

Undergraduate Research and Alumni: Perspectives on Learning Gains and Post-graduation Benefits

Despite many areas of overlap in the values expressed by higher education and business/industry, clear gaps exist between the skills employers seek and the learning outcomes that are tracked and assessed by higher education. Undergraduate research, as a high-impact practice providing myriad benefits, provides a credible option to bridge this gap. To illuminate the potential of undergraduate research to further the values of both higher education and business and industry, research administrators at the University of Wisconsin-Eau Claire surveyed alumni who had participated in undergraduate research to understand their perceptions regarding learning outcome gains and benefits as

they continued their education or sought employment.

The survey, Undergraduate Research Learning Outcomes and Gains (URLOG), was developed after a thorough literature review to identify and evaluate existing processes, tools, and surveys. Alumni reported significant gains across all the categories of learning outcomes surveyed, including higher-order thinking, preparation for graduate school or careers, and discipline-specific skills. Further, a majority of respondents indicated that undergraduate research was a significant positive factor in their actual admission to graduate school, employment, or both.

Table 1. Existing National Assessments that Address Learning Outcomes, Skills, and Concerns, Grouped by Target Population

Assessment Name	Author	Audience for Results	Measure Type	Sample learning outcomes, skills, concerns
UNDERGRADUATES				
Collegiate Learning Assessment	Council for Aid to Education	Higher education	Performance-based tasks	Critical thinking, written communication
The University Learning Outcomes Assessment (UniLOA)	Center for Measuring College Behaviors and Academics	Higher education	Perceptions & behaviors	Critical thinking, self-awareness, citizenship
Collegiate Assessment of Academic Proficiency (CAAP)	American College Testing (ACT)	Higher education	Performance-based tasks	Reading, writing, mathematics, science, critical-thinking skills
Proficiency Profile (formerly Measure of Academic Proficiency and Progress)	Educational Testing Service (ETS)	Higher education	Performance-based tasks	Critical thinking, reading, writing, mathematics
Valid Assessment of Learning in Undergraduate Education (VALUE)	Association of American Colleges and Universities (AAC&U)	Higher education	Rubrics (16 total)	Intellectual and practical skills, integrative and applied learning
College Senior Survey	Higher Education Research Institute	Higher education	Perceptions	Ability to see the world from someone else's perspective, critical-thinking skills
EMPLOYERS AND BUSINESS/INDUSTRY				
What America Needs to Know about Higher Education Redesign	Gallup and Lumina Foundation	Mixed	Perceptions	Preferred employee skills, level of graduate preparation for workforce, skill gaps
It Takes More Than a Major	Hart Research Associates, AAC&U	Mixed	Perceptions	Preferred employee skills, level of graduate preparation for workforce
Job Outlook	National Association of Colleges and Employers (NACE)	Mixed	Perceptions & intentions	Preferred employee skills, hiring plans
Skills and Employment Trends	Accenture	Mixed	Perceptions & intentions	Skill gaps, hiring and training plans
Talent Shortage Survey	ManpowerGroup	Mixed	Perceptions & intentions	Talent shortages, strategies to fill gaps
UNDERGRADUATES WHO PARTICIPATE IN RESEARCH				
Classroom Undergraduate Research Experience (CURE) – Post-course	Lopatto	Higher education	Perceptions	Become responsible for part of the project, write a research proposal (also includes the list of learning benefits from the SURE survey)
Research on Learning & Education	Lopatto	Higher education	Perceptions	Understand the research process, clarify career path
Survey of Undergraduate Research Experiences (SURE)	Lopatto	Higher Education	Perceptions	Understand how scientists think, self-confidence
Undergraduate Research Student Self-Assessment (URSSA)	Hunter, Weston, Thiry, and Laursen	Higher education	Perceptions	Write scientific reports or papers, confidence in ability to contribute to science
Research Skill Development Framework	Willison and O'Regan	Higher education	Rubric	Evaluate information sources, use discipline-specific language
ALUMNI				
Alumni Outcomes Survey	American College Testing	Higher education	Perceptions	Objective thinking, problem defining and solving
Alumni Survey	Higher Education Data Sharing Consortium (HEDS)	Higher education (private institutions only)	Perceptions	Critical thinking, information literacy



UW-Eau Claire students share research at the annual Celebration of Excellence in Research and Creative Activity (CERCA). In 2014, 607 students and 222 faculty mentors shared 343 collaborative projects.

