ONWiE Summit 2017

held Friday, November 24th 2017 at the University of Waterloo

Contents

Event Overview

On November 24th 2017, x representatives came together for the 2nd ONWiE summit. The event was hosted by Mary Wells, ONWIE Chair 2014 - 2018, and facilitated by Rebecca White of Engineers of Tomorrow.

The day consisted of 3 guest speakers, 2 workshops, including an open 'Members Forum', 3 brainstorming sessions with 7 prompts, and an overview presentation on the last ONWIE summit held in November 2015. The agenda was designed to maximize learning and knowledge-sharing for ONWiE participants, and to gather their feedback.

This report documents the most significant outputs and sets out next steps for ONWiE as it transitions into new leadership with the appointment of a new ONWiE Chair set for 2018.

Key messages from Introduction/2015 ONWiE Summit overview

Valerie Davidson, Founding Chair of ONWiE, presented an overview of the findings from the last ONWIE summit, held in 2015. ONWiE's strategic strength lies in doing ***creative, purposeful engineering outreach*** to girls aged 10 - 16 **,** engaging ***parents as partners*** in influencing and raising awareness of engineering as a possible career path, ***changing the narrative*** around who belongs in engineering and what is needed to succeed through that outreach. As a group, ONWiE is committed to reshaping ideas and inspiring possibilities for the future. They accomplish this by ***collaborating, engaging, sharing best practices & providing opportunities***

A general discussion ensued from the key takeaways of the 2015 summit, including:

- Physics is a barrier for some young women, and what some universities are doing about it
- Seeking input and influence from physics teachers to encourage their female students
- Reaching out to OAPT may be possible to brainstorm further solutions
- Number of female students taking Grade 12 physics has increased by 21% since 2005

Compilation of brainstorming exercises

The use of brainstorming prompts and post-it notes allowed the ONWIE Summit facilitators to collect large amounts of input and engage as many participants as possible (as opposed to a plenary/large group conversation style where a few voices can dominate). The prompts were posed, with participants encouraged to record their thoughts individually on post-it notes, then discuss with the group. Arranging their post-its in groups is a powerful way to combine, compare and synthesize ideas.

Prompt #1 - what is the biggest/best change you have noticed since the beginning of your time with ONWiE?

ONWiE members agreed unanimously that one of the highlights of the last several years within ONWiE has been the ***growth*** : both in the number of the events, and in the participation at each event. ONWiE also expanded to include College participation in GoENGGirl. This means ONWiE's outreach is impacting more students and their parents -- in Ontario and beyond. The national span of ONWiE's collaboration was a point of pride and accomplishment for members, symbolizing a 'nation-wide commitment to change'.

Another key win in recent years: seeing a shift in the ***receptivity and confidence of young audiences,*** especially young girls. Girls are more knowledgeable about engineering, have more sense of purpose in applying to university programs, and of the girls who take Grade 12 Physics, 40% of them are applying to engineering. Kids in general are more tech-savvy, less intimidated by technology, and more open to differences within society. Finally, year 1 engineering enrolment has improved steadily across most ONWiE member schools, with several at 30% first year female participation or higher.

A greater degree of ***diversity and inclusion*** was also observed within engineering programs and universities in general. Some data points cited included universities highlighting indigenous issues, focusing on diversity, equity and inclusion, and embracing the benefits of intersectionality. This shift was reflected in the outreach programs of ONWiE, aligning and strengthening the pro-diversity message and its benefit to the future of the engineering.

The ***content of the outreach*** that ONWiE members have been delivering in recent years has also blossomed: the inclusion of makermobiles, 3D makerspaces, coding workshops (like Go CODE Girl) and other activities demonstrating the breadth of options available through engineering were mentioned. Through portraying engineering as an evolving and vibrant field spanning many exciting industries, disciplines and interests, ONWiE members can inspire more and more young people to take an interest. ONWiE members also agreed that the ***recognition for ONWiE*** itself was an excellent indicator of its impact and success: besides the increase in enrolment in Grade 12 physics and growing numbers of registrants in all of ONWiE's programs (including repeat attendees who attended year after year, or attended all ONWiE events in a given year), support from CODE, the Council of Ontario Deans, was also mentioned. The Science Promotion award, awarded to ONWiE by the Natural Science and Engineering Research Council in May 2017.

