FUSION Report: 2020-21

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BE WHAT THE WORLD NEEDS

Executive Summary

The University of Saskatchewan's FUSION implementation began with 141 students in Fall 2020. Students enrolled as part of research, volunteer or classroom experiences, and the program ran with both optional and mandatory participation groups. Of the 141 enrolled, 115 students completed the program (82% completion rate).

Student skill development results were extremely positive, with students showing statistically significant growth in the two skill domains for which quantitative data was collected (Metacognition and Problem Solving). Data from student self-assessment also showed a significant percentage of students saw improvement in each of the program's seven outcomes.

Student feedback has also been predominantly positive, with students indicating they gained valuable knowledge and competency in all three skill domains. Students also commonly indicated how this learning would be of benefit to them in their academics and future careers. Students also frequently remarked having gained a clearer understanding of their own capacity within each of the skill domains, recognizing, as well, where they have room for continued growth.

Partner/instructor feedback has also been positive, with partners hearing similar feedback from students regarding their skill development. Many partners have indicated an interest in offering FUSION to their students again. In cases where the program was optional, partners have commented that the honorarium will be important to ensure student participation in FUSION. One partner did comment, however, that they had received feedback from a student that the benefits of the curriculum outweighed the honorarium.

Overall, the program was broadly seen as successful and of great value to students. Suggestions for the future of FUSION include expansion of the curriculum into other skill domains, and adding additional resources, particularly to complement some of the more challenging elements of the program, such as adding a workshop on how to define problems.

Introduction to FUSION

The Future Skills Innovation Network (FUSION) is a national network of Canadian universities focused on exploring innovative approaches to skill development for the future economy. Launched as part of the new, federally-funded Future Skills Centre (FSC), FUSION works to speed experimentation and scale effective approaches to skill acquisition at universities, while contributing research results, data, and methodologies to the larger network of FSC collaborators. The members of FUSION are Simon Fraser University, University of Calgary, University of Saskatchewan, Carleton University, Concordia University, and Memorial University.

Aiming to help universities prepare students for the future economy, FUSION is focused on achieving three main goals:

- Improving postsecondary outcomes for students from underrepresented groups
- Developing students' work-related skills through curricular and co-curricular activities
- Creating more flexible formats for accessing learning.

FUSION Skill-Development Curriculum

In Fall 2020, the network introduced the FUSION Skill-development Curriculum for pilot implementation at partner universities. The curriculum was designed to "wrap around" experiential learning activities to enhance students' skill development. This curriculum consists of video and text instructional content, guided self-assessments, exercises, reflections, case studies and other activities, providing students with the targeted instruction and guided practice they need to meaningfully improve important employment-related skills.

The FUSION Skill-Development Curriculum focuses on helping students enhance their skills across three critical 21st century skill domains:

- Metacognition – the ability of the mind to plan, monitor and assess its own learning and performance
- Communication – the ability to construct and convey a message through an appropriate medium
- Problem solving – the ability to connect various analytical strategies to come up with creative solutions to manage difficult situations**.**

The selection of these three skill domains was based on their repeated prioritization in surveys of employers and their perceived centrality to 'next-generation' employment opportunities for university graduates.

Using their experiential learning opportunity to apply their learning in real-time, students will learn to:

- Identify and articulate personal learning strategies and strengths in learning and processing information
- Identify how to adjust communication based on context, audience, purpose and medium
- Analyze and deconstruct a simulated work problem using the stages of the problem-solving cycle.

Implementation

Nationally

In 2020-21, the network successfully facilitated the bulk of the FUSION curriculum across five of our six network partners (Simon Fraser University will launch for their first run May 2021). In Fall term, 693 students were enrolled in the curriculum, situated in a diverse group of experiential and curricular offerings across our campuses. Additionally, information was collected from students that helped to initially assess the success of this launch. Across all data sources, the message was remarkably consistent: The FUSION curriculum provided tangible benefits to students who participated.

The initial success metric is student completion. Of the 693 enrollees, 72.3% completed the curriculum, completing all six modules, and submitting a completed workbook as a learning artifact. This completion rate surpassed initial expectations, which were tempered by the documented low rates of completion for other non-credit-bearing online courses.

