2020

Undergraduate Research: A Liberal Arts Education

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Abstract

Many institutions value a liberal arts education because it teaches students a wider variety of skills and information than a traditional undergraduate education, creating more holistic people, Taylor University is one such institution. Taylor University provides a liberal arts education to "encourage students to ask hard questions, apply themselves to the tasks at hand, and embrace their callings" (Taylor University, n.d.). Similarly, undergraduate research teaches students "creativity, critical thinking, logic, communication, and problem solving" among other skills (Klos et al., 2011). Just like a liberal arts education creates well-rounded individuals, undergraduate research teaches students skills that are transferable and applicable in multiple situations that provides them with "valuable employability and progression opportunities" (Butcher & Maunder, 2014). Despite the many similarities between the values of liberal arts and undergraduate research, some liberal arts educators do not recognize the importance of fostering meaningful research experiences for undergraduate students. The following research identifies the benefits and downfalls of undergraduate research for students and faculty, describes best practices for its implementation, and analyzes why undergraduate research is a necessary pedagogical tool in teach a liberal arts education.

Undergraduate Research: A Liberal Arts Education

Many industries seek graduates who are holistic people, critical thinkers, and versatile in their studies and expertise. The manner of education which focuses on these qualities is a liberal arts education. Liberal arts institutions teach a large breadth of knowledge stemming from multiple disciplines to create holistic academic experiences and produce well-rounded students. Taylor University is one such institution, "with more than 60 majors across the arts, humanities, sciences, and social sciences, and a Foundational Core curriculum that promotes a broad base of knowledge, Taylor encourages students to ask hard questions, apply themselves to the tasks at hand, and embrace their callings" (Taylor University, n.d.). Additionally, Taylor states, "the liberating arts are emphasized throughout every discipline; they are supremely practice for this life and for eternity, and they are all about student learning outcomes" (Taylor University, 2018). Undergraduate research (UR) shares many values with liberal arts and Taylor University. Some student learning outcomes emphasized in UR include, "creativity, critical thinking, logic, communication, and problem solving" among other skills (Klos et al., 2011). Unfortunately, like many institutions, Taylor does not always see the similarities of UR to a liberal arts education nor the importance of encouraging their students and faculty to participate in UR. This paper will weigh the benefits and challenges of UR, but will first define liberal arts and explore how UR shares the ideals of liberal arts in educating students.

Liberal Arts Education

This paper defines a liberal arts education as and education which deliberately teaches a large breadth of knowledge stemming from multiple disciplines for the purpose of creating more holistic academic experiences and producing more well-rounded students. In his book *Building the Christian Academy*, Arthur F. Holmes discusses how liberal arts largely influenced the development of Christian higher education. He emphasizes how Christian higher education should be intentionally connected to our faith, since "reflecting on how whatever we do in life relates to its creator and lord… makes life and learning a continuous doxology of praise to God" (Holmes, 2001). Similarly, Taylor University describes their goal for liberal arts in this way: "The chief end of a Christian liberal arts education is to know God intimately, become like Christ inwardly, and serve Him obediently" (Taylor University, 2018). Reformation-era pastor-theologian Theodore Beza, told the students of John Calvin's academy they were "to become inbred of true religion and equipped with all good arts, [so as to] better amplify God's glory" (Holmes, 2001). A Christian perspective on liberal arts not only incorporates multiple disciplines, but also integrates faith and learning.

Great philosophers and educators across history have demonstrated the importance of a liberal arts education. The education goal of the Greek orator Isocrates was to develop the whole person intellectually, mentally, aesthetically, and politically (Holmes, 2001). Isocrates adamantly encouraged well-rounded and educated students: "A well-educated man… must have the ability to deliberate and decide matters of all sorts, so he must listen to the poets, learn from the sages, associate with the wisest, and develop a well-equipped mind" (Holmes, 2001). Isocrates highly

valued being well-learned on a variety of matters, which contains many benefits for students. Holmes notes how a liberal arts education creates many transferable skills in students that are "perhaps the greatest practical asset of an education in the liberal arts" (2001). Some such transferable skills are "the ability to think for oneself, to understand where someone else is coming from, and to uncover assumptions and see where a line of thought leads; to state oneself with clarity, precision, and grace; to sort out complexities in a problem, formulate alternative game plans, and discuss them without either seeming threatening or feeling threatened" (Holmes, 2001). These skills, among others gained from a liberal arts education create many benefits for students and may be applied in multiple professional and personal situations.

