General Education Assessment

State University of New York
College of Environmental Science and Forestry

Academic Year 2014/2015

General Education Assessment Academic Year 2014–2015

Submitted for faculty endorsement on behalf of the committee by Kelley Donaghy on May 7th, 2015.

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Overview

The initial General Education Program at SUNY ESF, implemented in 1999, was created as a response to the SUNY Board of Trustees requirement to standardize general education across the SUNY system. The program has evolved both at a system level as well as at the College level and the assessment plan has been reorganized to meet the needs of the College, new system initiatives, as well as Middle States criteria.

Assessment of the general education program for 2014–2015 focused on developing the process for evaluating our general education goals, providing a review of data collected from the previous academic year, and generating recommendations for making assessment more efficient and informative in coming years. Data evaluation for this project cycle included only one year of data; future evaluation will typically consider data collected over a three-year period.

Process

This past year a faculty committee reviewed the general education student learning outcomes (SLO's) at the system level, the current college level, as well as those mandated by Middle States. The SLO's (**Appendix I**) were refined to meet these criteria and then rubrics were generated to guide the assessment of student work (**Appendix II**). Student work from a variety of sources was collected, including papers from general education writing courses, exams and laboratory reports from general education mathematics and science classes, and senior-level capstone projects from 6 of 8 departments and programs from across campus. The rubrics were applied and the results tabulated (**Appendix III**). The faculty involved with the initial review met to make recommendations based on the data and generated a draft of this report, which was presented to department chairs, and at each department's faculty meeting for review. It was also presented to the general faculty for review and feedback at a College-wide Governance meeting. The draft report was distributed to the faculty in March and April of 2015 to solicit input and support creation of a plan of action for ongoing assessment beginning in the fall of 2015.

Student Learning Outcomes

SUNY ESF's general education Student Learning Outcomes are concerned with six areas: (1) Scientific Reasoning; (2) Quantitative Reasoning; (3) Basic Communication Skills; (4) Technological and Information Literacy; (5) Values, Ethics and Diverse Perspectives; and (6) Critical Thinking.

(1) Scientific Reasoning

Students will be able to: demonstrate understanding of modern science and the implications of scientific discoveries, apply the scientific method, and use science to address contemporary problems.

(2) Quantitative Reasoning

Students will be able to: describe, interpret, apply, and evaluate quantitative information.

(3) Communication

Students will be able to: formulate and present ideas that reflect critical thinking skills and show awareness of audience, context, and purpose, and present a well-developed argument

(4) Technological and Information Literacy

Students will be able to: use critical thinking skills to determine the information needed to solve a problem, access information using appropriate technologies, and effectively and appropriately use information to accomplish a specific purpose.

(5) Values, Ethics and Diverse Perspectives

Students will be able to: demonstrate awareness of diverse cultures and values, recognize ethical issues in contemporary society, and apply ethical concepts in addressing diverse personal, professional, and societal settings.

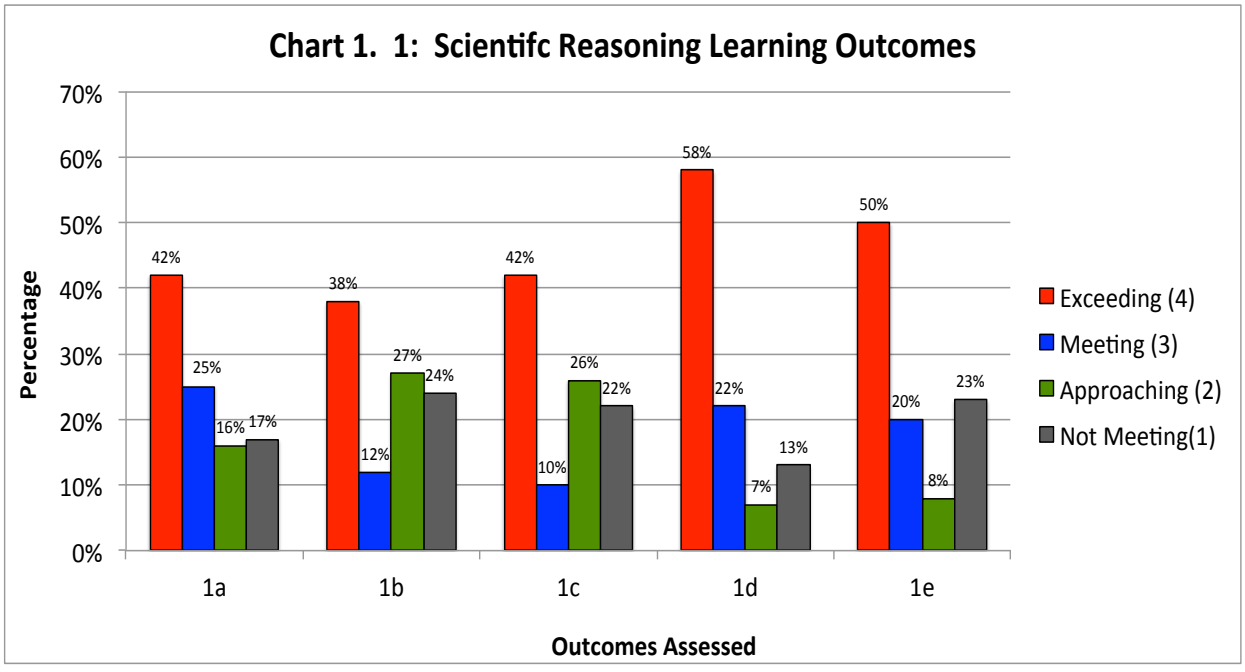
(6) Critical Thinking

Students will be able to: identify, analyze, evaluate, and develop well-reasoned arguments. (Note: this area inherently overlaps outcomes in the prior areas.)

Summary of Assessment of Student Work

(1) Scientific Reasoning

A rubric (Table AII.1 in Appendix II) was used to assess five learning outcomes associated with the Scientific Reasoning area: (a) demonstrate knowledge of the scientific method; (b) formulate and test hypotheses, (c) assess credibility and validity of scientific information, (d) make informed decisions on contemporary issues demanding scientific literacy and (e) analyze and discuss the relationship between scientific discovery and society. Reviewers evaluated lecture assignments, laboratory papers, exams, and capstone papers. For all outcomes for this review we set a target that 70% of the student work assessed should meet or exceed expectations. The results of our assessment are shown in **Chart I**.



The basic premise of scientific reasoning rests with an understanding of, and the ability to, apply the scientific method. Learning outcomes 1a (demonstrate knowledge of the scientific method) and 1b (formulate and test hypotheses) directly assess how well our students are achieving our learning

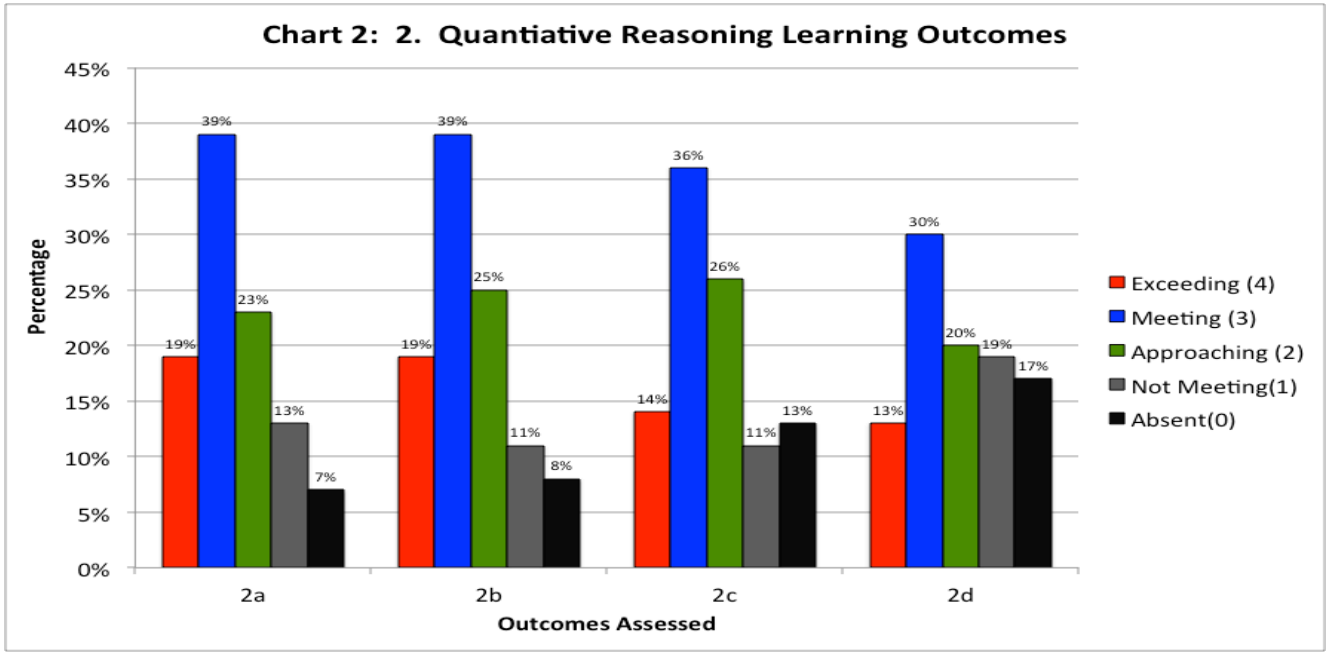
outcome goal for the scientific method. For outcome 1a, we are approaching the goal of 70% meeting or exceeding, but for outcome 1b we are falling short. A large number of the papers used to assess the second outcome were first year papers where students are still learning about experimental design. However, in capstone courses, the students show significantly more facility with experimental design and the iterative process associated with the scientific method. Recommendations for improving the outcome here is to introduce experimental design earlier in the College experience and to identify a culminating course that has a student product that reflects the College outcomes.