What Does Academia Want Undergraduates to Learn?

In 2006, Secretary of Education Margaret Spellings and her Commission on the Future of Higher Education released an initial report, which offered the following caution regarding the quality of learning outcomes: “the continued ability of American postsecondary institutions to produce informed

and skilled citizens who are able to lead and compete in the 21st-century global marketplace may soon be questioned” (Spellings 2006, 13).

As part of its recommendations, the commission noted that colleges and universities must define appropriate learning outcomes and develop methods of measuring progress. In the last several years, many educational organizations have endeavored to heed the commission’s advice. This work to define and measure learning outcomes coincides with increasing pressure for accountability on multiple fronts—inside higher education and from government and employers (Markle et al. 2013). Recent examples of responses include publication by the Association of American Colleges and Universities (AAC&U) of *Liberal Education and America’s Promise* (LEAP 2005) and

the National Research Council’s *Assessing 21st Century Skills* (2011). According to recent analysis (Markle et al. 2013), a review of desired learning outcomes championed by seven organizations (including AAC&U and international groups) found considerable agreement on outcomes associated with creativity, critical thinking, teamwork, communication, information literacy, citizenship, and life skills.

In tandem with the outgrowth of defined learning outcomes, several surveys have been developed to measure students’ gains in learning (see Table 1 on page 15). These tools largely focus on the current undergraduate population. Not surprisingly, given the work of national groups to define important learning outcomes, there is considerable overlap in the desirable outcomes included in each survey. For example, concepts related to critical thinking, citizenship, communication skills, and personal growth are present across all the higher-education groups’ identified learning outcomes (see Table 2).

What Do Employers Want Graduates to Know and Do?

In a recent study commissioned by the AAC&U, employers identified necessary skills and abilities for the workplace (Hart Research Associates 2013). Employers highly ranked ethics, intercultural skills, and professional development and considered those characteristics as priorities when hiring. The majority of employers surveyed (75 percent) wanted higher-education institutions to put more emphasis on critical thinking, problem solving, written and oral communication, and application of knowledge to real-world settings.

Similar responses have been found in a variety of other national and business/industry-based surveys of employers. In the *Job Outlook 2014 Survey* (National Association of Colleges and Employers), employers rated the following skills as most important: ability to make decisions and solve problems, communicate verbally, and find and process information. The *Accenture Skills and Employment Trends Survey* (2013) also identified problem solving and communication as important abilities, but also included leadership, knowledge of technology, and people management.

While there is considerable overlap in the skills valued by higher education and employers, a “disconnect” remains. The *Talent Shortage Survey* (ManpowerGroup 2013) found that 48 percent of employers had difficulty filling jobs due to a lack of technical skills among applicants and 33 percent due to limited workplace or “soft” skills. Employers have suggested ways to ameliorate the deficiencies. According to the Hart Research Associates study (2013), employers overwhelmingly agreed that the following activities, embedded during the undergraduate experience, would help prepare students for the workforce: develop discipline-based research questions

Table 2. Higher Education and Business/Industry: Shared and Unique Values Regarding Learning Outcomes and Skills

Shared Values: Higher Education and Business/Industry
Communication skills
Critical thinking
Information literacy
People management/teamwork
Personal growth
Higher Education Values
Citizenship
Creativity
Life skills
Business and Industry Values
Application of knowledge to real-world settings
Decision making
Ethics
Intercultural skills
Leadership
Problem solving
Technology

(83 percent); complete a project that demonstrates knowledge and skills (79 percent); conduct collaborative research (74 percent); and engage in hands-on experiences (69 percent). Likewise, in a recent survey by Gallup and the Lumina Foundation (2014), employers' most popular suggestion was "internships or practical hands-on experiences" when asked "what talent, knowledge, or skills should higher education institutions develop in students to best prepare graduates."

