Sample Learning Outcomes for Research Ethics Education in International STEM Collaborations

Purpose of the Templates

This CGS project supports a range of activities to enhance research ethics education in graduate international collaborations in STEM fields including the development of graduate learning outcomes. The sample outcomes provided below are designed to support and inspire the development of learning outcomes by project participants for research ethics education in STEM graduate international collaborations.

As indicated in the RFP for this project, proposals should include a plan to develop outcomes for graduate student learning that reflect key research ethics issues relevant to international collaboration. These may include general issues that apply to multiple disciplines as well as issues that are unique to specific STEM disciplines. Competitive proposals will provide evidence that the proposers have thoughtfully considered how the project will identify and develop learning outcomes. Proposals should also explain how these outcomes will be used to enhance graduate education in the targeted programs. The sample outcomes below cover a range of general topics and are not intended to limit or prescribe institutional approaches, nor do they address outcomes that will be unique to specific STEM disciplines. *Please note that CGS does not require proposals to use or adapt the specific outcomes on these sample templates, although all may use or adapt any that are applicable and relevant to the institution's proposed projects.*

Institutions are encouraged, however, to include in their plans for developing outcomes each of the three broad content areas on these sample outcomes (**cultural context, research practices, and ethical frameworks)** and to address different aspects of learning **(e.g., knowledge, skills, and attitudes)**.Examples of ways that proposals might plan to use the templates below might include, but are not limited to: circulation for discussion among a faculty team charged with developing draft learning outcomes for use in one or several international collaborations, facilitation of a focus group of graduate students using these templates to identify issues in research education that would inform the development of learning outcomes, or circulation among individual faculty who will bring expertise to the project team through their prior engagement in graduate learning assessment, research ethics education, and/or international research collaborations.

Method of Creating the Templates

These sample outcomes were generated in dialogue with an international, multi-disciplinary Advisory Committee consisting of STEM researchers (drawn from PI's on NSF-funded international research collaborations), national experts in learning assessment, national experts in international aspects of research ethics, and university leaders from STEM backgrounds with experience overseeing international research collaborations. The committee provided extensive input on content, but also advised on structure, presentation, and use. A draft of these outcomes, compiled by CGS project staff, was then reviewed by the Advisory Committee and comments incorporated to ensure that they are both relevant to a broad range of STEM disciplines and useful as prompts for institutional development of specific outcomes in graduate programs.

Sample Learning Outcomes for Research Ethics Education in International STEM Collaborations

TEMPLATE 1: Cultural Contexts

"By the time they complete their course of study, students should be able to/are expected to…"			
	Knowledge	**Skills**	**Professional Attitudes**
Cultural Contexts	Describe several prominent theories of culture and cultural difference. Identify social, economic, and political factors that may affect research practices in different countries. Compare structures of hierarchy and modes of communication in home and partner countries. Explain how cultural point-of-view may shape the pursuit of knowledge, including theories and methods. Compare the relationship between students and research supervisors at partner institutions. Compare policies and norms (explicit or implicit) for research conduct among partnering countries.	Situate him or herself in the context of various national cultures and communities. Consider various factors in assessing what is attributable to cultural differences and what are individual attributes. Seek information about differences in rules of professional etiquette and research practice. Take into account contextual information when making judgments about what is right or wrong. Identify effective ways to negotiate with international research partners and resolve differences using knowledge of cultural context. Prioritize the importance of research integrity issues in the context of an international collaboration and identify areas where compromise is or is not possible.	Question common stereotypes about individuals and researchers from participating countries. Respect cultural differences and areas of cultural sensitivity. Value self-awareness about culturally shaped values and biases. Demonstrate a willingness to seek information and resources when research norms and policies are conflicting or unclear. Use cultural knowledge to contribute to a collaborative environment of mutual respect, trust, and accountability. Demonstrate appreciation for the distinct contributions of all members of a collaborative research team. Convey tolerance for different levels of language proficiency and respect for the efforts of those conducting research in a non-native language.

TEMPLATE 2: Research Practices

"By the time they complete their course of study, students should be able to/are expected to…"			
	Knowledge	**Skills**	**Professional Attitudes**
Research Practices	Explain how national/cultural context may affect researchers' views of intellectual property and data ownership. Define plagiarism and explain how it may be viewed differently in different research cultures. Identify gaps and differences in national protocols and policies regarding equal access, transparency, and confidentiality. Explain how cultural, political, and economic contexts may shape views on information sharing and data access. Identify differences in national or cultural norms regarding authorship order and other formal acknowledgment procedures. Describe scenarios when information and data sharing may not be possible due to national security or political concerns.	Examine and question his or her cultural biases in assessing the value of contributions from an international research partner. Analyze ethical and practical challenges of sharing data and resources among international research partners.. Facilitate the sharing of data and resources among international research partners when appropriate. Seek effective ways to clarify ownership of knowledge and cultural and natural resources. Promote team-based publication in English and local languages, and seek to address the causes of plagiarism. Identify methods to build the research capacity of international researchers with available material and human resources.	Convey awareness of and respect for local knowledge that can be contributed by international research partners and/or research subjects. Show sensitivity to differential access to materials or technology e.g. issues of waste, unreliable internet access. Demonstrate openness to learning about local practices for data management, access and exchange. Demonstrate willingness to communicate with appropriate local authorities that may control the research process. Convey concern for different cultural approaches to establishing trust among international research partners.. Convey interest in sharing benefits arising from the use of information and knowledge provided by research subjects in partner countries.

TEMPLATE 3: Ethical frameworks

"By the time they complete their course of study, students should be able to/are expected to…"			
	Knowledge	**Skills**	**Professional Attitudes**
Ethical Frameworks	Define ethical values and principles and explain how they differ from laws, policies, and codes of conduct. Explain how culture may shape values and ethical principles. Identify common ethical challenges that arise in international research collaboration(s) in one's field. Provide examples of the way ethical norms and cultural values may lead to conflicts among international research partners. Explain how culture may shape views on research with human subjects. Articulate ethical principles for conducting collaborative research with international research partners. Describe collaboration scenarios where ethical decision-making may be complex and based on information that is uncertain or unclear.	Identify and prepare for ethical risk in countries where research regulations differ or where none exist. Seek input from international research partners in defining and measuring the benefits and outcomes of research. Compare and analyze the costs and benefits to international research partners in different collaboration scenarios. Take into consideration cultural values, ethical principles, and contextual information when resolving ethical problems that arise in international research. Formulate and analyze alternative ways to solve an ethical problem in international research. Consider how research outcomes may be presented and interpreted in different national contexts.	Demonstrate a willingness to seek information to place ethical issues in proper local and cultural context. Show respect for all human lives regardless of citizenship and culture in international collaborations involving human subjects. Demonstrate concern for limitations on the ability of research participants in some countries to provide informed consent. Acknowledge that the "right" decision in one country may lead to unintended ethical consequences in another. Respect differential impacts and broader societal outcomes of research in the home and partner country.