



Teaching and Learning Enhancement Fund

TLEF Project – Final Report

Report Completion Date: (2021/09/10)

1. PROJECT OVERVIEW

1.1. General Information

Project Title:	Weaving together Arts with STEM: Creating a living repository of pedagogical resources for UBC B.Ed., Graduate and Diploma Students		
Principal Investigator:	Yvonne Dawydiak (yr 2) ; Dr. Lorrie Miller (yr 1)		
Report Submitted By:	Yvonne Dawydiak		
Project Initiation Date:	May 2019	Project Completion Date:	August 31, 2021
Project Type:	<input type="checkbox"/> Large Transformation <input checked="" type="checkbox"/> Small Innovation 2 year <input type="checkbox"/> Flexible Learning <input type="checkbox"/> Other: [please specify]		

1.2. Project Focus Areas – Please select all the areas that describe your project.

- Resource development (e.g. learning materials, media)
- Infrastructure development (e.g. management tools, repositories, learning spaces)
- Pedagogies for student learning and/or engagement (e.g. active learning)
- Innovative assessments (e.g. two-stage exams, student peer-assessment)
- Teaching roles and training (e.g. teaching practice development, TA roles)
- Curriculum (e.g. program development/implementation, learning communities)
- Student experience outside the classroom (e.g. wellbeing, social inclusion)
- Experiential and work-integrated learning (e.g. co-op, community service learning)
- Indigenous-focused curricula and ways of knowing
- Diversity and inclusion in teaching and learning contexts
- Open educational resources
- Other: [please specify]



1.3. Final Project Summary

This project aimed to raise awareness of, and develop resources to support and raise awareness of STEAM learning (science, technology engineering, arts & math) in the Faculty of Education. Given the difficulties of cross-curricular integration in our “large, fragmented faculty” (as noted in the 2018 external review), we aimed to collaborate with faculty across departments and subject areas in order to better meet the needs of our teacher candidates/students as they embark on teaching careers in a time when there is a strong emphasis on interdisciplinary teaching and learning in the BC K12 Curriculum. Our project involved engagement and collaboration across departments and units in the Faculty of Education as we shared ideas, designed resources & delivered. Sharing our work on the Scarfe Digital Sandbox blog and via social media helped to make the project and resources visible across BC and beyond.

1.4. Team Members – Please fill in the following table and include students, undergraduate and/or graduate, who participated in your project.

Name	Title/Affiliation	Responsibilities/Roles
Dr. Lorrie Miller	Program Coordinator, Teacher Education, EDCP instructor (textiles)	Project instigator, resource and workshop development and evaluation, co-supervisor of student workers and volunteers (2019-20)
Dr. Marina Milner Bolotin	Associate Professor, EDCP	Project partner, support with hiring, resource evaluation
Wendy Traas	Education Librarian	Resource & research support, co-facilitator of workshops/seminars
Emily Fornwald	Education Librarian	Resource & research support, co-facilitator of workshops/seminars
Eric Lee	Undergrad, Cognitive Systems	Project Assistant, web design, Social media strategy, ADST integration
Scott Robertson	PHD student, EDCP,	Project Assistant, research & resource development, Make, Create Innovate facilitator
Nashwa Khedr	PHD student, EDCP	Project Assistant, research & resource development, student support
Belen Guillemin	MEd Art Education, EDCP	Project Assistant, research & resource development, student support
Yousra Alfarra	Undergrad, Cognitive Systems	Project Assistant, web design, social media strategy
Cindy Yu	Undergrad, Bachelor of Arts	Project Assistant, multi-media resource development, student support, workshop facilitation



Naomi Hudson	Undergrad, Faculty of Arts	Project Assistant, resource development, student support, workshop facilitation
Jacqueline Boivin	Undergrad, Bachelor of Arts in Music	Researcher Professional STEAM learning, coordination & resource development
Maryam Begzada	Undergrad, Cognitive Systems	Project Assistant, multi-media resource development, web design
Sam Yousefifard	MA, EDCP	Volunteer, design and media support
Daniel Bagnall	Masters in Counselling Psychology	Summer STEAM facilitator/support
Alexandra Tucker	Masters in Educational Technology	Summer STEAM facilitator/support

1.5. Courses Reached – Please fill in the following table with **past**, **current**, and **future** courses and sections (e.g. HIST 101, 002, 2017/2018, Sep) that have been/will be reached by your project, including courses not included in your original proposal (you may adapt this section to the context of your project as necessary).