An important network priority is providing access to experiential-learning and skill-development for equity-seeking participants. These participants identify with one or more groups which may be traditionally underrepresented in experiential learning and skill development. Across the network, students optionally reported on their membership in these equity seeking groups, as outlined by the Future Skills Centre.

Women = 349
Indigenous persons = 7
International Students = 57
Racialized persons = 160
Persons with disabilities and Deaf persons = 47

USask

The curriculum was delivered through Canvas, USask's Learning Management System (LMS). The implementation timeline was Sept 1 – Dec 23, 2020, with pre-set due dates for each module. If they completed the curriculum by the Dec 23 deadline, student were given a

certificate of completion and, if eligible, co-curricular record acknowledgment and a $150 honorarium.

With permission of the program leaders and faculty, students were recruited from the following programs and course:

A&S Peer Mentors
- The Arts & Science Peer Mentor Program matches up small groups of first-year students with two upper-year peer mentors in first year Learning Communities programs. Peer mentors serve as role models for first year students and help guide them on their university journey.
- Participation: Required
- 62 enrolled, 58 completed

SLS Peer Mentors
- Student Learning Services (SLS) offers a variety of free resources to help students develop study skills, note-taking skills, and strategies for exam preparation. SLS Peer Mentors provide academic support to their fellow students. They offer online and drop-in writing help, online resources, and a math and stats help centre.
- Participation: Required
- 50 enrolled, 35 completed

USRAs
- Undergraduate Student Research Assistants includes students in First Year Research Experience (FYRE) or experiential learning courses, capstone courses, honours projects, research assistants working with professors on projects, and other undergraduate students interested in building their research skillset.
- Participation: Optional
- 0 enrolled, 0 completers

MITACS
- MITACS Research Training Award (RTA) students are a group of graduate and post-doctoral students who received special funding to participate in MITACS programming focusing on academic and professional skills development.
- Participation: Optional
- 2 registered, 1 completed

FYRE Research Coaches
- FYRE incorporates dynamic research experiences into the curriculum right at the first-year level, setting students up for future professional and academic success. FYRE classes take students through the research cycle: ask a question, investigate the question, and share the results. Each FYRE class has access to senior students who work as research coaches for the FYRE project.

- Participation: Optional
- 9 registered, 4 completed

NUTR 450.3: Nutrition Program Planning and Evaluation
- NUTR 450.3 provides an understanding of the theories, principles, and techniques involved in planning and evaluating nutrition programs. Students work together to plan a nutrition program for a local agency or organization.
- Participation: Required
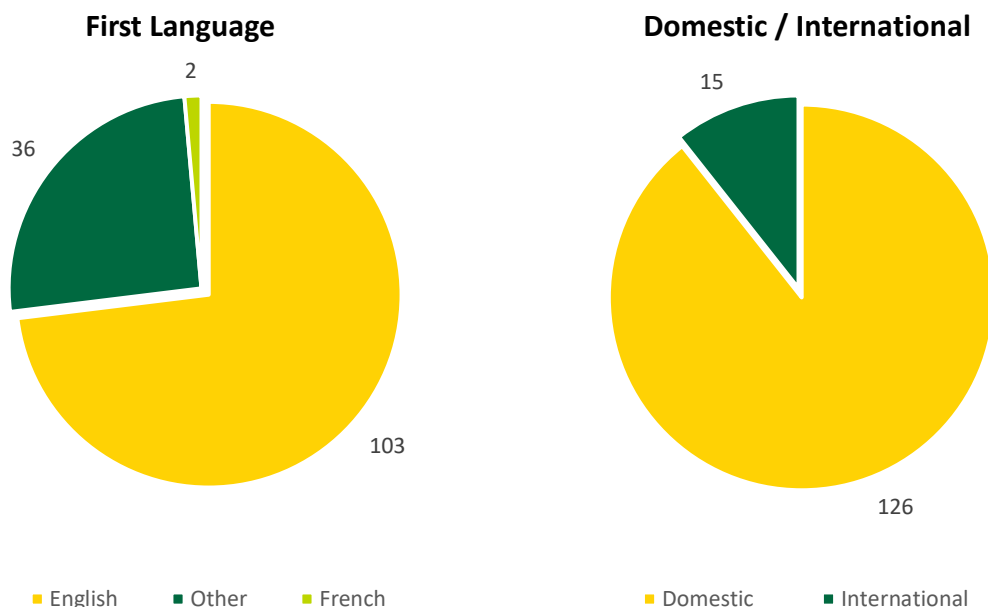- 15 registered, 15 completed