Further, employers have identified a lengthy list of skills that have not yet been commonly adopted as discrete learning outcomes in higher education (Table 2). The divide is evidenced in recent surveys that found only 11 percent of business leaders "strongly agree" that college graduates have the necessary skills and abilities (Gallup and Lumina Foundation 2014). In contrast, 87 percent of chief academic officers "agree" or "strongly agree" that their institution is increasing efforts to ensure that degree programs help graduates get jobs (Gallup and Inside Higher Ed 2014).

The Missing Links: Alumni Perspectives and Undergraduate Research

Alumni Perspectives. Recent college graduates are in an ideal position to bridge perspectives between higher education and business and industry. They have fresh experience on both sides—in college and in the workforce—and can consider their learning gains from both viewpoints. While those in academia also have personal experience as employees, their work to define learning outcomes and measure them in undergraduates is not focused through this lens. Similarly, employers may well have matriculated from higher education, but efforts to gather their perspectives have asked for their views as business leaders only. Indeed, individuals in academia and business each have a position to defend when representing their respective professional realms. Given the divide between the opinions of higher education and business, seeking input from an alumni point of view may provide a more balanced perspective.

Undergraduate Research. As noted in the Council on Undergraduate Research's *Characteristics of Excellence in Undergraduate Research* (COEUR 2012), undergraduate research is perhaps "one of the most powerful learning strategies," leading to "innovation and economic development," and ensuring student success in careers or continuing education (Hensel 2012, iv). Further, undergraduate research is a high-impact practice that provides multiple benefits to students. Kuh (2008) outlined essential learning outcomes and goals of liberal education that are connected to 10 "best practices" in higher education. One of those practices was undergraduate research.

Kuh found a significant positive relationship between student-faculty research and deep learning, as well as gains in general, personal, and practical learning. Specifically, undergraduate research helps students achieve desired learning outcomes that include "practicing integrative and applied learning" and "strengthening intellectual and practical skills" (Kuh 2008, 6). Such outcomes align with both higher education's goals and employers' needs.

As summarized in Table 1, there are a number of measures of learning outcomes—based on both performance and perceptions of gains—for undergraduates and students who participate in undergraduate research. Several surveys exist to gauge employer needs and values related to learning and skills. However, the list has few measures of alumni perspectives. Only two of them gauge the perceived learning gains of alumni, neither of which is targeted at individuals who participated in undergraduate research.

The Eau Claire Study of Alumni

Designated in 1988 as the University of Wisconsin System's "Center of Excellence for Faculty and Undergraduate Student Research Collaboration," the University of Wisconsin-Eau Claire's Office of Research and Sponsored Programs supports a dynamic program. Indeed, 37 percent of our graduating seniors have had an in-depth research experience during their undergraduate careers. For example, our annual event highlighting student research in 2014 included 607 students and 222 faculty mentors. These individuals shared 343 collaborative projects via performances, oral presentations, artwork, exhibits, and research posters. Based on this, we felt confident about the high level of student and faculty participation in undergraduate research. Further, we have regularly tracked and reviewed data on participation in such activity by department, discipline, and among underrepresented students to ensure that undergraduate research was a broadly available opportunity. However, we had only anecdotal evidence of students' learning gains and the post-graduation benefits arising from the research experience. Students would spontaneously share stories about how much they learned or how the experience helped them—but we simply did not have a process or tool to collect formal data.

During academic year 2011-12, we had conducted a thorough literature review to identify and evaluate possible processes, tools, or surveys that we could adopt or adapt to collect data on the benefits of undergraduate research. Based on examples in the literature (Alexander, et al. 2000; Bauer and Bennett 2003; Campbell and Skoog 2004; Harsh, Adam, and Tai 2011), we sharpened our focus on the learning outcomes and gains that students may achieve as a result of undergraduate research.