Learning outcome 1c was somewhat disappointing, with only 52% of our students meeting or exceeding the standard set. The committee discussed this result and questioned whether an after the fact assessment for this outcome is the best way to understand where our students on this topic. This outcome requires specific topical knowledge and therefore is best evaluated by the capstone instructors. Therefore the committee recommends that course instructors should be provided with specific things to look for and to directly evaluate student papers for this outcome.

The results of 80% and 70% for outcomes 1d (making informed decisions on contemporary issues) and 1e (analyze and discuss the relationship between scientific discovery and society), respectively, indicated that our students generally are meeting the standard we have set. However, the student work that was collected was specific to these outcomes, a question on a final exam for a general education chemistry course was used, and that question specifically asked for the students to compare and contrast and express an opinion on a societal topic. We recommend identifying other student work that could be used for the assessment of these outcomes.

(2) Quantitative Reasoning

A rubric (Table AII.2 in Appendix II) was used to assess four learning outcomes associated with Quantitative Reasoning. Lecture assignments, laboratory papers, exams and capstone papers were used to assess these four outcomes. The data can be found in **Chart 2**.



The results of 58% proficiency for outcome 2a (identifying and describing quantitative information in any context) is a little low. This is a basic quantitative reasoning skill, and we would expect that 80% of students would be able to exemplify this outcome at an average level. This outcome may need to be split into distinct components in order to better identify what students are having difficulty identifying or describing. The problems used to evaluate this learning outcome were poor indicators, and they largely focused on the more difficult portion of this outcome. The proportions of symbolic, visual, and numerical problems selected were not equal, and this may have skewed the results. However, the biggest factor in looking at the data was that most of the problems used for assessment attempted to capture all of the learning outcomes, and this in itself was faulty. This becomes evident when we look only at capstones and senior papers; in that group 72% of students meet or exceed outcome 2a. With this consideration, the 58% is low but understandable considering the metrics.

The data indicates that 56% of the samples surveyed were at least meeting outcome 2b (interpret quantitative information and draw inferences). Considering only questions that were more directly designed to measure this outcome (i.e. exam questions), then the data indicates that 70% would be at least meeting this outcome.

The most disappointing result was what the data says about outcome 2c (apply and analyze problems with acquired quantitative reasoning and skills). The data indicates that 50% of students were meeting or exceeding this outcome. This percentage did not vary much from exam questions to capstones or senior thesis. Ideally 75% of the students should be able to exemplify that they are at least meeting this outcome. The poor results seen here may relate more to the types of student products evaluated rather than student abilities. Nonetheless, it is disappointing that with senior papers and capstones alone only showed 52% were exemplifying that they were meeting this outcome.

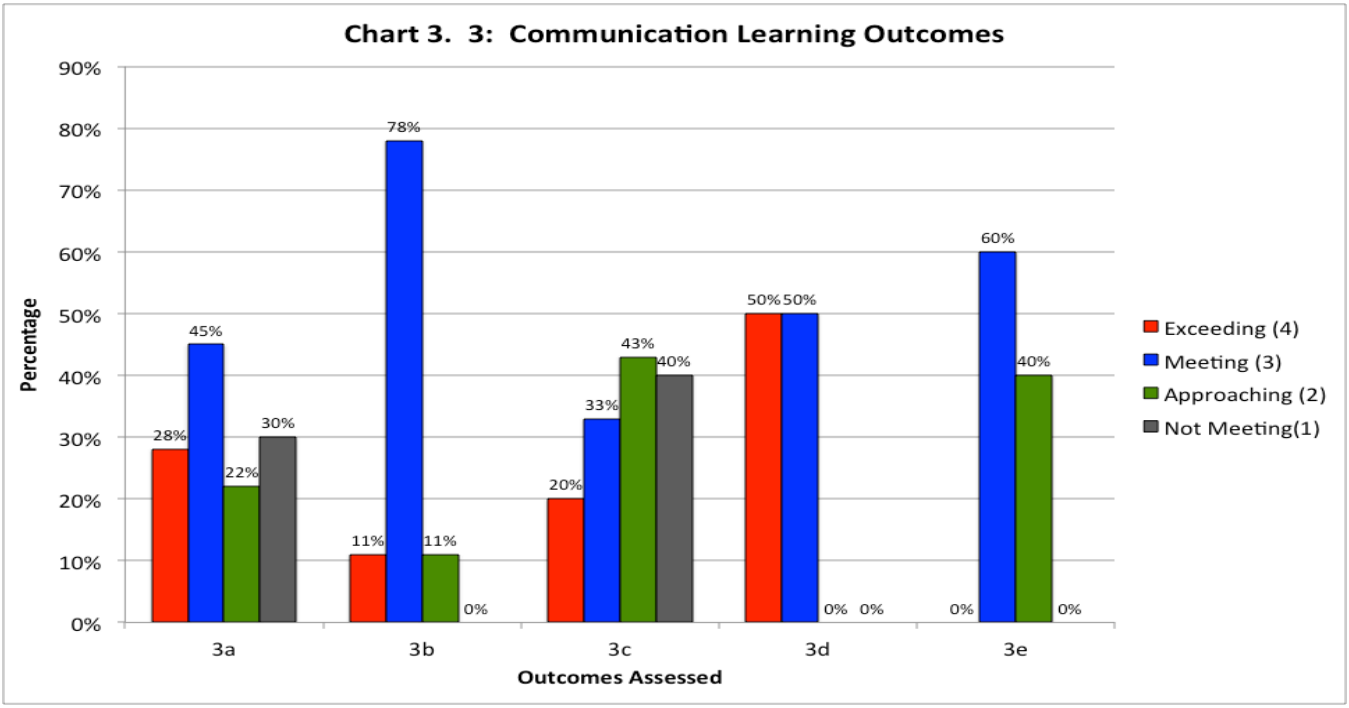
The data collected indicates that 43% of students were meeting or exceeding outcome 2d (synthesize and evaluate problems within a specific discipline using quantitative reasoning). This is a high level skill requiring students to use disciplinary knowledge to break down quantitative information and rebuild it using higher level quantitative tools to arrive at a conclusion. We sought to evaluate this outcome through capstone, senior project, or comprehensive projects; however, not all such articles required such an analysis, and might be difficult to measure consistently. The data shows that 43% are meeting this outcome when we consider only capstones, which is close to the 50% target. The data did show that 70% of students are meeting or exceeding this outcome based solely on evaluation of specific exam questions; however, this type of high-level objective may not be appropriately measured in such a context.

(3) Communication Skills

A rubric (Table AII.3 in Appendix II) was used to assess five learning outcomes associated with the Communication Skills area. Lecture assignments, laboratory papers, exams and capstone papers were used to assess these five outcomes. The data can be found in **Chart 3**.

The results gathered concerning outcome 3a (produce writing that clearly communicates ideas reflective of critical thinking skills) show that our students are meeting our expectation of being able to produce writing illustrative of their critical thinking skills that is grammatically correct and well developed. The data showed 72% of our students are meeting or exceeding the standard for this outcome. The data used included both student work from writing classes, where the emphasis is on the writing process, as

well as senior year capstone courses, where writing is used as a tool to bring research and experimental design work to the forefront.



Achievement of outcome 3b, Fluency of the Writing Process, is not possible to assess from finished work alone. While 89% of the papers assessed met or exceeded our standard, only 15% of the papers collected could be used for this outcome as few drafts of the papers were available. This is a good example of where the general education committee will need to provide the faculty members with a rubric and have them assess their students' work as it is being produced. This is what might be considered an "at the time" assessment; final work shows the result of the process but not the fluency of engaging with the process.

