Cognitive Science Program
GE CIL Assessment
CY 2022

Contents

CogSci CIL Assessment Plan, CY 2021

Required preliminaries

The first three of the following items of information serve to ground this Computer and Information Literacy plan within the fabric of the college. The fourth establishes an element of temporal continuity for the plan and its influence on our computer and information literacy instruction throughout our curriculum.

- **General Education Requirement being assessed**: Computer & Information Literacy
- **Course in which assessment of the CIL learning outcomes will take place**: Cog468 "Cognitive Science Capstone Seminar" - Fall 2021
- **Person overseeing assessment**: Craig Graci
- **Identify any changes you have made in your courses in light of the assessment that we did three years ago**:
  - We will heighten emphasis on our recommendation that students consider using **LaTeX** as their preferred document preparation language, rather than Microsoft's Word or Apple's Pages, for example, by requiring at least one assignment to be completed using a LaTeX template in at least two Cog labeled courses.
  - Experience with peer-based reviews of web-based documents suggests that it would be helpful for our students to be able to **annotate pdf documents** in a fluent manner. Consequently, we will introduce at least one assignment in at least two Cog labeled courses that call upon this skill. (This skill is especially useful in the time of Covid-19, when so many are doing so much of their work remotely, but will likely retain its increased utility in the years to come.)

General notes on our approach to the assessment

We decided to lace the structure of this plan, determined largely by the three required learning outcomes and our desire to interpret them in a manner that is appropriate for our program, with a thematic approach to assessment that we have conceived in terms of components (component outcomes) and tools.

1. We will approach this assessment task by decomposing each of the three learning outcomes into five **component outcomes**. These components address general skills, but do so in a manner that is particularly relevant to the field of cognitive science.
2. The **tools** used in the assessment are all drawn from requirements of the Cognitive Science Capstone Course. They are, for the most part, salient elements of the Cognitive Science Capstone Research Project that is the featured element in the course.
3. The names for **components** and **tools** are sometimes quite similar. Care was taken not to overload the names in a literal sense, but for the sake of naturalness of expression we determined that it would be best to permit the similarities to exist.

Learning Outcome 1: Perform basic operations of personal computer use

We will be assessing this learning outcome in **Cog468**, the Cognitive Science Capstone Seminar, during the Fall 2021 semester. These are the assessment tools that will be used:

- **REVIEW - Cognitive Science Research Paper Peer Review**: Each student performs a peer review of two other student research papers. Additionally, each student performs a peer review of two other student work sites. Both sorts of review are based on rubrics that afford representation in a regular grid of cells containing numbers and text, and which can be operated on by means of simple functions. Students will be required to share their reviews with authors of the papers and sites by means of documents that are created with a spreadsheet.
- **SITE - Cognitive Science Work Site**: Each student is required to craft a work site that archives a variety of artifacts pertaining to the course. Constraints on site creation include the crafting of .css and .html files using a powerful text editor, performing command line interactions, doing plenty of file format conversions, and a employing reasonable hierarchical organization of files.
- **PAPER - Cognitive Science Research Paper**: A paper is constructed incrementally as the semester unfolds. The process includes assignments to craft a problem statement, find sources, create an annotated bibliography, take notes in the form of quotes, summaries, or paraphrases. The process also incorporates a chain of drafts, beginning with a draft prerequisite assignment, and moving on to a "lightning" draft, a "skeletal" draft, a "substantial" draft, and a "final" draft. All of these paper oriented assignments afford ample opportunity for students to engage in both conventional and creative word processing tasks.
- **PRESENTATION - Cognitive Science Research Presentation**: Creation of a sequence of slides is required as an accompaniment to an end of semester research talk that highlights salient elements of the required research project.

For the Cognitive Science Major, we have decomposed this learning outcome into five component objectives which collectively seem to comprise a good portion of what many people consider to be the basic operations of personal computer use:

- **FILES -** manipulate and use files (interaction, not programming)
- **CELLS -** represent and process knowledge in regular grids of cells
- **TEXT -** engage in text editing and word processing activities
- **SLIDES -** design and create slides to accompany oral presentations
- **SITES -** design and create simple web pages

Our assessment will be qualitative in nature. Scores for the outcomes will assume one of four values: not meeting outcomes (`#`), approaching outcomes (`-`), meeting outcomes (`|`), or exceeding expectations (`+`). The FILES component will be assessed with the SITE tool, the CELLS component with the REVIEW tool, the TEXTS component with both the SITE tool and the PAPER tool, the SLIDES component with the PRESENTATION tool, and the SITES component with the SITE tool. A table of the following form will be filled out for each student in the Capstone Course in a manner that is consistent with the rubric presented below for each component outcome. An `X` will be placed in one cell of each row, indicating assessment for the student with respect to the component skill being assessed.