CUR's publication on facets of excellence in undergraduate research (COEUR 2012) provided a further impetus to formally assess learning outcomes related to undergraduate research. This publication provided benchmarks against which to evaluate institutional commitment to undergraduate research and quality of programming. Although UW-Eau Claire employed many of the best practices outlined (Rowlett, Blockus, and Larson 2012), a systematic and sustained assessment of student learning was a challenge, as it has been for many institutions (see, e.g., Chapdelaine 2012, 25).

Based on our analysis of the overlaps and divides in values between higher education and business and industry (Table 2) and Bauer and Bennett's (2003) landmark study of alumni perceptions, we decided that alumni would be an ideal target population to survey. Data from alumni would provide a benchmark against which to measure learning gains perceived by current undergraduates in a future survey. An additional goal was to understand the benefits of undergraduate research perceived by alumni as they continued their education or sought employment.

Survey Instrument

Borrowing from the method used by Craney et al. (2011), the *Teaching Goals Inventory* (TGI) developed by Angelo and Cross (1993) provided a comprehensive list of core learning outcomes. Since this inventory was designed to help educators identify instructional goals and apply classroom assessment techniques, we had to adapt this method to examine the co-curricular undergraduate research experience.

We vetted the TGI to ensure that it was comprehensive and would cover both higher education and business and industry values (Table 2). Specifically, we compared the TGI learning outcomes to those more recently identified by academia and business and industry and found significant overlap; all measures included concepts related to critical thinking, communication skills, problem solving, and life or personal skills. In addition, we compared the TGI against two well-respected survey instruments that measure undergraduate-research benefits among current students. These were the Research on Learning and Education (ROLE; Lopatto 2000) and the Undergraduate Research Student Self-Assessment (URSSA; Hunter et al. 2009) instruments. As a final step, we compared the TGI to the American College Testing (ACT) alumni survey, which included several questions related to learning gains, because our institution had ACT survey data from 2007, and we could potentially use the overlapping content to make comparisons between all alumni and alumni who participated in undergraduate research.

Our comparison and analysis revealed that the broad, non-disciplinary learning outcomes included on the ROLE, URSSA, and ACT surveys were represented on the TGI. We

were comfortable with the differences identified because they related to specific disciplinary concerns that were outside our area of interest. For example, the ROLE survey item "tolerance for obstacles faced in research process" and the URSSA survey's "confidence in my ability to do well in future science courses" queried a level of specificity regarding students' perceptions that was outside our scope.

After this comparison, we were confident that the TGI would meet our needs. In creating our survey, we maintained the six categories of the full TGI (see Table 3), but eliminated 15 learning outcomes that were redundant for our purposes. For example, several questions touched on ethics, so we included a single question about ethics within the "Discipline-Specific Knowledge" category. Our purposes in reducing the number of learning outcomes were to limit the overall time required for respondents to complete the survey and to keep our data collection and analysis focused and manageable.

Table 3. Alumni Survey Categories and Sample Learning Outcomes

Category	Sample Learning Outcomes
Liberal Arts and Academic Values	<ul style="list-style-type: none"> • Appreciation of other cultures • Knowledge of rights and responsibilities of citizenship
Basic Academic Success	<ul style="list-style-type: none"> • Listening skills • Writing skills
Graduate School/ Career Preparation	<ul style="list-style-type: none"> • Ability to work with others • Leadership skills
Personal Development	<ul style="list-style-type: none"> • Self-esteem/Self-confidence • Sense of responsibility
Discipline-Specific Knowledge	<ul style="list-style-type: none"> • Capacity to evaluate methods and materials • Skill in using techniques, methods, materials, tools and/or technology
Higher-Order Thinking	<ul style="list-style-type: none"> • Ability to apply principles already learned to new problems and situations • Ability to think creatively • Problem solving and analytic skills