Internal improvements to the ***structure, system and processes of ONWiE*** were also named as noted, including an increase in data/tracking, a centralized registration process, more formalized processes, reaching out to like-minded groups and networks. Looking at the broader data on women in engineering and paying attention to specific barriers they encounter allowed ONWiE members to analyze root causes and brainstorm new ways to address them. The results of these improvements were stated as better organized, better attended, more impactful and more smoothly coordinated events.

A higher profile for ONWiE within the engineering/education community was also noted, as evidenced from trademarking GoENGGirl, increasing its educational profile. The results: ONWiE's earning awards, delivering sought-after programs, and more interest from companies in sponsoring ONWiE.

By overwhelming consensus among ONWiE members, they are ***stronger together,*** i.e. the collaboration of member schools has directly contributed to the many successes ONWiE has achieved. By allowing themselves to act together as friends instead of competitors, member universities were able to achieve much more impact than would otherwise have been possible. ONWiE members reported feeling supported, feeling part of a community, and enjoying the opportunity to share resources.

ONWiE members report an ***increase in public awareness*** of ONWiE and engineering; parents were better informed, understood the events and signed their kids up more quickly. Along with overall support and increased funding from member universities, ONWiE leadership's efforts to build up the website, improve brand recognition of ONWiE and its programs, establish a stronger presence on social media, and create public resources such as videos were credited with this improvement.

In addition to the funding mentioned above which boosted ONWiE's overall impact, ***strategic alignment from member universities*** was cited as positive shift. Intentional changes from university administration, such as greater involvement in ONWiE events and outreach, hiring more female engineering professors, joining large-scale female leadership movements (like HeForShe) and performing faculty salary adjustments to eliminate gender-based pay gaps were all mentioned as examples.

Prompt #2: What new ideas are you most excited to implement

After hearing from two guest speakers, ONWiE members noted their eagerness to implement new ideas:

- ***Include by design:*** Excited about intersectionality, inclusive intentionality for any new programs, think about inclusive programs
- ***Engage male allies:*** More initiatives targeting men, invite more male leaders to speak at voluntary diversity education, male and female co-chair of ONWiE in future?
- ***Enhance learning for participants:*** Introduce a writing exercise, reflection exercise, 5 minutes writing exercise
- ***Influence decision-makers:*** Discuss gendered wording with companies recruiting on campus, the engendered success plan, release of diversity stats by companies
- ***Measure and monitor:*** Will look at Ontario K-12 data, data need, measuring impact
- ***Purposefully create collaboration:*** Examine networks within K-12, create better networks for collaborators, How to get voluntary engagement (forced training – maybe not?)
- ***Hone the experience for participants:*** Deliver more challenging workshops, have the messaging be more evident in the activity, using storytelling in engineering, more storytelling
- ***Develop volunteers:*** Approachable peer mentors, being a strong communicator is important more emphasis on role modeling

Prompt #3: Which will have the most impact?

Of the 'new' ideas listed above, ONWiE members felt that the following would be the most impactful:

- Shifting to incorporate ***"intersectionality" and inclusive language*** (for example, advertising accessibility in outreach events to send a clear message that everyone is welcome)
- Incorporating a ***writing activity*** at the conclusion of each outreach activity to enhance reflection and deepen learning for participants
- Embedding ***carefully chosen messages*** into the images, explanations and activities used during outreach events (including normalizing women in STEM and aligning with women-specific initiatives)

In addition, the following intervention ideas were identified for increasing event impact:

- Collecting feedback from female mentors/instructors
- Engaging male students in outreach to girls
- Adopting an online registration software

Prompt #4: What messages have worked well for you?

ONWiE members reported using each of the following messages during their engineering outreach events, also noting that 'focus[ing] on the message not the activity' was an effective approach.

- ***Helping*** : Help the world, "helpful" profession, Engineering as a helping career, How people are helped with engineering, Helped people.
- ***Community*** : Connect eng with social change, Societal impact of engineering, tie-in to humanities
- ***Creativity*** : Creative problem solving, Creativity is part of engineering, Creativity is valued in Eng, Engineering is creative and thrives on the arts
- ***High impact*** : Engineers find solutions to the world's biggest challenges, Human elements
- ***Many options:*** Engineering is so vast that there is something for everyone, illustrate how different disciplines help, Engineering is so much more than what you think it is
- ***Everyday impact:*** Engineering is prevalent, accessible to daily lived experiences
- ***Collaborative:*** Engineering is a team sport

Prompt #5: What are the specific things you could use to make your messaging more powerful?

