



Developing Transferable Skills: Program-Level Learning Outcomes for Biology Undergraduate Students

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About the project

This project assessed and evaluated the biology undergraduate curriculum and focused on transferable skills. We asked:

1. Which skills are important?
2. How they are delivered through the curriculum?
3. How do we define transferable skills program-level learning outcomes (PLOs)?

We found ...

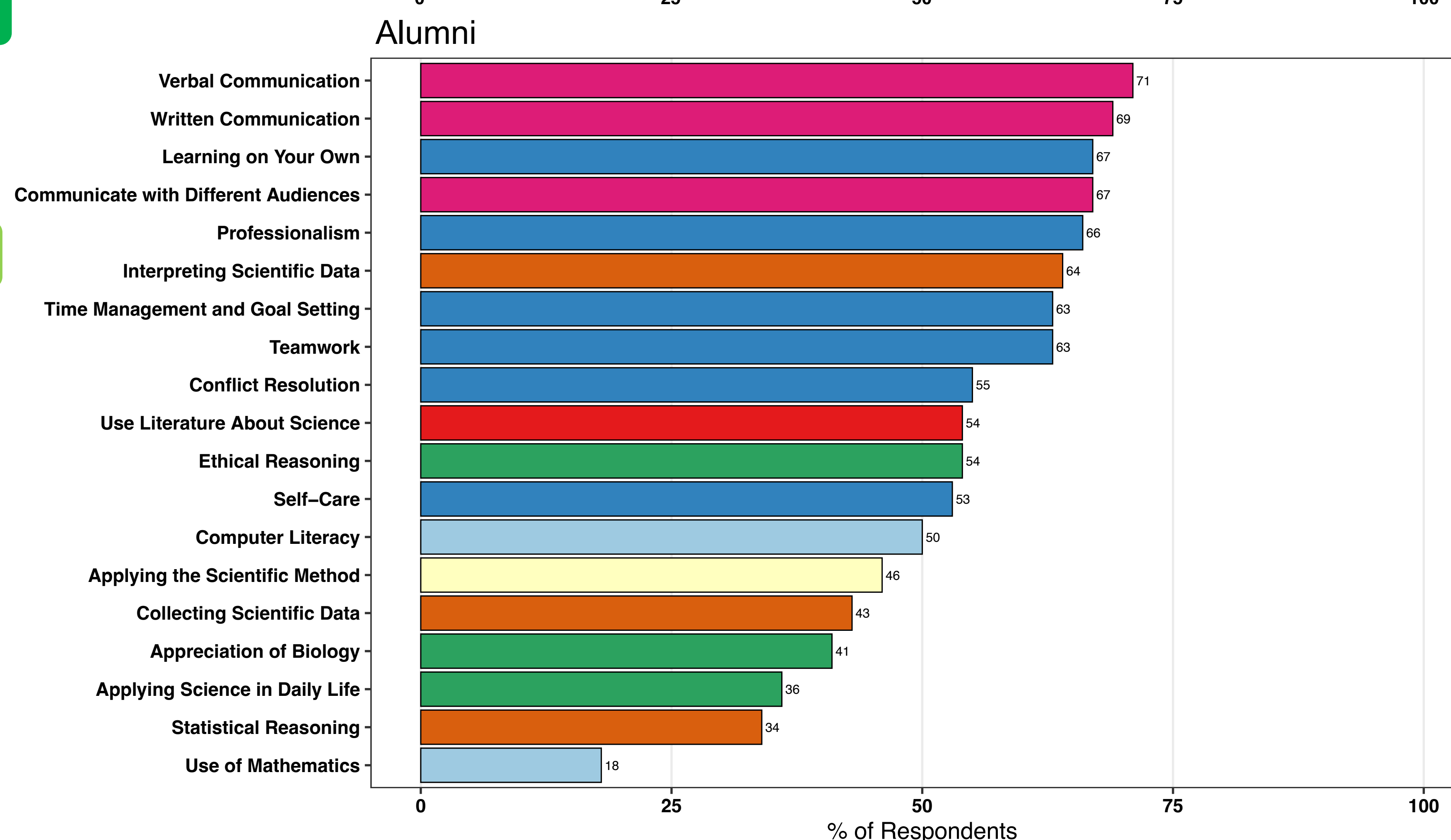
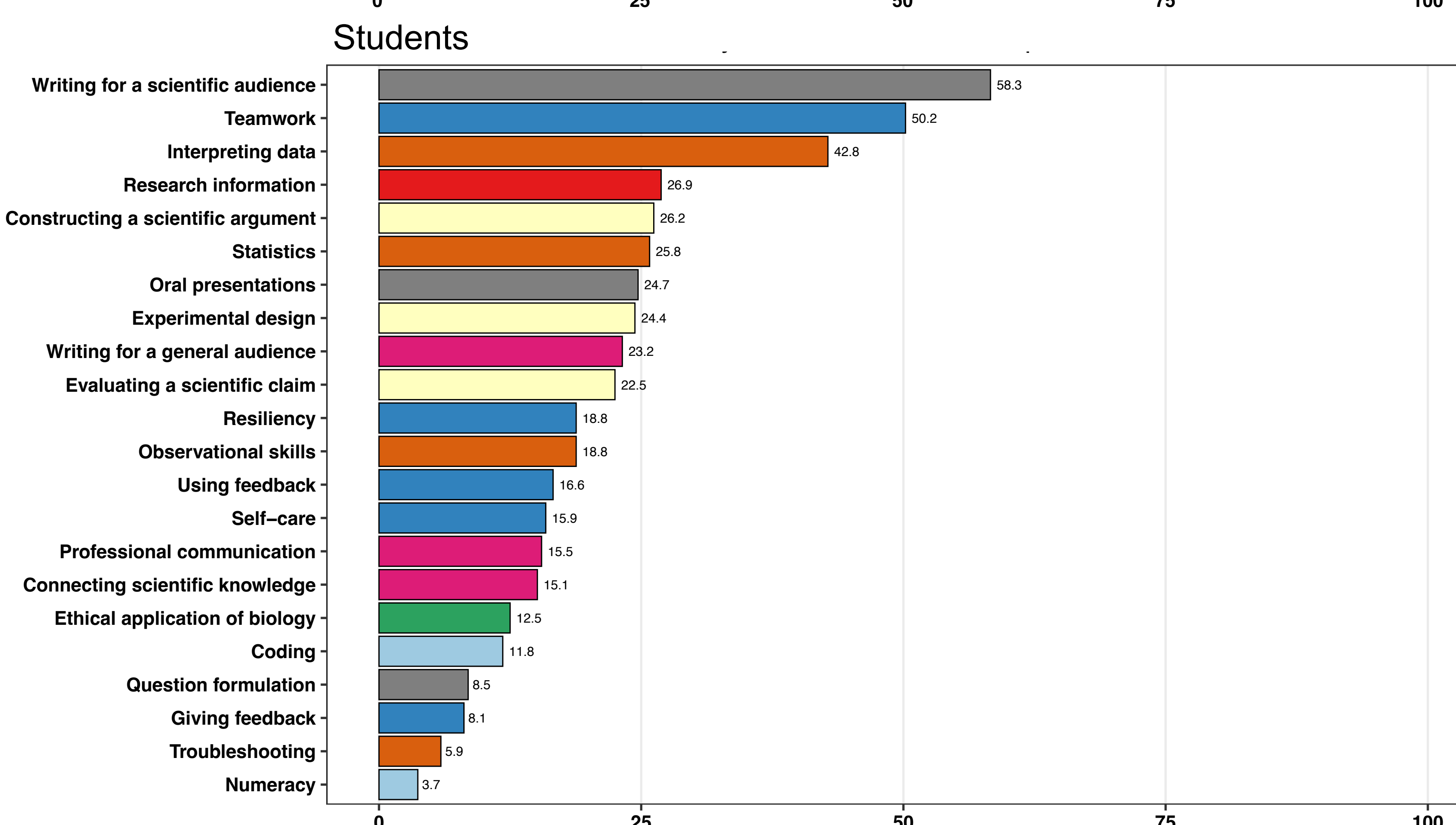