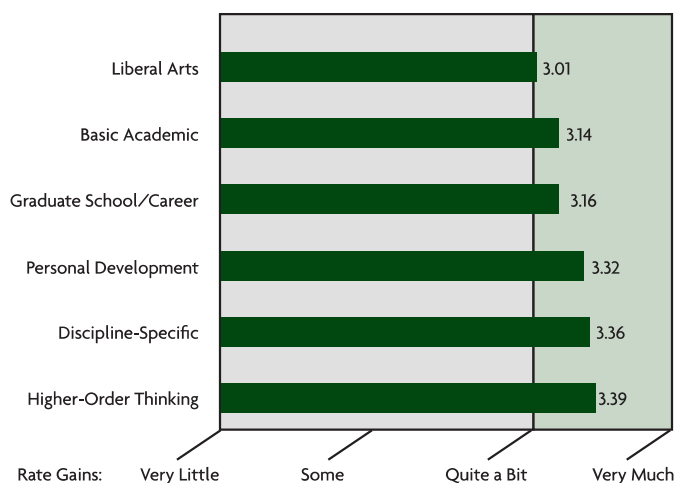
When we administered our survey in spring 2013, alumni were asked to rank their perceived learning gains using a 4-point rating scale, with 4 reflecting "very much" and 1 "very little." Alumni also were asked to comment on whether their undergraduate-research experience was helpful in securing employment, admission to graduate school, or both. Alumni had the option of providing open-ended responses to the questions about employment and admission to graduate school, as well concerning their overall perceptions about the undergraduate-research experience. An online survey tool (Qualtrics) provided an ideal platform in which to create the survey, which was distributed via email.

Respondents' Demographics, Perceived Learning Gains, and Post-Graduation Benefits

Working with our campus institutional research office, we identified individuals who had graduated within the past five years (2006-07 to 2010-11) and who had participated in undergraduate research funded by UW-Eau Claire's Office of Research and Sponsored Programs. Respondents (n=135/781, 17 percent) were asked to select the disciplinary category that best described their undergraduate research experience. The three most frequently cited ones were natural sciences (30 percent of respondents), social sciences, (26 percent), and humanities and fine arts combined (18 percent). Those areas were followed by health sciences (15 percent), education (8 percent), and business (3 percent).

The reported race of respondents was 88 percent white and 12 percent non-white, compared to 92 percent white and 8 percent non-white in the general student population. Forty-six percent of respondents had been first-generation college students, compared to approximately 41 percent of the general student body. Of the respondents, 72 percent identified themselves as women and 28 percent as men, which reflects a greater representation of women than in the general univer-

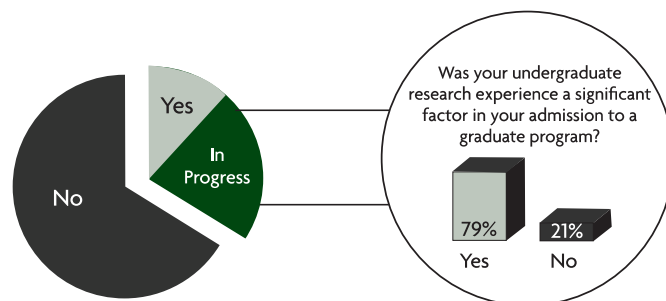
Figure 1. Summary of Alumni-Reported Learning-Outcome Gains



sity population, which is 59 percent female (UWEC Factbook 2013-14). On average, alumni reported learning gains of 3.0 or above (on a 4-point rating scale), representing "quite a bit" or "very much" gain (see Figure 1).

In the area of advanced education, 34 percent of respondents reported they either had a master's or doctoral/professional degree or were currently pursuing such a degree. This is more

Figure 2. Alumni-Reported Graduate School Status: Have You Received a Master's or Doctoral/Professional Degree?



than double the levels reported in UW-Eau Claire's most recent ACT alumni survey (11 percent) and the five-year average of our annual career-services alumni survey (14 percent). Alumni who had completed a graduate degree or were progressing toward one were asked whether their undergraduate-research experience was a significant factor in admission to a graduate program, and 79 percent responded "yes" (see Figure 2).