Achievement of outcome 3c was also disappointing, with only 54% of students meeting or exceeding our expectations. One of the most important aspects of good writing is the ability to interpret and use others work to enhance and support your writing. The fact that only half of the student work that was reviewed showed evidence of this indicates that more work needs to be done with students on how to use citations. We recommend collecting more data to better understand if this is a systematic problem or indicative of this sample of papers. We also feel that this outcome may need two different target goals, one for general education level classes versus student work produced at the end of their program.

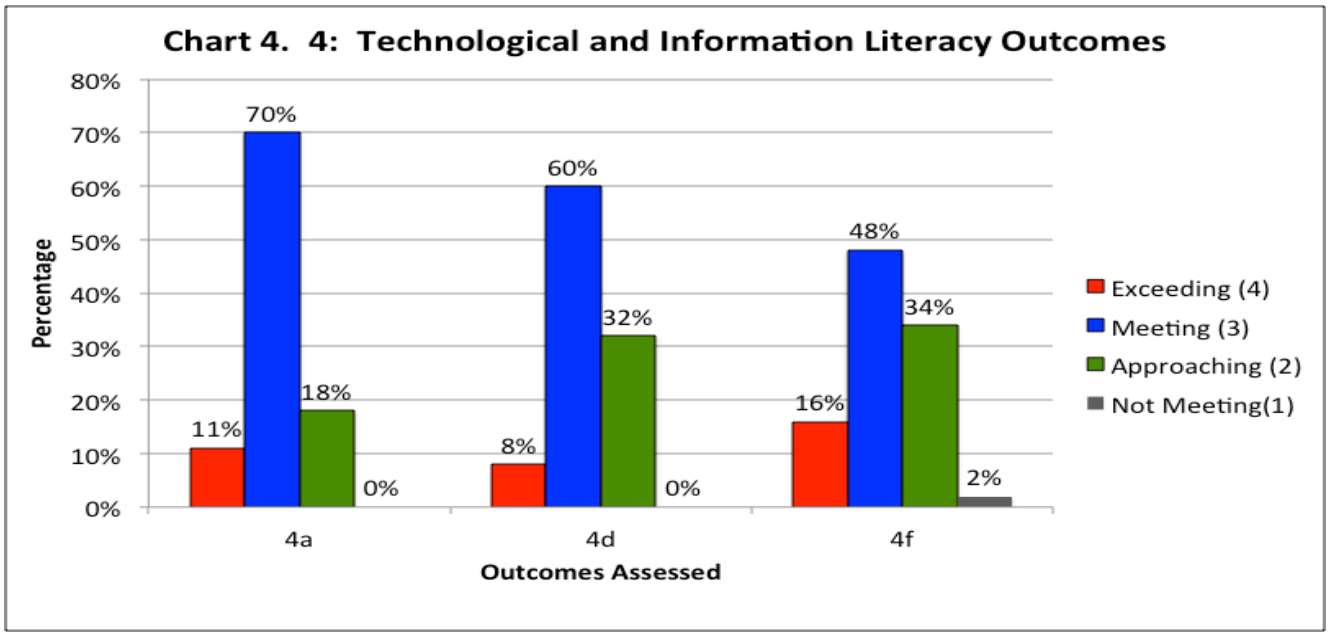
The data collected this year was insufficient to evaluate achievement of outcome 3d. Evaluation of oral presentations is another "at the time" assessment that will need to have faculty directly evaluate their students. The committee plans to provide faculty with rubrics for general education assessment and to train them on how to assess oral presentations for the purpose of general education (not course) assessment.

Peer review (outcome 3e) is another example of an assessment requiring "at the time" evaluation. Little, if any, of the materials collected had any evidence of peer review, thus the committee will recommend alternate means to collect data for future evaluation of this outcome.

In summary, learning outcome 3a and 3c were successfully assessed through this process. Students are meeting standards set for outcome 3a. For outcome 3e the committee will solicit feedback from the writing and capstone instructors about how to improve citation use in writing arguments. For Outcomes 3b, d and e, the committee recommends developing a rubric for faculty teaching those courses to perform "at the time" evaluation that can be used for general education assessment.

(4) Technological and Information Literacy

A rubric (Table AII.4 in Appendix II) was used to assess three learning outcomes associated with the Technological and Information Literacy area. Capstone papers were used to assess these three outcomes. The data can be found in **Chart 4**.



Assessment of outcome 4a (use critical thinking skills to determine information needed to solve a problem) indicates that our students have the skills to determine what information they need to find to solve a problem. The capstone papers showed clear evidence of students being able to characterize the questions under study and the information necessary to begin investigating those questions. Capstone projects were ideal for evaluating this outcome as many departments ask students to write their final paper in the form of a research paper or project report.

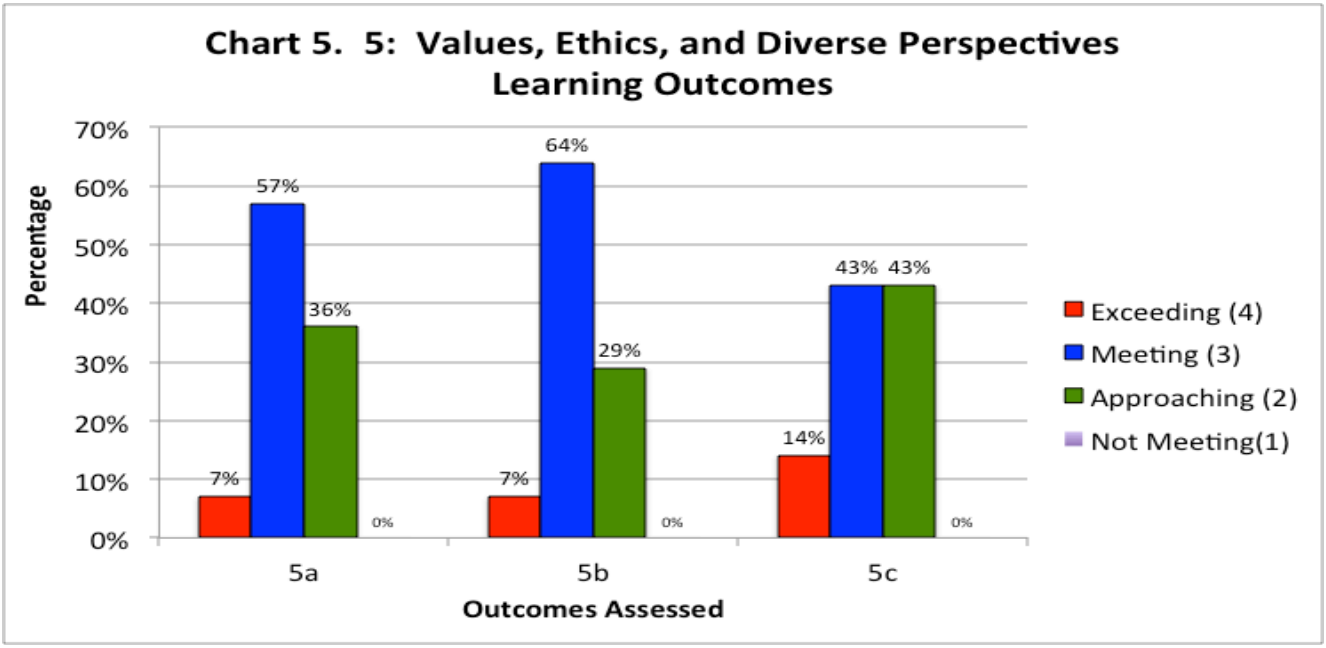
Outcome 4b (access information using appropriate technologies) was recognized as important, but could not be assessed using the data collected. The materials available to the reviewers were finished documents that did not have evidence about the technologies used to find needed materials. This is another "at the time" assessment that the committee thinks would be best evaluated by the course instructor or through targeted courses (e.g. ESF 200 Information Literacy).

Outcome 4c was not evaluated because of substantial overlap with outcome 1c. Prior to commencing review of student work, the committee did not pay careful attention to outcomes that were overlapping between subject areas. This inefficiency will be addressed in the next iteration of general education assessment.

The results for outcome 4d and 4e, were 68% and 64%, respectively. While these were slightly below the 70% threshold the majority of student work showed clear evidence of effective use of information and proper citations. As indicated in the communication outcomes assessment, students continue to need practice using sources effectively to support their arguments. It is heartening to note that while there are subtle differences in the rubric used to assess outcome 4d here and outcome 3c (communication), the results were similar. Therefore, addressing this on two fronts is likely to increase the success rate of our students in the future.

