

UNIVERSITY COUNCIL
RESEARCH, SCHOLARLY and ARTISTIC WORK COMMITTEE
REPORT FOR INFORMATION

PRESENTED BY: Caroline Tait, Chair, Research, Scholarly and Artistic Work Committee

DATE OF MEETING: April 17, 2014

SUBJECT: **Report on Undergraduate Research**

COUNCIL ACTION: For information only

PURPOSE:

The Research, Scholarly and Artistic Work Committee terms of reference call upon the committee to recommend to Council on issues and strategies to support research, scholarly and artistic work, and to provide advice to the Vice-President Research, the Vice-Provost Teaching and Learning, and Dean of Graduate Studies and Research on the contributions of undergraduate and graduate students and post-doctoral fellows to the research activity of the University. In keeping with its terms of reference, the attached report summarizes and reports on the Research, Scholarly and Artistic Work Committee's discussions on the university's initiative to more firmly establish undergraduate research within the undergraduate curriculum.

ATTACHMENTS:

1. Research, Scholarly and Artistic Work Committee Report to Council:
Undergraduate Research Initiative

Research, Scholarly, and Artistic Work Committee Report to Council: Undergraduate Research Initiative

1. Purpose of the report:

Toward an Engaged University: The Second Integrated Plan 2008/09 – 2011/12 sets out the goal of the “**engagement of students in research and discovery**” as follows:

The full potential of a research-engaged university is realized when students experience discovery and creative inquiry first-hand...Increasingly, a goal of our instructional design will be to provide students with authentic research experiences including modeling and mentoring by faculty as well as direct experience individually and in groups... We will not have succeeded, however, if we do not ensure that the vast majority of our undergraduate students have opportunities to experience research and discovery for themselves.... [and] have an opportunity to participate in a research project directly related to their program of study at least once during their academic career.

The following report summarizes a series of discussions held by the Research, Scholarly and Artistic Work (RSAW) committee that began in earnest in Fall 2013 and serves as follow up to committee discussions held in previous years about the enhancement of undergraduate research at the University of Saskatchewan. This academic year, RSAW set out to learn more about the university driven initiative in undergraduate research headed by the Vice-President of Research and in collaboration with the Vice-Provost Teaching and Learning, and the University Learning Centre. The goal of this new initiative is to provide research opportunities to all undergraduate students across all university colleges. The RSAW committee elected to hear from the administrative units who are directly involved in promoting and advancing the initiative, and from undergraduate students and faculty members who are currently or have in the past been engaged in undergraduate research activities. The committee thanks these individuals for their time and particularly for discussing the benefits and challenges of undergraduate research in a frank and open manner. In the future, RSAW plans to hear directly from faculty and students involved in the pilot projects that are underway now and those implemented in 2014/15 academic year, at which time RSAW will update Council again about the initiative.

This report outlines a series of specific and practical suggestions brought forward by the RSAW committee and poses questions where we believe further discussion and consideration is needed. For simplicity, this document uses the word “research” as a proxy for “research, scholarly, and artistic work.” Importantly, the intent of the document is not to critique the efforts of those involved in advancing undergraduate research but to provide information and advice to Council and proponents based on the committee’s exploration of the initiative. As such, the report is meant to inform, reinforce, and complement the work that has occurred to date. The RSAW committee will continue to keep up-to-date about advancement of this initiative, and this report should be viewed as a current update to Council on an initiative that will be followed by RSAW into the future.

2. Summary of efforts to date engaging undergraduate students in research:

The offices of the Vice-President Research, the Vice-Provost Teaching and Learning, and the University Learning Centre are leading the advancement of the university’s initiative to systematically engage in undergraduate research. In 2010, an interdisciplinary task force was

created to develop a framework to engage undergraduate students in discovery and creation opportunities, resulting in the submission of a paper entitled, *Undergraduate Research Opportunities*. The paper consists of an environmental scan of successful approaches used at other institutions to promote undergraduate research and a series of recommendations on strategies to advance undergraduate research at the University of Saskatchewan. Consultation on the report occurred with key bodies across campus, including the Associate Deans Research Forum, Deans' Council, the [then] Teaching and Learning committee of Council, and the RSAW committee.

In 2011, PCIP awarded \$400,000 in permanent funding to advance the undergraduate research initiative. The initiative focuses primarily on course-based experiences for undergraduate research and involves curricular revision and development based upon the goal of embedding an undergraduate research experience within the curriculum from the first through to fourth year. Expansion of student opportunities outside of the classroom (e.g. cooperative placements, internships, and research assistantships) and active promotion of knowledge translation of undergraduate research through various activities [e.g. poster presentations, undergraduate research journal] will be a central development of this initiative.

