SUNY Fredonia
General Education Learning Outcomes
Assessment Report
2013-2014

Subcommittee Information

General Education Category:	Natural Sciences	
Subcommittee Chair:	Bruce Tomlinson	Biology
Subcommittee Members:	Katharine Johanesen	Geosciences
	Matthew Gronquist	Chemistry
	Justin Conroy	Physics
Semester(s) In Which Data were Collected:	Spring, 2014	
Report Written By:	Committee	
Report Date:	6/12/14	

Course Information

Please provide the following information for each of the courses that are part of the curriculum for this outcome during the semester(s) of data collection:

Department	Subject Code	Course Number	Faculty Name	# of Students Enrolled	Were assessment data collected in this course?
Geosciences	GEO	141	Gordon Baird	97	Yes
Chemistry	SCI	301	Krista Bellis	36	Yes
Biology	BIO	111	Bill Brown	46	Yes
Computer Science	CSIT	120	Greg Cole	70	Yes
Geosciences	GIS	201	Ann Deakin	24	Yes
Biology	SCI	303	Doug Dolan	35	Yes
Physics	PHYS	101	Ilmar Filhaber	38	No
Biology	BIO	115	Michelle Kuns	60	Yes
Geosciences	GEO	142	Gary Lash	96	No
Geosciences	GEO	160	Gary Lash	42	No
Chemistry	CHEM	115	Holly Lawson	75	No
Biology	BIO	110	Scott Medler	61	Yes
Computer Science	CSIT	120	Adrienne Pelz	27	Yes
Biology	BIO	110	Nick Quintyne	59	Yes
Geosciences	SCI	301	Lee Servatius	36	No
Physics	PHYS	230	Erica Simoson	58	Yes
Computer Science	CSIT	120	Mike Szocki	65	Yes
Biology	BIO	111	Bruce Tomlinson	190	Yes
Biology	HONS	127	Bruce Tomlinson	19	Yes
Geosciences	GEO	175	Randy Woodbury	40	No
Geosciences	GEO	165	Kim Weborg-Benson	116	Yes

Assessment of Learning Outcome 1

Outcome 1:	Understanding of the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of mathematical analysis.
Assessment Method	Instructors were asked to evaluate student performance based on four levels of achievement: Exceeded Expectations, Met Expectations, Approached Expectations, Failed. Instructors were free to choose their own assessment instrument so long as it effectively addressed the learning outcome. Most data came from midterm and final exam questions. The collective data for the class was summarized in a table and submitted to the subcommittee. Instructors were also asked to submit the questions used for the assessment and a representative sample of the student responses from 20% of the class.
Evaluation Process	An email was sent out prior to the start of the spring semester to inform the instructors on the assessment process. Reminder emails were also sent out during the semester. Data was submitted to the subcommittee throughout the semester and reviewed in June.
Timing	Spring,2014
Student Participation	A total of 1,463 students were assessed on this learning outcome. This is up from 1,277 in 2011.
Assessment Results	47.6% of students assessed exceeded expectations, 35.2% met expectations, 9.4% approached expectations, and 7.8 failed.
Level of Attainment	**Nearly 83% of students met or exceeded expectations.**
Comparison to Previous Results	This was consistent with the 2011 assessment in which nearly 81% of students met or exceeded expectations for this outcome.

Assessment of Learning Outcome 2

Outcome 2:	Application of scientific data, concepts, and models in one of the natural sciences.
Assessment Method	See Outcome #1
Evaluation Process	See Outcome #1
Timing	See Outcome #1
Student Participation	A total of 1,204 students were assessed on this learning outcome. This is slightly down from 1,223 in 2011.
Assessment Results	44.6% of students assessed exceeded expectations, 33.7% met expectations, 10.5% approached expectations, and 11.2 did not meet expectations.
Level of Attainment	**78% of students met or exceeded expectations.**
Comparison to Previous Results	This was up from the 2011 assessment in which 70% of students met or exceeded expectations for this outcome.

Assessment of Information Management Outcome 1

Outcome 1:	Perform the basic operations of personal computer use
Assessment Method	See Outcome #1
Evaluation Process	See Outcome #1
Timing	See Outcome #1
Student Participation	A total of 474 students were assessed on this learning outcome. This is up from 115 in 2011.

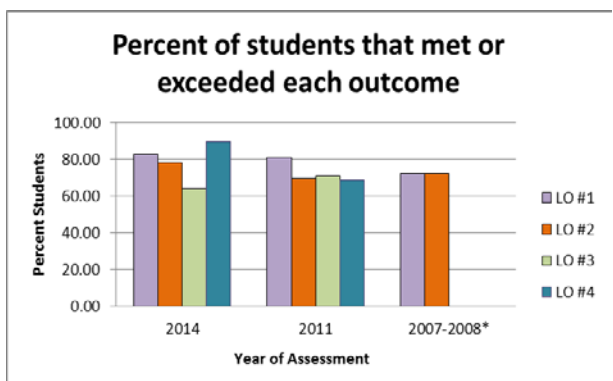| Assessment Results	31.7% of students assessed exceeded expectations, 58.0% met expectations, 5.1% approached expectations, and 5.3% did not meet expectations.
Level of Attainment	**90% of students met or exceeded expectations.**
Comparison to Previous Results	This was slightly up from the 2011 assessment in which 84% of students met or exceeded expectations for this outcome.