ONWiE members referenced the following ideas to boost the impact of messaging:

- Link the core messages to the content of the outreach (activities).
- Ensure alignment to the core message in the language used to market outreach events.
- Coach outreach staff and volunteers to use aligned language in their instructions and explanations to participants.
- Represent more complex challenges/problems in outreach activities.
- Design outreach activities that relate to fun, youthful challenges (e.g. coding).

Prompt #6: To what extent does your school understand the narrative you are creating for girls about engineering? How could they support you better?

ONWiE members generally agreed that their schools understood the narrative and goals of ONWiE in establishing engineering as a desirable program for students of diverse backgrounds.
They also noted the following opportunities to further improve alignment with those goals:

- ***Watch the wording:*** Language change, think about words and impact on audience, more inclusive language/how does that impact girls only, think about how write letters of recommendation
- ***Understand and eliminate bias internally:*** Blind evaluation in admission and scholarship when using video interviews, identify when there may be biases in the awards process, dealing with prejudices
- ***Influence others:*** Work with co-op/internship employers on gendered language in postings
- ***Invest in inclusion:*** Need time and resources, building more inclusive communities, putting inclusion at top of mind
- ***Commitment from the top:*** Leaders as vocal advocates, equity at a staff and faculty level, educational and leadership support, measuring and monitoring over time
- ***Consider the vision:*** Gender equality - what does that look like?

Prompt #7: Are there any areas you are struggling with?

The following areas were noted as challenges by ONWiE members:

- ***Impact of language:*** Be careful of microaggressions, ensuring lessons/activities are using gender neutral language
- ***Managing mixed gender dynamics:*** How to integrate boys and girls in camp activities, incorporating mixed gender groups at camp
- ***Engaging the right voices:*** Need more people to engage in this discussion, getting buy in from stakeholders, ignorance, how to keep accountable?
- ***Physical and financial accessibility:*** Be mindful of location, barriers to access socio-economic class, tools to overcome accommodation needs
- ***Moving beyond gender:*** How to concretely implement intersectionality, Struggling with intersectionality
- ***Support and resources:*** Struggle with time commitment, the length of time of involvement in equity/inclusivity work
- ***Interface with industry:*** Transition to workplace, counting issues with workplaces, noting the disconnect between the university and workplace experience for women

Prompt #8: What do you need in order to get there?

The following actions ensued from a brainstorming session with ONWiE members about what was necessary to address the struggles noted above:

- ***Leverage partnerships*** : Reach out EngiQueer group and offer support, wider community promotion, partner with universities, industry support, financial support
- ***Create and play up access for all*** : Sliding scale for event fees, advertise event accessibility, acknowledge expressions of other diversities within women
- ***Hone messages and communication methods*** : Pay closer attention to language
- Accurate data

Notes from Guest Speakers

Guest Speaker #1 "Beyond Bias: Deploying Diversity Science in Engineering", Dr. Hilary Bergsieker, University of Waterloo

As a social psychology researcher, Dr Bergsieker brought with her some insights to benefit ONWiE members in their efforts to do powerful and effective engineering outreach to young people. The topics she studies include breaking down prejudices between group, how to engage with the STEM community, implicit bias, and gendered works using job ads.

In industry and academia, there is overwhelming research confirming that bias against women is widespread and shapes how they are perceived; they are held up to different standards and evaluated differently compared to men. In engineering, undergrad women see unsupportive male colleagues as a barrier, while undergrad males think women generally lack the interest in STEM. Blind evaluations have proven successful in reducing bias in North American contexts.

Other solutions to combat this perception gap include bias training, which is more effective if it is voluntary, not mandatory. Role models at home (e.g. fathers) can also influence daughters' aspirations, especially if they take on an equal workload within the household.

