 2014; Lunsford et al., 2013; Ragins & Scandura, 1994). The primary individual-based obstacles include problems of competence, other personal problems, efforts to remake students into their own professional likeness, and lack of genuine investment in the mentoring enterprise.

At times, higher education faculty may be brilliant researchers and serviceable teachers, yet struggle with serious deficits in emotional intelligence and interpersonal acumen. Faculty who are aloof, lacking in empathy, critical, or demeaning in their exchanges with students are unlikely to be effective in the role of URSCW mentor. The most highly rated mentorships are described as reciprocal, highly engaged, and increasingly collegial by participants. For this reason, mentoring relationships can often be described as complex, fluid, and fiduciary relationships in which a mentor must deftly balance obligations to promote the student's best interest, and preserve professional boundaries while encouraging increasing mutuality and collegiality (Johnson, in press). At times, even accomplished mentors may find themselves in mentorships that have become problematic or conflict-ridden (Johnson & Huwe, 2002; Scandura, 1998). Competent mentors to undergraduate students must competently manage ongoing ethical challenges when serving in the mentor role. These include balancing advocacy with evaluation, honoring privacy, preserving boundaries while navigating multiple roles, allowing increasing collegiality and informality, and insuring equal access by diverse mentees (Johnson, in press).

Beyond competence, some college faculty exhibit interpersonal difficulty – even impairment – as a result of personality pathology (e.g. narcissism, avoidance, dependence), acute emotional disturbance (e.g. depression, anxiety, anger), or addiction

to substances. One can predict that in such cases, undergraduate students and their relationships with the faculty member may suffer (Johnson, 2015).

Still other faculty may block a student's personal or career development by applying pressure – deliberately or unconsciously – to push the student to follow in the faculty member's own career footpath. Called "cloning" in academe, this is the tendency for academics to validate their own career choices by encouraging students to make similar choices about discipline and career (Blackburn, Chapman, & Cameron, 1981). Of course, cloning may turn a relationship corrosive and diminish the value of URSCW mentoring.

Finally, there are faculty who lack investment in the mentoring enterprise generally, or who may not have the time, energy, or motivation required for engaged mentorships with students. These faculty may simply not be oriented to participation in developmental relationships. Such orientations are often exacerbated by institutional reward structures that fail to account for time engaged in mentorship (Johnson, 2015).

Recommendations for Academic Leaders in Undergraduate Institutions

Higher education administrators and chief academic officers play an essential role in stimulating attention to URSCW mentoring. Through their words, deeds, and financial resourcing, academic leaders can create the infrastructure required to encourage, support, and reward excellence in mentoring of undergraduates. Some have even suggested that such deliberate support is a moral obligation of academic leaders (Weil, 2001). To lead effectively in this area, academic leaders must acknowledge that not all faculty–student roles (e.g., advising, research supervision) will translate to engaged mentoring relationships. Academic officers and program administers must work to operationally define what they mean by URSCW mentoring, including the character of exemplar faculty–undergraduate student relationships and the expectations for faculty who serve in this role. Moreover, effective leaders must openly acknowledge both the rewards and the costs to faculty who engage in high-quality undergraduate mentoring (Lunsford et al., 2013) while developing creative strategies to assist faculty in this endeavor.

In this final section of the article, we offer seven specific recommendations for institutional leaders. Each recommendation constitutes one essential ingredient for developing an institutional culture conducive to URSCW mentoring. Our recommendations include: Create a culture of collegiality; Attend to mentoring efficacy and potential in faculty hiring; Prepare faculty for mentoring excellence; Develop best-fit mentoring structures; Institute an ongoing assessment process; Integrate mentoring performance into faculty promotion and reward systems; and Develop institution-wide awards for mentoring excellence.

Create a Culture of Collegiality

One of the casualties of hypercompetitive workplace environments is the thoughtful, consistent and collegial mentoring culture (Delong, Gabarro, & Lees, 2008). In order to nurture a culture in which mentoring is omnipresent in the daily work of faculty, academic leaders must first begin with collegiality (Cipriano, 2011). Collegial academic environments are characterized by trust, respect, and transparency. We suggest that such collegiality lends itself to care and concern for student development. More, when faculty model collaboration, collegial engagement, and care for one another, their undergraduate

mentees will learn to value these habits and behaviors (Fletcher & Ragins, 2007; Johnson, Barnett, Elman, Forrest, & Kaslow, 2012). When collegiality is modeled in faculty relationships with colleagues and students, it is more likely that undergraduates will themselves develop positive *mentoring schemas* and adaptive *relational caches* (Ragins, 2012). Mentoring schemas are cognitive grids that shape expectations, frame experiences, and motivate the student's own collegial behaviors. Relational caches occur when undergraduates experience high-quality relationships with faculty that subsequently generate the relational capacities necessary for students to build other high-quality relationships.

