SAINT LOUIS UNIVERSITY

Program Assessment: *Annual Report*

Program(s): Neuroscience

Department: Interdisciplinary: Biology & Psychology

College/School: Arts & Sciences

Date: 7/1/2019

Primary Assessment Contact: Drs. Tony Buchanan and Judith Ogilvie

1. Which program student learning outcomes were assessed in this annual assessment cycle?

Program Learning Outcome 3: *Students will be able to communicate neuroscientific information in a clear, reasoned manner, both verbally and in writing.*

2. What data/artifacts of student learning were collected for each assessed outcome? Were Madrid student artifacts included?

Our assessment plan called for collecting information from five sources to assess Learning Outcome 3: NEUR 4000: Neuroscience Lab, Capstone projects, PSY 3100: Brain, Mind, & Society, PHIL 4280: Biology & Mind, Capstone Projects, and our Senior exit survey.

The course number of NEUR 4000: Neuroscience Lab, has been changed to NEUR 3550. Dr. Baker-Nigh collected data and artifacts from this course that included written papers and oral presentations.

For PSY 3100: Brain, Mind, & Society, students completed a final paper in which they were tasked with integrating information about a neuroscientific topic of their choosing.

We chose to substitute NEUR 4930: Senior Seminar for PHIL 4280 in order to minimize requirements on other departments. The Senior Seminar included a 4-page student reflection that was peer reviewed and revised. The course also included individual student oral presentations on Hot Topics In Neuroscience News.

For capstone projects, we collected information from each of neuroscience faculty member on students that performed capstone projects with them, whether the project included a written or oral communication element, and their evaluation of the students' proficiency. We recognize that many students do their capstone projects with other faculty, so this is a sampling of neuroscience majors, not a complete review.

For the Senior survey, students were asked a series of self-assessment questions about how much they gained in their ability to communicate about neuroscience, both in oral and written form.

Madrid courses are not applicable to this assessment report.

3. How did you analyze the assessment data? What was the process? Who was involved?
NOTE: If you used rubrics as part of your analysis, please include them in an appendix.

For NEUR 3550: Neuroscience Lab, Dr. Baker-Nigh collected and assembled the data. However, Dr. Baker-Nigh went into labor a week early, before the data was analyzed, and is out on maternity leave.

For PSY 3100: Brain, Mind, & Society, Dr. Buchanan collected and assembled the data.

For NEUR 4930: Senior Seminar, student grades on the specific assignments related to this learning outcome were collected along with the grading rubrics. Comments on individual student rubrics were reviewed to look for any common strengths or weaknesses. Drs. Judy Ogilvie and Tony Buchanan, who

taught different sections of the course, collected and analyzed the data.

For Capstone projects, we determined what types of oral and written communication was included in each project and each faculty member provided an assessment based on a scale of 1-5 (5 = expert; 4 = advanced; 3 = intermediate; 2 = novice; 1 = beginning). Dr. Ogilvie collected and analyzed the data.

A link to a Senior Survey was sent to all graduating students. Reminders were sent to students who did not comply, clearly stating that their response is required. Twenty of the 53 graduating students completed the survey. Drs. Buchanan and Ogilvie were involved in writing the survey questions, collecting the data, and analysis.

4. What did you learn from the data? Summarize the major findings of your analysis for each assessed outcome.
NOTE: If necessary, include any tables, charts, or graphs in an appendix.

We have not received the data from NEUR 3550: Neuroscience Lab, but feel that we can make an adequate assessment without it, given the unusual circumstances this year.

For PSY 3100: Brain, Mind, & Society, students were assessed on written communication skills via performance on a final paper. Performance was assessed via a rubric (see attached), which assigned points based on content, organization, proper referencing, as well as spelling/grammar. Neuroscience majors averaged 47.2 out of a total of 50 points (94%) available on this assignment. This level of performance exceeds the 'proficient' level of competency (defined as 75% correct performance).