Dr Bergsieker is also working with Engineering Science Quest, an Actua member camp from the University of Waterloo wherein she analyzed results in camp attendees aged 12-14, and how their feelings of belonging in STEM/engineering were improved by the experience of having female 'best friends' at camp. More at Dr Bergsieker's research group's webpage

Guest Speaker #2 "The Future of Diversity: Intersectionality & EngiQueers Canada", Vanessa Raponi, EngiQueers Canada

Ms Raponi, a 5th year engineering undergrad student, started EngiQueers at McMaster, integrating various student groups (Black Engineers, WiE). They started with charity events, Valentine's Day event, and added the creation and delivery of diversity awareness workshops to their mandate. Today EngiQueers Canada is a registered Canadian non-profit organization with student chapters in 31 universities across the country, still growing and seeking new partnerships.

Ms Raponi noted that historically, engineering student culture has not been that inclusive (citing traditions and attitudes that reflect a time when women and visible minorities were not represented at all), and those traditions are prevalent in the workplaces as well. She then presented some highlights from the Inclusivity Training Programs that have been delivered to thousands of engineering undergrad students:

Stereotypes can move into prejudice, and solidify into discrimination. When discrimination is held over time by significant numbers of people, it creates a system of oppression. Some examples include:

- Classism: social classes, wealth imbalances, homelessness, socioeconomic impacts.
- Ableism: able-bodied people, mental and physical impairments, can be invisible
- Racism: different race, believe own race is superior, overt vs. covert, don't be a bystander

When encouraged to reflect and share their thoughts, ONWiE members identified the ways that their outreach activities may be inadvertently upholding:

- Classism: charging for outreach events, the location of the programs (i.e. need a car), more likely to become an engineer if a family member is one, mark based entry programs (having time to study), policy (free tuition policy is not inclusive to entire professional program tuitions), be cognisant of casual conversations.
- Ableism: language stigma, design building with inaccessibility in mind, labs are often inaccessible for those in wheelchairs. Those with mental health challenges may go unsupported because their struggle is invisible to others.
- Racism: not measuring it or American-izing it, making alcohol apart of every event, removing police from schools

Ms Raponi issued the following recommendations to ONWiE members to consider in order to disrupt existing systems of oppression through their outreach activities:

- Classism: never assume something is "cheap enough" (try sliding scale), don't equate aesthetics to seriousness of work or education, recognize your own privilege
- Ableism: advertise accessibility, educate on ableist speech, recognize invisible disabilities avoid labelling people (you have an illness vs you are the illness) – "always a person first", winter –

wheelchair ramps are the last ones cleared, share when elevators are down so route planning is easier
- Racism: recognize the drastic complexity, invite people of all colours to be guests, do not “tokenize”, host non-drinking events

An overview of Gender & Sexual Diversity workshop then followed, discussing fluidity and layers of gender (i.e. not everyone firmly identifies as either male or female), and ways we can make room for non-binary people to make everyone feel welcome; designating all gendered washrooms, for example.

- A few final takeaways/pieces of advice from Ms Raponi and EngiQueers Canada:
- Reflect on your own implicit biases (no one is immune)
- Be aware of stereotype threat in your young audience members, look for ways to interrupt it
- Be conscious of your speech and how you personally can disrupt bias/stereotypes (e.g. gendered language)
- Recognize intersectionality, meaning that people may face multiple systems of oppression
- As engineering students and the future of the profession, this matters A LOT to us
- Intersectionality is the next frontier for diversity in engineering
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More at EngiQueers Canada’s webpage

Guest Speaker #3 - NSERC Chair for Women in Science and Engineering (ON), Dr. Catherine Mavriplis

See website for funding opportunities, and Dr Maviriplis’ CWSE webpage .

Notes from Workshops

Workshop #1 - “Engineering Messaging: Simple ideas to maximize outreach impact and promote diversity”, Rebecca White, Engineers of Tomorrow

As a longtime organizer and coach of engineering outreach volunteers, Ms White brought the importance of designing the experience to ONWiE members’ attention, highlighting that it is not just about coming up with and running an activity.

Some key questions to consider in the design process: What are the key messages we want participants to take away? How are we deliberately addressing stereotypes or other negative perceptions that our audience might already have? If we can innovate in the way we do outreach, and give our volunteers a chance to bring their own experiences, we can impact the entire system of engineering.

The National Academy of Engineering's Changing the Conversation campaign is a great example of a ready-made set of messaging tools that can be used to create engineering outreach that appeals to young people (especially girls and women) who may not be inspired by the usual way of explaining engineering.

