Two-Year Progress Report
Society, Technology and Values
(Undergraduate Option)
September 2018

Background:
The last program review of the Society, Technology and Values (STV) Option was completed in June 2015. A response to the Reviewers' Report was submitted to the Associate Vice-President, Academic's office in April 2016. The Final Assessment Report was approved by Senate Undergraduate Council on September 13, 2016. In this progress report, the Centre for Society, Technology and Values (CSTV) tracks progress in responding to the recommendations of the reviewers.

Progress on Implementation Plan:
The reviewers made five recommendations. Actions of CSTV in response to each recommendation are provided below.

1. **It was recommended that CSTV take action to raise the visibility of its course offerings and the Option on campus, and to more clearly define its identity.**

Status:
In progress

Details:

CSTV has taken and is planning a number of small but significant changes to improve the likelihood that undergraduates, particularly Engineering students, become aware of and choose the STV Option.

One example of such a change: the STV Option is now much easier to find in the Undergraduate Calendar for students in the Faculty of Engineering (from which most STV students are still drawn). It is listed separately for non-Engineering students.

Having gathered information about first-year Engineering students' programs and scheduling, the Centre is developing a plan to make first- and second-year Engineering students more familiar with STV courses and the Option as an important first step in making the Option more viable for Engineering students. Our provisional plan is to modify the Option so that only a

minimum of three STV courses are required plus three STV-like courses. With this change, students in most Engineering programs could take the Option without needing extra courses to graduate. In Winter 2019, the CSTV Director will work with the Associate Chairs of interested departments in Engineering to map out paths that students can use to achieve the revised Option.

In September 2018, the Centre moved from a quiet corridor in Engineering 3 (E3) to the heart of Systems Design Engineering (SYDE) in Engineering 5 (E5). In 2019, the Centre will make our presence better known to students, staff, and faculty that use E5 and E7 (especially the 6th-floor bridge between the two buildings), with posters, displays from the Computer Museum, and prominent signage. Existing Centre personnel will be able, with a small budget for posters and using available artifacts, to highlight STV courses and Option requirements and to illustrate in small exhibits certain technical aspects of courses such as STV 202: Design and Society and STV 210: The Computing Society.

In Winter 2019, the Centre plans to have guest speakers in two classes that will be open to the public. STV 305: Technology, Society, and the Modern City will feature a discussion on the use of electric scooters in urban areas, with a focus on the pilot study in Waterloo this autumn. STV 302: Information Technology and Society will present Dr. Branka Marijan from the peace research organization Project Ploughshares, who will speak about autonomous weapons. The Centre also intends to work with Dr. Marijan over the next few months to develop a talk on digital literacy, to be presented both on campus and off.

Offering courses online appeals to part-time and mature students, to co-op students on work term, and to full-time students who cannot fit courses into their regular schedules. Online courses are also advertised separately. So, the Centre and Option benefit from more exposure when some offerings are available online. STV 202 will be the first online STV course. It has an appeal beyond Engineering and the on-campus course regularly has more applicants than available seats. The long-time course instructor has recently published a textbook that is being used in the on-campus version of the course and will provide a framework for the online offering.

The Centre is gaining profile across campus as the co-host of the University of Waterloo Computer Museum, which was co-created by the Director of CSTV, Dr. Scott Campbell. Three temporary displays related to events in the Faculty of Mathematics in March, June, and September 2017 were seen by hundreds of alumni, faculty, and students. Three permanent displays are planned for the Faculty of Mathematics, including one on slide rules that will be up early in 2019. Future displays in the Department of Systems Design Engineering and Engineering Computing are in the planning stages. The Museum has considerable research and teaching value and artifacts have been employed in STV courses.

The CSTV reviewers saw value in promoting CSTV as a research centre, which is in the original mandate. The Museum offers real opportunities in this regard, hosting research projects that explore the historical relationship between computers and society. The current emphasis on artificial intelligence and autonomous technology is also ideally suited to exploration from a STV perspective. The Centre is seeking SSHRC funding in partnership with Project Ploughshares on research that will strengthen the dialogue among academic researchers, industry, civil society, and nongovernmental organizations on the impacts of these technologies on governance, democratic participation, and conflict and security.

In 2018, Dr. Campbell's presentation at the CTE Teaching and Learning Conference raised the profile of both the Centre's course offerings and the Museum. At the 2019 Conference, he will offer a presentation on how to teach a class with students from a variety of disciplines.

