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# RIT ESSENTIAL PROGRAM OUTCOMES

**JULY 2014**

The work of the faculty as architects of the curriculum is informed by the university's mission to "lead higher education in preparing students for innovative, creative and successful careers in a global society," (RIT Strategic Plan: 2005–2015) and is guided by the Academic Program Profile. This Profile articulates important educational outcomes that are mission-driven and characterize what an RIT education represents.

RIT believes these five Essential Program Outcomes (EPOs) to be so critical that they should be integrated into every RIT program at the undergraduate and, where appropriate, the graduate level.

## The RIT Essential Program Outcomes are:

1. **Critical Thinking**
2. **Global Interconnectedness**
3. **Ethical Reasoning**
4. **Integrative Literacies**
    a. **Scientific literacy**
    b. **Computational or digital literacy**
    c. **Mathematical literacy or numeracy**
    d. **Communication literacy**
    e. **Technical literacy**
    f. **Aesthetic literacy**
5. **Creative and Innovative Thinking**





*If you would like to work with an Instructional Design Consultant, please visit the Teaching and Learning Studio: rit.edu/tls*

# INCORPORATING CRITICAL THINKING INTO YOUR COURSE

One widely adopted and effective approach to integrating critical thinking is through Bloom's Taxonomy of Educational Objectives. This famous taxonomy is a way to classify the levels of thinking/reasoning skills required in formal educational situations. There are six orders or levels in the taxonomy, each requiring a higher level of abstraction from the students. The highest order is the domain of Critical Thinking.

Your task is to move your students directly or indirectly (through lower order thinking) to the highest level. Practically speaking, this task consists of "converting" lower order learning goals and activities into higher order learning goals and activities.

***Critical Thinking*** *refers to those processes required to understand and evaluate complex claims of various sorts. It involves the evaluation of information, evidence, arguments, and theories, and the contexts in which these are encountered. It entails the questioning of different and competing perspectives, and challenging the (sometimes hidden) assumptions and inferences that determine what will count as evidence or argument. Critical thinking is learning to think in a disciplined and evaluative manner, to analyze and interpret the processes by which various claims are made and reliable conclusions are reached.*

This list illustrates learning activities that focus on lower order thinking:

- List the characteristics of test age-appropriate lesson plans.
- Recognize examples of surrealist art.
- Label a time line with the dates of major events leading up to World War I.
- Calculate standard deviation for a set of data.
- Identify the major sociological perspectives.

Contrast these to learning activities that focus on higher order thinking:

- Develop and test age-appropriate lesson plans.
- Analyze an unfamiliar work of art.
- Evaluate the effect of World War I on an unfamiliar historical event.
- Frame a hypothesis and formulate a research plan.
- Predict the longevity of a current trend based on one or more of the major sociological perspectives

The first step in incorporating critical thinking is to develop good problems or questions for students to think about. As seen in the examples of Bloom's Taxonomy above, good problems will elicit, engage, and cultivate students' higher order thinking skills and abilities. Naturally, the kinds of problems you develop for students will depend on the nature of problem-posing and question-asking in your own discipline, as well as your own emphasis in teaching critical thinking.

As John C. Bean writes in his classic treatment of critical thinking and active learning, Engaging Ideas: The Professor's Guide to Integrating Writing, Critical Thinking, and Active Learning in the Classroom (1996), "To grow as critical thinkers, students must develop the mental habits that allow them to experience problems phenomenologically, to dwell with them—to understand, in short, what makes a problem problematic." Consistent with Bean's recommendations for effective teaching, another highly effective approach to integrating critical thinking into your course is to recast a significant learning activity as a problem-based, active-learning activity.