Peer Health volunteers
- Peer Health volunteers are students dedicated to promoting health on the USask Saskatoon campus and are passionate about health issues that impact student well-being.
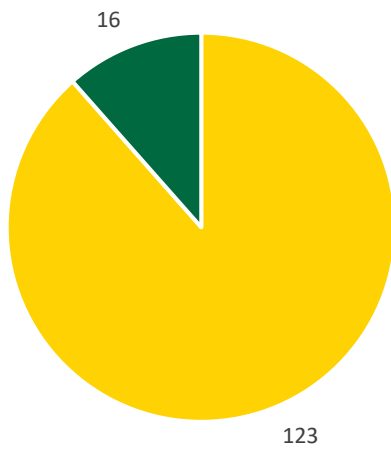- Participation: Required
- 9 registered, 8 completed

USask Outcomes

Student Demographic Data

141 students enrolled in FUSION and gave consent to participate in the research study. Of the 141 enrollees, 82% (115) completed the curriculum, completing all six modules, and submitting a completed workbook as a learning artifact. Demographic data collected through a survey at the beginning of the curriculum included the following:
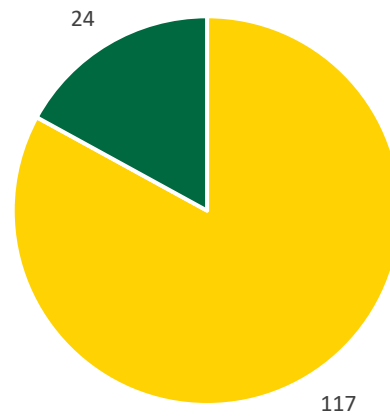
First Language

2
36
103

■ English ■ Other ■ French

Domestic / International

15
126

■ Domestic ■ International

Undergraduate / Graduate

16

123

- Undergraduate
- Graduate

First Generation

24

117

- No
- Yes

College Representation (%)

2% 2% 1% 1%
5%
5%
6%
11%

11%

56%

- Arts and Science (56%)
- Pharmacy and Nutrition (11%)
- Graduate and Postdoctoral Studies (11%)
- AgBio (6%)
- Kinesiology (5%)
- Other / Prefer not to say (5%)
- Edwards School of Business (2%)
- Engineering (2%)
- Nursing (1%)
- Law (1%)

Year of Study (%)

