GUIDELINES FOR STIRS CASE STUDIES
Scientific Thinking and Integrative Reasoning Skills (STIRS) Initiative
Association of American Colleges and Universities

Case-Based Learning and STIRS

Case-based learning is a well-established approach for enhancing students’ ability to think critically. Cases ask students to apply theories and concepts introduced in course lectures or readings, or sometimes in the case itself. The case-based approach can be an excellent strategy for engaging students actively in their own learning experiences, enhancing their grasp of knowledge, concepts, and skills.

Well-developed cases invite students to utilize evidence-based reasoning, applying scientific, quantitative, logical, and ethical frameworks to evaluate information and issues. Any discipline a student might pursue in the context of a liberal education could employ evidence-based reasoning. AAC&U’s LEAP program defines “liberal education” as “an approach to learning that empowers individuals and prepares them to deal with complexity, diversity, and change. It provides students with broad knowledge of the wider world (e.g. science, culture, and society) as well as in-depth study in a specific area of interest. A liberal education helps students develop a sense of social responsibility, as well as strong and transferable intellectual and practical skills such as communication, analytical and problem-solving skills, and a demonstrated ability to apply knowledge and skills in real-world settings.” (Association of American Colleges and Universities, 2013) By giving students the opportunity to grapple with complex, relevant, multi-dimensional problems, case-based learning is tailor-made for accomplishing the objectives of liberal education.

Through case-based learning, students gain practice defining problems, identifying the most relevant information to address a problem, recognizing knowledge gaps, and communicating about their insights. Some cases (particularly those where there are decisions to be made) also ask the learner to develop and evaluate options and decide on a course of action.

STIRS cases will introduce or reinforce key elements of the STIRS Framework. All STIRS case studies will:

- Engage learners in examining complex, multi-dimensional problems relevant to a wide variety of general education courses.
- Apply study design and statistical reasoning principles, or other relevant frameworks, to the evaluation of evidence.
- Ask learners to communicate effectively about issues raised by the case.

In addition, each case study will provide opportunities for students to gain mastery of one or more of the following STIRS competencies:

- Discuss how evidence can be used to advance knowledge and/or to inform subsequent research.
• Apply an evidence-based problem solving approach which moves from problem identification, to identification of causal factors, to evidence-based recommendations for solutions, to evaluation of outcomes.
• Apply an evidence-based decision making approach, identifying elements which frame and drive decision making for problems in the sciences, social sciences, and/or humanities.
• Analyze the operation of complex systems using evidence and systems thinking.
• Analyze ethics issues which are inherent in research and use of evidence.

STIRS case studies will be designed for use as curricular components or modules in a wide range of general education courses, including first-year seminars, courses that utilize cross-cutting themes to promote common intellectual experiences, writing-intensive courses, courses incorporating collaborative learning, and capstone or synthesis courses. (Click here for more details on these and other high-impact educational practices.)

In addition to advancing the student learning goals of scientific thinking and evidence-based reasoning, the STIRS case library will serve as resources to inspire faculty to adopt new ways of teaching that engage students more directly in their own learning. For faculty who are already committed to case-based teaching, the high-quality, peer-reviewed STIRS cases will be a valuable teaching resource.

Sample STIRS case studies, which should be seen as works in progress, are available at http://www.aacu.org/stirs/casestudies/index.cfm.

STIRS Case Topics and Types

Case topics are boundless. A STIRS case may address any issue that students and their instructors will find interesting across the social, physical, or biological sciences or the humanities. Cases should be cross-cutting, that is, the topics and concepts covered should be relevant to more than one type of course. Case developers may be attracted to a topic because they’ve done related research, because they have expertise from teaching the topic, or maybe just because they want to learn more. Or perhaps a faculty member has already used a case in his or her own teaching, and wishes to develop it formally so that others can use it. Often, students will be most interested in topics that are relatively current; however, historical cases also have great potential to illustrate the evolution of scientific ideas in a societal context.

Cases should be based on real-world issues and evidence, though to enhance teaching value they may incorporate hypothetical situations. Cases should be appropriate for undergraduate learners.

The National Center for Case Study Teaching in Science (NCCSTS), based at the University of Buffalo, has compiled a “nationally accessible refereed collection of exemplary case studies in all areas of science for use at the undergraduate, graduate, and high school level.” (National Center for Case Study Teaching in Science, 2012) For this effort, NCCSTS has developed an excellent classification system (National Center for Case Study Teaching in Science, 2012) describing a large variety of case types, which include:

• Analysis Cases
• Dilemma/Decision Cases
• Directed Cases
• Interrupted Cases
• Clicker Cases
• Laboratory Cases
• Problem-Based Learning (PBL) Cases
• Discussions
• Debates
• Intimate Debates
• Public Hearings
• Trials
• Jig-Saw Cases
• Role Plays

The STIRS cases will utilize the NCCSTS Case Classification system. Prior to case development, please review the NCCSTS case type descriptions for ideas about case type and structure.