The rubrics used for scoring each of the component outcomes:

- score(FILES) =
  - `#` if the student doesn't create even a very modest web site (since there would then be no evidence of file creation and use)
  - `-` if the site lacks referential integrity (since lack of referential integrity suggests, at the very least, a deficit of attention with respect to file names, or knowledge with respect to file properties)
  - `|` if the site possesses referential integrity, but the content of the web site is precarious with respect to file organization, file type, or something else

Learning outcome 1: INTERNAL-STUDENT-ID					
PERFORM THE BASIC OPERATIONS OF PERSONAL COMPUTER USE					
Outcome ID	**Description**	#	-	|	+
FILES	manipulate and use files (interaction, not programming)				
CELLS	represent and process knowledge in regular grids of cells				
TEXTS	engage in text editing and word processing activities				
SLIDES	design and create slides to accompany oral presentations				
SITES	design and create simple web pages				

  + if the site is well constructed

- score(CELLS) =
  - # if the student doesn't do the reviews
  - - if the content is wanting with respect to numbers or short fragments of texts
  - | if the content is okay but either the formatting is poor or no functions have been applied
  - + if the sheet is well constructed
- score(TEXTS) =
  - # if the student constructs neither a work site (which requires text editing) nor a paper (which requires word processing)
  - - if the student constructs either a work site or a paper, but not both
  - | if the student constructs both a work site and a paper, but at least one of the products shows a lack of competence or caring with respect to the representation of text
  - + if both products assume a proper finished form
- score(SLIDES) =
  - # if the student fails to create a sequence of slides to accompany the required talk
  - - if the slides are poorly designed or constructed
  - | if the slides are reasonably designed and constructed, but contain solely text
  - + if the slides are well designed, rich in content, and varied in terms of media represention
- score(SITES) =
  - # if the student doesnt build a work site
  - - if the required content is missing
  - | if the required content is present, but is overly challenging to read, find, or reference
  - + if the site meets specifications and is consistent with reasonable design principles

An aggregate table will be produced from the individual student tables. The central portion of the table will be generated by simply counting the number of students that fall into each of the four categories of assessment for each of the five component outcomes. The literal bottom line of the aggregate table will constitute the metaphorical bottom line of assessment with respect to Learning Outcome 1.

Learning Outcome 2: Understand and use basic research techniques

We will be assessing this learning outcome in **Cog468**, the Cognitive Science Capstone Seminar, during the Fall 2021 semester. These are the assessment tools that will be used:

- **EXAM - Cognitive Science Capstone Exam**: Each student sits for a 40 minute oral exam before a small number of members of the Cognitive Science Program Advisory Board. This examination generally takes place during the weeks leading up to Thanksgiving recess. Ten sets of questions are posed, one of each of the learning

Learning outcome 1: AGGREGATE DATA					
PERFORM THE BASIC OPERATIONS OF PERSONAL COMPUTER USE					
Outcome ID	**Description**	#	-	—	+
FILES	manipulate and use files (interaction, not programming)				
CELLS	represent and process knowledge in regular grids of cells				
TEXTS	engage in text editing and word processing activities				
SLIDES	design and create slides to accompany oral presentations				
SITES	design and create simple web pages				
Outcome 1	**data representing assessment of Outcome 1**				

outcomes that are directly associated with the major. This exam affords an excellent opportunity to explore not only student knowledge of ideas and issues associated with the content of cognitive science, but also student knowledge of basic research techniques.