Undergraduate Research

UR provides students the opportunity to gain the same skills mentioned. The Council for Undergraduate Research defines UR as "an inquiry or investigation conducted by an undergraduate student that makes an original intellectual or creative contribution to the discipline" (Salsman et al., 2013). Most scholars accept and use this definition. Though other definitions may vary slightly, "it is commonly believed that undergraduate research clearly enhances classroom learning by providing opportunity for students to become active learners" (Salsman et al., 2013). Studies indicate that outcomes of UR for students include "improved analytic and critical thinking, increased academic achievement and retention, persistence to degree completion in their chosen field, improved ability to think and work like a scientist, clarification of career plans, and improved preparedness or desire for graduate study" (Morales et al., 2017). These student outcomes of UR closely parallel the transferable skills identified in Holmes' *Building the Christian Academy*. Though some may think these benefits can occur through the typical lecture style of teaching. One study indicates skill acquisition is accelerated when teaching and research are combined: "Teaching and research are 'mutually enriching' by their joint goal of discovering and creating knowledge; making sense and debating ideas and asking probing questions" (Butcher & Maunder, 2014). While lecture is a time-tested teaching method, combining a liberal arts education with UR experiences can multiply the student outcomes liberal arts institutions, like Taylor University, seek to promote. David Lopatto, a psychology professor, even argues "Undergraduate Research helps to 'realize the goals of liberal education' because it fosters personal growth and development as well as providing professional skills for students" (McNary-Zak & Peters, 2011).

Unfortunately, despite the mutual benefits between a liberal arts education and UR, many in higher education do not see the value of UR. The present author seeks to prove the value of UR to higher education, specifically to a liberal arts higher education, by exploring the effects of UR on students and faculty, and identifying the best UR practices to maximize benefits for students, faculty, and institutions.

Student Benefits in Undergraduate Research

Benefits in Transferable and Practical Skills

The benefits for students who participate in undergraduate research are plentiful. Perhaps the most important benefit of UR for undergraduate students is the wide range of helpful skills that can be learned and practically applied in multiple areas of life. Butcher and Maunder express how "learning about research tools and techniques can enable students to develop a range of transferable skills — providing them with valuable employability and progression opportunities" (2014). Their study also found that participating in UR created an "enhanced self-belief in their academic abilities" and inspired some student participants to continue in graduate and postgraduate study (Butcher & Maunder, 2014). Increased self-confidence, specifically in their ability to conduct research, was one of the many benefits found across multiple studies. Self-confidence in one's ability to complete tasks is a great quality to acquire during their undergraduate career that will prove valuable as they enter graduate studies and/or the workforce.

Another study compared the amount of student effort in UR with their perceived benefits from the UR experience. The results show "more time spent on research was helpful in improving skills related to networking, improving professional credentials, and contributing to a body of knowledge" (Salsman et al., 2013). The same study saw "improved communication in oral, visual, and written modes; building collaborative skills; and increasing leadership skills" in students who put more time into their research. (Salsman et al., 2013). Developing communication and networking skills is crucial for someone entering the workforce or graduate studies. Networking connects people to opportunities for work; learning this skill in addition to growing in communication abilities will set up an individual for success after graduation.

In a study about student and faculty engagement in UR, Webber et al. claimed "the fundament goal for UR activities is to strengthen skills and abilities for baccalaureate students" (2013). The study notes both long-term and short-term UR offers students "acquisition of analytic and synthetic thinking, increased confidence in ability to make presentations or speak publicly, and assistance with employment and/or graduate school" (Webber et al., 2013).