In the open-ended comment area provided for respondents to elaborate on their responses regarding graduate school, the majority of the 44 comments stated three main themes: Undergraduate research gave an advantage or was an outright necessity for admission; it was a topic of discussion during interviews or in application letters; it allowed students to jump-start their master's education—they already had thesis topics or were well-prepared to join faculty research projects (Table 4 on page 20).

It has been widely reported that undergraduate research tends to spark or reinforce students' interest in graduate school (e.g., Craney et al. 2011; Lopatto 2004; Russell, Hancock, and McCullough 2007). There is also a widespread belief that undergraduate research provides a solid foundation for graduate-school admission and success. More recently, May, Cook and Panu (2012) suggested a strategy to formally measure the importance of various aspects of the undergraduate experience as predictors of graduate-school admission. Their logistic regression model compares the efficacy of a variety of undergraduate experiences, including undergraduate research. However, there has been little effort to ask alumni about what actions they ultimately took and why. Perhaps future research could combine survey methods based on intention and prediction with qualitative, experience-based data from alumni to expand the evidence on the benefit of undergraduate research for the pursuit of graduate education.

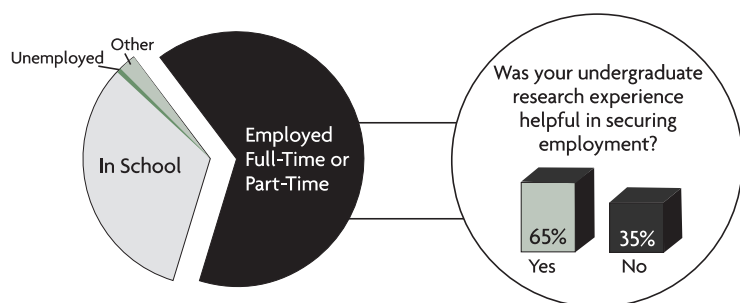
Alumni who indicated they were currently employed were asked whether their undergraduate-research experience was helpful in securing employment, and 65 percent answered "yes" (see Figure 3). Alumni also had the option of explain-

Table 4. Selected Alumni Comments

Please comment on your overall perceptions of your undergraduate research experience at UW-Eau Claire:	Was your undergraduate research experience helpful in securing employment? Please explain:	Was your undergraduate research experience a significant factor in your admission to a graduate program? Please explain:
<i>As someone who went on to graduate school where research is incredibly important, I believe that UWEC should emphasize research as an undergraduate even more.</i>	<i>My experience gave me a leg up on other candidates applying for my job.</i>	<i>Without my research experience, I doubt I would have been accepted into a graduate program.</i>
<i>My research experiences at UWEC were the best part of my education. Every step of my undergraduate research experiences helped prepare me for graduate school, which I am currently attending.</i>	<i>It added credibility to my resume and also taught me a lot of valuable lessons that I have applied in my work habits.</i>	<i>I always thought grad school was appealing but had no interest other than curiosity. Now I feel driven to attend.</i>
<i>Undergraduate research is essential in the field of science. Without experiences like these, students lack real-world application of their education. I gained cultural and scientific knowledge on my trip to ... Ecuador. Additionally, I participated in lab work after the trip, giving me experience in that as well. These are the type of experiences that students remember and learn from. I am in medical school now and even last week I was able to apply what I had learned.</i>	<i>It gave me experience performing a specific technique, helped me get hired at my current job, and has helped me learn/be trained faster at my job because of my experience.</i>	<i>The knowledge I gained during research, ability to think critically, and the recommendation letter I received from my research advisor were important pieces in my admission.</i>
<i>It is a unique experience that you would have hard time finding at larger universities.</i>	<i>I believe it was impressive to employers, both in demonstrating my involvement and in displaying my capabilities.</i>	<i>I had extensive experience that allowed me to start my thesis work right away.</i>
<i>It was an opportunity that not only helped set me apart from others in my class, but also helped me get a job in my field after I graduated.</i>	<i>It was a discussion point in my interview that helped set me apart from other candidates.</i>	<i>My research experience "gave me an edge" when applying to my graduate program.</i>
<i>My overall experience was very rewarding and not only was a great learning experience, it was a great experience to be able to network and get to know the faculty on more of a personal level.</i>	<i>My undergrad research allowed me to show a finished, published product that endorses my skills, determination, and dedication to projects.</i>	<i>It offered leadership experience and a chance to talk about something that not everyone got to experience.</i>
<i>It was a great way to apply skills I had been learning to real-world situations.</i>	<i>Employers often cite it when discussing my resume with me.</i>	<i>I was able to meet my master's advisor while presenting my undergraduate research at an international conference.</i>