Once you have developed a few higher order problems or questions, the logical next step is to present or deploy one or more active learning activities in your course. While the teaching and learning literature offers thousands of example activities, you can start with these examples from Bean's Engaging Ideas:

- **Present problems as formal writing assignments**
  Because formal writing assignments require revision and multiple drafts, they keep students on task for extended periods and are therefore among the most robust tools for teaching critical thinking.
- **Present problems as tasks for small group problem-solving**
  In this on-campus or online activity, groups have a set time to discuss and debate alternative solutions to a problem and arrive at either consensus or a reasoned "agreement to disagree." Groups report out and justify their solutions to the whole class.
- **Present problems as practice essay exam questions**
  Give practice essay exams as self-timed homework assignments. Provided feedback through on-campus or online discussion of all or a representative set of essays.

## Resources

Bean, J. (1996). Engaging Ideas: The professor's guide to integrating writing, critical thinking, and active learning in the classroom. San Francisco, CA: Jossey-Bass.

On the Cutting Edge: Designing Effective and Innovative Courses (http://serc.carleton.edu/NAGTWorkshops/coursedesign/index.html)

# INCORPORATING GLOBAL INTERCONNECTEDNESS INTO YOUR COURSE

Incorporating Global Interconnectedness requires looking at two dimensions (Case 1993):

- **Substantive Dimension**
  Knowledge of interconnected global systems, international events, world cultures, global geography, etc.
- **Perceptual Dimension**
  The capacity to see "the whole picture," whether focusing on a local, international, or global topic.

The definition of Global Interconnectedness presented by RIT includes four behaviors, two for each of these dimensions.

> ***Global Interconnectedness*** *refers to the ability to understand and function in an increasingly multicultural, international, yet interconnected environment. It fosters the development of individuals to become successful professionals, civic leaders, and informed citizens in a diverse national and global society. Individuals with these competencies would: demonstrate an understanding of the relationships between diverse populations and social, economic, and political power both in the United States and globally; demonstrate knowledge of contributions made by members of diverse and/or underrepresented groups to our various communities; consider perspectives of diverse groups when making decisions; and function as members of society and as professionals with people who have ideas, beliefs, attitudes, and behaviors that are different from their own.*

## Substantive Dimension

- Demonstrate an understanding of the relationships between diverse populations and social, economic, and political power both in the United States and globally
- Demonstrate knowledge of contributions made by members of diverse and/or underrepresented groups to our various communities

## Perceptual Dimension

- Consider perspectives of diverse groups when making decisions
- Function as members of society and as professionals with people who have ideas, beliefs, attitudes, and behaviors that are different from their own.

The intent is for RIT graduates to develop a firm and wide-ranging perspective on the world that they live in and use this knowledge regularly within their life and work. Applying a viewpoint that goes beyond their own culture, country, and constituent group should become a natural practice in the decisions they make and the actions they take.

Courses in different disciplines throughout RIT already address the substantive dimension by covering historical and current events. But, if desired, faculty can strengthen the emphasis on global interconnectedness by:

- Ensuring that the contributions of individuals, groups, or movements from other cultures are integrated into the course.
- Using texts, case studies, news accounts, or other sources from outside the U.S. when exploring historical or contemporary issues.
- Developing the perceptual dimension requires a more open-ended approach in which students must work more analytically. Consider these activities:
- Review a paper, article, or other source to identify assumptions that may show cultural bias.
- Compare similar studies or case studies set in different regions; explore whether cultural norms could account for any differences in results.

- Assign projects individual or group projects that are set in different regions or countries, or are focused on different cultural groups; debrief the assignment by having the class share differences they discovered.
- Identify how a study design, business plan, or other item would need to change so it could be implemented successfully globally or in another culture.

One simple practice that can help build a global perspective is to have students "pre-translate" their writing, as many organizations require, eliminating colloquialisms to facilitate translation for a global workforce. Or, if appropriate, ask international students to share relevant insights or experiences related to a course topic.

## Resources

Case, Roland, "Key Elements of a Global Perspective," Social Education, 57(6), ©1993 National Council for the Social Sciences.