Bar chart showing Year of Study percentages: 1st = 0%, 2nd = 21%, 3rd = 31%, 4th = 33%, Graduate = 11%, Prefer not to say = 4%
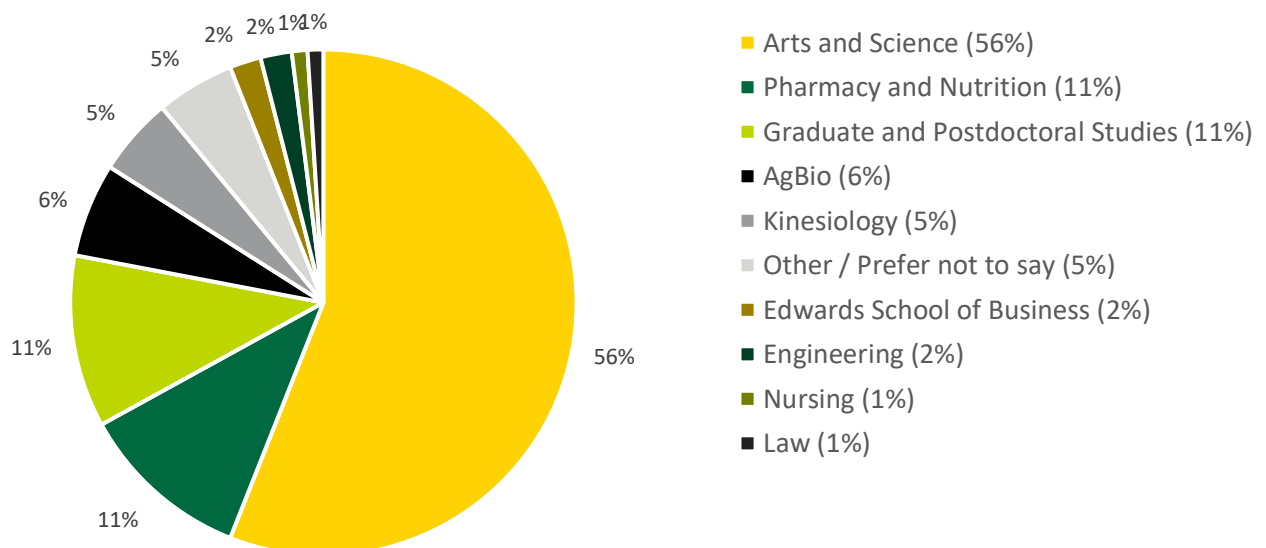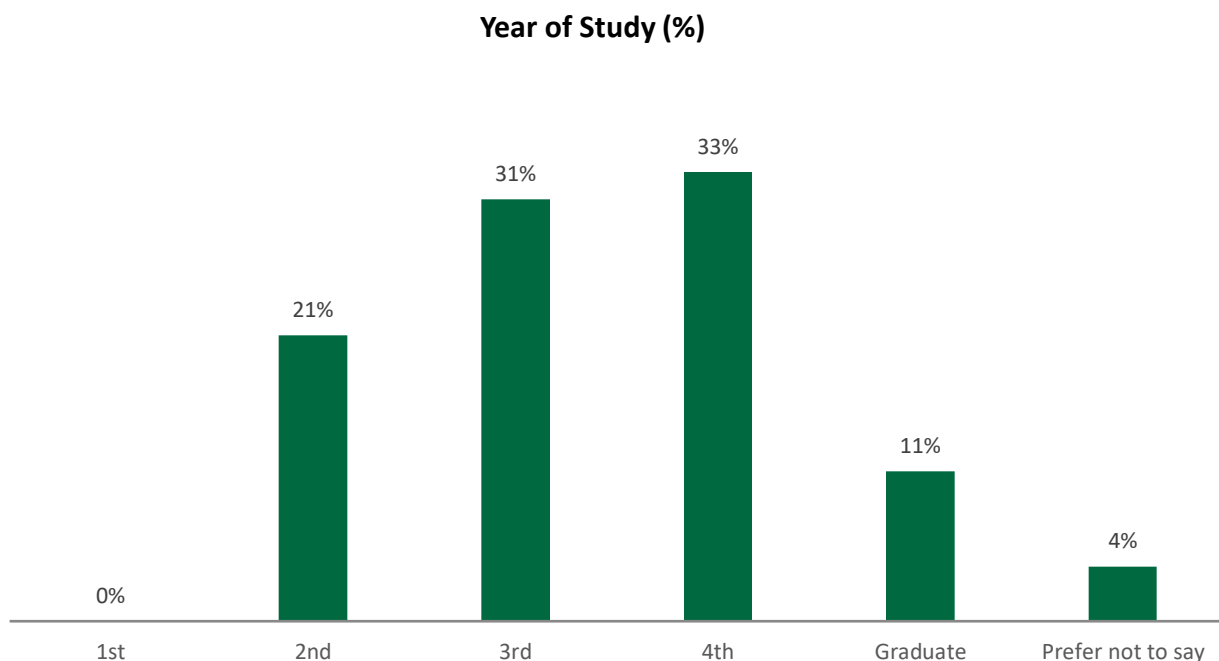
Students optionally reporting membership to these equity seeking groups as outlined by the Future Skills Centre (percentage of USask participant group):

    Women = 105 (74%)
    Indigenous persons = 2 (1%)
    International Students = 15 (11%)
    Racialized persons = 35 (25%)
    Persons with disabilities and Deaf persons = 11 (8%)

Student Engagement and Impact

Quantitative and qualitative data were collected for both the Metacognition and Problem-solving domains as well as the Orientation and Reflect Modules but, due to a scoring issues within the LMS, only qualitative data was collected for the Communication domain. In addition, as there were no pre-and post-scores to report on, only qualitative information is shared for the Apply Module.

