**Instructor Module: Bottom-up Ethics: Real World Training for Professional Practice**

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For students, opportunities to apply ethics training in real world circumstances are rare, especially for those who will eventually work in multiple disciplinary teams where members may have different levels of training in, and interpretations of, what constitutes ethical practice. Here, we describe an interactive two-day workshop that has been used successfully in an Introduction to the Professions (ITP) course in Illinois Tech’s biomedical engineering program. This module could be adopted for use in almost any course or workshop that seeks to introduce students to the intricacies of research ethics.

**Introduction**

For students, opportunities to apply ethics training in real world circumstances are rare, especially for those who will eventually work in multiple disciplinary teams where members may have different levels of training in, and interpretations of, what constitutes ethical practice. As the pace of innovation increases and new areas of scientific practice emerge, conventional ethics education may be insufficient for situations that students will encounter in their professional careers. Additionally, our NSF sponsored research on ethics in STEM labs at IIT suggests that ethics extends beyond the commonly covered ethics and responsible conduct in research (RCR) topics: plagiarism, falsification of data, and treatment of human and animal subjects to issues that involve social interaction, power relations, gender and other forms of difference. Our findings to date indicate that peer-to-peer, supervisor-to-lab member, and PI-to-student relationships are significant and provide the foundation for ethical research practice. We have found that creating opportunities in which students are able to interact as peers allows for frank and open discussion about issues that they encounter that might otherwise not be put into words or raised.

Here, we describe a two-class period, interactive workshop that has been used successfully in an Introduction to the Profession (ITP) course in Illinois Tech’s biomedical engineering program. This module could be adopted for use in almost any course or workshop that seeks to introduce students to the intricacies of research ethics.

The workshop described here is based on the work of designers Samantha Dempsey and Ciara Taylor, developers of a participatory hands-on approach to introducing ethics in the context of team-based projects. Dempsey and Taylor’s initial project in developing ethics training was inspired by their experiences in professional practice. Their goal was to raise awareness among multiple disciplinary teams engaged in product and process design. They have facilitated workshops at multiple conferences and have since created another initiative, *Ethics Quest,* which incorporates aspects of play and gamification[[1]](#footnote-0)[[2]](#footnote-1) “the application of game-design elements and game principles in non-game contexts.”[[3]](#footnote-2)

Building on this approach, our team has developed a workshop that helps students understand existing ethical standards specific to their discipline and facilitates hands-on activities that allow them to transform abstract ethics principles into meaningful ethical guidelines that can be carried into their academic and professional careers. The approach draws on on ethical role-play scenarios directly from Illinois Tech labs where professors and students encounter different roles, levels of power, conflicting goals, time pressure, and ideas about ethics. After the role-plays, students work in teams to brainstorm about ethical issues they are either interested in or have encountered in their coursework and research, and are asked to design an educational tool to help introduce other students to these issues. During the fall 2017 pilot of this approach, teams of students developed games, short plays, and discussion prompts looking at issues of mentoring, authorship, and research misconduct. In late November 2017 several teams presented the tools they developed through the workshop as part of an alumni panel discussion focused on ethical questions and situations that panelists have faced in their daily work.

**Timeline**

RCR Ethics Workshop AGENDA Day 1

| 08:50 - 09:05 | **Short Presentation + Kickoff** | Presentation: 15 min |
| --- | --- | --- |
| 09:05 - 09:30 | **Embodying the Problem**  Individual + Teams of 2 + Group Share | Activity + Share: 25 min |
| 09:30 - 09:50 | **Brainstorm Activity**  Individual + Group Share | Activity + Share: 20 min |

RCR Ethics Workshop AGENDA Day 2

| 08:50 - 09:00 | **Day 1 Recap + Prototyping Overview** | Presentation: 10 min |
| --- | --- | --- |
| 09:00 - 09:25 | **Prototyping + Crafting the Story**  Group Activity | Activity: 25 min |
| 09:25 - 09:45 | **Storytelling**  Group Share | Presentation: 20 min |
| 09:45 - 09:50 | **Closeout + Next Steps** | Presentation: 5 min |

**Teaching Notes**

This workshop is meant to give students hands-on experience in recognizing ethical issues, discussing these issues as a group, and finally sharing what they have learned about ethics in research to a larger audience. If this workshop can help student develop their moral imagination, or ability to think of a range of possibilities in a particular situation in order to solve an ethical challenge, all the better.