Merry M. Merryfield, "Pedagogy for Global Perspectives in Education," Theory and Research in Social Education, Volume 26, Number 3, College and University Faculty Assembly of the National Council for the Social Studies.

# INCORPORATING ETHICAL REASONING INTO YOUR COURSE

"The need for professional ethics is driven by the fact that professionals are proxy decision makers. They have expertise that the average person does not have and use that expertise to make decisions for those who lack expertise. The primary public interest in professional ethics, therefore, is knowing that professionals are aware of their responsibilities and have the tools for making responsible decisions." (Steneck 1999)

While teaching ethics is usually discussed in the context of business programs, ethics apply to all disciplines and professions. The "how" of teaching ethics, however, is not always clear. The relativism that many students display is one obstacle, (Sommers 1993) as is the belief by some that students' ethical values are set by the time they reach college. However, students have demonstrated development in making conclusions about dilemmas by studying ethics in class (Carlson and Burke 1998).

***Ethical Reasoning*** *is the development of students' abilities to understand and critically engage the ethical dimensions of thought, knowledge, and behaviors, and to contribute ethically to the personal, professional and larger social contexts in which they live. Realizing that behavior has consequences for the welfare of others, learners assess reasoning processes and learn the ethical principles that help guide and evaluate actions. Such reasoning engages the underlying normative commitments and consequences of different traditions of ethical thought, of fields of knowledge, of contexts that transcend individual interest, with an appreciation for the kind of complexity that goes well beyond the binaries such as "right and wrong."*

It's true that educating students about ethical models and their history and applying those ethics in different situations would take a significant amount of class time. But highly relevant models in many disciplines already exist as codes and guidelines established by professional associations, such as the IEEE Code of Ethics.

This taxonomy can help you determine the level of student impact you might want to aim for within a course (Dean and Beggs 2006):

| Student impact | Outcomes | Teaching techniques or behaviors |
|---|---|---|
| **Exposure (Descriptive)** | Students are sensitized to ethical issues, emphasizing consequences for unethical acts. | Sharing professional codes of conduct, newspaper articles, stories, and real world scenarios. |
| **Beginning ethical analysis (Descriptive)** | Students learn enduring models or systems for evaluating situations on an ethical basis. The emphasis is on generating alternatives of ethical reasoning and action. | Sharing frameworks such as Kant's Categorical Imperative, Aristotle's Virtues model, or stakeholder analysis models. |
| **Ethical reasoning and ranking (Descriptive and Normative)** | Students generate viable courses of action, and learn to rank order them preferentially. By choosing some alternatives over others, a normative component in this taxonomy begins. | Critical reflection exercises and case analysis, with recommended actions and the ability to explain preferences. |
| **Behavioral change: Situational (Normative)** | Students personalize ethical analysis by taking the actions they deem best for dilemmas on a case-by-case basis, depending on situational variables. | Not cheating on a particular test or tax return. |

| Student impact | Outcomes | Teaching techniques or behaviors |
|---|---|---|
| **Behavioral change: Consistent (Normative)** | Students accept ownership of ethical norms and standards without imposed sanctions. Values are changed and ethical behavior is consistent. | Never cheating on exams regardless of ability to "get away with it," or "blowing the whistle" regardless of potential backlash. |

## Resources

Carlson. Patricia J; and Burke, Frances, "Lessons Learned from Ethics in the Classroom: Exploring Student Growth in Flexibility, Complexity, and Comprehension, .Journal of Business Ethics; Aug 1998; 17, 11; ABI/INFORM Global.

Dean, Kathy Lund and Beggs, Jeri Mullins, "University Professors and Teaching Ethics: Conceptualizations and Expectations," Journal of Management Education, 2006 30: 15.

Sommers, Christina Hoff, "Teaching the Virtues," Public Interest; Spring 1993; 111; ABI/INFORM Global.

Steneck, Nicholas H. "Designing Teaching and Assessment Tools for an Integrated Engineering Ethics Curriculum," 29th ASEE/IEEE Frontiers in Education Conference, © 1999 IEEE November 10--13, 1999, San Juan, Puerto Rico.