(5) Values, Ethics and Diverse Perspectives

A rubric (Table AII.5 in Appendix II) was used to assess three outcomes associated with Values, Ethics and Diverse Perspectives. Capstone papers were used to assess these three outcomes. The data can be found **Chart 5**.



This outcome area has not been emphasized in the College's general education courses and going into the review there was concern that it would be missing from our student work altogether. However, the use of capstone courses illustrates that through the disciplines, for example through professional development seminars and upper-level courses where students work closely with faculty members and professionals in the community, students are being exposed to ethical topics within their fields and perhaps in society and incorporating such considerations in their senior projects. In many departments there has also been a movement toward lower-level exposure to professional ethics discussions.

Moving forward, the committee is excited by the opportunities being presented by the revision of the undergraduate program through the strategic planning process to be more intentional about creating opportunities for our students to engage more directly with different cultures and with the philosophy of science and history. Intentionality in the design of these experiences will result in better outcomes in the very near future. Some of the current ideas on the table include, increased community engagement through service learning, emphasis on a travel experience (semester away US or Abroad) and a more focused general education program where sets of core courses discuss some of the biggest societal and environmental questions of the day.

(6) Critical Thinking

Several of the individual areas assessed above have critical thinking student learning outcomes and these have not yet been correlated at this time.

Communication of Results

The student learning outcomes were first presented for faculty input and edification at the October 29, 2014 College Governance Meeting. The committee collected student work to review for six weeks, mostly capstone or synthesis papers, some papers from general education courses, exams and grading rubrics from other courses. The grading rubrics were specifically broken down by outcomes to be assessed when they were used. In late November, a group of faculty applied the general education learning outcomes rubrics to the student work and collected data based up on the number of papers, exceeding, meeting, approaching or not meeting expectations. This data was presented to the faculty at the January 21st, 2015 meeting, as well as at academic council. The committee then created a draft of this repot to solicit faculty feedback. Feedback from faculty was collected by representatives of the committee attending departmental faculty meetings, presentation at academic council and collecting responses via email. These responses can be found in Appendix IV of this report. The final report was presented to Academic Council on May 5, 2015 and then presented for faculty endorsement at the May 7th, 2015 College Governance meeting.

Recommendations Based Upon Data Collected

The General Education Assessment review for the 2014–2015 Academic Year focused on several elements: (i) establish a College-wide set of General Education Learning Outcomes, (ii) develop a protocol for collecting and analyzing data, (iii) collect and review data for the 2013–2014 Academic Year, and (iv) make recommendations for continued efforts in General Education Assessment. The committee performed the first three items above and shared the results with the College community through the draft of this report, enabling completion of the fourth item above. While Appendix III summarizes the recommendations associated with each learning outcome, with only one year of student data to evaluate, it is not appropriate to make sweeping changes to the General Education program at ESF. However, the Committee is able to make general recommendations related to the process and protocols.

- Establish a regular cycle for data collection
    - Collect data annually for analysis every three years
    - Communicate data collection requirements clearly with faculty
- Collect materials in electronic format to simplify review
    - Invest College resources to support the use of e-portfolios
- Determine distribution of General Education outcomes across all courses
    - Provide feedback to faculty about student learning outcomes so that they can better incorporate material into their courses
    - Include General Education outcomes on course syllabi
- Identify optimal courses for collecting assessment data
    - Differentiate between collection of course materials for review or data to be collected by instructor during the course (committee generated rubrics for student presentations, search methods, etc.) collection needs
    - Create rubrics for faculty to evaluate items that are best done by the instructor

        - Use of databases to find references (Library courses)
        - Interpretation of reference materials (instructor of capstone courses)
        - Communication skills assessment of student presentations
- Establish clear and consistent sample protocol
    - Evaluate data collection size and sampling techniques
    - Reconsider thresholds identified for expected level of attaining student learning outcomes
- Require all majors to identify a synthesizing experience
    - Nature of experience would vary by program and may not address all outcomes
    - Majority of programs would use existing capstone course others may use advanced disciplinary course
- Create a group responsible for overseeing the general education program
    - Could be a Division of General Education
- Review College-wide student learning outcomes
    - Identify potential overlap between existing outcomes
    - Identify critical thinking outcomes
- Review communication protocols
    - Clearly establish mechanism for feedback cycle

Actions Taken

Process Refinements

- Data collection
    - Cycle established, all data is due on October 1 for the previous academic year
    - Data collection site for instructor upload of data created (Google Drive Folder) eventually student work will be transferred to TracDat
    - Sample size was refined to a random set of student work products that are representative of the complete range of student performance. A minimum sample size shall be twenty work products for courses with enrollment under 200, 10% for courses with enrollment over 200, and all student products if enrollment (or the number of groups) is under 20.

Program Refinements

- Communication of Outcomes
    - Provided feedback to faculty about student learning outcomes so that they can better incorporate material into their classes (Faculty meeting, electronic documents and individual department meetings)
    - Syllabus template was updated to require the inclusion of College-wide student learning outcomes
    - Faculty have been asked to identify the College-wide student learning outcomes that connect to their courses
- Began to identify potential overlaps and drafted critical thinking outcomes
- College-wide discussion about general education was part of the strategic planning process with respect to the undergraduate student experience

To date the sample size was too small to suggest specific changes to our courses and curriculum, following the next three-year cycle we expect to be able to better identify course and curricular areas of improvement.

Timeline for Future Assessment

October 1 – data from previous academic year is due – annually

(AY 2015/16, 2018/19) First Year – Outcomes 1 and 2

(AY 2016/17, 2019/20) Second Year – Outcomes 3 and 4

(AY 2017/18, 2020/21) Third – Outcomes 5 and 6 (collating from previous years)

(2018, 2021, 2024) Every third year – Collate and compile all results for a comprehensive report.

APPENDIX I

General Education Student Learning Outcomes

APPENDIX I: General Education Student Learning Outcomes

Table AI.1: Scientific Reasoning Learning Outcomes

Students at ESF will be able to demonstrate an understanding of modern science, the implications of scientific discoveries, be able to apply the scientific method and to use science to address contemporary problems.	
Learning Outcomes	**Products**
1a. Demonstrate knowledge of the scientific method.	Lecture assignments, exam and quiz questions from general education science courses
1b Formulate and test hypotheses.	Laboratory reports from general education science courses.
1c. Assess credibility and validity of scientific information.***	Lab reports and capstone papers; Analytical writing unit from EWP 190 courses.
1d. Make informed decisions on contemporary issues demanding scientific literacy.	Final exam questions from General Chemistry I; Final lab report in General Chemistry II; General Biology assignments on current events related to scientific discoveries; capstone projects from all majors that have capstones
1e. Analyze and discuss the impact of scientific discovery on human thought and behavior.	

*** Critical Thinking Student Learning Outcome

Table AI.2: Quantitative Reasoning Learning Outcomes

Students at ESF will be able to: effectively communicate quantitative information through describe, interpret, apply, and evaluate quantitative information	
Learning Outcomes	**Products**
2a. Identify and describe quantitative information symbolically, visually, numerically or verbally.	Exams, projects, labs, fieldwork
2b. Interpret quantitative information and draw inferences from them.	Exams, projects, labs, fieldwork
2c. Apply and analyze problems with acquired quantitative reasoning and skills.	Exams, projects, labs, fieldwork
2d. Synthesize and evaluate problems within a specific discipline using quantitative reasoning	Exams, projects, labs, fieldwork

Table AI.3: Communication Learning Outcomes

Students at ESF will be able to: formulate and present ideas that reflect critical thinking skills and show awareness of audience, context, and purpose, and present a well-developed argument using appropriate sources.	
Learning Outcomes	Products and Sampling Plan:
3a. Produce writing that clearly communicates ideas reflective of critical thinking skills.***	Research papers/portfolios from EWP 290 or capstone projects representative of various majors
3b. Demonstrate fluency in a writing process.	Research papers/portfolios from EWP 290 or capstone projects representative of various majors
3c. Demonstrate the ability to integrate relevant sources when composing an argument.	Research papers/portfolios from EWP 290 or capstone projects representative of various majors
3d. Demonstrate the ability to prepare and present an oral presentation.	Capstone presentations representative of various majors
3e. Demonstrate the ability to evaluate and provide meaningful feedback on own and others work.	Capstone presentations representative of various majors

*** Critical Thinking Student Learning Outcome

Table AI.4: Technological and Information Literacy Learning Outcomes

Students at ESF will be able to: use critical thinking skills to determine the information needed to solve a problem, access information using appropriate technologies, and effectively and appropriately use information to accomplish a specific purpose	
Learning Outcomes	Products
4a. Use critical thinking skills to determine the nature and extent of the information needed to solve a problem.***	Capstone projects
4b. Effectively and efficiently access needed information using appropriate technologies.	Capstone projects
4c. Critically evaluate information and credibility of its sources.***	Capstone projects
4d. Effectively use information to accomplish a specific purpose.	Capstone projects
4f. Ethically and legally access and use information	Capstone projects