ing their answer, and alumni comments (79 total) noted connections between undergraduate research and employment. A common theme included the perception that the research experience provided a competitive advantage and allowed them to share concrete examples to demonstrate their skills during job interviews (See Table 4 for specific examples of alumni comments).

Figure 3. Alumni-Reported Current Employment Status

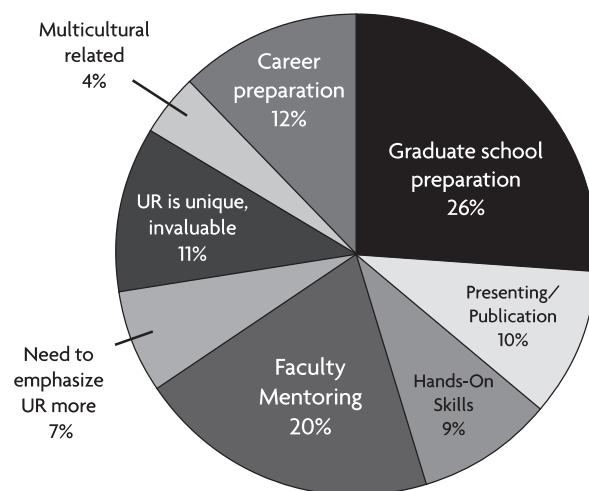


Research has revealed a consensus among employers that new graduates are lacking important workplace skills and that higher education should place more emphasis on developing these skills (Gallup and the Lumina Foundation 2014; Hart Research Associates 2013; ManpowerGroup 2013). Employers also agree that having undergraduates complete a project that demonstrates knowledge and skills, conduct collaborative research, and engage in hands-on experiences would help fill the skills gap (Gallup and the Lumina Foundation 2014; Hart Research Associates 2013). On our Undergraduate Research Learning Outcomes and Gains (URLOG) survey, alumni who had research experi-

ences reported significant gains in learning outcomes associated with employers' desired skills. Higher-order thinking and discipline-specific skills (with reported gains of 3.39 and 3.36, respectively, on a 4-point scale) were the two highest ranked skill categories. Through their anecdotal responses, alumni agreed that undergraduate research helped them secure employment.

Alumni also had the option of providing comments on their overall perceptions about the undergraduate research experience, and 73 (54 percent) responded. After coding the comments as either generally positive or generally negative, the vast majority (90 percent) were predominantly positive in nature. Further coding was completed to identify common

Figure 4. Common Themes and Their Frequencies in Alumni Comments Regarding Overall Perceptions of Undergraduate Research Experience



themes and their frequencies in all the alumni comments; these are presented in Figure 4.

While other surveys of individuals who participate in undergraduate research measure perceptions of learning gains and benefits during or immediately after a research experience (Table 1), UW-Eau Claire's URLOG surveyed alumni up to five years after the undergraduate-research experience. Of alumni who indicated their year of graduation, 27 percent had graduated three to five years ago. However, differences in perceived learning gains between alumni who had graduated five years ago and those who graduated ≤ 1 year ago were modest (see Figure 5).

Survey Uses and the Future

To date, we have shared our alumni-survey findings with several university offices, including the Office of Integrated Marketing and Communications, the Office of Admissions, and the university foundation. Personnel have incorporated data in several marketing documents about the value of undergraduate research that alumni perceive in securing employment and admission to graduate school. In addition, the Office of Research and Sponsored Programs has used quotes from the alumni survey in marketing materials targeted at current and prospective students.