# INCORPORATING SCIENTIFIC LITERACY INTO YOUR COURSE

Science is a large part of the public policy debate; citizens must weigh in on policy issues where making an informed decision means evaluating opposing scientific arguments around topics like climate change, nuclear power and embryonic stem cell research.

To be informed citizens, RIT graduates must be able to judge the merits of conflicting information using not just critical thinking skills, but also an understanding of basic scientific principles. Successful graduates should also develop a personal and civic-minded curiosity about scientific issues in the news. This familiarity with basic science is often called Scientific Literacy (SL).

While there is no single definition of SL, in one study only 28% of American adults rated as scientifically literate (Miller 1998). Even professional scientists did not rate highly in overall scientific literacy when looking outside of their specialties (Hazen 2010).

Students at RIT also run the risk of developing expertise in one area at the expense of failing to attain an overall scientifically literate mindset across disciplines.

***Scientific literacy*** *refers to describing, explaining, and predicting natural phenomena. Students learn to critically engage articles about science in discipline-based and popular media and enter into conversation about the soundness of their conclusions. Scientific literacy requires familiarity with scientific modes of inquiry and an understanding of their applications when addressing questions of science and technology. It refers to a person's ability to identify scientific issues underlying national and local decisions and to express positions that are scientifically and technologically informed. A literate citizen should be able to evaluate the quality of scientific information and scientific claims on the basis of the sources and methods used to generate them. Scientific literacy also refers to the capacity to pose and evaluate arguments based on evidence and to apply conclusions from such arguments appropriately.*

## Major scientific themes for the assessment of scientific literacy (OECD 2003)

- Structure and properties of matter
- Atmospheric change
- Chemical and physical changes
- Energy transformations
- Forces and movement
- Form and function
- Human biology
- Physiological change
- Biodiversity
- Genetic control
- Ecosystems
- Earth and its place in the universe
- Geological change

Strategies to embed scientific literacy in courses include:

- Using scientific principles or current issues in science as starting points for art or media projects
- Investigating cultures through their contributions to science and scientific knowledge
- Framing discussions of history or literature through the lens of the scientific world view at the time
- Linking discussions of science and engineering at any level to topics such as sustainability, product lifecycle management, etc.

## Resources

Hazen, Robert M., “Why Should You Be Scientifically Literate?” ActionBioscience.org, sources 11/4/10.

Miller, Jon D., “The measurement of civic scientific literacy,” Public Understanding of Science 1998 7: 203

Miller, reported in Science Daily, 2/27/07.

The PISA 2003 Assessment Framework: Scientific Literacy, © OECD 2003.

# INCORPORATING COMPUTATIONAL OR DIGITAL LITERACY INTO YOUR COURSE

With the proliferation of new and emerging technologies for educational and social use, the goal of the Computational (or Digital) Literacy is for the learner to be proficient in these areas. Competency in these areas begins with understanding the devices and tools used, and the learning environment is the ideal place to uncover both the "how's and why's." According to Gilster (1997), "the most critical of these is the ability to make educated judgments about what we find online.

> ***Computational or digital literacy*** *is the ability to understand the fundamental underpinnings of and appropriate uses of digital devices and media as vehicles of understanding and vehicles for learning, working, communicating, and collaborating. It includes the ability to actively engage and interpret digital media, reproduce data and images through digital manipulation, evaluate and apply new knowledge gained from digital environments, and make educated judgments about the information and environments we find online. Digital literacy requires understanding and critical evaluation of the special challenges posed by the complexity of digital sources and environments.*

These two assignments, focusing on the "reading" mode mentioned previously, are examples of how to incorporate these literacies in the classroom:

Using a social networking or microblogging service utilizing instant messaging, SMS, or a web interface (e.g., Twitter, Jaiku), students write and share article summaries that address a computational or digital aspect of the course content. In composing any summary, students must determine the hierarchical structure and logical sequence of the selected article while eliminating specific details. Using Twitter, or otherwise limiting summaries to 140 characters, this assignment encourages students to focus on the article's essential structure and logical sequence, while exposing them to the appropriate uses of the technology.