Instructions for Case Proposals

Before proposing a case, please review the STIRS framework. The case concept proposal you submit as part of your STIRS Scholar application should articulate how your case will:

1. Apply study design and statistical reasoning principles, or other relevant frameworks, to the evaluation of evidence;
2. Link with the keywords used in the STIRS Framework. (Note that each of the keywords is also defined on the STIRS website in the glossary.)
3. Accomplish one or more of the following STIRS competencies:
   • Discuss how evidence can be used to advance knowledge and/or to inform subsequent research.
   • Apply an evidence-based problem solving approach which moves from problem identification, to identification of causal factors, to evidence-based recommendations for solutions, to evaluation of outcomes.
   • Apply an evidence-based decision making approach, identifying elements which frame and drive decision making for problems in the sciences, social sciences, and/or humanities.
   • Analyze the operation of complex systems using evidence and systems thinking.
   • Analyze ethics issues which are inherent in research and use of evidence.

If your concept proposal is accepted in conjunction with your STIRS Scholar application, you will be invited to:

• Attend a case writing workshop on March 1, 2014 in Portland, OR in conjunction with the AAC&U General Education and Assessment Meeting. Workshop participants will work with AAC&U Senior Fellow Dr. Katherine Hunting, a case studies expert, and with each other to further develop their in-progress case studies.
• Submit a first draft of your student case by April 1, 2014 and a final draft by June 1st, and
• A first draft of your facilitator guide by July 1, 2014 and a final draft by September 1st.

Katherine Hunting will provide guidance to case developers, as well as editorial review of draft materials on a rolling basis. To enhance expertise among the STIRS Scholars and to expand feedback on each case under development, each participant will also have the opportunity to review one other draft case.

The following is the anticipated timeline for peer-review and publication.
• Student cases and facilitator materials will be peer-reviewed in September 2014. The peer-review criteria and process are described on the STIRS website.
• Authors make revisions in response to peer reviewer feedback and submit final materials by November 1, 2014.
• AAC&U will conduct final editorial review and formatting for publication in November, 2014.
• The target date for case study publication on the AAC&U STIRS website is December 15, 2014.
• Following publication, STIRS case studies will also be featured in AAC&U print media.

The STIRS website has a compilation of resources related to case writing and case teaching. These may be particularly helpful for novice case developers. In addition, the resources webpage includes three in-progress STIRS cases which can be consulted as examples.

Please consult the AAC&U Style Guide for guidance on word usage, abbreviations, formatting, reference style, etc.

A note about assignment of copyright: Authors will be asked to sign a form that transfers the copyright of their work to AAC&U. Consequently, anyone seeking to reproduce cases must request permission from the AAC&U Office of Communications, Policy, and Public Engagement.

The Concept Proposal

Please submit a two-to-four page case study concept proposal as part of your STIRS Scholar application by January 6, 2014.

Concept proposals should:
• Briefly describe the case study topic.
• Briefly describe your background/history with the case, if any. For example, have you done research in this area? Have you previously taught a partially or fully developed version of this case? Have you previously taught about these issues or concepts, but not in case format?
• List examples of types of scientific evidence that students will be asked to examine and (preliminarily) the approaches the case will take to examine the evidence.
• Note the type(s) of case formats you are considering.
• Identify the STIRS keywords as well as the STIRS competencies that your case will address (at this preliminary point).

In preparing your concept proposal, it will be helpful to review the proposed Criteria for Peer Review.

The Student Case

The Student Case includes the materials that students will read ahead of time or during class. The student case should draw the learner in, capturing his or her interest with a compelling narrative. However, effective teaching cases don’t just tell a good story and then relate the lessons learned; in fact, they typically don’t supply many answers. Some cases introduce a protagonist facing a dilemma or decision, and take learners into the protagonist’s world by providing carefully constructed contextual information and bringing the learner to the decision point. Other cases may describe the evolution of knowledge, a program, or ideas, and give learners the opportunity to analyze issues, and to make connections between historical events and present-day context. (Hunting & Gleason, 2012) Good
teaching cases provide students with opportunities – such as through analysis and discussion, debate, or role play – to participate actively in their learning.

Student cases will typically range from 2000 to 6000 words and should be written in past tense. (While recognizing the value of shorter vignette-type cases, the STIRS Case Study Project is targeting the development of more complex cases that can serve as substantial components of general education curricular modules.) Cases, while differing widely in style, often share these common elements. Note that the bolded sections (Introduction, Background and Context/Situation Analysis, and Key Questions) make up the central narrative of the Student Case.

- **Learning Objectives**
  - Describe the expected student learning outcomes (“Through their participation in this case study, students should be able to: . . .”). Make sure your learning objectives are measureable by using action verbs describing what the student will be able to do. (Search on “Bloom’s taxonomy action verbs” for numerous examples.)
  - Most importantly from the perspective of the STIRS Case Study Project, the learning objectives should operationalize how student learning activities link to the STIRS framework.
  - You may have learning objectives in mind from the beginning, or they may evolve as you write your case.
  - If the module is divided into multiple sections, include learning objectives for each.