- **PROJECT - Cognitive Science Research Project**: This course features individual interdisciplinary, representation rich research projects of a relatively modest scale. The Capstone Research Project is intended to be in the spirit of authentic undergraduate research. Each student is required to craft and complete their own project. Students are given wide latitude in negotiating a realm of study, as well as research approach, so long as the topic stands in a justifiable relationship to the computational/representational assumption which unifies the field and the approach is consistent with the interdisciplinary assumption which diversifies the field. Students are required to produce two significant artifacts as a result of completing this project: an on-line work portfolio and a paper. Students are periodically asked to walk the class through their portfolio.
- **SITE - Cognitive Science Work Site**: Each student is required to craft a work site that archives a variety of artifacts pertaining to the course. Constraints on site creation include the crafting of .css and .html files using a powerful text editor, performing command line interactions, doing plenty of file format conversions, and a employing reasonable hierarchical organization of files.
- **PAPER - Cognitive Science Research Paper**: A paper is constructed incrementally as the semester unfolds. The process includes assignments to craft a problem statement, find sources, create an annotated bibliography, take notes in the form of quotes, summaries, or paraphrases. The process also incorporates a chain of drafts, beginning with a draft prerequisite assignment, and moving on to a "lightning" draft, a "skeletal" draft, a "substantial" draft, and a "final" draft. All of these paper oriented assignments afford ample opportunity for students to engage in both conventional and creative word processing tasks.
- **ESSAYS - Cognitive Science Capstone Final Essays**: The focal point of the final activity for the Capstone Course is a collection of student essays. Students are asked to compose three essays and bring hard copies of them to the classroom during the final exam period. They are also asked to prepare to write three essays on other clearly delineate topics so that they will be able write in a clear and coherent fashion on the topics during the final exam period. Some of the essays will shed light on student knowledge of basic research techniques.

For the Cognitive Science major, we have decomposed this learning outcome into five components which represent research techniques that, generally speaking, intersect with the interests of general education and cognitive science:

- **PROBLEMS -** engage in problem finding and problem space analysis
- **SCIENTIFICMETHOD -** articulate and apply aspects of the scientific method
- **PATTERNS -** distinguish between big data research and more traditional methods
- **COMPUTATIONS -** discuss essential ideas associated with computational modeling
- **INTERDISCIPLINARITY -** define and discuss approaches to interdisciplinary research

Our assessment will be qualitative in nature. Scores for the outcomes will assume one of four values: not meeting outcomes (#), approaching outcomes (-), meeting outcomes (|), or exceeding expectations (+). The PROBLEMS component will be assessed with the PROJECT tool and the SITE tool, the SCIENTIFIC METHOD component with the EXAM tool and the ESSAYS tool, the PATTERNS component with both the EXAM tool and the ESSAYS tool, the COMPUTATIONS component with the EXAM tool and the ESSAYS tool, and the INTERDISCIPLINARY component with the EXAM tool tool and the PAPER tool. A table of the following form will be filled out for

each student in the capstone course in a manner that is consistent with the rubric for each outcome. An `X` will be placed in one cell of each row, indicating assessment for the student with respect to the component skill being assessed.

Learning outcome 2: INTERNAL-STUDENT-ID					
UNDERSTAND AND USE BASIC RESEARCH TECHNIQUES					
Outcome ID	**Description**	`#`	`-`	`|`	`+`
PROBLEMS	engage in problem finding and problem space analysis				
SCIENTIFICMETHOD	articulate and apply aspects of the scientific method				
PATTERNS	distinguish between big data ideas and traditional design methods				
COMPUTATIONS	discuss big ideas associated with computational modeling				
INTERDISCIPLINARITY	define and discuss approaches to interdisciplinary research				

The rubrics used for scoring each of the component outcomes:

- score(PROBLEMS) =
  - `#` if the student fails to come up with any candidate research problems for their capstone project (students are asked to find three problems, discuss their scope, and defend their relationship to cognitive science by relating them to the fundamental assumptions of the field)
  - `-` if the student comes up with at least two reasonable problems
  - `|` if, additionally, the student can contextualize and articulate the significance of at least two of the problems
  - `+` if, additionally, the student can describe the internal structure of their research problem in a clear and compelling manner
- score(SCIENTIFICMETHOD) =
  - `#` if the student fails to characterize the scientific method in a reasonable way
  - `-` if the student can identify and explain at least most of the elements of the scientific method in a satisfying manner
  - `|` if, additionally, the student can describe a classic example of its use
  - `+` if, additionally, the student can relate the method to some bit of work that they have done while studying cognitive science at Oswego
- score(PATTERNS) =
  - `#` if the student is unable to broadly distinguish between big data research and more traditional research design methods in a satisfying manner
  - `-` if the student can broadly distinguish big data research and more traditional research design methodology in a satisfying manner
  - `|` if, additionally, the student can discuss examples of research within either the realm of big data or the realm of more traditional research methodology, but not both
  - `+` if, additionally, the student can discuss work that they have done while studying cognitive science at Oswego that falls within one of the two ways of knowing
- score(COMPUTATIONS) =
  - `#` if the student is unable to express knowledge of the computational/representational assumption that underlies the field of cognitive science
  - `-` if the student is able to articulate the computational/representational assumption
  - `|` if, additionally, the student can describe the main paradigms of computational modeling and discuss their basic affordances
  - `+` if, additionally, the student can readily describe an instance of how some computational modeling framework has contributed to the advancement of knowledge
- score(INTERDISCIPLINARITY) =
  - `#` if the student is unable to articulate the interdisciplinary assumption that enriches research in cognitive science and so many other fields
  - `-` if the student can articulate the interdisciplinary assumption

| if, additionally, the student can provide a compelling account of an interdisciplinary research endeavor