Most engineering outreach happening today does not include this strategic messaging approach, and therefore risks enforcing existing stereotypes and inequalities rather than uprooting them. One example is outdating messaging that refers to a narrow band of disciplines of engineering (e.g. bridge-building activities) which do not portray engineering as innovative, evolving, socially relevant, helping people, etc.

A strict, literal definition of engineering is not necessary for young audiences, as they will respond better to a story-telling approach and being encouraged to explore and discover for themselves. As a general rule, all communicating we do about engineering must be accessible to its audience and create a positive experience that makes them want to learn more. They can always learn more details and technical information later. This is not a false impression of what engineering is, rather a more strategic way to bring in the interest of a broad group of young people to discover it for themselves. There are ways to modify activities and include positive messaging into 'traditional' engineering activities, and to train volunteers who may hold a more 'old school' view of engineering.

More at Engineers of Tomorrow's homepage

Workshop #2 - Member Open Forum

Nika Zolfaghari, Ryerson University

Ryerson ran a co-ed GoEng(Girl) with a 50/50 split of M/F, instead of the typical all-girls event; they considered it a success because it provided an opportunity for boys to see female leaders presenting technical topics to them and helped girls feel less isolated due to the event being only for girls.

Some ideas to consider for future events like this one:

- Train volunteers to identify and step into situations where boys take over and girls hang back
- Registration can be confusing for male participants because it is still done through the WiE site
- Weave topics related to diversity and inclusion into activities
- Keep both events as the panel discussions address different topics
- Cap male participation at max 50%, and continue running the all-girl event as well

Since students form their ideas about gender and belonging at a very young age, an event like this can show inclusion and reflect the changing culture in engineering. Of the 80 students who registered, 63 showed up, with a roughly 50/50 gender split.

More at Ryerson's Go ENG Girl page.

Marisa Sterling, York University (Lassonde School of Engineering)

York University designed and is promoting a new event planning tool called the Inclusion Lens; it gives specific guidelines and tips to event organizer to ensure they are not unintentionally excluding anyone. With the idea that a lot of people want to do the right thing but don't know what to do, the Inclusion Lens gives a comprehensive list of things to consider. Its goal is to change behaviour and make inclusive design of event more natural and routine. All ONWiE members are encouraged to use the Inclusion Lens tool and provide feedback to Lassonde on the experience.

More at the Inclusion Lens website.

Kelsey, Western University

Western University has started a program called EngSquad, which provides mentorship to girls in grades 9-12. They meet 4 times throughout the year, gearing the first 3 visits local, industry locations. The 4th meeting is a weekend at Western, with an overnight stay on campus. Of the 20 girls who did the overnight, 5 accepted an offer to attend Western and study engineering.

More at Western's EngSquad page.

Lisa Lim-Cole, Education Officer, Incubation Ontario Ministry of Education

The Ministry of Education has assembled a task force to help change the way that STEM education is delivered in Ontario schools. They are also aiming to transform their relationship with the education sector. They're in the process of creating a better web interface for those visiting the Ministry website.

Some of the topics they are working to cover: design thinking, connections to everyday life, and computational thinking & coding as a tool set. Many resources are available for teachers and outreach event organizers.

More at The Ontario Ministry of Education's Incubation & Design branch website.

Edwin Tam, University of Windsor

The University of Windsor's engineering department has partnered in the Build A Dream symposium for girls for the last several years. It started as an event to encourage girls in skilled trades side and then engineering was added afterwards.

More at the Build a Dream website.

Conclusion/Overview

As ONWiE heads into its next phase in 2018 with the appointment of a new Chair, it owes a significant amount of gratitude to its outgoing Chair, Dr Mary Wells. Under her leadership in the last five years, ONWiE has advanced its collaboration, public profile, student reach, improved its systems and processes, and broadened its membership from across Ontario to nationwide. Through holding its two member summits (in November 2015 and November 2017), ONWiE leadership has helped clarify the accomplishments its members most value, and the priorities they hold for the future. ONWiE has a bright future ahead building on the strategic, collaborative, and supportive foundation it has established to date.

Report prepared by Erica Lee Garcia, Engineers of Tomorrow. Please report any errors or omissions in this report to Rohini Wittke at rwittke@uwaterloo.ca so they can be corrected.