In approaching the challenge of making undergraduate research a priority in educational training at the University of Saskatchewan, the leadership team recognized the need to engage colleges and invite them to become champions of the initiative. As a start three colleges/divisions were invited to participate in curricular pilot projects focused on core "gateway" courses. These included the College of Kinesiology, the College of Agriculture and Bio-resources, and the Social Sciences Division, College of Arts and Science. Fifteen members of faculty agreed to participate in the pilot and introduce an undergraduate project into a 100-level course. A curriculum coach was hired to support faculty members in designing course content and a fundamental principle was adopted; "research is about asking questions and using the methods of a discipline to find answers and communicate results". It was felt this principle could be equally applied in a first-year class or a senior undergraduate class. In addition, senior undergraduate and graduate students were hired as research coaches for students. The role of the research coaches is to support faculty instructors by providing mentorship to students enrolled in the courses. In January 2014, the first of these courses – two sections of SOC 111 were taught, engaging a total of 340 students. Other faculty involved in the pilot project are currently developing undergraduate research courses for roll out in the first and second terms of the 2014-15 academic year. The planned assessment by the leadership team will determine the viability and success of the first three college level pilot projects and the potential for broader application.

3. The benefits:

The benefits of engaging undergraduate students in research are manifold to the university's mandate and to the student—undergraduate and graduate—and faculty bodies.

a) Recruitment and retention:

The undergraduate research initiative has the potential to be a distinguishing feature of the undergraduate experience at the University of Saskatchewan and serve as a recruitment and retention tool. As our goal is to recruit top level undergraduate students from within the province and beyond, offering a well crafted undergraduate research experience will be an attractive feature to students when making their decision of where to attend university.

The committee speculated that engaging in undergraduate research could be a positive and powerful part of a student's undergraduate experience. For students who are less comfortable initially with university education and engagement, having opportunities to participate in research may serve as a protective measure that increases their interest in their education, improves their academic performance and prevents them from considering dropping out. The committee felt that because of the level of engagement required and purposeful linking of undergraduate research to "real life" impacts, a greater sense of identity, belonging, and meaningful contribution could occur for undergraduate students. Assessment and evaluation of the undergraduate research experience will determine the degree to which this is true and identify areas and strategies that could utilize the undergraduate research experience to reduce student drop out and increase academic achievement.

b) Equal opportunity:

Undergraduate research has been a priority of the USSU for a number of years and they have been involved with the development and visioning of this initiative as an equal opportunity education experiences for all undergraduate students. While endorsed by the USSU (see USSU briefing document on Undergraduate Research), a curriculum-based approach to undergraduate research seeks to enhance undergraduate education at the University of Saskatchewan in new and innovative ways. By providing undergraduate students with a number of experiences throughout their program, students will gain a better understanding of the scope of research questions, methodologies, techniques, processes, and outcomes. Under the umbrella of undergraduate research, independent analytical and critical thought will be enhanced for all undergraduates and better prepare students to actively select graduate studies as a career pathway and/or prepare them for employment post-graduation. Embedding undergraduate research within the curriculum from the first year is expected to remove the mystique of research as something that takes place outside of the classroom or as an activity done by only a select few undergraduate students in honours programs.

c) Building a research culture:

The University of Saskatchewan is one of the U15 universities in Canada and as such is undertaking strategies to build a cross-college research culture that involves all students who attend the university. When faculty members describe the scope of their research field to undergraduate students in the classroom, research becomes more accessible and is enhanced further when students have the opportunity to take part in their own research development and application. When faculty and graduate student assistants work alongside undergraduate students on a research project, the students receive mentoring in research that has not up until now been available across all colleges and units. As one of the U15 universities in Canada, the entrenchment of research activities in undergraduate curriculum should foster a culture of research that positively impacts all colleges. Providing undergraduate students with the opportunity to showcase and present their research to peers and mentors builds accomplishment and disseminates knowledge to others. The involvement of graduate students as mentors, instructors, and collaborators further builds the university's capacity, giving graduate students important experience for future employment either as a university faculty member or in whatever career path that they choose. The outcome of inter-generational mentoring and instruction (faculty → graduate student → undergraduate student *or* faculty → undergraduate student) builds collegial ties that will expand the academic genealogy of the University of Saskatchewan, enhancing research and academic networks for the University of Saskatchewan across universities, industry, local and regional communities, and government.

d) Strengthening and enhancing connections with local, national, and international communities

Many undergraduate research opportunities involve partnerships (to varying degrees) with community, government, and private sector and non-profit organizations. Students may take up research that addresses a set of needs identified by research partners from outside of the university and in so doing they not only learn the process and value of engaged learning, but their work also benefits their research partners. This, in turn, strengthens the community outreach efforts of the university and positions us advantageously within the broader cultural, political, scientific, economic, and artistic landscapes.