+ if, additionally, the student can distinguish among integrative interdisciplinarity, multidisciplinarity, and transdisciplinarity, and discuss various fields of knowledge with respect to these classifications

An aggregate table will be produced from the individual student tables. The central portion of the table will be generated by simply counting the number of students that fall into each of the four categories of assessment for each of the five outcomes. The literal bottom line of the aggregate table will constitute the metaphorical bottom line of assessment with respect to Learning Outcome 2.

Learning outcome 2: AGGREGATE DATA					
UNDERSTAND AND USE BASIC RESEARCH TECHNIQUES					
Outcome ID	**Description**	#	-	—	+
PROBLEMS	engage in problem finding and problem space analysis				
SCIENTIFICMETHOD	articulate and apply aspects of the scientific method				
PATTERNS	distinguish between big data ideas and traditional design methods				
COMPUTATIONS	discuss big ideas associated with computational modeling				
INTERDISCIPLINARITY	define and discuss approaches to interdisciplinary research				
Outcome 2	**data representing assessment of Outcome 2**				

Learning Outcome 3: Locate, evaluate, and synthesize information from a variety of sources

We will be assessing this learning outcome in **Cog468**, the Cognitive Science Capstone Seminar, during the Fall 2021 semester. These are the assessment tools that will be used:

- **EXAM - Cognitive Science Capstone Exam**: Each student sits for a 40 minute oral exam before a small number of members of the Cognitive Science Program Advisory Board. This examination generally takes place during the weeks leading up to Thanksgiving recess. Ten sets of questions are posed, one of each of the learning outcomes that are directly associated with the major. This exam affords an excellent opportunity to explore not only student knowledge of ideas and issues associated with the content of cognitive science, but also student knowledge of basic research techniques.
- **PROJECT - Cognitive Science Research Project**: This course features individual interdisciplinary, representation rich research projects of a relatively modest scale. The Capstone Research Project is intended to be in the spirit of authentic undergraduate research. Each student is required to craft and complete their own project. They are given wide latitude in negotiating a realm of study, as well as in the research approach, so long as the topic stands in a justifiable relationship to the computational/representational assumption which unifies the field and the approach is consistent with the interdisciplinary assumption which diversifies the field. Students are required to produce two significant artifacts as a result of completing this project: an on-line work portfolio and a paper. Students are periodically asked to walk the class through their portfolio.
- **SITE - Cognitive Science Work Site**: Each student is required to craft a work site that archives a variety of artifacts pertaining to the course. Constraints on site creation include the crafting of .css and .html files using a powerful text editor, performing command line interactions, doing plenty of file format conversions, and a employing reasonable hierarchical organization of files.
- **PAPER - Cognitive Science Research Paper**: A paper is constructed incrementally as the semester unfolds. The process includes assignments to craft a problem statement, find sources, create an annotated bibliography, take notes in the form of quotes, summaries, or paraphrases. The process also incorporates a chain of drafts, beginning with a draft prerequisite assignment, and moving on to a "lightning" draft, a

"skeletal" draft, a "substantial" draft, and a "final" draft. All of these paper oriented assignments afford ample opportunity for students to engage in both conventional and creative word processing tasks.

- **PRESENTATION - Cognitive Science Research Presentation**: Creation of a sequence of slides is required as an accompaniment to an end of semester research talk that highlights salient elements of the required research project.
- **ESSAYS - Cognitive Science Capstone Final Essays**: The focal point of the final activity for the Capstone Course is a collection of student essays. Students are asked to compose three essays and bring hard copies of them to the classroom during the final exam period. They are also asked to prepare to write three essays on other clearly delineate topics so that they will be able write in a clear and coherent fashion on the topics during the final exam period. Some of the essays will shed light on student knowledge of basic research techniques.