Learning to evaluate websites. This activity allows students who are relatively new to college-level research to compare and contrast websites using CABLE criteria (C = currency, A=authority, B=bias, L=level, E=explore). Group students based upon their selected research topics and explain CABLE. Students work in groups to find websites to support their topics and answer the CABLE questions, then present their findings to the rest of the class.

This learning activity teaches Computational Literacy that focuses on "writing":

Using an online collaboration tool such as a wiki, students work in groups collaborating to create a knowledge base on a topic related to the course subject matter. For instance, visual art students could collaborate on a repository of resources (see https://wiki.rit.edu/display/arthistory/Home). Taking full advantage of the possibilities and limitations of hypertext and using online resources such as videos (created on their own or borrowing from an open source such as YouTube), the wiki should result in an interactive, robust learning space. As an additional "reading" component, students could evaluate the resources chosen for the repository to determine their credibility and value to the project.

## Resources

Churches, Andrew, and Lee Crockett, Ian Jukes*, The Digital Diet: Today's Digital Tools in Small Bytes,* 21st Century Fluency Project, Kelowna, BC (Canada), 2010.

Gilster, P. *A Primer on Digital Literacy* (Mississauga, Ontario: John Wiley & Sons, 1997).

Sittler, Ryan L. and Douglas Cook eds., *Library Instruction Cookbook,* American Library Association, Chicago, 2009.

# INCORPORATING MATHEMATICAL LITERACY OR NUMERACY INTO YOUR COURSE

The goal of the Mathematical Literacy Outcome is to help ensure that RIT graduates have an ability to understand and use mathematics in their personal lives as well as their chosen discipline and profession. This ability, sometimes referred to as Quantitative Literacy, can comprise an assortment of skills, but one aspect often mentioned is instilling students with a comfort and confidence in the ability to "do math (Steen, 2001)." In fact, when the University of Nevada, Reno developed a "Math Across the Curriculum" program, the design team recognized the prevalence of "math phobia" among students and recognized the need to establish goals of both "improving skills" and "improving attitude" with regard to mathematics (Johnson 2006).

***Mathematical literacy or numeracy*** *is the ability to reason rigorously and quantitatively with numbers and other mathematical concepts, not only in the field of mathematics but also in other fields. To be numerically literate, a person has to be capable of understanding and applying mathematical systems of representation and reasoning. Numeracy involves developing confidence and competence with numbers, measures, and the theories that support them. It requires an understanding of numbering systems, a repertoire of mathematical techniques, and an ability to solve quantitative or spatial problems in a range of contexts. Numeracy also demands an understanding of the ways in which data are produced, gathered by counting and measuring, and presented in graphs, diagrams, charts, and tables. The integration of mathematical knowledge with problem-solving and communication skills is required to function successfully within our technological world.*

Building on this foundation of confidence, the Mathematics Association of America suggests that Quantitatively Literate graduates should be able to:

- Interpret mathematical models such as formulas, graphs, tables and schematics, and draw inferences from them.
- Represent mathematical information symbolically, visually, numerically and verbally.
- Use arithmetical, algebraic, geometric, and statistical methods to solve problems.
- Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal results.
- Recognize that mathematical and statistical methods have limits.

Some ways that faculty can incorporate mathematical literacy into courses across disciplines include:

- Requiring students to present data in different tabular or graphic forms and discuss if the forms change or increase their understanding and insights from the data.
- Dissecting statistics or other number-based information in relevant news stories and articles to ensure students' understanding of what they mean
- Incorporating developing a budget or other number-based component onto major projects.