*** Critical Thinking Student Learning Outcome

Table AI.5: Values, Ethics, and Diverse Perspectives Learning Outcomes

Students at ESF will be able to: demonstrate awareness of diverse cultures and values, recognize ethical issues in contemporary society, and apply ethical concepts in addressing diverse personal, professional, and societal settings.	
Learning Outcomes	Products
5a. Demonstrate awareness and recognition of diverse cultures and ways of thinking and knowing	Capstone projects
5b. Demonstrate recognition of ethical issues throughout society	Capstone projects
5c. Apply ethical concepts to diverse personal	Capstone projects

Table AI.6: Critical Thinking Learning Outcomes

Students at ESF will be able to: Students will be able to: identify, analyze, evaluate, and develop well-reasoned arguments.	
Learning Outcomes	Products
6a. Identify, analyze, and evaluate arguments in own or others' work.	Integrated into other learning outcome assessment
6b. Develop well-reasoned arguments	Integrated into other learning outcome assessment

APPENDIX II

Rubrics Used for Assessing General Education Student Learning Outcomes

APPENDIX II: Rubrics Used for Assessing General Education Student Learning Outcomes

Table AII.1: Scientific Reasoning Learning Outcome Rubrics

Outcome	Exceeding (4)	Meeting (3)	Approaching (2)	Not Meeting (1)
1a: Demonstrate Knowledge of the scientific method	Papers show a clear introduction based on observation, a hypothesis, methods section on the experiment to be done, a results and discussion section that is well thought out and based on collected data and a possible future work section	Papers have introduction, hypothesis, methods, results and discussion section, but it is less well written, the results and the data do not match or at least seem less well understood. No more than one missing component.	Several components are missing, the data collected seems weak or missing and the results and discussion section do not discuss the data collected.	Paper does not have a clear outline that would indicate that the scientific method was used in the development of the ideas.
1b. Formulate and test hypotheses	Hypothesis is clearly spelled out and the introduction and experimental design are clear. Data is collected that support or deny the hypothesis.	Hypothesis is spelled out, the experimental design if flawed or at least not as well developed. Data is collected that support or deny the hypothesis	Either the hypothesis is missing, the experimental design is flawed. Data is collected but it is not able to support or deny the hypothesis	No hypothesis, experimental design is unclear, data is not collected or it not relevant to the rest of the paper
1c. Assess credibility and validity of scientific information	References are present and discussed critically in the text. A variety of reference materials are used (primary, secondary) and are referenced accurately.	References are present and may be discussed critically in text. Less variety in reference materials used and the style of referencing may not be uniform	Very few references are present but not discussed critically. Only websites are used as references and the style of the references are not uniform.	No references.
1d. Make informed decisions on contemporary issues demanding scientific literacy.	Students are able to express an opinion about a prompt that includes a contemporary issue (fracking, energy, biodiversity, sustainability). They can write pros and cons and then express a well-supported opinion based on their arguments.	Students are able to express an opinion about a prompt that includes a contemporary issue (fracking, energy, biodiversity, sustainability). Their opinion is not well supported and they do not have a set of pros and cons.	Students express an opinion about a prompt that includes a contemporary issue (fracking, energy, biodiversity, sustainability) but there is no supporting evidence presented.	Opinion is yes or no, no clear understanding of the problem expressed in the prompt.
1e. Analyze and discuss the relationship between scientific discovery and society.	Clear connections are made between the history and philosophy of science and their impact on society. For example: ethics and the Tuskegee experiments or vaccinations or the rise of technology.	Connections are made between the history and philosophy of science and their impact on society, discussion is in much less depth. For example: ethics and the Tuskegee experiments or vaccinations or the rise of technology.	Weak Connections are made between the history and philosophy of science and their impact on society, discussion has no depth. No examples are given.	No connections are made, no examples are given and no attempt to provide any details is made.

Table AII.2: Quantitative Reasoning Learning Outcome Rubrics

Outcome	Exceeding (4)	Meeting (3)	Approaching (2)	Not Meeting (1)
2a. Identify and describe quantitative information symbolically, visually, numerically or verbally.	Provides accurate explanations of information presented in mathematical forms. Makes appropriate inferences based on that information. *For example, accurately explains the trend data shown in a graph and makes reasonable predictions regarding what the data suggest about future events.*	Provides accurate explanations of information presented in mathematical forms. *For instance, accurately explains the trend data shown in a graph.*	Provides somewhat accurate explanations of information presented in mathematical forms, but occasionally makes minor errors related to computations or units. *For instance, accurately explains trend data shown in a graph, but may miscalculate the slope of the trend line.*	Attempts to explain information presented in mathematical forms, but draws incorrect conclusions about what the information means. *For example, attempts to explain the trend data shown in a graph, but will frequently misinterpret the nature of that trend, perhaps by confusing positive and negative trends.*
2b. Identify and describe quantitative information symbolically, visually, numerically or verbally	Skillfully converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding.	Competently converts relevant information into an appropriate and desired mathematical portrayal.	Completes conversion of information but resulting mathematical portrayal is only partially appropriate or accurate.	Completes conversion of information but resulting mathematical portrayal is inappropriate or inaccurate.
2c. Apply and analyze problems with acquired quantitative reasoning and skills.	Uses the quantitative analysis of data as the basis for deep and thoughtful judgments, drawing insightful, carefully qualified conclusions from this work.	Uses the quantitative analysis of data as the basis for competent judgments, drawing reasonable and appropriately qualified conclusions from this work.	Uses the quantitative analysis of data as the basis for workmanlike (without inspiration or nuance, ordinary) judgments, drawing plausible conclusions from this work.	Uses the quantitative analysis of data as the basis for tentative, basic judgments, although is hesitant or uncertain about drawing conclusions from this work.
2d. Synthesize and evaluate problems within a specific discipline using quantitative reasoning	Explicitly describes assumptions and provides compelling rationale for why assumptions are appropriate. Shows awareness that confidence in final conclusions is limited by the accuracy of the assumptions.	Explicitly describes assumptions and provides compelling rationale for why assumptions are appropriate.	Explicitly describes assumptions.	Attempts to describe assumptions.
	Calculations are successful and comprehensive to solve the problem and elegantly stated.	Calculations are successful and comprehensive to solve the problem	Calculations attempted are either unsuccessful or represent only a portion of the calculations required to comprehensively solve the problem.	Calculations are unsuccessful and not comprehensive to solve the problem.

Table AII.3: Communication Learning Outcome Rubrics

Outcome		Exceeding (4)	Meeting (3)	Approaching (2)	Not Meeting (1)
3a. Students will be able to produce writing that clearly communicates ideas reflective of critical thinking skills.	Thesis/ Focusing Claim	Easily identifiable, focused thesis with significant complexity reflective of critical thinking.	Identifiable and focused thesis with some complexity reflective of critical thinking.	Vague or unfocused thesis; little complexity reflective of critical thinking.	No controlling purpose or thesis. No evidence reflective of critical thinking.
	Organization and Development	Logical, coherent and engaging introduction; well-demonstrated conclusion. Paragraphs fit within structure coherently and present pertinent evidence to support central/subsidiary ideas. Sophisticated and varied sentence structure; transitions add to logical development of topic.	Coherently and logical introduction through solid conclusion. Paragraphs fit within structure and present evidence to support ideas presented. Sentences generally well constructed and transitions are sound—though sequence of ideas may be awkward.	Weak introduction and unsatisfactory conclusion. Basic paragraphing exists, but often fails to support central idea; Inadequate evidence and examples. Sentence and paragraph transitions are often unclear or illogical.	Unsatisfactory introduction and unsatisfying ending, thus conveying sense that much of what has been presented is unresolved.
	Evidence	Draws on, presents, and contextualizes pertinent examples and evidence to support ideas, using appropriate citations. Significa nt evidence of critical thinking about source.	Generally draws on, presents, and contextualizes examples and evidence to support ideas, using appropriate citations. Some evidence of critical thinking about source.	Infrequently draws on, presents, or contextualizes examples and evidence to support ideas. Inconsistent citations. Minimal evidence of critical thinking about source.	Rare or no examples or evidence to support ideas. Inconsistent or no citations. Evidence of critical thinking about source is absent.
	Rhetorical Considerations (Attention to Audience, Context, Purpose)	Solid command of word variety; tone and diction appropriate for subject/audience. Successful execution of wide range of conventions particular to discipline or writing task(s) e.g. organization, content, presentation, formatting, stylistic choices.	Some degree of control over tone and diction appropriate for subject/audience. Consistent use of important conventions particular to a discipline or writing task(s), including organization, content, presentation, and stylistic choices.	Tone and diction are often inconsistent or inappropriate for subject/audience. Writing sometimes follows expectations appropriate to a discipline or writing task(s) for basic organization, content, and presentation.	Tone, diction, and word choice not appropriate for the subject/ audience. Writing rarely follows a consistent system for basic organization and presentation appropriate to a discipline and/or writing task(s).
	Mechanics (grammar, punctuation, spelling)	Mechanics are error free.	Some control over tone and diction appropriate for subject and audience.	Mechanics are not well executed and may, at times, obscure meaning.	Mechanics disrupt reading and often obscure meaning.