For Cognitive Science majors, we have decomposed this learning outcome into five components. The first three of these probably find manifestation in most plans for assessing this outcome. The last two, probably not, at least not in the manner presented here. The science of design has long been a significant theme running through cognitive science, and distributed cognition is increasingly valued as a powerful framework within which to study ideas associated with perception and action. Since we feel strongly that both of these topics belong, or at least should belong, squarely within the realm of general education (Herb Simon (in "The Sciences of the Artificial"), and Don Norman (in "Things that Make Us Smart"),for example, have argued persuasively for this perspective), we took the liberty of incorporating them into the mix of skills that figure into our assessment of locating, evaluating, and synthesizing ideas from a variety of sources. The components are:

- **SOURCES -** find, classify, and evaluate source materials
- **NOTES -** paraphrase notes and synthesizes notes from other notes
- **TEXTS -** craft short narratives which judiciously incorporate source information
- **DESIGN -** articulate and apply principles of design
- **DCOG -** interact mindfully with cognitive artifacts in distributed cognition (DCog) environments

Our assessment will be qualitative in nature. Scores for the outcomes will assume one of four values: not meeting outcomes (`#`), approaching outcomes (`-`), meeting outcomes (`|`), or exceeding expectations (`+`). The SOURCES component will be assessed with the PROJECT tool and the PAPER tool, the NOTES component with the PROJECT tool and the PAPER tool, the TEXTS component with both the PAPER tool and the ESSAYS tool, the DESIGN component with the SITE tool and the PRESENTATION tool, and the DCOG component with the EXAM tool and the PROJECT tool and the SITE tool. A table of the following form will be filled out for each student in the capstone course in a manner that is consistent with the rubric for each outcome. An `X` will be placed in one cell of each row, indicating assessment for the student with respect to the component skill being assessed.

Learning outcome 3: INTERNAL-STUDENT-ID					
LOCATE, EVALUATE, AND SYNTHESIZE INFORMATION FROM A VARIETY OF SOURCES					
Outcome ID	**Description**	`#`	`-`	`|`	`+`
SOURCES	find, classify, and evaluate source materials				
NOTES	paraphrase notes and synthesizes notes from other notes				
TEXTS	craft short narratives which judiciously incorporate source information				
DESIGN	articulate and apply principles of design				
DCOG	interact mindfully with cognitive artifacts in DCog environments				

The rubrics used for scoring each of the component outcomes:

- score(SOURCES) =
  - `#` if the student doesn't create the required list of sources in support of the research project
  - `-` if the student creates a list of sources but fails to reasonably classify them with respect to the research project goals
  - `|` if the student creates and reasonably classifies the required list of sources, but fails to provide proper citation
  - `+` if the student properly creates, classifies, and cites the sources, and additionally provides cogent annotations for each source in the manner prescribed by the source finding assignment

- score(NOTES) =
  - `#` if the student doesn't create the required bank of notes in support of the research project
  - `-` if, after mining the sources for significant bits of knowledge and recording them verbatim, the student fails to at least occasionally produce paraphrases of these bits and syntheses of related bits in the manner prescribed in the note making assignment of the research project.
  - `|` if the student builds a bank of quotes and paraphrases and syntheses, but without suitable balance with respect to the goals of the research project
  - `+` if the student builds a bank of quotes and paraphrases and syntheses with a proper balance in light of the research aims
- score(TEXTS) =
  - `#` if the student doesn't even make it to the stage of the research paper construction process marked by satisfactory completion of the "skeletal" draft
  - `-` If the student satisfactorily completes the "skeletal" draft but not the "substantial" draft
  - `|` If the student satisfactorily completes the "substantial" draft
  - `+` if, additionally, the student writes good Capstone Finale essays grounded in reasonable sources
- score(DCOG) =
  - `#` if the student fails to interact with relevant cognitive artifacts while performing the required research
  - `-` if the student successfully interacts with appropriate library resources to obtain sound source materials
  - `|` if, additionally, the student builds a valuable website in support of the research endeavor, one which archives significant artifacts for reflection
  - `+` if, additionally, the student tells a compelling story of the role that distributed cognition has played in their development as a cognitive science major, complete with reference to the more salient cognitive artifacts that they will have encountered in their studies
- score(DESIGN) =
  - `#` if the student student fails to produce either a web site in support of the research project or a slide show to help with the required research talk
  - `-` if the student produces both the site and the slides, but one or both is significantly lacking in some respect, making it far less effective than it otherwise might be.
  - `|` if the student produces both a reasonably well designed site and reasonably well designed slides
  - `+` if, additionally, the student can talk in a compelling manner about design as a way of thinking

An aggregate table will be produced from the individual student tables. The central portion of the table will be generated by simply counting the number of students that fall into each of the four categories of assessment for each of the five outcomes. The literal bottom line of the aggregate table will constitute the metaphorical bottom line of assessment with respect to Learning Outcome 3.