Analysis of the quantitative data indicated that students reported significant and consistent increases from pre-test to post-test across the Metacognition and Problem-solving domains, with the effect size being moderate to large. This confirms what students shared through their workbook entries (as quoted in samples below).

Explore Module – Metacognition

Results of Paired T-Tests of Metacognition Skill Domains Examining Mean Differences from Pre-Test to Post-Test

Domain	Pre-test		Post-test		Mean diff.	t(96)		Cohen's d
	M	SD	M	SD				
Planning	3.72	0.53	4.18	0.56	0.48	9.88	***	1.00
Comprehension monitoring	3.63	0.54	4.12	0.57	0.49	8.63	***	0.88
Correction strategies	4.16	0.45	4.45	0.42	0.29	7.02	***	0.71
Evaluation	3.49	0.55	4.05	0.61	0.55	9.42	***	0.96

Note. *** indicates that the difference in means was significant ($p < .001$)

"My main takeaway from [the metacognition] module is the fact that our skills can always be improved and developed. Mastering a skill does not mean that we have a complete grasp on that skill and can always look for ways to improve and implement changes in our learning and work."

"[D]ifferent strategies will lead to different outcomes. I have learned that we must be careful to not be bound to the same learning strategies in every situation. Instead, we should always assess and identify the best method of learning."

Explore Module – Communication

"Although I consider myself a relatively competent communicator, I can always improve by considering various elements of communication. It can also be beneficial to step outside my comfort zone and practice methods of communication I am unfamiliar with or do not prefer, in order to increase and broaden my skills."

"My main takeaways from [the communication] module are that we can always be improving our communication skills and that there are certain aspects of communication that we need to be aware of. It may seem like communication only consists of what you are saying, but there are many other areas to consider if you want to have successful interactions […] I think this module made clear the importance of listening and receiving/responding to feedback in your encounters in order to get the most out of the conversation."

Explore Module – Problem-Solving

Results of Paired T-Tests of Problem-Solving Skill Domains Examining Mean Differences from Pre-Test to Post-Test

Domain	Pre-test		Post-test		Mean diff.	t(93)		Cohen's d
	M	SD	M	SD				
Identifying the problem	3.99	0.45	4.30	0.52	0.30	5.99	***	0.62
Planning a solution	3.81	0.49	4.20	0.54	0.39	8.67	***	0.89
Confidence in solving problems	3.80	0.55	4.20	0.50	0.40	8.46	***	0.87
Assessing the solution	3.88	0.65	4.25	0.64	0.36	5.43	***	0.56

Note. *** indicates that the difference in means was significant (p < .001)

"My main take away [from the problem-solving module] is that there are multiple different problem-solving steps and maybe the one I currently use may not be the best one for me or may not be the most useful in a broader context of problems. Another takeaway is that there is a formulation to problem solving that through rehearsal can potentially alleviate some of the stress of not having a plan."

"I think something I didn't think about before, was making sure my definition of the problem is accurate. I often go straight to the problem solving and brainstorming, but I think clearly defining the problem will make my process more efficient."

Apply Module

"The main take away [from the Apply module] is to break down complex problems into a way that you can understand the problem from multiple levels (who is involved, where and why is the problem occurring, etc.) that allows us to understand the gap between our beginning and end goals to the problem."

"I really enjoyed the exercise of identifying a problem that involves metacognitive, critical thinking and communication skills. It helped me to identify a problem and think about the structure of this. Brainstorming is definitely a good way to look for actions and strategies that open a world of possibilities and then narrow down the options helped me create a plan ad prepared me to act on it."

Orientation and Reflect Modules

Most students reported either remaining the same or increasing in their self-assessment across the seven outcomes. A small portion reported a decline which is not surprising as such an effect is not uncommon when students are introduced to a new skill and experience a drop in their confidence.