Not only does participating in UR improve a multitude of skills in students, but it also sets them above their peers who did not participate in UR. According to Klos et al., "Undergraduates who participate in meaningful research and creative projects are more successful than other students, both during and after college, in terms of creativity, critical thinking, logic, communication, and problem solving" (2011). They also found "college graduates who participated in mentored research during their undergraduate careers report significantly higher abilities than their peers to develop intellectual curiosity, acquire information independently, analyze literature critically, speak effectively, act as a leader, and possess clear career goals" (Klos et al., 2011). This demonstrates how skills learned in UR carry on into students' future careers in a positive way. Students who participated in UR during their undergraduate careers were better prepared for employment and graduate school, showing increased skill levels in an abundance desirable qualities.

Benefits in Undergraduate Study

While many benefits remain with student researchers after their time in academia, participating in UR also helps students succeed in their current studies and research experiences. One benefit of UR that helps students in their field is richer engagement with a focused content area (McNary-Zak & Peters, 2011). Additionally, one study found "UR added value to their undergraduate experience, providing opportunities to develop and hone skills which were described and alluded to, but not practiced in their degrees. Students also reported enjoying being supported to develop a research-informed voice" (Butcher & Maunder, 2014). As students continue to take courses in their major field of study, they are introduced to a wide breadth of concepts important to their field. While courses are clearly important to an undergraduate education; students are empowered by UR to go deeper into topics that interest them in their field.

UR also teaches students how to conduct research. Salsman et al.'s study about student effort in research found "the more time spent on research showed an increase in knowledge about the safe and ethical conduct of research" (2013). For example, a student involved with quantitative research may learn how to format a survey, enter data into a program, run statistical analyses, interpret statistics, and more. The more time students spend learning these processes, the more efficient and more ethical researchers they become.

Ann Marie Leonard Clinton wrote an afterword to McNary-Zak and Peter's *Teaching Undergraduate Research in Religious Studies*. Clinton discusses the experiences she had as an undergraduate student involved in a mentored research project; "Having a professor who was willing and able to explore my ideas with me, point me in the right direction, and give me the tools I needed to conduct research is an opportunity that I never would have had in the traditional classroom" (Clinton, 2011). Her research experience gave her knowledge she would not have learned in a traditional classroom setting. Clinton also expresses how her one-on-one research experience was one of the most meaningful and constructive experiences she had in her undergraduate study (2011), which leads into the last benefit of UR for students.

Benefits in Making Meaningful Experiences

UR gives students a more enjoyable and meaningful undergraduate experience. Studies have shown that "alumni with research experience rated involvement in undergraduate research as one of their most beneficial college activities" (Taraban & Logue, 2012). This demonstrates that UR experiences positively influence students for many years and create deep meaning in their lives. The fact that alumni identify UR as the most beneficial college activity it "implies that research experiences do not simply clarify but, instead, magnify interest in advanced training" (Taraban & Logue, 2012). The meaningful experience students have carries over into further academic training. Results from the National Survey of Student Engagement, and various alumni surveys "indicate that students find meaning and the inspiration for creative and critical thought through participation in educational experiences that are *differentiated*, *applied as well*

as theoretical, *experiential*, and *authentic*" (Klos et al., 2011, emphasis original). Creative work in UR experiences are avenues that provide students with such experiences. While students find great meaning and benefit in participating in UR, students are not the only party involved. Faculty members see benefits from UR, but also face some challenges.

Faculty Involvement in Undergraduate Research

Faculty Hesitation in Undergraduate Research

UR experiences require faculty involvement as a mentor in research. While faculty can enjoy and benefit from UR, they also face challenges that may cause hesitation in initiating research with undergraduates. One obstacle for faculty participation in UR is funding. A lack of funding is typically characteristic of UR programs. Tompkins et al. surveyed many social work professors about the UR programs at their institutions (2009). Their results indicate lack of research funding was a highly culpable for keeping faculty members from engaging in UR (Tompkins et al., 2009). Additionally, a study focused on faculty motivation in participating in UR found that "those who received government funding for their research were more likely to involve undergraduates in research projects" (Morales et al., 2017). While plenty of faculty members enjoy researching with undergraduates, lacking adequate monetary resources to fund UR often deters them from initiating it.