For NEUR 4930: Senior Seminar, two assignments were assessed. First, all students gave an individual verbal presentation on a current topic in Neuroscience. Specifically, students identified a neuroscientific study reported in the popular press, compared it to the original research publication, and presented both the research and their critical analysis of the different presentations of the information. A rubric (attached) was used to evaluate student presentations with an average total score of 93.67%. The focus of the written assignment was a 4-page reflection on how the diverse electives for the Neuroscience major relate to the core concepts of neuroscience, with each student focusing on their own elective choices. A rubric (attached) assessed papers on clarity, interconnection, relevance, and analysis on a scale of 1-5 (5 = distinguished, 4 = proficient, 3 = apprentice, 1/2 = novice/unacceptable). Students average score was 4.63 or 92.5%. This level of performance exceeds the 'proficient' level of competency (defined as 75% correct performance) for our graduating seniors.

Twenty students were included in the analysis of the capstone projects. Of these, 16 wrote and presented posters, which included both a written and oral component, 14 wrote papers or grant proposals ranging from 3 – 10 pages in length, and three gave oral presentations of their research in lab meetings. Nineteen of the 20 students had elements of both oral and written communication incorporated in their capstone project. All students were ranked in either the advanced (4/5) or expert (5/5) category with an average of 4.375 on a scale of 1-5 (5 = expert; 4 = advanced; 3 = intermediate; 2 = novice; 1 = beginning) or 87.5% for written communication and 4.37 or 87.4% for oral communication. For both written and oral communication skills, this level of performance exceeds the 'proficient' level of competency (defined as 3.75 on the scale of 1-5 or 75%).

Self-assessment questions from the senior survey asked how much students gained in both oral and written communication ability.

Verbal/oral communication: 100% of graduating Neuroscience majors reported some gain in their ability to **verbally** communicate neuroscientific information in a clear, reasoned manner. Specifically, the majority of students (56%) reported a large or very large gain in their ability to verbally communicate neuroscientific information in a clear, reasoned manner, with 43% reporting moderate and 0% reporting a small or no gain in communication ability.

Written communication: 94% of graduating Neuroscience majors reported some gain in their ability to communicate neuroscientific information in a clear, reasoned manner in **written** form. Specifically, the majority of students (63%) reported a large or very large gain in their ability to verbally communicate neuroscientific information in a clear, reasoned manner, with 31% reporting moderate and 6% reporting a small or no gain in communication ability.

We consider these results to be well above the 'proficient' level of competency (defined as 75% correct

performance).

5. How did your analysis inform meaningful change? How did you *use the analyzed data to make or implement recommendations for change* in pedagogy, curriculum design, or your assessment plan?

Assessment data will be shared with all Neuroscience faculty at our next faculty meeting. Overall, both indirect (self-reported) and the direct data indicate that we are successfully achieving Learning Outcome 3 at several different points in the curriculum.

The data for LO3 was collected from a range of courses, taught by different faculty members using different rubrics, yet the results were notably consistent. Thus, we feel that fewer courses could suffice for future assessment. Data from the capstone experience was the least reliable since any students that did not have a neuroscience faculty member as a mentor on their project were not included. In addition, some presentations or written work were done individually where others were done in a group. Thus, we feel that data from the capstone experience can be omitted in the future. Because NEUR 3550 and NEUR 4930 are required for all neuroscience majors and NEUR 4930 is limited to only neuroscience majors, we believe that inclusion of these two courses will be most valuable and most straightforward to analyze in the future. Although data from PSY 3100 proved very helpful this year in the absence of data from NEUR 3550, this course includes a significant mix of psychology and neuroscience majors making it more time consuming to extract meaningful data.

NEUR 4930: Senior Seminar is a new course, offered for the first time this year with multiple very small sections. The two assignments described above from this course were particularly effective in achieving and measuring the success of LO3. We will take this into consideration in making any changes to the course design, particularly since this course may be expanded from 1CR to 3CR in the near future and potentially taught by different faculty.

6. Did you follow up ("close the loop") on past assessment work? If so, what did you learn? *(For example, has that curriculum change you made two years ago manifested in improved student learning today, as evidenced in your recent assessment data and analysis?)*

Last year, our assessment focused on Program Learning Outcome 2: *Students will be able to synthesize information to formulate hypotheses, design experiments and engage in scientific research.*

We were especially pleased that the NEUR 3550: Neuroscience Laboratory contributed to LO2 in a meaningful way. This year the course scaled up from 23 students to 40. The data from last year was used to ensure that the elements of the course that are central to the success of this learning objective were retained.