3b. Students will be able to demonstrate fluency in a writing process.	Revision of Content, Focus, Structure	Clear evidence of revision by altering content and approach, reorganizing material, or clarifying and strengthening coherence of ideas. Revisions may include addition of new material; deletion of unhelpful material; strengthening transitions and sections; rewriting sentences.	Able to revise by refining content, sharpening focus, and improving structure, clarity, and coherence. Refining may include: clearer presentation of evidence, shifting emphasis, improving transitions that keep focus evident, reworking individual sections or sentences.	Lack of ability to revise in any substantial way. Revision has not been sufficient to improve content, focus, structure, clarity, and coherence of an earlier draft. Such revision may be limited to sections of the writing rather than to the work as a whole.	No ability to revise at level of content or structure. Either changes do not improve these features or are focused almost solely on mechanics.
	Editing for Sentence-Level Correctness (Mechanics)	Mechanics of final revision are nearly flawless.	Mechanics are mostly accurate and rarely impede meaning.	Mechanics have problems and sometimes impede meaning.	Mechanics are problematic and make it difficult or impossible to understand meaning.
3c. Students will be able to demonstrate the ability to integrate relevant sources when composing an argument.	Identification and Selection of Appropriate Sources	Carefully selected range of relevant sources from multiple perspectives, giving rich researched argument. Sources clearly support and advance argument.	Few sources representing a few perspectives on topic. Sources generally support and advance argument.	Limited selection of sources representing narrow perspectives on topic. Sources somewhat support and advance argument.	Limited selection of sources, resulting in a polarized or shallow perspective. Sources neither satisfactorily support nor advance argument.
	Integration of Sources to Support Argument	Works closely with researched texts and makes appropriate decisions about quoting, paraphrasing, or summarizing. Consistently integrates source material; always uses signal phrases when appropriate. Clearly analyzes or challenges perspectives of sources in thorough manner.	Works closely with researched texts and generally makes good decisions about quoting, paraphrasing, or summarizing. Generally integrates source material smoothly, and uses signal phrases when appropriate. Shows evidence of analyzing or challenging perspectives of sources.	Begins to engage with researched texts; limited fluency in decisions about quoting, paraphrasing, or summarizing sources. Inconsistently integrates source material; sometimes lacks signal phrases. Minimally analyzes or challenges perspectives of sources.	Does not engage with researched texts. Inable to make decisions about quoting, paraphrasing, or summarizing sources. No smooth integration of source material; no signal phrases. Weakly analyzes or challenges perspectives of sources.

3d. Students will be able to demonstrate the ability to prepare and present an oral presentation.	Content (Supporting details: explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities)	Central message is precisely stated, appropriately repeated, memorable, and strongly supported. A variety of types of supporting materials significantly support presentation. Consideration of audience, context, and purpose is very apparent.	Central message is clear and consistent with supporting material. Supporting materials appropriately reference information or analysis that generally establishes credibility. Consideration of audience, context, and purpose is apparent.	Central message is basic and not memorable. Minimal use of supporting details somewhat reduces presenter's credibility. Consideration of audience, context, and purpose is somewhat apparent.	Central message is unclear and undeveloped. Insufficient supporting details greatly reduce credibility. Consideration of audience, context, and purpose is absent.
	Organization (specific introduction and conclusion, sequenced material within the body, and transitions)	Organizational pattern is clearly and consistently observable and is skillful and makes content of presentation cohesive.	Organizational pattern is clearly and consistently observable within presentation.	Organizational pattern is intermittently observable within presentation.	Organizational pattern is not observable within presentation.
	Delivery (posture, gesture, eye contact, and vocal expressiveness)	Delivery techniques make presentation compelling, and speaker appears polished and confident.	Delivery techniques make presentation interesting, and speaker appears comfortable.	Delivery techniques make presentation understandable, and speaker appears tentative.	Delivery techniques detract from understandability of presentation, and speaker appears uncomfortable.
3e. Students will be able to demonstrate the ability to evaluate and provide meaningful feedback on own and others work	Evaluation of peers (with respect to evaluation criteria)	Student provides rich constructive feedback.	Student provides thorough and thoughtful constructive feedback.	Student provides minimal constructive feedback.	Student provides little or no constructive feedback.
	Self-Evaluation (with respect to evaluation criteria)	Student provides rich detail when conducting self-evaluation.	Student provides thorough and thoughtful detail when conducting self-evaluation.	Student provides minimal detail when conducting self-evaluation.	Student provides little or no detail when conducting self-evaluation.

Table AII.4: Technological and Information Literacy Learning Outcome Rubrics

Outcome	Exceeding (4)	Meeting (3)	Approaching (2)	Not meeting (1)
4a. Use critical thinking skills to determine the nature and extent of the information needed to solve a problem.	Identifies focused, clear, and complete research question; many key concepts; and clear idea of extent and depth of information needed. Strong evidence of critical thinking skills.	Identifies a clear and complete research question, a sufficient number of key concepts; and acceptable idea of extent and depth of information needed. Some evidence of critical thinking skills.	Identifies an unfocused, unclear, or partial research question; some key concepts; and incomplete idea of extent and depth of information needed. Minimal evidence of critical thinking skills.	Fails to identify a research question, key concepts, or idea of extent and depth of information needed. Little or no evidence of critical thinking skills.
4b. Effectively and efficiently access needed information using appropriate technologies.	Retrieves a variety of relevant sources of information that directly fulfill the information need using appropriate technology, search tools, and methods.	Retrieves a sufficient number of relevant sources of information that fulfill the information need using appropriate technology, search tools, and methods.	Retrieves sources that generally lack relevance, quality, and balance. Primarily uses inappropriate technology, search methods, and tools.	Fails to retrieve relevant sources of information to fulfill the information need. Ignores appropriate technology, search tools, and methods.
4c. Critically evaluate information and credibility of its sources.	Critically evaluates and analyzes information and its many and diverse sources. Evaluation is consistent and thoughtful.	Evaluates and analyzes information from a sufficient number of sources. Evaluation is sufficient.	Mostly ignores or superficially evaluates information from some questionable sources.	Fails to evaluate information from a limited number of questionable sources.
4d. Effectively use information to accomplish a specific purpose.	Demonstrates understanding of breadth and depth of research. Synthesizes and integrates information from a variety of sources. Draws meaningful conclusions. Clearly communicates ideas.	Uses appropriate information to accomplish purpose. Draws relevant conclusions. Synthesizes information from a sufficient number of sources. Effectively communicates ideas.	Uses incomplete information and only partially accomplishes intended purpose. Draws incomplete conclusions. Inconsistently communicates ideas.	Does not use relevant information. Fails to accomplish intended purpose. Does not draw conclusions. Fails to effectively communicate ideas.
4f. Ethically and legally access and use information	Consistently and correctly cites sources.	Correctly cites sources	Incomplete citations.	Does not cite sources or copies sources without crediting authors.