Another hesitation for faculty participating in UR is the perceived capabilities of undergraduates. Some faculty members believe undergraduate students are incapable of understanding and conducting meaningful research. The previously mentioned study of social work professors indicates that "students' lack of understanding of research" and "students' lack of confidence about conducting research" is a common challenge of UR (Tompkins et al., 2009). Faculty might also worry research done with undergraduate students will not be taken seriously in their field of study. Some fields may not "accept a journal article or an abstract for a disciplinary conference presentation that has an undergraduate as a second author" (Young, 2011). While this does not force faculty to exclude undergraduate students from research entirely, it certainly hinders the research process if students' work will not be accepted by their field. Alternatively, some faculty may pridefully assume undergraduates could not help their project unless "they've spent years getting up to speed" (Young, 2011). Even if professors include undergraduate students in small ways, students do not understanding key concepts in the field will surely slow down complex research.

Lastly, faculty members hesitate to engage in UR because of issues surrounding time. Finding an adequate research schedule between students and faculty can be challenging (Tompkins et al., 2009). However, the issue of time for professors is typically more about the time necessary to teach students the skills needed to work proficiently. Tompkins et al. make note that "students can often enter the experience with minimal research knowledge and skills, and faculty members may spend significant time teaching and supervising undergraduate research assistants" (2009). To some professors, the effort required to bring students up to speed is not worth the benefits.

Faculty Benefits in Undergraduate Research

While specific and realistic challenges exist for faculty involved in UR, there are benefits and reasons for professors to participate in and enjoy UR. The first way faculty benefit from UR is by improving relationships between faculty and students. One study that researched student and faculty engagement in UR found "greater faculty participation led to more student participation" (Webber et al., 2013). Higher numbers of faculty willing to engage in meaningful research correlated to higher numbers of students striving to gain UR experiences. In one study, a result of including students in meaningful research was that it reconceptualized relationships with academic staff (Butcher & Maunder, 2014). The study notes "the close one-on-one collaborative relationship with a supervisor, framed around discourse of conducting and analyzing pedagogic research, contributed to the development of a more collegial partnership between undergraduates and academic staff" (Butcher & Maunder, 2014). Student collaboration with faculty created relationships that brought more meaning to the research project. These findings address "the need for students to be involved as coresearchers in scholarship work and is effective because students are engaged in a mutual investigation of a pedagogic question, rather than researching the 'expert's' discipline" (Butcher & Maunder, 2014). Improved relationships between faculty and students give faculty more meaningful research, and offers the student better learning outcomes from both the research experience and their traditional coursework.

Faculty members indicate greatly enjoying UR because students bring an energizing enthusiasm to the project. This enthusiasm often helps faculty see their own research in a new light. One study explained how "many supervisors were struck by how enthusiastic the students were to explore a particular research topic and find answers to the questions posed— even if this meant moving into different disciplinary territories" (Butcher & Maunder, 2014). Student excitement is often surprising to professors. Well-rounded students may ask thought-provoking questions that may cause faculty to rethink their research, especially when they incorporate insights from another field. A survey taken of professors shows "students bring enthusiasm, a willingness to learn, and a fresh vision to the undergraduate research process" (Tompkins et al., 2009). This willingness to learn and fresh vision can refresh faculty who have been working on a particular project for some time and may inspire new insights. The student-faculty collaboration is mutually beneficial: "Studies have shown that the close cooperation of mentor and mentee is highly satisfying to both. Working closely with one or two students offers us [faculty] the opportunity to see close-up the effect we have on student learning, and this sense accomplishment can renew our enthusiasm for our work" (Huber & Lanci, 2011). Students and faculty help each other benefit from UR.