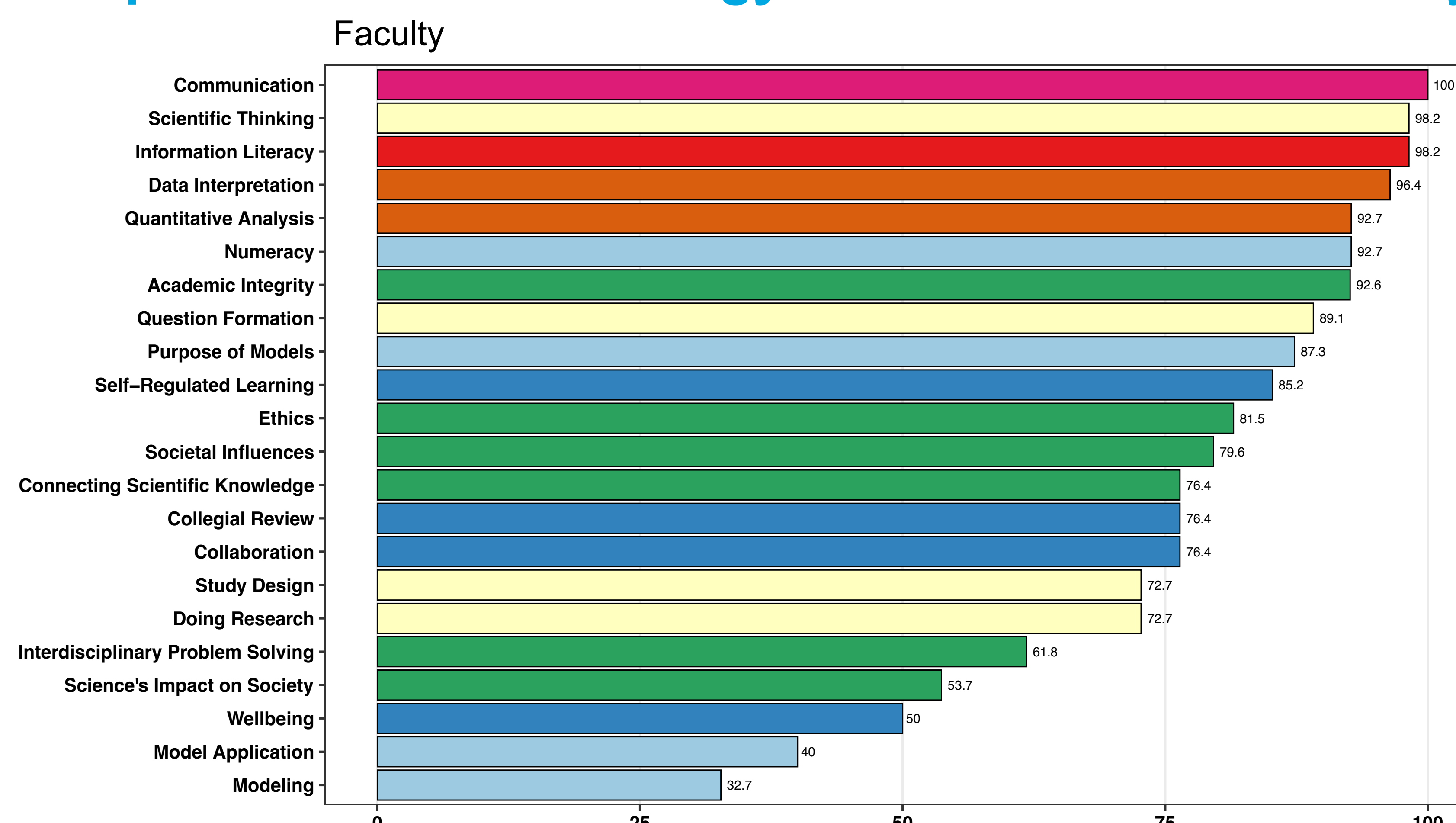
- faculty, alumni, and students value **interpreting data**, and **communication** as very important.
- other skills were **valued differently** in their importance
- transferable skills are **not evenly distributed** across the curriculum.

