HANDBOOK FOR HUMAN PRACTICES

created by iGEM Stockholm 2017 for the iGEM community

What is Human Practices?

Human practices is about exploring the bigger impact of your research by taking the project out of the laboratory and applying it into a real-world context and answering the question: "How will your project affect the world, and how will the world affect your project?"

As a team, you will need to consider the safety of your project, environmental sustainability and also take into consideration the ethical aspects of your work. Human practices is divided into two main parts:

- **Integrated Human Practices (HP)**
- **Public Engagement and Education.**

Integrated HP refers to the demonstration of how your out-of-the-lab exploration affected and changed your research and design. Public Engagement and Education involves engaging the broader society, raising awareness, educating and establishing a dialog with the community.

Human Practices can be a broad and undefined field, however, it is an important part of the project. We, iGEM Stockholm 2017, therefore believe there is a need for a Human Practices manual that guides teams from day one to the Big Jamboree, so that everyone can master their Human Practices!

Manual Overview

Who does not know the area better than previous winning and nominated teams for Human Practices and their judges? This manual is built on a questionnaire sent out to previously successful teams, judges and the official judging handbook of iGEM.

The manual is divided into two parts, one where the broader themes included in iGEM is described, and secondly one that includes the practical challenges that you may be faced with during the project, including; how to start up your Human Practices, how to structure your team, time management, medal criteria and detailed information about the different areas of HP and good examples to demonstrate it.

How to start
Short answer: "The earlier the better"

Before you have a project idea, start by reading up about HP, gather information and start thinking about who your relevant stakeholders are -   who will be affected by your project?
Go out and speak to the community and integrate their thoughts, experiences and feedback into the project from the beginning.
This way, HP will follow you throughout the project.

How do we structure our team?
Short answer: "With clearly structured areas of responsibilities, where the whole team is kept in the loop!"

We suggest these two ways of dividing the workload amongst your team:
   1.   Either you have a subgroup working on Human Practices, with at least 2 people working full-time (preferably more) and 2-3 working part-time.

2. Include the entire group working on Human Practices with 2 members working full-time.

Most successful teams choose the first option, although it is always important to involve the whole team in your events and integrated work.

How much time to spend?
Short answer: "More than you think!"

To ensure that you reach as successful goals as possible in your Human Practices, we suggest that you spend at least 30% of your total project time on it, according to the previous successful teams!

Also, keep in mind, iGEM is much more than a research project and continuous work with HP during your time in iGEM is important.

Look at other successful teams
Short answer: "Good artists copy, great artists steal – Steve Jobs"

We are not encouraging you to steal, but don't re-invent the entire wheel. Instead – learn from previous teams and get inspired by their processes and outcomes.

Go through previous successful teams wiki-pages. From these pages, you will get inspired, get an idea of how the entire process works and how they managed their team and timeline. Since the first iGEM competition in 2003, there are loads of teams that accomplished great results. In many of these cases you can also be inspired by, and build further on their work.

Public Engagement and Education

Issues regarding certain aspects of HP, such as ethics, sustainability, safety and security don't always have simple solutions. iGEM teams should therefore strive to educate and engage the broader society to find the best possible solution to these issues.

A successful Public Engagement and Education (PE&E) project should involve innovative educational tools and public engagement activities that enables, facilitates and catalyzes a discussion regarding the science behind synthetic biology. This will lead to sparks igniting for new scientific curiosity and will lead to an increased established public dialogue about synthetic biology, with and from voices outside the laboratory.

Although, it's important that **PE&E should NOT be pursuing how great iGEM is or how synthetic biology can save the world. Judges will focus their evaluations on whether a dialogue was established between the team and the public.**

According to the Judging Handbook 2017:

- Teams should be able to demonstrate that this dialogue was bi-directional.
- Teams should be able to demonstrate that they have learned from the interaction and/or that the opportunity for learning was built into the activity.
*- Judges should focus on **WHY** the team has chosen their specific activities, **WHAT** they have done and accomplished, and **HOW** they have learned from the activity.*

Keep in mind that your PE&E project may not necessarily have anything directly to do with your "wetlab" work.

Integrated Human Practices

In Integrated HP you consider important questions beyond the lab bench such as ethics, sustainability, social justice, safety, security, environmental impact, or intellectual property rights. As a team, you need to demonstrate that you have investigated, addressed and integrated one or more of these issues into the design of their project (typically the "lab" component or final application)

You should also combine the input and dialog given from your public engagement, and integrate the society's opinion into your research and product design. You see, they go together!

You will be evaluated on how well you show that the results of this research are fully integrated into the design, execution and presentation of their project.

According to the Judging Handbook 2017:

- The team should be able to document how their project evolved based on the information acquired from these activities. The methodology is not necessarily the focus of the judge's evaluation.
*- Focus on **WHY** the team has chosen their specific activities, **WHAT** they have done and accomplished, and **HOW** it has been integrated into the "wet lab" portion of their project.*

The way of answering the question "How will my project affect the world, and how will the world affect my project?" is to simply **address all the stakeholders** involved in your final product. And preferably do this at an early stage so you have the time to integrate it into your project! And don't forget to execute a proper (theoretical) product development.

Supporting Entrepreneurship

One of the Special Prizes is called "Best Supporting Entrepreneurship" and to make it clear, this is not a part of Human Practices. But if you conduct a proper product development in your integrated HP (which you should), you will notice that these two categories go together, and you might be competing for another prize!

According to headquarters, it's hard to differentiate them. The main difference is that in in the entrepreneurship prize, you target one or very few specific stakeholders, while in Integrated, you target them all.

Would you like to be successful in this? Then you will have to construct a formal business plan based on customer needs and created a viable product that customers want to use.

According to the Judging Handbook 2017:

- *Customer Discovery – Has the team interviewed a representative number of potential customers for the technology and clearly communicated what they learned?*
- *Based on their interviews, does the team have a clear hypothesis describing their customers' needs?*
- *Does the team present a convincing case that their product meets the customers' needs?*
- *Has the team demonstrated a minimum viable product (MVP) and had customers to commit (LOI, etc.) to purchasing it / using it?*
- *Does the team have a viable and understandable business model/ value proposition to take their company to market?*

Applications

To get you started and inspired we thought of collecting some of the different applications the previous successful teams have done.

Public Engagement and Education:

- *Create a handbook*
- *Make educational kits for students and teachers*
- *Re-designed lab experiments for visually impaired students*
- *Clinics, scholarship programs and events*
- *Create a game or an app*
- *Modules for introducing synthetic biology to high schools*
- *Create a community lab*

Integrated Human Practices:

- *Newspaper articles with experts*
- *Analysis of laws and regulations*
- *A legal policy or proposal*
- *Visit the customers/patients/doctors*
- *Talk to the government*
- *Guide to patents*

Collaborations

Short answer: "Collaboration is key."

As always in iGEM, collaborate! This applies to HP just as much. A couple of months into your project, look out for teams with similar projects or maybe teams that have strength in areas you don't. If you're creating a legal proposal as an example, talk to teams to see how their laws work in their countries. Or why not work and build upon previous teams' human practices work! One of the criteria is "Is it documented in a way that other teams can build upon?"
So: research and see if there is previous work that could lift yours and others projects!

Conclusions Acknowledgement
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Stockholm 2016
OLS_Canmore 2016
Imperial 2016
Groningen 2016
Bielefeld 2015
William and Mary 2015
UofC_Calgary 2016
Cornell NY 2016
Paris Bettencourt 2016

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