Outcome	Remained the same	Increased	Declined
I routinely identify and articulate personal learning strategies and strengths in learning and processing information. (n = 85)	54.1%	43.5%	2.4%
I create professional goals and plan for how my work experience will contribute to those goals over time. (n = 85)	56.5%	41.2%	2.4%
I identify how to adjust my communication based on context, audience, purpose, and medium. (n = 84)	54.1%	36.5%	9.4%
I analyze and deconstruct a simulated work problem using the stages of the problem-solving cycle. (n = 84)	34.5%	57.2%	8.3%
I clearly define complex problems in work experiences. (n = 84)	47.6%	45.3%	7.1%
I adjust my personal approach to complex problems in my work experience based on context and audience. (n = 84)	38.1%	59.5%	2.4%
I assess my progress during and after my work experience to clarify and extend my skills. (n = 84)	53.6%	36.9%	8.3%

"[D]ifferent strategies will lead to different outcomes. I have learned that we must be careful to not be bound to the same learning strategies in every situation. Instead, we should always assess and identify the best method of learning."

"Problem solving is a process, and everyone has a different way of looking at and solving problems. There isn't necessarily one solution, and that even the definition of "solved" is different from person to person."

Student and FUSION Partner Feedback

Six students participated in an optional follow-up interview conducted by the FUSION Project Student Assistant. Transcripts of the interviews were reviewed, and the following is a sample of themes and comments that emerged regarding their experience:

Skill development

"[The curriculum] helped me in the long run in being more efficient and just being more mindful and thinking about what I'm doing… I feel it really did help that and just realize that that's important."

"The communication module talked a little bit about perspective taking and making sure that you're using the right words so that that person can understand you… it was a good opportunity for me to understand that. I need to realize who's in the crowd or who's in the audience or who I'm talking to and try to talk to them in a way that they'll understand."

"I think the problem solving is the area of growth for me or the area with the most growth… [it] provided me with the tools and reflective knowledge or tools to reflect on my problem solving.… usually, I really like to immediately jump to the solution… it really had me stop and reflect on why I do that and encourage me to evaluate my problem solving."

User experience

"I think the workbook was good. It followed along really nicely and allowed me to think about my thoughts and then collect it and keep it in one spot… it was nice to have a spot to collect all my thoughts and to reflect."

"I think with the workbook, my preference would have been to have it integrated within canvas rather than as a separate document that I had to manage outside of canvas… sometimes that felt a little bit clumsy and having two different platform[s]."

"I guess, overall, I found the modules easy to understand… I kind of liked the mix of videos and written material, because I think some people who are they get more out of it from videos as opposed to reading or the other way around… And I felt like the pace of the modules are really good, too."

"I didn't find very much value in the reflect module… I was actually quite disappointed that it was just a repetition of all of the different assessments that were built into the previous modules, I think that was disappointing."

Facilitation and support

"She's [the facilitator] really good at setting reminders and announcements when you have so much going on and you need to do it and it just kind of slips your mind for a while… It was just kind of nice to feel like someone cared that we were doing it and putting in our work.""

"One thing I would really appreciate is having an instructor like a check in every couple of weeks… And then I think having like a sounding board almost or a coach guiding those problems would really help students… having like an on-the-ground person that checks in with each individual or having like a seminar style once even like once every three weeks or something, I think would be helpful."

"What would have enhanced my learning experience is some sort of collaboration with others… maybe even a conversation with the facilitator in small groups of either our section of Canvas… I think I would have like some interactivity with others who were completing fusion either within my section or across another section, from across Canada as well, even that opportunity to connect with other students."

Inclusivity and accessibility

"I found that the modules were really text heavy, which I don't think is a bad thing. But I think having more videos and visual images to kind of lead the reader and the learner through the process would be a little bit more helpful."

"I feel like maybe they could give more specific examples to the various challenges or the various situations that people have, for example, like a student who's also a parent, for example, like someone who's an international student, like what kinds of challenges they face."

"I think one of the challenging parts is the curriculum relies heavily on Internet and having access to a device and reliable Internet… if we have students who are living internationally, especially, there's quite a few of them this year because of the pandemic, I think that access to technology might actually be a little more challenging for international participants."

"I worry that some of language perhaps might be challenging for students who don't see themselves as an academic scholar, yet they don't see themselves in the identity of a university student."

Overall value

"I think it's a really great course and a really great opportunity specifically for undergrads or people coming into university… this would be great to have within the arts and science program as almost like a requirement."