4. The challenges:

A broad array of opinions exists regarding what is practical and feasible at the undergraduate level, and the RSAW committee carefully considered the challenges associated with the integration of undergraduate research at the level desired.

a) The challenge for faculty:

Success of undergraduate research across the student body relies upon the engagement and commitment of faculty and their respective departments and colleges. The committee feels that achieving this requires a cultural shift in how undergraduate curriculum is designed and delivered across the university. Cross-college exposure to, and discussion of enhancement of undergraduate research, occurred during the initial implementation of pilot sites with significant interest being expressed from faculty and departments. For some departments, undergraduate research is already embedded in specific courses, however, for other departments engaging in undergraduate research is a larger challenge, particularly in first- and second-year courses, and will require departments to rethink the current curriculum and the adoption of new approaches. Faculty members who spoke to our committee as well as our own committee members expressed concern that embedding undergraduate research in the curriculum requires a substantial commitment of time for faculty. Faculty require time to develop and integrate research within their undergraduate courses and to build alternate grading systems. While there appears to be openness on the part of faculty and departments to provide undergraduate research opportunities to all students, concern exists that the desired shift will inevitably result in significant time and resource pressures on faculty and departments that are already stretched to breaking points.

Faculty member participation in undergraduate research also demands time and energy beyond curriculum development, including supervisory responsibilities, logistical challenges (e.g. scheduling lab time and supervision, identification and arrangement of community placements, securing financial and human resources to undertake specific course projects), and, ensuring university ethical standards are met. For junior faculty, their primary focus should be on building a successful research program by attaining tri-agency and other research funding, and undertaking research and knowledge translation activities, specifically academic publication. At the same time, junior faculty are required to meet their department and college standards for renewal of probation, tenure, and promotion. Because of competing demands, measures must be in place to give junior faculty the optimal conditions to support both their career development and to engage in providing undergraduate research opportunities.

The curriculum of the professional colleges, such as Law and Medicine, which are already fully subscribed, makes fitting in an undergraduate research experience challenging. At the first-year level, the dense and demanding content will require judicious selection of content revision. This will also be required in disciplines where research per se is not the language of innovation and discovery. For example, in some units, entrepreneurship or artistic works account for advancement in the field and therefore an “undergraduate research experience” must reflect the framework of the unit rather than a generic (and irrelevant) understanding of “research” and research “innovation” and “discovery”.

b) The importance of using a tailored approach: simplicity and the right level:

The challenge of distinguishing between research experience in the first year versus senior and upper-year courses requires careful thought to ensure the experience is a positive one and pitched at the right level. Simplicity and “do-ability” in years 1 and 2 is key to ensuring success. Therefore, research projects must be scaled appropriately and able to be completed in the time available.

Disciplinary approaches will need to be tailored to appropriate expectations. For example, community-based research activities are embedded in real-life challenges and in some areas students without training and experience in methodologies used in research with vulnerable populations can run into significant challenges if they are not under full supervision. Further, in certain areas involving research with human or animal subjects, timely submission and approval of ethics will be required. For their own and the university’s protection and protection of research subjects, undergraduate students will need instruction in ethical standards and practices before being allowed to engage in research with vulnerable research subjects (human and animal) that requires review by the university’s research ethics boards.

c) Funding limitations:

Granting agencies often limit the researcher’s ability to provide a stipend for technical assistance or undergraduate student support, requiring that research funds be applied toward graduate student stipends. Strained departmental budgets make the additional expense of providing an undergraduate research experience, particularly field experiences a barrier. This is an even greater challenge given the current budgetary reductions the university faces. The committee heard that sessional support provided in some instances to assist with the instruction of sections of large first-year classes, with respect to coordination and delivery of a research module, is being downsized and may not be available in the future. The gap between ramping up undergraduate research and the fiscal reality that departments and colleges find themselves in was a question that the committee felt has not been fully answered, and will be something that we will continue to monitor and seek feedback about from all stakeholders.

