

Power to Perspective: The Importance of Diversity and Outreach to Create Positive Change

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Representing diversity is crucial to the process of creating innovative solutions. The Our Lady of the Snows (OLS) Synbio team has taken on a variety of initiatives to reach out to a wider, more diverse public in order to accumulate different perspectives on our project of interest: the management of plastic through purposeful biological recycling. Therefore, as part of our outreach process, we have been interacting with our surrounding community by participating in the annual Canadian Rockies Public Schools Regional Science Fair, teaching young minds about the basics of synthetic biology, and asking the general public and other specific groups to take part in a survey about our project. We have also been contacting people with expertise in different areas, including local plastic specialists, members of government organizations and local/multinational companies. For our project to be wanted it must be needed, and our research has proven that by collecting different opinions and adapting our project accordingly we can increase our impact on the wider public, hence creating a sustainable solution for all. Diversity in perspectives enhances creativity, critical thinking and the generation of new ideas. We cannot isolate our ideas and expect them to bloom and prosper in a genuinely desirable, feasible and viable way. First, we must connect with others, engage in conversation, share perspectives and learn from each other. After all, innovation resides in the power of perspectives.

Keywords: Diversity, perspectives, outreach, synthetic biology, plastic recycling, education

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Watch a video introduction by the authors at <http://bit.ly/2xG6NI5>

Students

Reaching out to our fellow students, although a relatively near public to access, required our team’s full attention and effort. We presented at the Canadian Rockies Public Schools’ Regional Science Fair and set up a small “workshop” in which we demonstrated how to create bio-art out of genetically modified

Escherichia coli. This initiative called for a significant amount of organization: we had to arrange a convenient setting; separate ourselves into subunits with specific jobs (safety enforcers, presentation animators, lab workers, etc.); assess and implement the necessary safety precautions; and prepare the materials

needed, which included 75 plates of agar and 2 different “colours” of bacteria (genetically modified *E. Coli*). Moreover, we used this opportunity to take a survey of the students at the fair, to collect their opinions and to get a sense of their knowledge of the current plastic crisis, their recycling habits, and their thoughts on genetic engineering in general. From this, we gained a great deal of valuable information for our project.

In the 62 submissions we received, these were the most significant results:

- 95% of the people surveyed answered that they would consider buying products that had been recycled from plastic. This piece of information helps confirm that our project is desirable.
- Everyone questioned either agreed or felt “neutral” when asked if they were aware of the serious plastic problem in the ocean and on land.
- 4.8% of the people questioned put their plastics in the garbage, 37% put their plastics at the bottle depot and 77% put them in the recycling (people could select more than one answer).
- When asked if they felt that enough was being done around the world to biodegrade and recycle plastics, 24.2% said yes and 75.8% said no.
- Only 30.6% of the people questioned knew what a Genetically Modified Organism (GMO) was. This data suggests that we should raise awareness of GMOs among the wider public, to eliminate any potential source of confusion.
- 12.9% of the people were uncomfortable knowing that GMOs could be used to break down plastics. Although this number is relatively low (only 8 people out of 62), it suggests that we should make available an information platform about synthetic biology – exploring the advantages and disadvantages of this branch of engineering – to encourage educated decisions from the wider public regarding GMOs.
- 35.5% of the people had never heard of clothing made from plastic.
- When asked if their view of clothing would change after finding out it could be made of biodegraded materials, most people answered that since it would be better for the environment, they wouldn’t mind wearing it. Again, this result suggests that our project is desirable.
- 82% of the people answered that one of the most important factors that would incite them to buy clothes was comfortability. This is a very important factor to take into account in relation to the design process of the project, assuming we were to continue on the plastic-to-textile idea path.

This said, it should be noted that the people surveyed only represent a small portion of the student populous – most of them are still in primary or middle school. Thus, more data must be collected to have a proper, genuine representation of this particular group. Nevertheless, this experience made us realize

that people are more likely to participate and help a cause if the answer is handed to them and somehow benefits them, like depositing recycling materials at the bottle depot. Or wearing comfortable clothing made out of plastic recycled by genetically modified organisms.

Plastic specialists

Next, we contacted some local plastic specialists. We emailed Peter Duck, the Regional Zero Waste Coordinator of the Bow Valley Waste Management Commission, and after a couple of email exchanges, we established a date to have a proper interview with him. On April 5th, five people from our team met with Peter Duck in our school science lab, and the questioning began. This was our first face-to-face experience with a real expert educated in the environment and waste management field, and it exposed us to all kinds of new insights and concerns. We learned about the process of downcycling, about issues regarding the recycling of “dirty” plastic, how contamination of plastics with food and other forms of waste disrupts the recycling processes, and other difficulties that we will be facing during the design planning of our project.

Peter Duck connected us with other specialists in the waste and plastic department including waste management supervisor Simon Robbins (who will be showing us around our local sorting facility) and Christina Seidel from the Recycling Council of Alberta. It seemed like we were coming up with more questions than answers. In an attempt to shine light on our inquiries we discovered that the chain of learning never truly ends. Thankfully, we connected with more and more people who were ready to help and pitch in their knowledge.