Which skills should we examine?

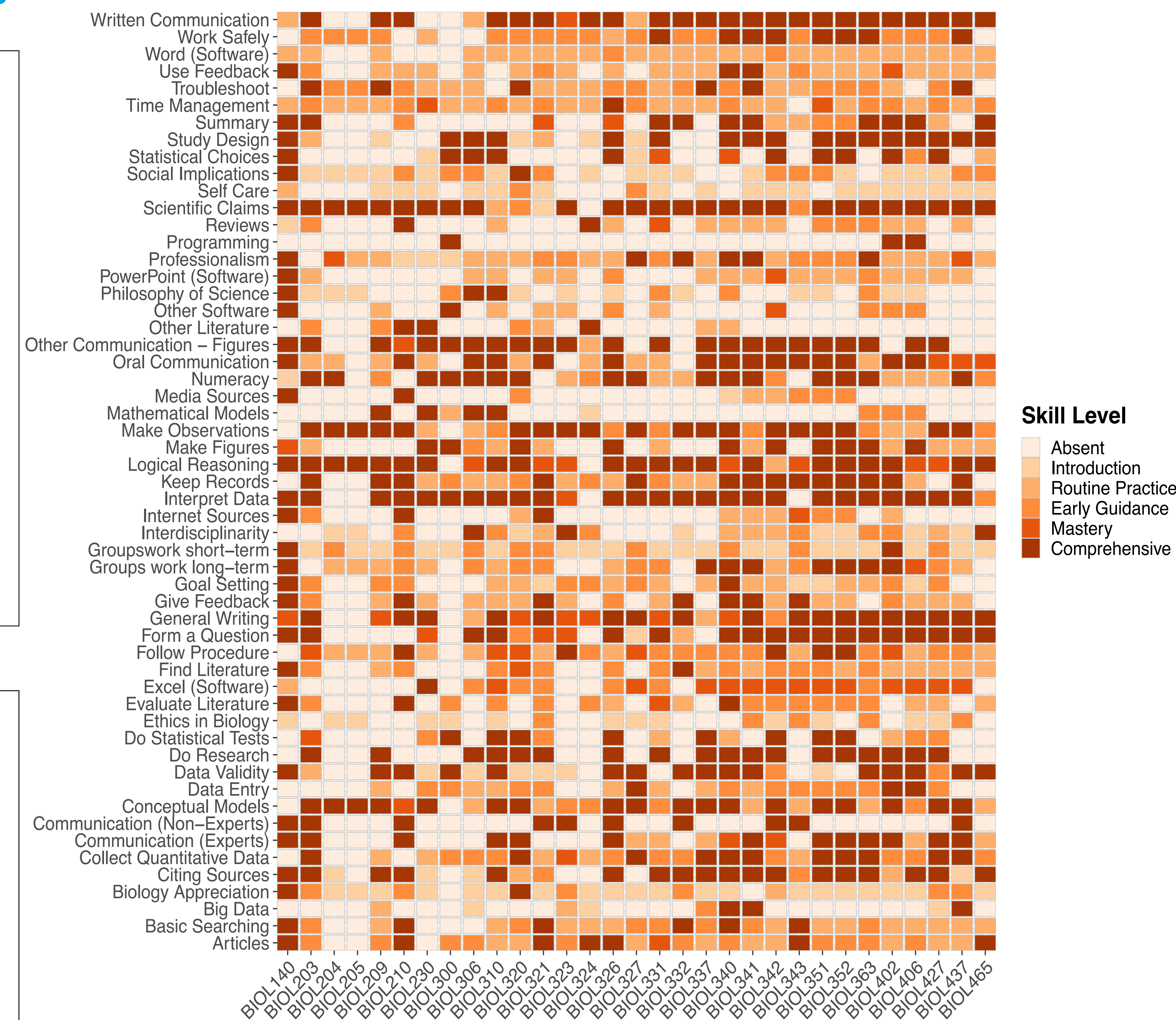
We developed 48 skills for the Biology context, using source documents¹; Faculty of Science BSc Degree Outcomes draft; surveys, interviews, and focus groups with faculty, alumni, and students.

<p>PROCESS OF SCIENCE</p> <ul style="list-style-type: none"> Philosophy of Science Form a Question Study Design Data Validity Evaluate Claims Logical Reasoning Do Research 	<p>INFORMATION LITERACY</p> <ul style="list-style-type: none"> Find Information Source Credibility Read Scientific Articles Read Reviews Read Other Sources 	<p>DATA SCIENCE BASIC</p> <ul style="list-style-type: none"> Numeracy Basic Searching Basic Software
<p>COLLECT & ANALYZE DATA</p> <ul style="list-style-type: none"> Work Safely Follow a Procedure Make Observations Collect Quantitative Data Keep Records Enter/Organize Data Statistical Reasoning Do Statistical Tests Interpret Data Troubleshoot 	<p>COMMUNICATION</p> <ul style="list-style-type: none"> Scientific Community Comm. With Non-Scientists Written Comm. Verbal Comm. Visual Comm. Make Figures Citing Sources Synthesize Information 	<p>DATA SCIENCE ADVANCE</p> <ul style="list-style-type: none"> Mathematical Modelling Programming (incl. R) Big Data
<p>PROFESSIONAL SKILLS</p> <ul style="list-style-type: none"> Group Projects Professionalism Giving Feedback Utilize Feedback Time Management Goal Setting Self-Care 	<p>SCIENCE IN SOCIETY</p> <ul style="list-style-type: none"> Biology Appreciation Interdiscipl. Biology Social Implications Ethics in Biology 	<p>TEACHING PRACTICES</p> <ul style="list-style-type: none"> Short-Term Group Tasks

Top 3 Important Skills for Biology Graduate As Identified By:



Skill distribution across biology laboratories



Developing Program-Level Learning Outcomes (PLOs)

We developed a **draft of Transferable Skills PLOs** ([link here](#)) with four skill categories, each with five to seven sub-categories:

1. Interpreting Biological Information
2. Performing Biological Research
3. Communicating Biological Information
4. Quantitative Reasoning and Computational Analysis
5. Professional skills, personal development, and the role of science in society

The PLO draft were distributed for **review to the Botany and Zoology faculties**.

Next Steps

The project team will develop content PLOs together with the Botany and Zoology faculty during the Zoology Faculty Retreat (May 2022) and the Biology Teaching Retreat (June 2022).

Reference ¹Alexa Clemmons, Jerry Timbrook, Jon Herron, Alison Crowe (2020). BioSkills Guide. Core Competencies for Undergraduate Biology, (Version 5.0). QUBES Educational Resources. doi:10.25334/156H-T617

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