## Resources

Steen, Lynn Arthur, ed. (2001), *Mathematics and Democracy: The Case for Quantitative Literacy.* The National Council on Education and the Disciplines,

Johnson, Jerry (2006) "Math Across the Curriculum at UNR," in Gilman ed. *Current Practices in Quantitative Literacy.*

# INCORPORATING COMMUNICATION LITERACY INTO YOUR COURSE

The Communication Literacy Outcome is consistent with RIT's mission to "lead higher education in preparing students for innovative, creating, and successful careers in a global society" (RIT Strategic Plan: 2005-2015). Indeed, communicating in this 21st century, with the emphasis on global interconnectedness, is a skill in which our students simply must become proficient.

These assignments are examples of how one could teach incorporating both the "reading" and "writing" aspects of Communication Literacy:

- **From data to thesis**
  Provide students with raw data (lists, graphs, or tables) and ask them to determine what thesis or hypothesis the data might support. This strategy is especially useful for teaching students how to write the findings and discussion sections of scientific reports, or how to use statistical data in arguments.
- **Newsletter/e-newsletter**
  As a member of a hypothetical production team, each student researches, designs, writes and publishes a prototype newsletter for an organization along with a detailed examination and definition of the audience and purpose for the newsletter. Each student presents his or her newsletter to the class, which acts as a review committee to approve or disapprove full production.
- **E-portfolio**
  Each student plans, creates, organizes, and reflects upon course work and other artifacts using a "restricted" folder in RIT's wiki or myCourses. The e-portfolio is a means of demonstrating achievement of instructional outcomes and growth, and provides a place for students to organize the evidence. As part of the e-portfolio, students are required to write a reflective essay on each work/artifact sample included.
- **Track changes**
  This assignment uses the Track Changes feature in Microsoft Word to assist students in communicating more effectively within teams, and to assist you in assessing the individual performance of team members. In essence, teams must complete a significant writing project by communicating and collaborating only in Track Changes, which allows all team members (and you) to view the comments, additions, subtractions, and other changes made by all reviewers.

***Communication literacy*** *is, broadly stated, the mastery of language in expressive (spoken and written) and receptive (listening and reading) forms that enables an individual to understand, interpret, and use language successfully for a variety of purposes. More specifically, it is the ability to transmit a message that conveys meaning to an intended audience. Communication may be verbal or non-verbal in the symbolic and dynamic exchange of information. Knowledge of American Sign Language (ASL) and foreign languages also foster an enhanced capacity to understand and successfully engage in the full richness of human communication, and enable people to function more successfully in the global workplace.*

## Resources

Bean, J. (1996). *Engaging ideas: The professor's guide to integrating writing, critical thinking and active learning in the classroom.* San Francisco, CA: Jossey-Bass.

Shank, P. (2007). *The online learning idea book: 95 proven ways to enhance technology-based and blended learning.* San Francisco, CA: Pfeiffer & Co.

# INCORPORATING TECHNICAL LITERACY INTO YOUR COURSE

Technical Literacy is another of the literacies that has—and is—evolving, as new technologies are introduced. We have myriad choices of technologies, tools, and devices to choose from. The instructor's role, then, is to teach their students how to think critically about the technologies—again—not only "how" to use the technology, but to critically think about "why."

The assignment below is an example of how students can practice using a technology (e.g., an iPad, MP3, or other source), then writing about the application of the technology used. Note that this assignment also addresses several of the other Integrative Literacies.

Compare and contrast videos. Have students select and analyze in detail two videos from YouTube (or other online source) in each of the following categories, and then present their selected videos to the class, and then report their analysis.