The CSTV Twitter account is active and has 50 followers, including academics and journalists. The Centre's website has been updated and is the site of a blog that has had more than 140 postings in less than two years. The Director of CSTV was interviewed in Fall 2017 by a journalist writing *for The Globe and Mail* about ethics and autonomous vehicles.

In early 2019, the Centre will begin working with the Engineering Change Lab (ECL) of Engineers Without Borders, to help develop greater links among Engineering faculty members interested in STV-like teaching and research. The ECL exists to facilitate high-level connections between academic, government, industry, and nonprofit organizations interested in taking up the challenges of engineering education and training in Canada.

2. **CSTV was advised to improve and formalize ties with other groups, particularly in the Faculty of Arts.**

Status:
In progress

Details:
The Centre has actively participated in the [Science and Technology Studies (STS) Teaching Group](#) initiative originally headed by Heather Douglas ([Waterloo Chair in Science and Society](#), in Philosophy), which aimed to create a cross-faculty, interdisciplinary STS minor available to all undergraduates. As a leading member of this coalition of instructors from across campus, CSTV Director Campbell was involved in preliminary discussions with the Provost in the summer of 2017. Although Dr. Douglas has now left the university, the STSTG continues to meet and has plans to stage pedagogical events in 2019.

STV courses have established informal but longstanding connections across campus. For example, every term [STV 202](#): Design and Society has guest speakers from [Engineers without](#)

Borders and St. Paul's University College's GreenHouse for social impact incubation. In such interactions, all groups become more aware of the others. CSTV is also developing more links with Project Ploughshares and the Centre for Peace Advancement at Conrad Grebel University College, including co-sponsored events.

When envisioning closer ties with the Faculty of Arts that would benefit CSTV, it seems natural to turn to other interdisciplinary programs. In rebuilding the STV Option, we will add the new course PACS 315: Engineering and Peace, to our own short list of elective courses. There is also the possibility that this course will be cross-listed with STV. We currently cross-list one other course, STV 210/HIST 212; however, in three iterations almost all students have been from Engineering, with only a few from Arts and Mathematics. Before encouraging more cross-listing, the Centre must find ways to encourage non-Engineering students to enroll.

Currents efforts of the Centre focus on the Faculty of Engineering, where there have been signs of renewed interest in the STV Option. However, the Centre remains open to undergraduate-based links with other Faculties, particularly those that encourage programs to add STV courses to elective lists, and from which we can draw courses as we improve the Option and create our own elective list of STV-like courses.

For example, the School of Planning recently indicated an interest in cross-listing STV 305: Technology, Society and the Modern City, and that same STV course will be added to an elective list in the new Minor in Urban Studies in the Faculty of Environment. Further discussion may reveal potential for stronger links with that Faculty. STV courses are also on a short list of electives for some Applied Health programs and further discussion could reveal deeper potential with Applied Health Studies.

3. **CSTV was advised to expand its intellectual scope, possibly through new course offerings, the addition of faculty, and curricular reform.**

Status:
In progress

Details:
The Centre now has two full-time permanent faculty members. It has always existed on a restricted budget; even maintaining the status quo took careful planning. However, early indications suggest that the new activity-based budget model will give the Centre a chance to grow. This could lead to a third full-time faculty member, offering considerable scope for expanded intellectual scope and new courses. We look forward to this possibility.

Over the last year, Systems Design Engineering has been developing an Artificial Intelligence (AI) graduate program, which also presents the possibility of gaining a part-time faculty

member responsible for a graduate course on the impact of AI and a related undergraduate course.

A new senior course, STV 305: Technology, Society and the Modern City, is now in the undergraduate calendar and will be taught regularly, starting in Winter 2019.

However, before more courses are developed, it is important to rationalize existing courses and revamp the Option, so that it is easily seen how each new offering helps students to fulfill requirements that make the Option worthwhile to them and to future employers.

Renumbering of courses has taken place and is reflected in the 2018-2019 Undergraduate Calendar. STV 100 remains the introductory course, although there is some thought that it could be bumped to a 200-level course with a greater emphasis on theory, while a more general introductory course on the value of understanding the relationship between society and technology for all citizens would be developed. In a way, it would correspond to PACS 101: Peace is Everybody's Business. Such a course could attract a new student clientele.

All the 200-level courses now have an enrolment cap of 80 and none have prerequisites. They include STV 201: Special Topics, 202: Design and Society, 205: Cybernetics and Society, and 210: The Computing Society (cross-listed as HIST 212).