Several actions were taken with respect to the neuroscience capstone experience. First, we initiated networking efforts through several channels at the medical school in an effort to increase opportunities for independent research projects. These efforts are ongoing. Secondly, we reviewed the capstone options currently available and identified several ways to expand course offerings. Specifically, (a) PSY 4965: Capstone Practicum Project was added to the Neuroscience Program approved list of capstones with a procedure coordinated with the Psychology department to ensure that the practicum project is relevant to the neuroscience major, (b) a research capstone course was offered by Dr. Jill Waring in Spring 2019, and (c) an experiential capstone course will be offered in Fall 2019 by Dr. Judy Ogilvie on an experimental basis.

IMPORTANT: Please submit any revised/updated assessment plans to the University Assessment Coordinator along with this report.

Final Paper Instructions

Each student will write a research paper on a topic related to the course, incorporating the ensemble hypothesis discussed in the textbook. The paper requires informative and argumentative writing in developing a thesis supported by relevant empirical evidence. For example, how might the ensemble hypothesis inform our understanding of the neural and mental deficits associated with Alzheimer's disease? Or how does the ensemble hypothesis explain the development of morality in human history?

The paper must clearly develop the thesis in 6-8 typed, double-spaced pages. A title page with an abstract and the references at the end of the paper are in addition to the 6-8 pages. The final paper will be evaluated for mechanics, clarity of expression, and coherence as well as its content and effectiveness of argumentation. The reference list should contain 6-10 citations to scholarly books, book chapters, or articles in technical psychological journals. PSYCHINFO is a useful database for obtaining relevant primary source material, but other library resources may also be pertinent to your work (e.g., MEDLINE or Google Scholar).

There are two example papers available on Blackboard (note, however, that these papers do not include discussion of the ensemble hypothesis, but demonstrate what a good paper related to course content looks like).

Schedule of assignment

Abstract due date—April 9 (worth 2 point on paper assignment)

Paper Consultation dates—April 2-April 30

Final Paper due date—May 2 (printed copy; in class)

Final Paper Rubric

Criteria	Unsatisfactory	Satisfactory	Excellent
Content: Is the thesis statement clearly summarized and supported?	**4 Points** Not accurately summarized, and/or were not clear.	**8 Points** Somewhat accurately and/or clearly summarized.	**16 Points** Well-summarized in an accurate and clear manner.
Organization: Was the paper well-organized and easy to follow? Did the format of the paper make sense given the information presented?	**4 Points** The paper was not well-organized and/or easy to follow, and/or was poorly applied or did not make sense given the presented information.	**8 Points** The paper was somewhat well-organized and/or easy to follow; partially well-developed or had the potential to work well, but fell flat.	**16 Points** The paper was well-organized and easy to follow, and complimented the thesis statement well.
APA style: Did the paper follow APA style?	**4 Points** Many errors in APA style.	**8 Points** A few errors in APA style.	**16 Points** No errors in APA style.
Spelling/Grammar: Were there errors in spelling or grammar?	**0 points** Errors in spelling or grammar.		**2 points** No errors in spelling or grammar.
			Total: ____/50

Hot Topics in Neuroscience News Assignment:

DUE BY **Monday 2/25/19**:

- News article and related scientific article. (more than one option is fine if you can't decide).
- email to Dr. O by email: judith.ogilvie@slu.edu

For this assignment, you will critically read a piece of neuroscience journalism alongside the scientific article it reports on, and analyze how experimental research is transformed into news. Start by finding a short (1-3 pp) story in an online or print newspaper or magazine (not a blog) about a neuroscientific study that is of interest to you (suggestions include NPR: www.npr.org/sections/science/, New York Times Science News: www.nytimes.com/section/science, Wall Street Journal Science: www.wsj.com/news/science. Do NOT use blogs that are based on press releases such as www.sciencedaily.com/terms/neuroscience.htm.) Once you have found an article in the popular press, you will then read the scientific research publication it references (focusing on its introductory and concluding sections.

The following questions should guide your analysis:

What claims of significance and implication are made in the scientific publication, and how are these recast as they move into the public domain? What hopes, fears, and speculations get voiced in the popularization of the research? What limitations of the experimental setup and qualifications on the results are deleted? How do images and/or the journalistic description of the research enhance or distort the actual research presented in the scientific publication? Your analysis should draw on ideas and concepts presented in your neuroscience coursework (you must cite a specific example from a specific class).