"… this isn't just going to help you today and tomorrow, it's going to help you for every part of your life is going to help you in school, and it's going to help you and your future career and it's going to help you network…you can have better and deeper conversations."

"I think it's useful, this is the stuff that I think they are learning in the classroom, but it's not explicitly taught…. You could apply [it] to a real-life scenario. And I think this is what FUSION has done for those students, was to teach them how they can use this outside of their classroom experiences and ensure that going forward, whether, looking for summer job or, you know."

In follow-up conversations with USask FUSION Partners,

FUSION Successes

"One student at our year end meeting this week talked about how much the course helped her in the PH leadership role. She was able to practice what she learned. This student feels that PH leaders should take this prior to becoming a PH staff leader."

Barriers and pain points

"This whole last year was difficult. Although this was easier to implement with new student staff, previous staff needed convincing to complete FUSION. Fall term was busy for them: working with a new volunteer group, moving everything to on-line, and big changes to their own lives. Adding FUSION was definitely an add-on. The honorarium made it easier to ensure that they completed the program. Without the honorarium I don't know how many would have completed it. I would love to make it a pre-requisite to becoming a staff leader instead of adding in once they've been hired."

Suggestions for future

"Please keep offering this so that we can build it into our programs. One student told me that the benefits outweigh the honorarium. the honorarium is a nice bonus, but not completely necessary."

Overall value

"FUSION may be the leadership program that Student Leadership Community of Practice has been looking for! Peer Health orientation is so busy with Health training and outreach how-tos, that I've neglected some of this. FUSION offers life-long learning."

"[A]fter completing it, I think it's a great program. Fairly simple in concept, but lots of high-level practical information and advice. I really like how it's tailored to students, but really adaptable to any situation."

"Perhaps the staff of students who were involved this past year could chat to discuss how they used the program or plan to use it. I'd love ideas of how to incorporate FUSION into my work with student staff more."

"[A]fter completing it, I think it's a great program. Fairly simple in concept, but lots of high-level practical information and advice. I really like how it's tailored to students, but adaptable to any situation".

Recommendations and Next Steps

Recommendations

Based on informal feedback from students and FUSION partners, survey and self-assessment data, and student interviews, the USask FUSION Project Leads recommend:

- Timelines
  - Make the curriculum available before the students' experiential learning opportunity begins or as close to the start date as possible
  - Continue with a gap between the Apply Module and the release of the Reflect Module to facilitate learning and encourage implementation of their problem-solving strategies
- Communications
  - Add more messaging up front to explain the timing of the release of modules and the rationale of spacing
  - Add messaging at the end to ensure that they complete all questions in the Reflect Module
  - Continue to make the importance of workbook engagement explicit
  - Add the evaluation survey at the end of the curriculum
  - Simplify the language further for ESL
  - Continue with regular announcements and engagement in Canvas
- Student engagement and supplemental instruction
  - Cross network engagement – Create opportunity(s) for students to learn from all FUSION project leads and engage with FUSION students from across the country
  - Create opportunity for students to interact and engage as a cohort of learners
  - Offer supplemental workshops/sessions and opportunity to talk with a facilitator (especially in the problem-solving section)
- Expansion
  - Leverage video or written testimonials to help promote the program
  - Encourage students in STEM programs to take advantage of the program, as well as more Indigenous and male participation
  - Focus on creating more opportunities for implementation in for-credit courses (e.g., NUTR 450.3)
  - Create other versions of FUSION to facilitate the development of additional skills

- Continued flexibility and understanding
  - Practice compassion and understanding as students and FUSION partners continue to navigate the exceptional circumstances of the pandemic

Next Steps

- Spring/Summer 2021
  - Implementation with the USRA's using the updated curriculum
  - CCR acknowledgment and a certificate of completion will be provided to those completing the curriculum, and a $150 honorarium for the first 194 students enrolled
  - Partner with SFU to offer optional co-hosted workshops to bring the two campuses USRA's together as they engage in the FUSION curriculum
- Fall 2021
  - Approach current FUSION partner to present the opportunity for them to offer the curriculum to their students again
  - Expand the number of for-credit offerings of FUSION to two
  - Offer FUSION partners the opportunity, if appropriate, to collect data from a control group of students opting out of the FUSION curriculum