Course	Section	Academic Year	Term (Summer/Fall/Winter)
EDCP 467J	301	2019	Fall
EDCP 467J	302	2019	Fall
EDUC 450B	305	2019	Fall
EDCP 355A	301	2019	Fall
EDCP 374A	301	2019	Fall
EDCP 373A	301	2019	Fall
EDCP 352A	302	2019	Fall
EDCP 472	301	2019	Fall
LLED 351	108	2020	Winter
LLED 351	104	2020	Winter
LLED 351	107	2020	Winter
EDCP 349	108	2020	Winter
EDCP 349	109	2020	Winter
EDUC 321	107	2020	Winter
EDUC 321	117	2020	Winter
LLED 351	119	2020	Winter
LLED 353	119	2020	Winter
EDUC 430	964	2020	Summer
EDUC 430	921	2020	Summer
EDCP 352A	302	2020	Fall
EDCP 467J	301	2020	Fall
EDCP 467J	302	2020	Fall
EDUC 450A	109	2020	Fall



EDCP 349	107	2021	Winter
EDCP 349	108	2021	Winter
EDCP 349	109	2021	Winter
EDCP 421D	301	2021	Winter
EDCP 418D	301	2021	Winter



2. OUTPUTS AND/OR PRODUCTS

2.1. Please **list** project outputs and/or products (e.g. resources, infrastructure, new courses/programs). Indicate the current location of such products and provide a URL if applicable.

Product(s)/Achievement(s):	Location:
Module resources for Science courses (4 modules)	Canvas EDCP 467 & EDCP 349 course shells
8 Podcast episodes	Anchor: https://anchor.fm/scarfe-sandbox Spotify: https://open.spotify.com/show/7kvoa8QD2mScdNsYdjvZ8A
44 blog post STEAM resources	https://scarfedigitalsandbox.teach.educ.ubc.ca/sandbox-resources/steam-resources/
STEAM resource section & filter system on OER	“ “
Create, Make, Innovate workshop series (& resources to support related sessions each fall)	“ “
Canvas resources to support in-class instruction and online seminars	Located in various courses in Canvas (co-created with instructors)
Events to share STEAM resource repository & gain feedback	Summer STEAM event, focus groups and survey (online events hosted in July 2021)
Introduction of STEAM OER to incoming BEd instructors and teacher candidates	Via the Canvas shell “Navigating the BEd Program” developed in response to online pivot during COVID. Updated for 21/22 and plan is to continue to use this as a resource – ongoing - each year all BEd students are enrolled and faculty are invited to join.
Provide opportunities for students to integrate STEAM into planning for practicum	Gearing up for Practicum Sessions (350+ students reached over 2 years) – one on one and small group consults in collaboration with the Ed Library

2.2. Item(s) Not Met – Please list intended project outputs and/or products that were not attained and the reason(s) for this.

Item(s) Not Met:	Reason:
Beta launch, ‘grand opening’ & UX survey	COVID 19 pandemic required cancellation of planned in person events
Introduce STEAM OER to new BEd course instructors at faculty orientation	Shift to online orientation and pressures of topics needing space on agenda caused cancellation of this agenda item.
Reach grad and diploma students	Limited – again due to COVID 19 pressures, change in project team

3. PROJECT IMPACT

3.1. Project Impact Areas – Please select all the areas where your project made an impact.

- Student learning and knowledge
- Student engagement and attitudes
- Instructional team-teaching practice and satisfaction



Student wellbeing, social inclusion

- Awareness and capacity around strategic areas (indigenous, equity and diversity)
- Unit operations and processes
- Other: [please specify]

3.2. What were you hoping to change or where were you hoping to see an impact with this project? – Please describe the intended benefits of the project for students, TAs, instructors and/or community members.

- ❖ Provide open access to curated STEAM resources to BEd students, faculty, alumni, in-service teachers and grad students
- ❖ Provide exposure to teacher candidates to interdisciplinary ideas and approaches and connect these with BC Curriculum
- ❖ Facilitate and encourage faculty sharing and collaboration in part to help address challenges noted in 2018 Teacher Education External Review

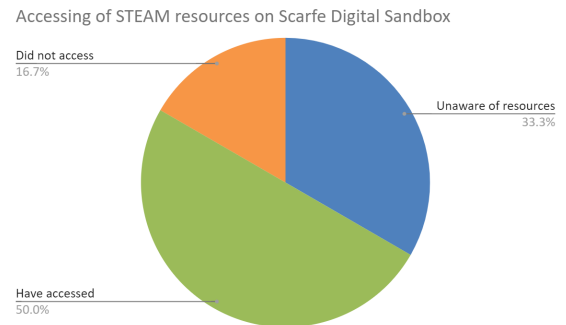
3.3. Were these changes/impacts achieved? How do you know they occurred? – How did you measure changes/impacts? (e.g. collected survey data, conducted focus groups/interviews, learning analytics, etc.) Describe what was learned from this process. You are encouraged to include copies of data collection tools (e.g. surveys and interview protocols) as well as graphical representations of data and/or scenarios or quotes to represent and illustrate key themes.