Engaging in UR is also beneficial for faculty because it allows them to witness firsthand students succeeding academically. A study that researched faculty motivation in mentoring undergraduate students received a response that said, "The tangible, measurable rewards to the professor are overshadowed by the personal satisfaction we gain by playing an active role in personal and professional growth of students" (Morales et al., 2017). Professors who invest in their students feel great reward from seeing their students' success and this reward motivates them to continue in UR. These experiences reward faculty members because it applies "skills

with content to create an authentic learning experience" (Salsman et al., 2013). Research with undergraduate students has been described as "the purest form of teaching" (Salsman et al., 2013). Faculty dedicated to their students' academic growth should want to create learning environments that are genuine and stimulating. These studies suggest UR might be the way to create such an environment. Additionally, "faculty mentors [involved in UR] report significant benefits to their quality of work and life" (Webber et al., 2013). The personal rewards for faculty who care deeply for their students and their research are quite fulfilling in and out of the academic setting.

On a more practical note, UR helps professors complete necessary tasks and can improve their teaching and lecturing skills. Faculty members report that "students have the potential to contribute to faculty members' continuing work and often help faculty members manage demanding teaching and scholarship schedules" (Tompkins et al., 2009). Student researchers can alleviate the workload of mentoring professors, which can motivate faculty to participate in UR. One study shares that professors "may become involved in UR because they believe that, in exchange for academic credit or knowledge acquisition, students can accomplish some tasks that they would otherwise have to do" (Webber et al., 2013). Professors must accomplish many responsibilities week after week, and working with students can less their workload. Working closely with undergraduate students can also improve professors' lecturing skills. Mentoring undergraduate students gives professors "a window into [students'] perceptions of the world" and improves their connection with students in traditional classroom settings (Huber & Lanci, 2011). Multiple benefits of UR exist for faculty members, benefits that are both personal and practical.

Worst Practices of Undergraduate Research

Insufficient Education

Several UR practices are not helpful to anyone involved. One significant downfall to UR programs is when they fail to teach students the skills necessary for success. Butcher and Maunder's study identified four levels of student involvement in research (2014):

1. Research led:	Students learning about current research in the discipline by tutors imparting the latest research findings in a particular field during taught classes.
2. Research-oriented:	Developing research skills and techniques through research methods classes and activities.

3. Research based:	Undertaking research and inquiry by carrying out empirical research work or engaging in problem-based activities.
4. Research tutored:	Engaging in research discussions such as academic debates with tutors and/or critiquing theories and papers.

Butcher & Maunder critique research programs that focus on levels one and two of student involvement in research, but never get to or reject levels three and four (2014). By rejecting the last two levels of student involvement in UR, students are unable to reach their full potential nor acquire new knowledge and transferable skills.

Certain major curriculums can also fail to provide their students with needed skills for assignments and senior projects. Many undergraduate majors have some variation of a comprehensive capstone assignment for graduating seniors, whether it be a research paper, project, or presentation. These assignments often synthesize students' knowledge from their entire undergraduate curriculum. Programs of study must slowly teach students the skills needed for these projects, or else students "find themselves thrown into a confusing and even terrifying maelstrom, with the thesis as a distant shore approached through tempestuous seas, with only a minimal lifeline of guidance upon which to grasp" (Klos, 2011). Underprepared students end up feeling completely overwhelmed and incapable of completing their final assignment. UR may be used to help students acquire and develop those skills that will be invaluable during their comprehensive assignment. Additionally, in UR experiences themselves, it is crucial for students to be given the skills they need lest they feel unprepared to complete the tasks set before them.