All 300-level courses have an enrolment cap of 25 and have prerequisites; they are designed for more experienced students. They include STV 302: Information Technology and Society, 304: Technology in Canadian Society, 305: Technology, Society, and the Modern City, and 306: Biotechnology and Society.

STV 400, a supervised independent research project course, is still for Option students only and is required to complete the Option. STV 401 is available for advanced topics.

In the upcoming revamping of the Option, STV 400 will become only one possible route to completing the Option. The requirement of a lengthy research project is a known deterrent to prospective students, many of whom have other significant project-based courses in their final year. An STV Option that can be achieved through coursework only will be introduced. It will consider STV-like courses already offered by various departments. Here is a small, partial list of courses from across campus that fit this criterion:
- BET 420: Entrepreneurship for Social Impact
- ENGL 108D: Digital Lives
- ERS 372: First Nations and the Environment
- GER 271: German Thought and Culture: Objects
- MSCI 442: Impact of Information Systems on Organizations and Society
- PHIL 252: Quantum Mechanics for Everyone

- SVENT 225P: Social Entrepreneurship: Exploring Social Change
- WS 205: Gender, Culture and Technology.

The likely format of the new Option will be 3 STV courses + 3 STV-like courses (which could include more STV courses).

To improve course offerings and overall pedagogy, CSTV instructors will continue to explore opportunities through on-campus teaching events, such as the Teaching Excellence Academy or the Instructional Skills workshops, and the annual Teaching and Learning Conference. Off-campus teaching conferences may be explored as well. CSTV occupies a rare interdisciplinary nexus for undergrads at UW, which generates unique and valuable pedagogical perspectives worth sharing.

The Centre has no graduate students, so there is no obvious source of teaching assistants or sessional instructors. Until a new full- or part-time instructor becomes available, CSTV will endeavor to locate senior graduate students and sessional instructors already on campus who can take over one of the established STV courses—in particular, STV 100 and 202—so that experienced instructors can develop new courses, both a new introductory course with broad appeal, and more senior courses that can help our future professionals.

4. **The Centre was strongly encouraged to develop a long-term plan—a set of clear goals— that will provide a context for all activities and reforms.**

Status:
In progress

Details:
The Centre has been a leading member of the STS initiative. Long-term planning for the Centre was linked to that effort and major changes to the STV Option were held off to ensure that it would mesh with a possible STS Minor. It is no longer clear when that Minor will develop. Although some momentum has been lost, STV instructors remain interested in reaching students from all Faculties.

At present, we believe growth for the Centre is best found by assisting departments in the Faculty of Engineering in both meeting and exceeding the accreditation requirements of Engineering students, especially in the areas of the impact of technology on society, ethics, and the development of professionalism. Over the next year, the Director of CSTV will work with the individual Engineering departments to modify the scheduling and requirements of the Option to more easily meet the specific career aspirations of particular blocks of Engineering students.

The STV name was considered a weakness in 2016. What did "values" mean? In 2018, with a newly focused emphasis at the University of Waterloo on meeting the needs of the whole student[1], a set of courses that focus on values and what the society and the individual mean by values seems to have something important to contribute.

As well, ideas of values have relevance in the professionalization of Engineering students. For example, the Canadian Engineering Accreditation Board graduate attributes relate professionalism and engineering impact to public interest, equity, sustainability, and stewardship. The University of Waterloo Undergraduate Degree Level Expectations emphasize autonomy, professional capacity, and diversity. At the University of Waterloo, the relationship of these values with the development and use of technology ought to be deliberately explored in an academic setting.

5. CSTV was asked to explore the reasons for low enrolment in the Option.

Status:
In progress

Details:
Option enrolment is low for several reasons. First, many students from across campus remain unaware of its existence, and we have outlined some plans above to correct that. It is still, however, necessary in an era of increasing specialization to continually make the case for small interdisciplinary programs that reach across faculties. Second, the Option requirement of STV 400 is too burdensome. Removing STV 400 as a requirement (as outlined above in point 3), will help. Third, few students are willing to take extra courses to graduate, but we believe we have identified paths in many Engineering programs that could minimize or eliminate this problem. Working with specific departments should help make the Option more attractive, as will providing at least one STV course online.