- Videos that contain value messages of which they do not approve, and why
- Videos that contain value messages of which they approve
- Videos that are outstanding in their artistry, using video and filming techniques in innovative ways
- Videos that use clichéd imagery and/or ideas

***Technical literacy*** *refers to people's knowledge of different technologies, their capability to use the technology appropriately and effectively to accomplish various tasks, and their understanding that technologies are socially shaped as well as socially shaping. A technologically-literate person can think critically about technological issues and decisions about the uses of technology in context. Technological literacy can be further defined by three interrelated attributes of the technologically literate: knowledge of technology, its application, and its impact; the ways one thinks and acts regarding technology; and the capability to use different and appropriate technologies.*

These assignments teach the "writing" aspect of Technical Literacy; again, they also address several of the other Literacies and model Bean's suggestions for active learning activities:

- **Learning by teaching technology**
  Have students organize and present a teaching demonstration on a current information or communication technology of their choice (such as iPad, Prezi, digital media, Skype, etc.). Working in a group, students deliver a mini-workshop to teach their peers a useful technical skill.
- **Lessons on local history and historical change**
  Students enhance lessons on local history and historical change by locating historic photos and then "re-shooting" them from the same distance and perspective using a digital video or still camera. The combined photographic research will record changes that have impacted a community, give students a perspective on the history of an area, and contribute to a communities' historic record. Students work in teams and use a website, wiki, or other online technology to share their photos and report their findings to their classmates.

## Resource

Resource Guide, Ontario Ministry of Education, 1989

# INCORPORATING AESTHETIC LITERACY INTO YOUR COURSE

"In the university, too, spaces may be set aside for painting, sculpting, composing, film making; but they are at a figurative distance from the locations where inquiry and research takes place. Little is done, on this or any other level of education, to nurture the aesthetic impulse in the ambience of aesthetic objects, or to relate creative explorations to the cultivation of aesthetic attitudes."

Maxine Green, "Aesthetic Literacy in General Education," Philosophy and Education: Eightieth Yearbook of the National Society for the Study of Education, 1981

Aesthetic Literacy follows the two-mode model mentioned earlier; meaning that incorporating Aesthetic Literacy into your course necessarily involves "reading" and/or "writing" a work of art or an aesthetic experience.

***Aesthetic literacy*** *refers to the ability to understand and critically engage creative messages in their informational, aesthetic, cultural and social dimensions. An aesthetically-literate individual can engage and communicate successfully in a variety of creative forms and appreciate different traditions and practices such as visual, oral, auditory, and written communication. Aesthetically-literate individuals have the ability to create, amend, and reproduce images, sound, and/or physical objects.*

- Reading: understanding a poem or song, interpreting a video, or deciphering the meaning of a painting.
- Writing: creating a sculpture, producing a podcast or taking a photograph.

This classroom exercise for teaching Aesthetic Literacy focuses on "reading," as well as moving students from lower to higher orders of thinking:

Evaluating a Work of Art: Ask students make to list of all the things they see in a work of visual art without making any kind of judgment about the work. Point out the importance of careful, non-judgmental observation. Have the students pay close attention to the art elements the artist used and how the artist used those elements to organize the composition using rhythm, balance, movement, proportion, variety, emphasis, and unity. Ask students to explain or tell the meaning of the work. Encourage them to think creatively and imaginatively at this stage, but make sure that base their interpretations on what they concluded in the first two steps. Have students decide whether the work is successful or has merit.

Many RIT colleges and departments are responsible for and therefore provide innumerable examples of how to teach the "writing" side of Aesthetic Literacy, especially the following:

- The College of Imaging Arts and Sciences
- The Department of Fine Arts in the College of Liberal Arts
- Departments of Art and Computer Design, Arts and Imaging Studies, and Performing Art in the National Technical Institute for the Deaf

## Resources

Greene, Maxine. (1981) *Aesthetic Literacy in General Education.* The National Society for the Study of Education.

Hutchings, Pat & Gale, Richard. (2005) *Aesthetic Literacy Across the Curriculum: A Conversation.* The Carnegie Foundation for the Advancement of Teaching.

# INCORPORATING CREATIVE AND INNOVATIVE THINKING INTO YOUR COURSE

One challenge to assigning and evaluating activities that are supposed to demonstrate creativity and innovation is enabling students to show genuine creativity and innovation; that is, does the assignment provide a chance to develop a truly original solution?