- ❖ Overall, we believe that the project was successful despite some shifts due to impact of the COVID 19 pandemic. The added pressures of online teaching and learning had a significant and somewhat negative impact on our engagement with faculty and students from March 2019 through August 2021. Our impact on graduate students and diploma students was limited to extra-curricular events and resource sharing. Impact on BEd students was still strong, integrated into coursework as well as extra-curric events and resource sharing.
- ❖ Analytics for the Scarfe Digital Sandbox Open Ed Resource site indicated a marked increase in annual users, sessions and page views from the start of the project through to present.
 - April 2018 – March 2019 there were 7,090 users and 9,784 sessions
 - April 2019 – March 2020 there were 13,523 users and 13,523 sessions
 - April 2020 – March 2021 there were 25,666 users and 32,909 session*

*already between April 2021 and Sept 2021, there have been 12,640 users and 14,564 sessions

- Session duration averaged approximately 2 minutes with a peak of 5.5 minutes (during the initial pivot to remote instruction in K12 and post-sec in Spring 2020 (coinciding with the launch of “COVID” remote teaching & learning resources) and other peaks coinciding with new resource launches and on campus workshops and Summer STEAM event.

- ❖ We were able to conduct a user experience survey and a small focus group during Summer 2021 following our very successful Summer STEAM event. We did not do so during the project term due to the perception that students and faculty were already overwhelmed. Given the timing of this event and survey, we were happy with the participation. Students who participated overwhelmingly responded positively to an anonymous feedback survey about the impact of these sessions, STEAM resources and support with their planning and teaching during the 20-21 BEd year. The wide majority of students reported attending between 3 and 6 sessions during the week and 100% of survey respondents were either very satisfied (85%) or somewhat satisfied (16%) with the event and resources. Online resources including recordings were also shared across the program (access has been ongoing throughout July and August – data unavailable at time of writing).
- ❖ The majority of survey respondents were aware of STEAM resources available via the Scarfe Sandbox.
- ❖ 70% of respondents indicated they could apply what they'd learned via resources & workshops to their teaching. The majority of students reported finding the materials and resources to be useful and showed an interest in applying their learning to their future classroom teaching.



“I felt that the workshops were very practical and I appreciated the hands-on approach. The hosts also provided a lot of resources and material which I am looking forward to using in my own lessons.”

“Without these sessions, I wouldn’t have been exposed to these approaches.”

The team provided “great information & resources in a hands-on, fun way. So much learning in manageable one-hour sessions.”

- 3.4. Dissemination** – Please provide a list of **past** and **upcoming** scholarly activities (e.g. publications, presentations, invited talks, etc.) in which you or anyone from your team have shared information regarding this project. Be sure to include author names, presentation title, date, and presentation forum (e.g., journal, conference name, event).
- ❖ *WestCast Conference (Western Canadian Teacher Education Program Network) Feb. 21, 2020 9:45 – 10:45am Ignite the Future Garden-based Learning: Teacher candidates’ multi-sensory/multimodal learning in, with and through the garden co-presented with Faculty members including Margot Filipenko, Susan Gerofsky, Cynthia Nichol & Wendy Traas (along with a BEd student*
 - ❖ *TLEF Showcase (reg’d and prep’d a poster for 2020, prep’d poster & presented virtually at 2021)*



❖ *Classroom to Communities Conference (C2C)*

October 23rd, 2020 Place-based learning in a Pandemic: using your sense to experience nature. Co-presented with UBC faculty Patrick Robertson & Theresa Rowley. This presentation wove in resources developed as a result of this project and highlighted digital technology enabled, interdisciplinary approaches to teaching. Resources developed for and from this presentation were also shared as part of several credit courses in the BEd program.