In order for students to get the most from this workshop, it is important that they have some knowledge about what is meant by the term “ethics,” why it is important, and what some of the ethical standards are in responsible research practice. Having the students read - and discuss - the professional code of ethics for their discipline is a great start, especially if you can have the student use the professional guidelines when discussing a simple case study. We have included slides used in a 100- level biomedical engineering course that you can use as a starting point. This introduction could be done in an earlier class or as part of a longer introduction to the workshop. You can also add segments to your intro that specifically introduces students to particular topics you would like them to focus on (authorship, mentoring, data management, etc.) Resources for doing so can be found on the Online Ethics Center if you look in the Instructor Materials collection.

Physical space plays an important role in this workshop, as students should be free to easily form groups to discuss, and will need room to build the prototypes of their educational tools. Things will (and should) get loud as students swap ideas, take on roles, and start building their prototype.

This workshop is a great opportunity to bring in some interdisciplinary collaborators to help facilitate the workshop. During our iterations of the workshop, we had five facilitator from the biomedical engineering department, the ethics center, and two designers who led the workshop. Each team had their own table to work at and workshop facilitators walked around the room during periods when students were brainstorming or building their prototypes, answering questions, providing prompts to stimulate conversations, and helping with logistical issues. Our facilitators were also able to stimulate some animated conversations during the presentation of the student’s prototype games that helped highlight different viewpoints and raise interesting points about how the games could be developed and used in the future.

Teams of 4-6 students will likely work best for the workshop. Teams should be small enough that everyone has to become involved.

For day 2, students should have access to a range of building materials. A short list could include: playdough, pipe cleaners, construction paper, scissors, glue, markers, etc. Students can either have a supply of these at their tables or can grab them from a central location if space allows. For some ideas of what the final prototyped games might look like see the last few slides of the powerpoint provided.

**Conclusions and Direction for Future Research**

This undergraduate workshop came out of a larger National Science Foundation project funded under the “Cultivating Cultures for Ethical STEM (CCE STEM) entitled, “[A Bottom-Up Approach to Building a Culture of Responsible Research and Practice in STEM](http://ethics.iit.edu/cultivatingcultures).” This project worked with graduate students were actively engaged in research to work together in a series of six workshops to develop guidelines that seek to address ethical issues they have faced in their research. This larger project helped us to realize the need for designing ethics education interventions that are attuned to students’ educational level and experience. Based on the receptiveness of the students and the enthusiastic response of the faculty we intend to continue to refine this approach for undergradaute ethics education. As mentioned previously, we see the potential for adapting this module for students in other STEM programs, but also for undergraduate business students. In the next iteration of the project we will build in a way to evaluate the efficacy of this approach over time. Because the module was conducted in what is typically a first year course it should be possible to interview students at least once or twice before they complete their undergraduate studies.

**Further Information**

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We welcome all educators to use and adapt this workshop for their own use, and ask that you contact us to let us know how things went, what issues or questions came up, and how we might develop this resource further. Please contact us at [csep@iit.edu](mailto:csep@iit.edu) or [leave us feedback using this Google Form.](https://goo.gl/forms/oVUplsyvGt6xvnKl1)

1. Huotari, K., & Hamari, J. (2012). ["Defining Gamification - A Service Marketing Perspective"](https://www.researchgate.net/profile/Juho_Hamari/publication/259841647_Defining_Gamification_-_A_Service_Marketing_Perspective/file/9c96052e13e865be00.pdf). *Proceedings of the 16th International Academic MindTrek Conference 2012, Tampere, Finland, October 3–5*. [↑](#footnote-ref-0)
2. Sebastian Deterding; Dan Dixon; Rilla Khaled; Lennart Nacke (2011). [*From game design elements to gamefulness: Defining "gamification"*](http://dl.acm.org/citation.cfm?id=2181037.2181040) [↑](#footnote-ref-1)
3. <https://en.wikipedia.org/wiki/Gamification> Accessed Sept. 23, 2016 [↑](#footnote-ref-2)