In the near future, we plan to discuss how findings from the alumni survey can support the university's new marketing and branding strategy, specifically, ways to highlight undergraduate research as a distinctive feature and reason to choose UW-Eau Claire. Also, Ray Cross, president of the University of Wisconsin System, has started a system-wide Talent Development Initiative. The overall purpose is to en-

courage "new and innovative ways to produce high-talent graduates to close skills gaps in the state" (Kremer 2014). By continuing to share the alumni-survey findings and building new data related to perceived benefits of undergraduate research, we can contribute to this system-wide initiative.

Early in the process, we realized the importance of working closely with our university foundation and alumni office to gather alumni contact information and coordinate our communications with alumni. The foundation and alumni offices had email addresses for our list of alumni who had participated in undergraduate research. However, given that some of the alumni were up to five years post-graduation, the contact information was not always current. Hence the alumni office was able to provide email addresses for 1,443 of these individuals, but only 781 of these were unique and ultimately deliverable (54 percent).

While working with institutional research, they shared plans to conduct an alumni survey the same time as ours, and we wanted to avoid "survey fatigue" or redundancy. We shared drafts of our survey with institutional-research-office personnel to gain feedback and to identify areas of possible overlap. Ultimately, our survey population was a subset of alumni—only alumni who participated in undergraduate research and graduated in the past five years—rather than targeting all alumni. Therefore, we did not encounter any challenges or negative feedback related to survey fatigue.

Our next step will be to send the same survey to alumni who participated in undergraduate research and graduated in the five years (2001-02 to 2005-06) prior to the alumni already surveyed. Comparing the results of the first survey with data gathered on alumni who are even further removed from their undergraduate-research experience will reveal whether the perceived gains and benefits hold over the long-term.

In spring 2014, we used the core of the alumni survey (38 learning outcomes organized into six categories) to develop a survey of current undergraduates who had participated in undergraduate research, based on their recent involvement in our annual student-research event. We plan to compare perceived learning gains between the undergraduate and alumni groups. Going forward, our goal is to administer this undergraduate survey every spring.


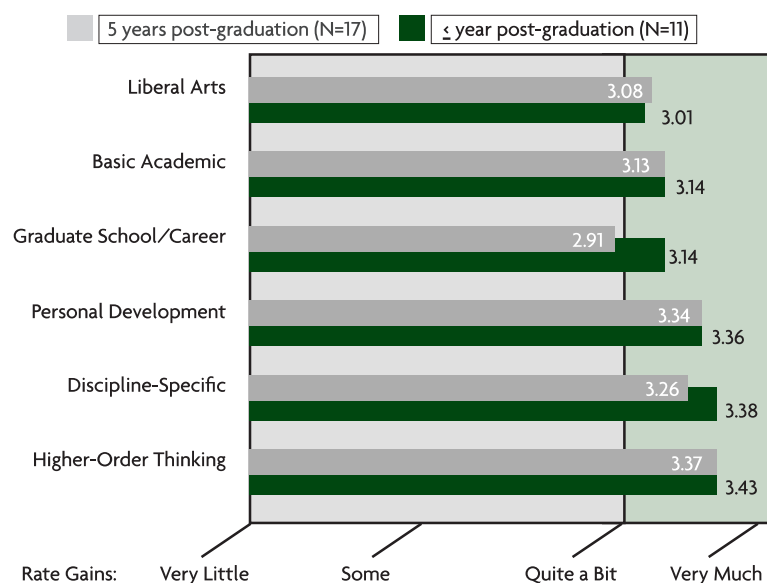
We also plan to work with academic departments to develop targeted modules to add to the base undergraduate survey and assist in developing mechanisms for departments to measure student outcomes more directly. Other campuses in the University of Wisconsin System have expressed an interest in our surveys, and they will be shared through the newly established Wisconsin System Council on Undergraduate Research (WiSCUR). 

Figure 5. Summary of Alumni-Reported Learning-Outcome Gains: ≤ 1 Year Post-Graduation vs. 5 Years Post-Graduation



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