- ❖ *Summer STEAM UBC Bed virtual learning event Week of July 12th 2021 (included multiple daily workshops and focus groups). Resources shared across all BEd students via Canvas course)*
- ❖ *Fall 2019 Family Math and Science Day Faculty of Education Community Outreach Event. Collaborated with event organizer (and project co-I, Marina Milner-bolotin to integrate Arts into this typically math and science focused event.*
- ❖ *Fall 2019 Create, Make, Innovate foyer workshop series connected with faculty, staff and students through informal, hands-on and discursive sessions facilitated by a graduate student in education, our education library, and the project team.*
- ❖ *Ongoing informal presentations & sharing with STEM outreach collective – monthly meetings ongoing (a group of faculty and staff from across disciplines at UBC sharing STEM outreach initiatives, resources)*
- ❖ *Publications: social media sharing of blog posts related to the project (by project assistants, grad students and me)*
- ❖ *Informal sharing at quarterly Course and Cohort Coordinators Meetings*

4. TEACHING PRACTICES – *Please indicate if **your** teaching practices or those of **others** have changed as a result of your project. If so, in what ways. Do you see these changes as sustainable over time? Why or why not?*

As noted in our project proposal, teaching within subject areas in our intensive program can be siloed. As a result of this project, we were able to bring together faculty for conversations from across and within disciplines and departments both for resource sharing, collaborative planning and our podcast conversations. Such collaborative practice may exist within departments but rarely occurs across departments and subject areas. As found in the Teacher Education external review (2018), such collaboration would improve coherence in the program.

The result of our project was both formal and informal collaboration and the development or deepening of faculty and staff relationship. This relationship building encourages shifts in practice, sharing of resources and increased interdisciplinary opportunities for students and is, in itself, quite self-sustaining. The students who were hired for (or volunteered for) this project also expressed the value of the research they conducted as part of their work for this project. One graduate student noted that they “didn’t use technology in (my) teaching” and didn’t really see the need. For this student, the experience gained during their time with our project supported the pivot to COVID remote teaching the following year. Another graduate student was offered, and accepted, a position teaching in a STEM classroom and credited, in part, experience in this project with their successful application. As a result of this project, resources were co-created and shared in 28 sections of 15 courses in the BEd program with plans already in place for implementation in four courses including on graduate diploma course.



In addition, my role is now (since Summer 2019) a full-time position in Teacher Education (Learning Design Manager) allowing me to reach out and engage faculty in these and other conversations, create new resources and work with graduate students in Education to develop new resources and workshops for students. This project has reinforced for me the delicate balance needed to achieve collaboration and adoption. Sharing these approaches and resources with our students (teacher candidates/pre-service & in-service diploma students) has the added benefit of helping to shift the practice of teachers in K12. One student noted, during a focus group discussion, referring to our STEAM & Ed Tech workshops: *“Without these sessions, I wouldn’t have known about these resources and strategies as I wasn’t exposed to them in my coursework or practicum.”*

5. PROJECT SUSTAINMENT – *Please describe the sustainment strategy for the project components. How will this be sustained and potentially expanded (e.g. over the next five years). What challenges do you foresee for achieving the expected long-term impacts listed above?*

- Due to the 11-month (short term) nature of the BEd student enrolment, resources developed can be re-used and re-purposed annually. For example, a seminar developed in collaboration with UBC Engineering’s Geering Up educator, Katarina Smith and UBC Science professor, Oksana Bartosh, was presented in person in Winter 2019, developed for online in Winter 2020 and will be repurposed this year across all sections of the General Science & Junior Sciences courses in the BEd program. With Dr. Bartosh’s permission, I have also adapted and shared the resources from this session with elementary science faculty and teacher candidates and incorporated them as part of a case-based learning approach with one of our elementary cohorts of students.
- During this 2-year grant cycle, the leadership in the Teacher Education program recognized the immense value of having graduate students in education and/or students from other disciplines hired to support students in our program. This resulted in the hiring of two graduate students in May 2021 as peer tutor and peer mentor in Teacher Education. The Peer mentor position, in particular, is meant to support digital competencies. Both positions will allow for planning support and incorporate STEAM approaches and resources where appropriate. These positions are confirmed for W1 and W2 2021 and will, likely, be an ongoing part of our program budgeting.

Challenges: Embedding resources within courses has the greatest reach and, one could argue, value in an intensive 11-month program where students do not necessarily have a great deal of additional time. Gaining ‘access’ to courses requires long term relationship building and is something I am focused on continuing. There were individuals reached who had differing opinions as to the value of STEAM or interdisciplinary learning and will likely not engage with resources. Even still, much was learned from the conversations that ensued as a result of these critical perspectives and some individuals provided us with further references to support their perspectives. Since one of our project aims was to help our students develop their own understanding of STEAM, this was invaluable feedback and helped propel critical conversations with students during coursework, as part of our Create, Make, Innovate workshops and the podcast series.

While access to courses was not universal across the program, many students were keen to seek professional development and recognized it as part of their professional responsibility as educators making our student reach quite broad (over 900 students via non-credit PD opportunities during the two-year implementation). Housing resources on an already known and utilized repository and sharing via social media extended our reach beyond current students to the wider education community including alumni.