Attend to Mentoring Efficacy and Potential in Faculty Hiring

In many academic environments there are professors who show marginal or poor inter-personal skill and emotional intelligence; some are prone to narcissism and others show little regard for the welfare of colleagues or students (Johnson, 2015). Competence in the mentor role requires foundational character virtues, core emotional and relational abilities, as well as specific career and psychosocial mentoring competencies (Johnson, 2003). Of course, ensuring such competence is most elegantly addressed at the point of the faculty hire. Requesting evidence of experience and efficacy in mentoring URSCW would appear to be one effective tool in an effort to enhance collegiality and increase mentoring competence among faculty. Yet, selection committees and deans rarely address this issue in the hiring process (Landrum & Clump, 2004). For instance, in one study of academic job ads from the American Psychological Association's *Monitor on Psychology*, only 7.5% of ads mentioned advising and 3.9% mentioned mentoring as salient job components (Johnson & Zlotnik, 2005). Moreover, among the 636 ads reviewed, only one requested evidence of efficacy in the advising or mentoring role. Academic leaders should consider strategies for assessing mentoring success or at least potential for URSCW mentorship during the hiring process.

Prepare Faculty for Mentoring Excellence

It is vitally important for academic leaders to consider strategies for intentionally preparing faculty for their role as mentor to undergraduate students. Promising methods may include formal orientations led by established faculty mentors, workshops on skills and processes required for excellence in URSCW mentoring, and even ongoing supervision of URSCW mentoring by junior faculty, perhaps by seasoned mentors with expertise in student mentoring (Allen et al., 2009; Braxton et al., 2011). New faculty may benefit from training that emphasizes the evolving and increasingly collegial nature of positive mentorships, the ethical obligations unique the mentoring role, and strategies for addressing conflicts or concerns with mentees in URSCW contexts. Finally, when graduate students are present in the educational milieu – particularly when they will have some role in mentoring URSCW experiences – it is imperative to similarly train graduate students for basic competence in mentorship (Horowitz & Christopher, 2013).

Develop Best-fit Mentoring Structures

Once collegiality and competence for the mentor role are addressed among faculty, it is time to collaborate with faculty – either institution-wide or by divisions or

departments – to create URSCW mentoring structures and programs that fit the academic culture and context. Although faculty – and many students – often report a preference for informality in forming faculty-student mentoring relationships, this approach often yields lower rates of mentoring when compared to formal structures. Summer or year-long URSCW experiences often provide formal avenues for connecting faculty with undergraduates for the purpose of mentored research experiences. But faculty need not rely exclusively on traditional one-to-one mentorships with students. In place of or in addition to such traditional mentoring models, faculty may find that group, team, and peer mentoring approaches provide unique advantages depending on the unique academic context and culture (Johnson, 2015).

Institute an Ongoing Assessment Process

One of the more delicate balancing acts for academic leaders is striking just the right tone in assessments of mentored URSCW experiences without making assessment of mentorship become onerous and noxious in the eyes of faculty. In one study of an organizational mentoring, Eby and colleagues discovered that the balance between strong leader support for mentoring activities and formal monitoring and accountability was a tricky one; substantial demands for assessment and tracking dissuaded participation in mentoring programs (Eby, Lockwood, & Butts, 2006). Eby's findings offer a warning to institutional leaders that excellent mentors can easily be disaffected by tracking and assessment efforts that are perceived by faculty as intrusive or unnecessarily burdensome. Nonetheless, if good quality mentoring is crucial for high-impact URSCW experiences, academic leaders must consider best-fit strategies for assessing faculty performance and student outcomes.

Integrate Mentoring Performance into Faculty Promotion and Reward Systems

Karon (1995) observed that all too often, the faculty activities most likely to result in promotion and tenure are entirely unrelated, or perhaps worse, negatively correlated with commitment of time to mentoring students. Academic leaders should take an honest look at their current criterion for rewarding and promoting faculty. Just as Purdue University is currently integrating faculty mentoring performance into salient reward systems, so too must other institutions decide how mentoring undergraduate students in research fits into evaluative standards for faculty (Jaschik, 2015). To the extent that salient "go/no-go" decisions such as academic promotion and annual pay step increases are linked to evidence of both mentoring commitment and success – however defined and measured – we predict that faculty attention and performance in this domain will rise.

Develop Institution-wide Awards for Mentoring Excellence

Our final recommendation for academic leaders involves the thoughtful development and administration of both institution-wide and perhaps more context-specific awards for URSCW mentoring excellence. Awards are often a low-cost method for enhancing attention to faculty mentoring efforts. If mentoring excellence is prioritized on par with excellence in teaching, scholarship, and service, then it stands to reason that the number of awards for mentorship should rival those in the other three areas.

Conclusion

What research has come to show about the experience for students engaged in URSCW is that it has the potential to provide deep and lasting high-impact learning. This potential can only be fully realized when our institutions commit to the belief that high-quality mentoring matters, for students, faculty, and their institutions. Once committed, institutional leaders must create and support cultures and structures conducive to promoting, reinforcing, and celebrating excellent URSCW mentorship.

Doing so will allow colleges and universities to better emphasize quality mentoring relationships, and develop strategies and practices that assist faculty and students alike in aspiring to and developing an effective mentoring experiences.

Disclosure statement

No potential conflict of interest was reported by the authors.

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