Dissemination of research outcomes can vary significantly and depending on the needed resources and those available to faculty instructors will determine whether dissemination activities occur. Although the impact of some student research projects might be significant and the potential for ongoing application might be tremendous, if there are inadequate funds to support dissemination and knowledge transfer - workshops, publications, written, oral or on-line reporting back to communities, advertisements, etc. - then the overall value of the research will be undermined. The RSAW committee felt that dissemination was an important conclusion to the undergraduate research experience and questioned the demands that the full range of research activities (start to finish) would place upon undergraduate students. An additional concern is whether those students who because of necessity are employed while in university, and/or are parents or caregivers of

family members, will be disadvantaged, particularly if research activities such as data collection and dissemination activities require flexible hours or for them to work more frequently in teams that meet at inopportune hours for them. The committee was unable to determine how undergraduate research will impact upon these particular groups of students, if at all. We will continue to seek information about this question as the pilot projects conclude and new initiatives started.

d) Logistics:

Consideration of resources – including as applicable, equipment, travel time, safety—must prevail and adequate infrastructural support made available. Group project work is often predicated upon having a set limit of participants—too few or too many students may mean the project is no longer available. Ensuring the expectations of the course (degree of work, student initiative, access to transportation, etc.) are apparent at the outset to students is important. Proximity to a research mentor is also important to enable side-by-side learning and the resolution of any conflicts should they arise.

e) Graduate student assistants:

The model of employing graduate student teaching assistants requires new resources and training to ensure graduate students also have a positive experience and that their efforts make a difference. Graduate students in interdisciplinary programs may be disadvantaged in not having affiliated undergraduate programs and efforts should be made to include them as mentors and instructors.

5. Committee recommendations:

- **Faculty be rewarded at an institutional level for developing their curriculum to encompass undergraduate research; if faculty are not rewarded, the intention to participate may evaporate in the face of competing demands and pressures, regardless of how interesting or worthwhile the initiative is.**
- **The initiative be embedded at the departmental level and individual faculty members can opt out of the initiative.**
- **The experience of undergraduate research be broadly defined, and should not be misconstrued to mean only experiential hands-on learning. Many departments and faculty regularly engage in undergraduate research whenever they offer a course on how to write a research proposal or how to research secondary sources. Other frameworks for innovation and discovery must be considered such as entrepreneurial, artistic work, and other models employed by departments.**
- **Dissemination and knowledge transfer of undergraduate research be a priority of the initiative and the participating units in order to provide students and all stakeholders with tangible outcomes.**
- **Learning outcomes be developed to measure success;**
- **Exploration continues regarding the possibility of applying academic course credits to summer research internships and research assistantships, and in doing so that practical considerations of this direction be considered, (e.g. should tuition apply? How will**

evaluation be undertaken?)

- **Individual departments and non-departmentalized colleges are encouraged to include a section that details their undergraduate research initiatives in all curriculum renewal processes.**

6. Summary:

The undergraduate research initiative at the University of Saskatchewan is an exciting and bold strategy to improve undergraduate education. It holds great promise for the university's future by improving the university's ability to attract and retain the best students in the province and beyond. Young people are by nature curious and innovative. Providing them with a range of opportunities to explore and discover throughout their undergraduate degree will create mature and accomplished graduates.

The implications of the undergraduate initiative for colleges, departments and faculty is still unclear, however more will be known once evaluation of some of the early pilot projects are completed and modification to later ones are made. This will be a learning process for all, and the RSAW committee will continue to monitor this initiative for Council, as well as providing advice and guidance to the OVPR's leadership team.

7. Further information:

Additional information can be found on the university web site as outlined below.

[The Gwenna Moss Centre for Teaching Effectiveness: Undergraduate Research and Inquiry](http://www.usask.ca/gmcte/resources/teaching/strategies_experiential/undergraduate-research-and-inquiry)
http://www.usask.ca/gmcte/resources/teaching/strategies_experiential/undergraduate-research-and-inquiry

[The University of Saskatchewan Undergraduate Research Journal, volume 1, issue 1, February 2014](http://www.usask.ca/urj/)
<http://www.usask.ca/urj/>

[Research Learning Community](http://www.usask.ca/ulc/lc/research)
<http://www.usask.ca/ulc/lc/research>

[College of Kinesiology One-Credit Undergraduate Research Experience](http://kinesiology.usask.ca/study-here/undergraduate/ocre.php)
<http://kinesiology.usask.ca/study-here/undergraduate/ocre.php>

[Social Sciences: Taking the Pulse of Undergraduate Research](http://www.usask.ca/gmcte/stories/2013/08/taking-pulse-undergraduate-student-research)
<http://www.usask.ca/gmcte/stories/2013/08/taking-pulse-undergraduate-student-research>

[Undergraduate Project Symposium](http://words.usask.ca/ussu/2013/11/25/undergraduate-project-symposium/)
<http://words.usask.ca/ussu/2013/11/25/undergraduate-project-symposium/>
<http://words.usask.ca/ussu/2014/01/20/undergraduate-project-symposium-2/>

[NSERC sponsored undergraduate research](http://words.usask.ca/news/2013/08/21/nserc-program-fosters-undergraduate-research-at-u-of-s/)
<http://words.usask.ca/news/2013/08/21/nserc-program-fosters-undergraduate-research-at-u-of-s/>