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Table AII.5: Values, Ethics, and Diverse Perspectives Learning Outcome Rubrics

Outcome	Exceeding (4)	Meeting (3)	Approaching (2)	Not Meeting (1)
5a. Demonstrate awareness and recognition of diverse cultures and ways of thinking and knowing	Analyzes, adapts, or applies understanding of multiple worldviews, experiences, and power structures incorporating multicultural perspectives to address significant global problems	Identifies and describes experiences of others in historical and/or diverse contemporary contexts, demonstrating openness to varied cultures and worldviews	Identifies and describes experiences of others in narrow or stereotypical contexts, demonstrating limited understanding or openness to varied cultures and worldviews	Is not able to identify or describe distinctions between other cultures or worldviews, either in historical terms or in contemporary contexts.
5b. Demonstrate recognition of ethical issues throughout society	Discusses and analyzes core ethical beliefs and origins with depth and clarity in unfamiliar contexts as well as those applicable to common issues facing individuals and environmental professionals Adapts and applies the experiences of others in historical or contemporary contexts, applying multiple cultural perspectives and worldviews, suggesting ethical interventions or solutions to significant global problems.	Clearly articulates core ethical beliefs and their origins in settings typically applicable to common issues facing individuals and environmental professionals Considers the experiences of others as an integral part of identifying ethical responses to problems in historical or contemporary contexts, with demonstrated openness to varied cultures and world views.	Occasionally able to identify and describe ethical behaviors and their origins applicable to common issues facing individuals and environmental professionals Occasionally considers the experiences of others when applying ethical principles to problems, applying a limited degree of openness to varied cultures and worldviews.	unable to identify or articulate ethical responses to common issues facing individuals and environmental professionals Does not consider ethics in problem solving or decision making, or applies only a limited, parochial worldview, regardless of context
5c. Apply ethical concepts to diverse personal, professional, or societal settings	Adapts and applies the experiences of others in historical or contemporary contexts, applying multiple cultural perspectives and worldviews, suggesting ethical interventions or solutions to significant global problems.	Considers the experiences of others as an integral part of identifying ethical responses to problems in historical or contemporary contexts, with demonstrated openness to varied cultures and world views.	Occasionally considers the experiences of others when applying ethical principles to problems, applying a limited degree of openness to varied cultures and worldviews.	Does not consider ethics in problem solving or decision making, or applies only a limited, parochial worldview, regardless of context

APPENDIX III

General Education Results

General Education Review Results

Raw Data includes data points that were unclear if the outcome was relevant to the student work evaluated.

	Learning Outcomes	Products Evaluated	Rubric Raw Data (Meeting or Exceeding)	Rubric Analysis (Meeting or Exceeding)
1. Scientific Reasoning	1a. Demonstrate knowledge of the scientific method.	Capstone papers. Lecture Assignments and Exam and Quiz Questions - from the general education science courses	49%	67%
	1b. Formulate and test hypotheses	Capstone Papers. Laboratory reports from the general education science courses.	40%	49%
	1c. Assess credibility and validity of scientific information***	Capstone Papers. Lab reports and Capstone papers - evaluate citations; Analytical writing unit from EWP 190 courses.	44%	52%
	1d. Make informed decisions on contemporary issues demanding scientific literacy***	Final Exam Questions from General Chemistry I; Final Lab report in General Chemistry II; General Biology assignments on current events related to scientifc discoveries; capstone papers from all majors that have capstones	32%	80%
	1e. Analyze and discuss the relationship between scientific discovery and society	Capstone Papers.	11%	70%
2. Quantitative Reasoning	2a. Identify and Describe quantitative information symbolically, visually, numerically or verbally.	Exams , Projects, Labs, Fieldwork	58%	58%
	2b. Interpret quantitative information and draw inferences from them.	Exams , Projects, Labs, Fieldwork	56%	56%
	2c. Apply and Analyze problems with acquired quantitative reasoning and skills.	Exams , Projects, Labs, Fieldwork	50%	50%
	2d. Synthesize and Evaluate problems within a specific discipline using quantitative reasoning.	Exams , Projects, Labs, Fieldwork	43%	43%
3. Communication	3a. Produce writing that clearly communicates ideas reflective of critical thinking skills.	Research Papers from General Education Courses, senior synthesis and capstone papers.	72%	73%
	3b. Demonstrate fluency in a writing process.	Research Papers from General Education Courses, senior synthesis and capstone papers.	14%	89%
	3c. Demonstrate the ability to integrate relevant sources when composing an argument.	Research Papers from General Education Courses, senior synthesis and capstone papers.	50%	54%
	3d. Demonstrate the ability to prepare and present an oral presentation.	Research Papers from General Education Courses, senior synthesis and capstone papers.	6%	100%
	3e. Demonstrate the ability to evaluate and provide meaningful feedback on own and others work.	Research Papers from General Education Courses, senior synthesis and capstone papers.	5%	60%
4. Technology and Information Literacy	4a. Use critical thinking skills to determine the nature and extent of the information needed to solve a problem.	Senior Synthesis or Capstone Projects	82%	82%
	4b. Effectively and efficiently access needed information using appropriate technologies.	Senior Synthesis or Capstone Projects	0%	0%
	4c. Critically evaluate infomratino and credibility of its sources	Senior Synthesis or Capstone Projects	Not accessed	Not accessed
	4d. Effectively use information to accomplish a specific purpose	Senior Synthesis or Capstone Projects	39%	68%
	4e. Ethically and legally access and use information	Senior Synthesis or Capstone Projects	53%	64%
5. Values, Ethics and Diverse Perspectives	5a. Demonstrate awareness and recognition of diverse cultures and ways of thinking and knowing	Capstone projects, Senior Synthesis projects (random sample of 40) representative of various majors	30%	64%
	5b. Demonstrate recognition of ethical issues throughout society.	Capstone projects, Senior Synthesis projects (random sample of 40) representative of various majors	33%	71%
	5c. Apply ethical concepts to diverse personal, professional or societal settings.	Capstone projects, Senior Synthesis projects (random sample of 40) representative of various majors	27%	57%

APPENDIX IV

Departmental Feedback Collected by Committee Members on First Draft of this Report

Departmental Feedback on the General Education Assessment Draft

Question to Departments: ***The assessment of general education is being done at both the foundational level within the courses as well as at the capstone level, therefore, the success of ESF's College-wide General Education Outcomes is the responsibility of every faculty member on campus. After reviewing the General Education Assessment Draft Report, is there anything that you will do differently in your course? If so what are they? If not, why not?***

Comment from ES/The Writing Program:
After reviewing the document, I would collect more evidence of students' work with research and sourcing assignments and how these practice and process assignments feed into the research paper assignment.

Chemistry Department:
The Chemistry Department will require a final paper (or poster) from all students taking FCH 498 which is our version of a capstone course. They will collect the FCH 495 proposals which are overseen by an individual faculty member and the FCH 498 papers (or posters) which will be overseen by student's individual research directors.

It is also worth noting that some members of the department do no see the value of general education and would prefer not to have a general education program at all. While this group was the minority, it was not a minority by much.

One note on the report indicated that we need to pick up the Critical Thinking objective and make that into something, it is lacking any attention beyond its first mention.

Comments from EFB:

Nice job of summarizing; some confusing parts: e.g., first line under the chart indicates that outcome 2 only had 14% of students meeting or exceeding expectations, but I don't see how that number is drawn from the figure it references.

One of the recommendations in this report is to require students in all majors to have capstone experiences. All of us should consider carefully the implications of that statement for our department, which contains a large number of students and 7 majors. It is one thing to have capstone experiences in a department graduating 5-20 students a year, but this would be a different type of burden for us. How will 'capstone' be defined? Is this practical for us? What resources would be required and is there a chance those could be provided in a time of financial crisis?

I don't think a capstone experience (requirement) is appropriate for all majors on campus. Or even if we created a capstone experience it would be very different for some of the majors and would not collect the data you are specifically looking for. If the committee was to dictate what a capstone is for each major I think it would be totally inappropriate. The other issue with adding a capstone is that some majors would be unduly burdened because they are already short faculty. You are adding another course that someone would have to teach/coordinate - one of the main reasons I haven't added a capstone to our

major. One of the reasons people of the departmental curriculum committee were recommending I didn't add a capstone course.

Another problem is this would be a curriculum change for many of the majors on campus requiring the curriculum committees approval which can be a painful process. Would there be some sort of blanket approval process if this was required? Or would each major have to have both the new "capstone course" and the curriculum change approved? But it also means taking more open elective courses away from students which some majors have very few of to begin with. Also how would all of this effect seamless transfer? Would more students be required to take an extra semester or two because of a capstone requirement and having specific prerequisites they have to have accomplished first. For example, there are already a number of wildlife students that I know that have had to stay an extra semester to get Jonathan's class in the fall, which is the equivalent of the capstone for wildlife.

I have thought about adding a "capstone course" to EE&I to make data collection for the major easier but the capstone would take more of a portfolio review focus where mentors in the field of Environmental Education & Interpretation evaluated the students portfolios.
It would not collect the information that you all are suggesting in this proposal. This information is not appropriate for a capstone in this program. We are more interested in the communication of science to the public. We want to make sure the student portray accurate information in appropriate methods, but having them demonstrate research is not appropriate.
Why not collect some of this information from upper level science courses?

Re: Outcome 1, 2, & 3: A final capstone experience in each major will not necessarily measure this outcome.E.g., where scientific research is not the focus of the major. It is still important for them to understand experimental design but would more appropriately be measured in an upper level science course(s). Adding a required capstone experience may also be a burden on majors that are already short on faculty.

Question about “The committee plans to provide students with rubrics for general education assessment and to train them on how to assess oral presentations for the purpose of general education (not course assessment) assessment”. Should this be a student or faculty?