Note: If you feel that there is not enough material to analyze in the news item you have chosen, or if you want to focus on how one particular point in a study gets picked up and presented in the media, you may look at a set of popular articles based on one scientific article. Alternatively, you may choose to analyze one news story that reports on a small set of scientific articles. If you go this route, remember that the purpose of this assignment is to be as specific as possible in your reading and analysis, so don't take on additional items at the expense of close and careful analysis.

PRESENTATION FORMAT

DUE ON **Wednesday 3/20/19**:

Formal 20 minute oral presentation leaving an additional 3-5 minutes for questions and discussion. The talk should be very well prepared and rehearsed in advance so as to fit in the allotted time. When preparing your presentation, please refer to the "Presentation Tips" powerpoint posted on Blackboard.

Grading rubric for Presentations in Biol 4250 Sp2019				
	Excellent (A range) (8-7.5 pts or as noted)	**Competent (B range) (7-6.5 pts)**	**Developing (C range) (6-5.5 pts)**	**Unsatisfactory (D-F range) (5-0 pts)**
Content of Present-ation	Clear, consice summary of the overall topic. Why is the topic "hot"?	Adequate summary of the overall topic and current importance.	Minimal summary of the overall topicand current importance.	Failure to summary of the overall topicand current importance.
	Thorough, insightful summary of the scientific article. What claims of significance and implications are made?	Sufficient summary of the scientific article. What claims of significance and implications are made?	Some aspects of the scientific article are omitted or need further clarification	Did not demonstrateunderstandin g of the article
	Clear description of the context of the article from the public domain.	Adequate description of the context of the article from the public domain.	Minimal or vague description of the context of the article from the public domain.	Failure to include description of the context of the article from the public domain.
	Critical analysis: How are claims in the scientific article recast for the public domain? What hopes, fears, and speculations are added? What limitations and qualifications are omitted? Do images and/or language enhance or distort the original research? (20-18.5 pts)	Adequate analysis of how the claims in the scientific article are recast for the public domain. Addressed other questions sufficiently. (18-16 pts)	Fragmentary or vague analysis of how the claims in the scientific article are recast for the public domain. Some questions not clearly addressed. (15-13 pts)	Failure to analyze how the claims in the scientific article are recast for the public domain. Some questions not addressed at all (12-0 pts)
	Clear and specific explanation of the relationship between the material and neuroscience course(s) that you have taken.	Adequate explanation of the relationship between the material and neuroscience course(s) that you have taken.	Mininmal or vague explanation of the relationship between the material and neuroscience course(s) that you have taken.	Failure to explain the relationship between the material and neuroscience course(s) that you have taken.
	Appropriate citations of primary sources, references for background, & any pictures taken from other sources.	Most citations are appropriate. One or two may be missing or lack of primary citations.	Variable citations. Bibliography incomplete.	consistently incorrect, few, or no citations
Prepara-tion & Delivery	Material included was relevant, well organized, and key points were clear	Material included was relevant, adequately organized, and key points were presented	Material was relevant to some degree, not well organized, &/or some key points were confusing	Material was disorganized, relevance was unclear, key points were not delineated
	Powerpoint was used effectively; student did not read the text directly; slides supported what presenter said and used appropriate text size, quantity, labeling of pictures, etc.	Powerpoint was used adequately; student did not depend on text directly; slides supported what presenter said and were understandable	Powerpoint was used, but student read text almost entirely from slides; slides did not clearly support what presenter said & were difficult to understand	Powerpoint showed little evidence of advance preparation. Student read entire text from slides; slides were confusing, poorly laid out &/or not labeled well.
	Student addressed the class directly and in a clear voice, at an appropriate speed, and consistently made eye contact	Student addressed the class directly but with a less than clear voice, uneven speed, and/or made only intermittent eye contact	Student spoke too softly, unclearly, too fast, and/or with abrupt fragments and interjections; rarely made eye contact	Student was inexpressive, distracting, inaudible, or spoke too fast to be understood; no eye contact with the class
	Student well judged the scope of the assignment regarding time allotted, leaving time for questions. Responses to questions reflect significant preparation and a clear understanding of the material	Student adequately judged scope of assignment regarding time allotted, w/time for questions. Responses to questions reflect adequate preparation & an under-standing of the material.	Student misjudged scope of assignment regarding time alloted. Responses to questions inaccurately represented material, reflecting minimal preparation & understanding.	Student did not manage presentation time well . Student was unable to respond substantively to questions, reflecting little preparation or understanding of the material.
	Presentation was entertaining, but not overdone			
	Excellent (A range) (8-7.5 pts or as noted)	**Competent (B range) (7-6.5 pts)**	**Developing (C range) (6-5.5 pts)**	**Unsatisfactory (D-F range) (5-0 pts)**