- **Preparatory Materials**
  - Identify materials that students should read, view, or listen to in preparation for the case study.

- **Introduction**
  - The introduction should set the stage to introduce the critical challenges or problems that will need to be overcome. This compelling introduction should incorporate the question(s) facing the protagonist or decision-makers, if they are present in the case.

- **Background and Context/Situation Analysis**
  - Provide information about the concept/program/problem/policy question/etc. that students will need to address the case questions.
  - Expand on the context of the problem. Characterize the business, the community, scientific or economic landscape, cultural context, political context, etc.
  - What information did the decision-makers or others have? What information is still needed? What are the issues? What are the options? (or may leave to students to identify options)

- **Optional: Key Questions**
  - These should relate to the learning objectives. You may decide to ask these along the way as the case evolves, or to ask them at the end. Don’t answer the question(s)! Rather, leave it to the students to figure them out.
  - Sometimes it will be useful to give students questions in advance for class discussion, further research, and/or written assignment. Alternatively, Key Questions might be included only in the Facilitator’s Guide because sometimes classroom discussions/activities are most effective if students are not given questions in advance.

- **References**
  - Utilize the reference format described in the [AAC&U Style Guide](https://www.aacu.org/). 

- **About the Authors**
- Include a short paragraph about each author; also comment on each author’s role in the events the case study describes (if relevant).

- **Optional: Exhibits and Supplemental Materials**
  - Include relevant data, tables, charts, maps, or other supplemental materials if relevant for class activities. These might be in the body of the case, or they might be in an appendix. If at all possible please use only materials that are not subject to copyright protection. However, if any permissions are needed, please note.
  - Alternatively, supplemental materials might be included only with the Facilitator’s Guide if it’s best for the instructor to control the timing of their distribution.

### The Facilitator’s Guide

The Facilitator’s Guide should prepare a naïve instructor (who is relatively unfamiliar with your specific case topic) to teach the case. Because cases evolve so much as they are developed, we recommend that you focus first on the Student Case. (Of course, it may be useful to compile notes for the Facilitator’s Guide as you think of issues while developing the Student Case.) When the Student Case draft is in relatively solid shape, then turn your attention to expanding, organizing, and polishing the Facilitator’s Guide.

The Facilitator’s Guide is supplemental to the Student Case (that is, it does not need to repeat information already included in the Student Case). It should include these elements:

- **Abstract and Case Classification**
  - Provide an abstract of up to 250 words describing the case and suitable for publication.
  - As part of the abstract, indicate the case classification using case categories from the [National Center for Case Study Teaching in Science](https://www.nccst.org/case-studies/).
  - Indicate whether the case is based solely on actual events or also involves hypothetical scenarios.

- **Teaching Suggestions**
  - Discuss courses the case might be used in or adapted for.
  - Consider how the case might support [High Impact Educational Practices](https://www.npg.org/), such as first year seminars, capstone courses, integrative studies programs or learning communities, writing-intensive courses, collaborative learning, and diversity/global learning.
  - Include Key Questions, if not a part of the Student Case
  - Include suggestions for teaching the case and organizing student activities.

- **Answers to Key Questions and Additional Background Information**
  - Elaborate on background/history/context (above and beyond that already included in the Student Case and any required preparatory materials) that the instructor will need to effectively teach the case.
  - Discuss answers to the case’s Key Questions, including additional insights and discussion prompts.
  - Summarize the key issues raised by the case study, and explain how the data/evidence/results may be utilized to address these issues. Expand on alternative solutions or outcomes.
  - Identify any significant dynamic tensions, controversies, ethical dilemmas, etc. that are raised by the narrative.

- **Assessment of Student Learning**
Include suggestions for written assignments and/or examination questions that could be used to demonstrate student attainment of case learning objectives. These may relate directly to the case’s Key Questions, or they may ask students to apply concepts they’ve learned from the case in a different context. If the assignment or exam questions are distinct from the Key Questions, then please provide sample answers.

Indicate student products which result from the module which can be included in an e-portfolio.

- Case Evaluation
  - Suggest AAC&U VALUE rubrics and specific components of each of these rubrics which might be used to assess the effectiveness of your case as a learning tool.

- Linkage of Case Learning Objectives to STIRS Framework
  - Indicate how the case learning objectives link to one or more of the STIRS Competencies (see above).
  - Identify STIRS keywords which are addressed by the case.

- References
  - Include references for material included in the Additional Background Information section. It is not necessary to duplicate references which are already included in the Student Case.

- Optional: Further Information
  - Additional resources (if needed) to prepare the instructor to teach the case. For example, this might include websites, additional reading, or resources for classroom activities such as role play descriptions.
  - PowerPoint slide sets, if appropriate.

- Optional: Epilogue
  - Include as relevant to summarize the ending or current status of the actual events the case is based on. What happened following the events described in this case?

Sources Cited