The Option category could be a problem as well. "Options" are an idiosyncratic Waterloo degree designation and our research has indicated that the number of available Options has decreased significantly in recent years. There are no Options in the Faculty of Arts—only Minors, Diplomas, and Certificates. Most Options in other faculties are largely an area of concentration within a particular discipline. So, it is hardly surprising that few students consider adding an Option to their program of study. Currently, we do not believe there is sufficient interest to recommend 'promoting' the STV Option to the more recognizable 'Minor' designation, nor would it make sense to convert the Option to a Diploma or Certificate.

Engineering is actually relatively generous in providing a variety of Options to its students. Again, they tend to reflect an area of concentration within one discipline, more than a cross-disciplinary focus on a particular topic. The existing STV Option could fill a gap.

Explain any circumstances that have altered the original implementation plan:

The new activity-based budget model is being rolled out more slowly than expected and uncertainly still exists about how much money will flow to CSTV. This directly affects the ability of CSTV to make plans, but also results in hesitation across many parts of campus to explore new endeavors. However, as noted above, preliminary information made available in late 2018 suggests that the Centre will have the resources to consider new activities and even a new faculty member.

Address any significant developments or initiatives that have arisen since the program review process, or that were not contemplated during the review:

Growing interest at the University in the relationship between AI and ethics/values has led to the formation of a committee by the Office of Research to explore this area in more depth. The Centre is ideally placed to make a significant contribution to these activities, because such a relationship is at the core of all STV teaching. Such a focus suggests an opening to a fuller exploration of the idea of values and what they mean to citizens of a society—not only future employees.

Updated Implementation Plan:

	Recommendations	Proposed Actions	Responsibility for Leading and Resourcing (if applicable) the Actions	Timeline for addressing Recommendations
1.	Improve profile of CSTV, STV courses & STV option	STV Option relocated in Undergrad Calendar (COMPLETE) Work ongoing to connect with advisors and students about Option, particularly within Engineering. Improved physical and online presence. E.g., small events and signage in new office location. Research-based partnerships being explored and developed Computer Museum giving Centre new profile	Director, CSTV	Ongoing during next 5 years
2.	Increase non-Engineering enrolment	Continued participation with Science and Technology Teaching Group to encourage cross-faculty student enrolment.	Director, CSTV	Ongoing

3.	Restructure Option	Option revamp	CSTV Director	Fall 2019
4	Rebuild STV curriculum	Courses renumbered and in Calendar. New course STV 305 (COMPLETE)	CSTV Director	Complete
5.	Improve student gender balance	Sensitivity to gender and diversity in all courses; more diversity seems to be occurring naturally as more women enter STEM disciplines on campus.	All STV instructors	Ongoing
6.	Improve CSTV governance and administrative limitations	Action still needs to be taken	CSTV Director	2020
7.	Improve profile	See recommendation 1, above.		
8.	Improve ties with other groups	Links are being maintained with STSTG and strengthened with PACS, the Centre for Peace Advancement, and Project Ploughshares. Exploration of closer ties with Departments across campus that offer STV-like courses is ongoing.	CSTV	Ongoing
9.	Expand scope, critical perspectives	New course (STV 305, COMPLETE), new online section of existing course (starting with STV 202)	STV 202 instructor will develop online version; resource requirement TBD.	Online course planning in progress; complete by 2020/2021.
10.	New long-range vision	Develop option possibilities that appeal to Engineering students	CSTV Director exploring SSHRC Partnership grant possibilities	Grant applications starting in 2019

		Reignite idea of CSTV as research as well as teaching centre		
11.	Improve Option enrolment	By focusing on key groups of students, Option can be redesigned to meet particular needs.	CSTV Director	Option revisions submitted by Fall 2019

The Department Chair/Director, in consultation with the Dean of the Faculty shall be responsible for monitoring the Implementation Plan.
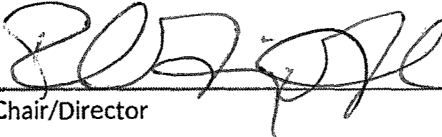
Report on anything else you believe is appropriate to bring to Senate concerning this program: N/A
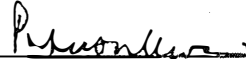
Date of next program review: 2022-2023

Date

Signatures of Approval:

_____ July 26/2018

Chair/Director   Date

_____ 16 July 2018

Faculty or ~~Administrative~~ Dean   Date

Feb. 22, 2019

_____

Associate Vice-President, Academic   Date

(For undergraduate and augmented programs)

_____

Associate Provost, Graduate Studies   Date

(For Graduate and augment programs)

Scott Campbell

Director, CSTV.   17 July 2018.