Assessment of Critical Thinking Outcome 1

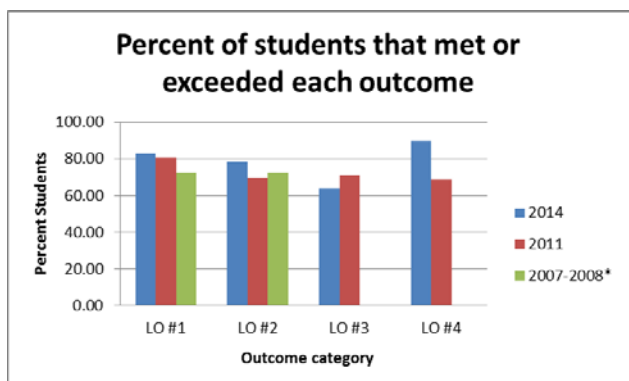| Outcome 1:	Identify, analyze, and evaluate arguments as they occur in their own or other's work.
Assessment Method	See Outcome #1
Evaluation Process	See Outcome #1
Timing	See Outcome #1
Student Participation	A total of 1,174 students were assessed on this learning outcome. This is slightly up from 1,151 in 2011.
Assessment Results	29.7% of students assessed exceeded expectations, 34.2% met expectations, 13.5% approached expectations, and 22.6% did not meet expectations.
Level of Attainment	**64% of students met or exceeded expectations.**
Comparison to Previous Results	This was slightly down from the 2011 assessment in which 71% of students met or exceeded expectations for this outcome.

Assessment of Critical Thinking Outcome 2

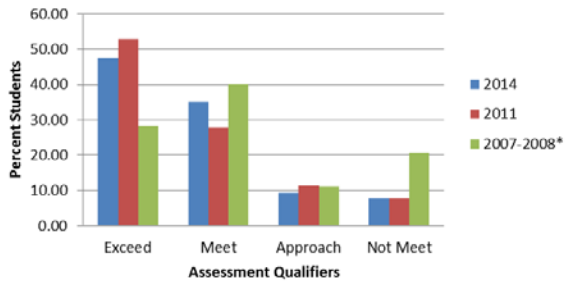| Outcome 2:	Develop well-reasoned arguments.
Assessment Method	Not assessed separately from Critical Thinking Outcome #1.
Evaluation Process	
Timing	
Student Participation	
Assessment Results	
Level of Attainment	
Comparison to Previous Results	

Conclusions

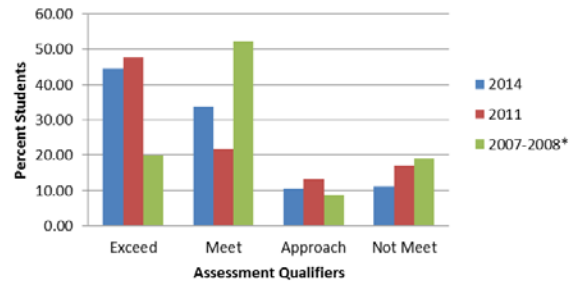| What are the three most important conclusions drawn from your data about attainment of student learning outcomes within the category?	1) Virtually the same instructors that participated in this assessment also participated in 2011, making the assessment process more consistent. Instructors also seem more aware of the assessment process and already have it embedded in their classes.
	2) Overall, student performance was good and comparable to the last assessment.
	3) The biggest deficiency in student performance was in critical thinking. This is also consistent with the findings of the last

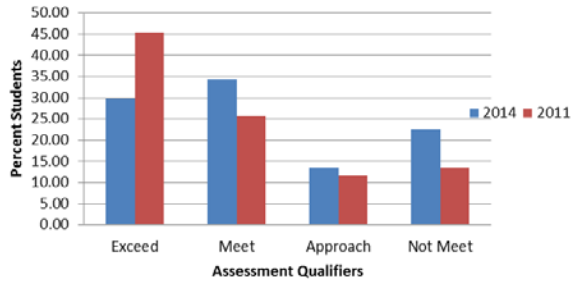|	
	assessment.
What factors make it difficult to draw conclusions about student learning in this category?	While the aggregate scores presented in this report suggest that students are for the most part performing well in regard to the learning outcomes, scores from individual courses varied dramatically. In some courses over 90% of students met or exceeded expectations, while in others less than 20% met or exceeded expectations. This makes it difficult to draw overarching conclusions from the data. These differing results could in part be due to a difference in standards and expectations of individual instructors. Another variable could be the general age of the students in a particular course. This might be particularly true for the critical thinking assessment, since students need some amount of base knowledge to think critically.
What are your recommendations for improving the process of assessment of student learning in this category?	The committee believes that using a consistent approach over assessment cycles has allowed for a more meaningful comparison of the data to previous years. We recommend that this consistency be emphasized in the future.
What are your recommendations for improving student learning in this category?	None based on the positive data collected.
Please share any other comments the subcommittee may have.	The assessment of Critical Thinking again produced relatively poor results. However, it is possible that this is a deficiency in the assessment method rather than student performance. Since Critical Thinking is infused throughout the General Education curriculum, perhaps a college-wide discussion could produce more effective assessment techniques.

Percent of students that met or exceeded each outcome

Percent of students that met or exceeded each outcome

LO 1: Methods Used by Scientists

LO 2: Application of Data

LO 3: Critical Thinking

LO 4: Information Management