To spark creativity when giving assignments that require students to recall or relate known facts, you can build opportunities for innovation into the learning structure. For example:

- Encouraging students to use novel methods for presentations.
- Asking students to design an experiment or other method to validate or demonstrate a known principle.
- Explaining one of the learning outcomes of the class and asking students—individually or as a group—to come up with a method that would realistically and fairly demonstrate that they've achieved this outcome.

***Creative and Innovative Thinking*** *are higher-level thought processes that imagine new possibilities. Through the application of imaginative thought and activity, something novel is conceived and/or produced. "Creative thinking is both the capacity to combine or synthesize existing ideas, images, or expertise in original ways and the experience of thinking, reacting, and working in an imaginative way characterized by a high degree of innovation, divergent thinking, and risk taking" [quoted from Association of American Colleges and Universities (AACU), Creative Thinking VALUE Rubric].*

However, incorporating Creative and Innovative Thinking into a class can also include learning about the creative process itself, or determining how creativity and innovation might be needed in the future. Taking this approach can mean:

- Using a model of the creative process to review the contributions of an individual who is already included in the curriculum
- Asking students to think about the areas or challenges that people in their discipline will need to address in the near-term or long-term future.
- Looking at a creative idea developed by the class and working on how that solution could be reality-tested, implemented, or commercialized.
- Debriefing a group project by having group members identify the roles that team members played (for example, who were divergent thinkers? Who are convergent thinkers?)

## Resources

Yu, Chung Y. and David Shaw, "Fostering Creativity and Innovation in Engineering Students," 2006 International Mechanical Engineering Education Conference, Beijing, China, April 2006.

Stouffer, W.B., Jeffrey, S. and Oliva, M.G. (2004) 'Making the Strange Familiar: Creativity and the Future of Engineering Education', 2004 American Society for Engineering Education Annual Conference and Exposition, Washington, DC.

# PROGRAM ASSESSMENT

As part of the semester conversion process, each program at RIT developed a Program Assessment Plan that identified the courses in which program-level goals and student learning outcomes are mapped to EPOs. These courses provide opportunities for students to demonstrate achievement of these outcomes.

Addressing one or more EPOs in a course does not necessarily mean major redesign, addition of new content, or developing a new assessment. If a course is aligned with one or more of the EPOs on the program assessment plan, the department recognized a potential—if not explicit—connection between the course content and those outcomes. So rather than adding new course elements, look for opportunities to add another dimension to an existing—and successful—activity, project, or assignment.

The EPOs are broad in scope, so each program developed or mapped specific program-level outcomes relevant to the discipline. Faculty must then determine course level outcomes that support the program outcomes at an appropriate level. Programs developed a data collection cycle to collect student learning outcomes assessment data from courses to measure student achievement.

## Example

| | |
|---|---|
| **Essential Program Outcome:** | **Global Interconnectedness** |
| **Program Learning Outcome:** | Analyze the impact of engineering solutions in a global and societal context. |
| **Course Learning Outcome:** | Describe the environmental and societal impact of engineering designs. |

## To get started on assessing EPOs in your course:

- Review the Program Level Assessment Plan to determine the program-level student learning outcomes and courses that are aligned with the EPOs.
- Determine existing assignment(s) that could provide opportunities for students to demonstrate achievement of the outcome and be a good source of data.
- Design the assessment method and instrument, making a direct connection to the course goal in support of the EPO, such as an item on a grading rubric.
- Redesign the assignment(s), as appropriate, to ensure (or emphasize) the EPO-aligned course outcome.
- After students complete the assignment(s), collect the assessment data.
- Remember that you must explicitly indicate the class assignments that support EPO-based program outcomes in student assessments; if included, the program will collect this data.
- Consult with your Department Head to confirm how and when student learning outcomes assessment data related to EPOs is being collected.