NEUR 4930: Making Connections Assignment

> "One important way experts' and novices' knowledge organizations differ is in the number or density of connections among the concepts, facts, and skills they know…. [For example, students might] absorb the knowledge from each lecture in a course without connecting the information to other lectures or recognizing themes that cut across the course as a whole…. if students lack a strongly connected network their knowledge will be slower and more difficult to retrieve…. Moreover, if students do not make the necessary connections among pieces of information, they may not recognize or seek to rectify contradictions."
>
> From Ambrose et al. (2010) *How Learning Works: Seven Research-Based Principles for Smart Teaching,* pp. 49-50

DUE BY **Thursday 10/11/18**:

- During class, you will have selected one of your neuroscience electives for further reflection.
- Reflect on ways that the material you learned in this elective class can be related to neuroscience.
- Find a review article linking some aspect of the course with neuroscience. The review article does not have to be very current, since these may be broad topics.
    - One of the best sources of reviews for this assignment is *Trends in Neurosciences*, available electronically from the SLU library.
    - Go to http://lib.slu.edu. Click on "databases." Select "Pubmed"
    - under the Search bar, click on "advanced."
    - under "Builder," use the pull down menu to change "All fields" to "Journals"
    - enter "Trends in neurosciences." Enter other search terms in the next line.
- Write a reflection that includes the following:
    - Reflect on how the course is relevant to neuroscience using two of these issues: physical/anatomical, functional/physiological, genetic, evolutionary, or clinical/societal connections.
    - How did your reading change your understanding of the material from the course?
    - Reflect on how knowledge and/or skills (e.g. presentations, reading primary literature) from the course are relevant to you or may have relevance in fulfilling future career goals.
    - What new questions do you have?
    - See also specific review criteria on the back.
- Assignment should be at least 4 pages long **(**12 point Times Roman, 11 pt Arial or equivalent; 2x spacing**)**, plus one page of references**.**
- Next class period (10/11/18), your reflection will be peer reviewed, based on specific review criteria in the rubric on the back.

Assessment Rubric for Student Reflections

Learning Outcome: Over the course of the semester, the majority of students advance at least one stage in reflection.

	Distinguished	Proficient	Apprentice	Novice/Unacceptable
Clarity	The language is clear and expressive. Abstract concepts are explained accurately. Explanation of concepts makes sense to an uninformed reader.	Minor, infrequent lapses in clarity and accuracy, including spelling or grammar.	There are frequent lapses in clarity, accuracy, spelling and/or grammar.	Language is unclear and confusing throughout. Concepts are either not discussed or are presented inaccurately.
Interconnection	The reflection demonstrates connections between material from elective courses and facets from the broad field of Neuroscience, bolstered by the choice of review article.	The reflection demonstrates connections between material from elective courses and facets from the broad field of Neuroscience, bolstered by the choice of review article.	There is little attempt to demonstrate connections between material from elective courses, the chosen review article, and the field of Neuroscience.	No attempt to demonstrate connections to Neuroscience.
Relevance	The reflection demonstrates how the elective course is relevant to Neuroscience and meaningful to the student.	The reflection demonstrates how the elective course is relevant to Neuroscience and meaningful to the student.	Student makes attempts to demonstrate relevance, but the relevance is unclear to the reader.	Most of the reflection is irrelevant to Neuroscience and/or to the student.
Analysis	The reflection moves beyond simple description of the connections to an analysis of how the material contributes to student understanding of connections.	The reflection demonstrates student attempts to analyze the connections but analysis lacks depth.	Student makes attempts at applying the review article to the elective course concepts but fails to demonstrate depth of analysis.	Reflection does not move beyond description of the elective course.