Out-of-province outreaches

Furthermore, one of our teammates was sent on a weeklong Adventures in Technology trip sponsored by our local Rotary Club. “I got some awesome insight on the plastic recycling industry through visiting the biggest MRF [Material Recovery Facility] in Saskatchewan, Loraas Recycling,” reported Elian Dupre Sarmiento. Although this trip wasn’t intended to be part of the OLS Synbio outreach plan, Elian grasped the opportunity and prepared a full report on what he learned from Loraas Recycling. This gave us an insight into the sorting of plastics in high-end MRFs. We saw that sorting plastics at this MRF is not an issue, unlike at Bow Valley, where geographical location doesn’t allow enough space for big MRFs. In Elian’s report, it is stated that Loraas collects all 7 types of plastic and packages them into corresponding bales. They sort the plastic with two state-of-the-art quarter-million-dollar machines that use UV light to determine what number (signifying the type) a plastic is. Strong b of air then blow the plastics to different conveyor belts to be compacted into bales.

“[The Loraas Recycling representatives] said that they send all the plastics to a distributor, which then sends it to the various customers. Yet the distributors are not keen at all about telling Loraas which companies in particular are taking the plastics. They say it’s part of a confidentiality agreement between the distributor and the buyer. So nobody really knows what happens to the plastics after Loraas Recycling sorts them. This

might be where we want to look into. The companies might be melting them, and this is most likely where we would like to offer a biotech solution,” explained Elian in his report.

Politics

We reached out through social media to Marlo Reynolds, the Chief of Staff for Environment and Climate Change Canada. This Canmorite is a committed and engaged individual towards environmental and energy issues, having worked in BluEarth Renewable Inc. and the Canadian Wind Energy Association (CanWEA) before entering the field of politics. A phone call meeting is to be arranged soon.

Clothing companies

Since our project is heading towards the creation of textiles from plastics, we have reached out to clothing companies that are known to use recycled plastics in their products, including Lolë, Nike, Quicksilver and Patagonia. We asked them about the recycling process of textiles, the current lifespan of plastic-made textiles and about all major issues concerning the production of polyester. We also asked for their opinion on genetically engineered organisms[2] : if we were to sell the product of our project – textiles made from plastic recycled by genetically modified bacteria – we first had to make sure that people would be comfortable with our idea and interested in potentially purchasing our product. Currently, we are in the midst of email exchanges where we are being referred from one department to the next. Thus, we still haven’t quite gotten the answers we were looking for – nonetheless, we will persist and be patient.

Challenges

One of the most important tools – but often the most challenging – is communication. Sometimes, communication is not always effective, and the answers we receive are vague. Thus, we must learn to master the “art of asking questions”. For example, to get good and precise results for our survey, we had to design our questions to be understandable, pertinent and to the point. Moreover, another crucial skill to practice for efficient communication is patience. Needless to say, the waiting process can be frustrating, especially when deadlines are close by. Thankfully, we have reached out to many people. All of them responded at different rates, so we’ve been kept busy while waiting for others to respond.

Sponsors

Of course, our trips and equipment weren’t going to pay for themselves so we turned to LaFarge, a local company that has shown interest in supporting sustainability and education in the community. When we asked them if they would like to sponsor us, they very generously provided us with the financial support we needed. We will host a “meet and greet” on April 28th with a team of representatives from Lafarge to explain our mission

in detail and to exchange ideas. We are extremely grateful for their financial support and encouragement in furthering our education.

Future Plans

Although we will address our project through a synthetic biology approach, we plan to open discussions and idea brainstorming beyond the scientific community. After all, as mentioned earlier, plastic management is an issue that affects the whole world. This means we must reach out to people who are not normally associated with synthetic biology, but who we really must listen to if we want to attain true global sustainability. It would be great to meet with artists, teachers, engineers and anyone who has something to share and contribute to our project. We could even organize a summit, open to all members of the community, to discuss and debate issues concerning recycling, plastics, and synthetic biology. In order to start designing our project in the lab we need to know what people want. And in order to know what they want, we must make an effort to reach out and create connections with people who will contribute to our final product. There are many groups at play, all working together towards a common goal: Plastic experts give insights into the recycling industry; students focus on what needs to be advertised and what the public need to be aware of; clothing companies help provide examples of textile recycling models; government organizations instruct us on how the plastic crisis is currently being dealt with; teachers help collect knowledge on the technical aspect of our project; and all of these people give us insight about what they want to see, helping us ensure that we are doing what is desirable and helpful for our community. All of these collectives are part of our mosaic of perspectives.

We are not done collecting perspectives for our project, far from it. Our team has come to understand that diversity is a constant and crucial aspect of sustainability, and the sharing and learning process never stops. Exploring different points of view and adapting to them is a challenge, but nonetheless a very important strength. After all, innovation resides in the power of perspectives.

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