Re “Require the use of an e-portfolio”:: Is this for all students? Or particular classes? What would be required in the portfolio since each major is so different? Would we have a platform for the e-portfolio that all students and faculty have access to or would someone be responsible for collecting the e-portfolio information for each student?

Re “ Create a cohesive general education program that runs through all four years”: This would be nice in many ways, but it also requires that all majors redesign their curriculum many of which are already short on credit hours. Also how would this match with SUNY requirements for general education and seamless transfer? Would ESF require more general education courses to create a 4-year program?

4. After reviewing the General Education Assessment Draft Report, is there anything that you will do differently in your course? Nope.

If so what are they? If not, why not? I teach GenBio and I would be happy to modify my course if someone specifically identifies something about the course that is falling short, but at this point I’m

covering all of the Learning Outcomes as well as the specific objectives (as articulated in the report)and so I don't plan on wasting my time changing something that might be getting the job done. I'd also be happy to modify exams (add questions) to contribute to assessment, but again, I won't waste my time unless someone asks me to do so. To me, we are being made to jump through assessment hoops when all the evidence I've ever seen indicates our students are satisfied and are getting jobs.

An aside is that when I first started here, I volunteered to serve on EFB's Curriculum Committee and was tasked right off the bat with assessment. I gathered info and data and suggested we (EFB) implement a BIO ETS Major Field Test to graduating seniors ($20/student) to identify the strengths and weaknesses of our majors and to monitor it over time. That was 7 yrs ago - we didn't implement the test and we still haven't gotten much of anywhere with this.

5. I agree that you probably should not be using introductory courses for assessing these outcomes. And I also agree that we should use the introductory courses, when appropriate, as places to start exposing students to these learning objectives (like communication, experimental design, scientific reasoning).

On the top of page 3 is a recommendation to "…ensure that all students have a final capstone experience." This requirement would be extraordinarily burdensome in EFB if all students were required to do this. We have on average 20-22 undergraduate advisees per faculty member (not including additional Env. Sci. advisees that some EFB faculty take on). There would be about 5-6 per year for just seniors of course. That still doesn't quite diminish the level of work for all, or substantial level of work for a few in addition to all other obligations. What EFB would be saddled with is just substantially more than faculty in chemistry,PBE or SCME (off the top of my head). We need to be extremely careful about additional teaching loads that we propose to impose upon faculty. This is beginning to feel like another unfunded mandate. I am not at all questioning the importance of capstone undergraduate experiences. But if this is going to be required then we need additional faculty to make it happen.

p. 4 – synthesize and evaluate problems – again it sounds like outcomes are requiring capstones for measurement. However, any/all 300- or 400-level courses should be incorporating content, assignments, exam questions at this level. Couldn't we use those course assignments and exams to measure this outcome?

Reference to "Learning Outcome #3" or "#4" without explicit indication of that outcome or the means of measuring the outcomes makes this report difficult to read and interpret (for instance, text on p. 5 and top of p 6).

Environmental Studies (ES) Feedback on Recommendations:

● Analyze data over a three-year period
- Makes sense.

● Collect materials in electronic format
- Logistics: Will documents be scanned? If not, why not?
    ~ Removal of students' names would be a challenge if docs are not scanned
- Do we need to let students know their work will be used for assessment?

~ Perhaps talk with students to see if they have suggestions/concerns about requiring electronic submission
~ Should have a conversation about this with USA?

● **Require the use of an e-portfolio**
- E-portfolios are not used in most science-based programs; more appropriate for programs such as LA.
- Would be difficult/onerous to implement across campus.

● **Create spreadsheets for faculty to evaluate items that are best done by the instructor**
- Not clear what this refers to.

● **Provide feedback to faculty about student learning outcomes so that they can better incorporate the material into their courses.**
- What is the intent?
- Seems too generic as a response to deficits in College Learning Outcomes, although there is strong agreement that feedback is important.
- Doesn't identify fixes.
- We should target areas that need improvement, but need to be more specific about how/why this would be done and how it might inform process for improvement.

● **Create a cohesive General Education program that runs through all four years**
- Not clear what this means.
- Is it connected to Strategic Planning?
- SUNY asks us to do Gen Ed within the first two years, so we need to factor this into the discussion of what we mean by this.

● **Require all majors to do capstone experiences**
- Agree, but programs should retain flexibility to do this the way we deem appropriate for our program. The Senior Synthesis in ES counts as our capstone and this is working well.

● **Create a group responsible for overseeing and creating the General Education program**
○Could be a sub-committee of the faculty Governance committees, Instructional Quality and Academic Standards and/or Curriculum
○Could be a division like ES (ES = Environmental Studies; need to spell out Environmental Science).
- This is a college-wide responsibility.
- Agree that this should go through Faculty Governance.
- IQAS+ group will take this up in the fall.

GENERAL COMMENTS FROM ENVIRONMENTAL STUDIES:
- The conversation around the Gen Ed report (draft) stimulated great conversation and raised all kinds of important questions. It also stimulated interested in college learning outcomes.

- Each department might put together a matrix of courses that maps out courses in relation to college learning outcomes. This would provide a broad, institutional view so the process that is more than ad hoc solutions working in isolation.

GENERAL COMMENTS FROM FNRM:
- FOR490 Capstones will be required to be submitted in PDF or other electronic format, and be made available (where?) for the general education assessment.

-The departmental outcomes have been reduced to 4. There may be some connection with the departmental outcome and the general education outcome. SOmeone would have to go through them and determine if we can double dip on the data collected by the department and use it for gen ed.

-The APM math classes will continue to identify questions throughout the course that measures QR learning outcomes.

-Are you also interested in feedback on the document? I was confused by the numbered learning outcomes within the numbered learning outcomes. I wonder if one of these could have a different name. The second level are "measurements" within the "learning outcomes"?

-Ironically, the section on grammar has grammatical errors. "grammatical correct" is not grammatically correct. "Data" is a plural noun.

-I don't teach undergrads so I won't do anything differently in my undergraduate courses, but I'm also not sure what this would be.

-For APM 103/104, APM 105/106, APM 205/206 classes we are responsible for, we will identify questions on exams, projects and finals that are in line with the outcomes, and report the finding. We have done this informally this year, but we will have to better define our approach to hit all of the learning outcomes. We will start with the final exams.

Comments from SCME/ERE:

- Knowledge is mis-typed in Outcome #1 of the Scientific Reasoning table (page 16)

- ERE has clear overlap with some of the Gen Ed outcomes: we should make this known to students, faculty, and assessors

- ERE should create an advising check-list that includes attention to students reflecting on how they can create products for a digital portfolio, where products demonstrate their ability in these areas.
    - Beyond this, the campus should consider investing in a mechanism for all students to create a digital portfolio.

- Why aren't we simply connecting our general education assessment directly to the SUNY General Education, e.g. we could have outcomes related to
    - Mathematics
    - Natural Science
    - Basic Communication
    - Critical Thinking
    - Information Management

    - Something that gets at the breadth through coverage of at least four other subject areas.

- Is there any plan to connect the General Education assessment to the Undergraduate Experience discussion that has been going on in the Strategic Planning process?

- It still isn't quite clear how the broader campus learning outcomes would connect to all classes and what we (faculty vs. students) would do with that information

- We perform assessment at multiple levels at ESF, it would be good to have a clear hierarchy, and better understand the organizational structure of assessment on campus. We presumably do some assessment for SUNY, and certainly need to for Middle States and many separate program accreditations, it would be nice if we could synchronize a little more.

- Connected to the above, it would be good to have someone who is monitoring and posting information about assessment calendars, i.e. for department and campus level information: when are we collecting data, when are we analyzing data, when are we anticipating reviews, etc.

- Again connected to the above two points, if the campus actually wants to show it cares about assessment, we need to invest resources in this process. While faculty clearly need to be engaged in assessment (department and college level) at some level (e.g. contributing data), there needs to be someone with real time assigned to manage assessment on campus. We really can't claim to have a culture of assessment on campus if there is ultimately no top-down support. The IQAS committee (with rotating membership) can perhaps help facilitate data collection moving forward (perhaps), but we cannot be the ones to manage this if we want to succeed. The assessment person should probably report to the President, not Bruce, i.e. separate the audit from who is being audited.

- In terms of our next Middles States visit, we need to be clear that we did not previously have an assessment plan. We now have a plan in place, but with only one year of data we are working to improve the protocol rather than truly evaluate the data. We may need to refine:
    - Our outcomes (reduce overlap, refine what is expected)
    - The data we collect (what type, how much, sufficient samples)
    - How we evaluate that data (who does it, what thresholds are selected)
    - How we communicate the results (what is the best feedback loop)

- We are not finished yet, and likely never will be since this is a continuing process, but with sufficient investment, we believe we can be successful.