Bias and Unequal Opportunity

Sadly, biases and unequal opportunities may be present in some UR programs. Evidence suggests that UR experiences might only be beneficial for a certain demographic of students (Taraban & Logue, 2012). While many argue that undergraduate research is beneficial for all students, a rival hypothesis suggests "benefits of research depend on ability and belong to students with high GPAs" (Taraban & Logue, 2012). The results of this study strongly supported this hypothesis. The study shows that increases in all five factors of UR were predicted by GPA and that higher GPA students benefit from UR more than lower GPA students (Taraban & Logue, 2012). A rival hypothesis for this study was that research is better for upper level students (Taraban & Logue, 2012). This was partially supported, as upper level students who benefitted from research were also high ability students. It is "suggest[ed] that some students become

sidelined as they advance through college and fail to develop valuable skills, beliefs, and attitudes related to inquiry and research" (Taraban & Logue, 2012). Research also shows that low GPA students decrease in their research ability over time, average GPA students show no change, and high GPA students are the only category that increases in ability (Taraban & Logue, 2012). This study indicates UR may only be helpful for students who are already advanced, and that less capable students may be left behind, which would reduce confidence in their own ability to conduct research. The same study also notes that faculty support only increased throughout college for high GPA students (Taraban & Logue, 2012). These results should push the field to consider ways for lower GPA and ability students to gain benefits from UR experiences.

Taraban and Logue's study also showed evidence of gender bias being at play in UR experiences. The research mindset and research methods variables of UR were predicted by gender, showing more benefits to men (2012). This suggests there may be implicit bias in the research programs included in this study. This should encourage faculty who supervise UR to evaluate their programs and implement tactics to reduce bias.

Best Practices of Undergraduate Research

Faculty Mentors

A great asset to UR is having professors who are willing and able to mentor the students with whom they research. Taylor University states, "Each Taylor faculty member is committed to using his or her gifts, abilities, and expertise to foster the integration of faith, mind, body, and spirit in each and every student" (Taylor University, 2018). This philosophy of faculty members contributes greatly to the UR experience. One study identified the impact that faculty's commitment to enhancing student experience had on students. The results indicate "several students continued to work with their supervisors on dissemination activities including presenting at national conference and contributing to the writing of academic articles" (Butcher & Maunder, 2014). This shows how effective the presence of faculty mentors invested in the student experience is for undergraduates (Butcher & Maunder, 2014). Another study showed that increased ability in Research Mindset and Research Methods was predicted by the frequency of meetings with a faculty advisor (Taraban & Logue, 2012). This confirms the importance of intentional faculty involvement in UR. Mentored research is key for UR because "it correlates with higher retention rates, especially for students most at risk academically . . . it is not just honors students and the most academically motivated undergraduates who benefit from UR, but also students who otherwise would have trouble engaging with college work" (Klos et al., 2011). Above, it is discussed how over time lower GPA students often fall behind when developing research skills. However, faculty mentors can empower that demographic of students to succeed. Mentoring students also creates better learning experiences because it is easier to learn from "discovery guided by mentoring rather than on the transmission of information" (Huber & Lanci, 2011). Mentored research is a more engaging form of active learning than lectures. Overall, mentors in research drastically change the research experience and provide ways for students to flourish in the research environment.

Scaffolding Curriculum

Scaffolding, building upon knowledge taught in previous courses and learning experiences, is a good practice of UR. Scaffolding is most helpful for teaching research skills, especially when the skills are included in the major courses' curriculums, continually built upon, and culminated in a comprehensive assignment. Scaffolding allows teachers to teach their students as if they are an apprentice: "In teaching students as in working with apprentices, then, a teacher must teach his pupils how to discover and know the truth. He does this by showing how he himself approaches the science and then giving them practice in doing it themselves" (Holmes, 2001). Building on previous knowledge helps students learn each step well and encourages them to move to the next task with confidence. In her article about scaffolding curriculum, Shanahan says, "research integrated into the curriculum broadens the impact significantly" (2011). Teaching and research are mutually enriching and provide a more holistic education. Shanahan explains the benefits of scaffolding curriculum: "By introducing research early in the curriculum and then deliberately developing more challenging assignments that build on those initial skills, faculty help mitigate some students' dread of research and truly educate undergraduates to conduct research proficiently" (2011). This slow introduction and development of research skills throughout the curriculum prevents the students from being overwhelmed by a comprehensive assignment and builds confidence in their abilities.

Case Study (Wayment & Dickson, 2008)

Wayment and Dickson investigated one mid-sized psychology department and their students' involvement in UR, identifying five main issues of their department's current system for UR. Those problems were 1) lack of student awareness, 2) unequal student access, 3) poor curricular timing, 4) lack of publicity, and 5) uneven access/incentives for faculty (Wayment & Dickson, 2008). Overall, their department found many students were not aware of the opportunities, and those who were aware were given opportunities by connections rather than ability. They analyzed these problems and made adjustments in their department to fix them. The first change they made was to create an application procedure for UR. This addressed the problem of inequal student access to participating in research projects. The department also implemented various ways of advertising the research opportunities available. Information about the applications were put on the department website and discussed in classes. They also advertised UR by displaying projects in hallways and featuring student work in the department newsletter which was also made to address these challenges. The psychology department also changed the way they assessed and communicated with their majors. Various classes were asked to fill out questionnaires about UR opportunities in their department, with the questionnaire emphasizing the importance of research experience and fieldwork. The last change they made was to compensate professors who participated in UR with a reassigned teaching load.

After implementing these changes, this psychology department saw much higher student involvement in UR. From the previous 11 years, they had an average of 40 student researchers per year. After their first year with changes, there were 87 student researchers. The second year

saw an increase to 117 student researchers. They noted that all of their initial challenges had seen significant improvement. This case study provides an example for acknowledging poor practices and applying practical ways to improve.

Other Suggestions to Improve Undergraduate Research

The literature provides many suggestions for improving student experience and faculty interaction in UR. Some studies encouraged research skills training programs or including research in the general education requirements (Morales et al., 2017; Young, 2011). Suggestions were also made for faculty engagement in UR. Those suggestions include encouraging faculty-student interactions, promoting faculty awareness of mentoring minority students, incentivizing faculty mentors in UR, and supporting campus wide events that include UR (Morales et al, 2017; Young, 2011). One study noticed that lab courses had a strong association with faculty support and peer support, suggesting lab courses help strengthen the relationships students have with faculty and their peers (Taraban & Logue, 2012). Multiple sources also encourage research programs to consider how to make UR more beneficial for lower ability students (Taraban & Logue, 2012). McNary-Zak and Peters specify that "selectivity should not mean that Undergraduate Research is restricted to the best and brightest students but, rather, that it is intended for those students with a certain curiosity and capability" (2011). UR should be available and beneficial to all students and these suggestions may increase its accessibility.

Conclusion

Both liberal arts educations and UR experiences are valuable for developing holistic and well-rounded students. Not only do they develop these types of students, but they also create an avenue for integrating multiple perspectives and fields. This multidisciplinary approach is characteristic of the liberal arts, and can include integrating secular fields of study with theology and the Christian faith. A liberal arts education that pursues good knowledge from many places is glorifying to God. UR contributes to this pursuit of good knowledge by creating opportunities for liberal arts students to explore fields outside of their major course of study and learning the ways God can be seen and glorified in different fields. UR also benefits students by giving them skills to succeed both inside and outside of academics, as well as creating meaningful experiences that will be valued after graduation. UR can be difficult for professors; it takes time, money, and effort, which is not always ample in undergraduate contexts. However, undergraduate research can bring much benefit and joy to professors. They can improve their lecturing skills, delegate some of their responsibilities, and interact with students more personally. UR is most beneficial when the best practices are observed. Universities should encourage faculty to mentor students for maximum research success for students, faculty members, and institutions. Departments with comprehensive research papers should also consider a scaffolding curriculum to develop over time the knowledge and skills needed to excel.

As a liberal arts institution, Taylor University should highly value UR since it parallels many of the core values of a liberal arts education. This institution, and many others, should also strive to promote best practices for UR to improve student learning outcomes and faculty involvement in research mentorship.

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