Learning outcome 3: AGGREGATE DATA						
LOCATE, EVALUATE, AND SYNTHESIZE INFORMATION FROM A VARIETY OF SOURCES						
Outcome ID	**Description**	#	-	—	+
SOURCES	find, classify, and evaluate source materials				
NOTES	paraphrase notes and synthesizes notes from other notes				
TEXTS	craft short narratives which judiciously incorporate source information				
DESIGN	articulate and apply principles of design				
DCOG	interact mindfully with cognitive artifacts in DCog environments				
Outcome 3	**data representing assessment of Outcome 3**				

CogSci CIL Assessment Data, CY 2021

For each of the three learning outcomes, the data is presented for each of the three students that were enrolled in the Fall 2021 Cognitive Science Capstone Course. The agregate data over the three students is also presented for each of the three learning outcomes.

LO 1: Perform the Basic Operations of Personal Computer Use

Learning outcome 1: S1					
PERFORM THE BASIC OPERATIONS OF PERSONAL COMPUTER USE					
Outcome ID	**Description**	**#**	**-**	**|**	**+**
FILES	manipulate and use files (interaction, not programming)				x
CELLS	represent and process knowledge in regular grids of cells				x
TEXTS	engage in text editing and word processing activities				x
SLIDES	design and create slides to accompany oral presentations				x
SITES	design and create simple web pages				x

Learning outcome 1: S2					
PERFORM THE BASIC OPERATIONS OF PERSONAL COMPUTER USE					
Outcome ID	**Description**	**#**	**-**	**|**	**+**
FILES	manipulate and use files (interaction, not programming)				x
CELLS	represent and process knowledge in regular grids of cells	x			
TEXTS	engage in text editing and word processing activities				x
SLIDES	design and create slides to accompany oral presentations				x
SITES	design and create simple web pages				x

Learning outcome 1: S3					
PERFORM THE BASIC OPERATIONS OF PERSONAL COMPUTER USE					
Outcome ID	**Description**	**#**	**-**	**|**	**+**
FILES	manipulate and use files (interaction, not programming)				x
CELLS	represent and process knowledge in regular grids of cells				x
TEXTS	engage in text editing and word processing activities				x
SLIDES	design and create slides to accompany oral presentations				x
SITES	design and create simple web pages				x

Learning outcome 1: AGGREGATE DATA					
PERFORM THE BASIC OPERATIONS OF PERSONAL COMPUTER USE					
Outcome ID	**Description**	#	-	—	+
FILES	manipulate and use files (interaction, not programming)	0	0	0	3
CELLS	represent and process knowledge in regular grids of cells	1	0	0	2
TEXTS	engage in text editing and word processing activities	0	0	0	3
SLIDES	design and create slides to accompany oral presentations	0	0	0	3
SITES	design and create simple web pages	0	0	0	3
Outcome 1	**data representing assessment of Outcome 1**	1	0	0	14

LO 2: Understand and use basic research techniques

Learning outcome 2: S1					
UNDERSTAND AND USE BASIC RESEARCH TECHNIQUES					
Outcome ID	**Description**	#	-	|	+
PROBLEMS	engage in problem finding and problem space analysis				x
SCIENTIFICMETHOD	articulate and apply aspects of the scientific method				x
PATTERNS	distinguish between big data ideas and traditional design methods				x
COMPUTATIONS	discuss big ideas associated with computational modeling				x
INTERDISCIPLINARITY	define and discuss approaches to interdisciplinary research				x

Learning outcome 2: S2					
UNDERSTAND AND USE BASIC RESEARCH TECHNIQUES					
Outcome ID	**Description**	#	-	|	+
PROBLEMS	engage in problem finding and problem space analysis				x
SCIENTIFICMETHOD	articulate and apply aspects of the scientific method			x	
PATTERNS	distinguish between big data ideas and traditional design methods			x	
COMPUTATIONS	discuss big ideas associated with computational modeling			x	
INTERDISCIPLINARITY	define and discuss approaches to interdisciplinary research				x

Learning outcome 2: S3						
UNDERSTAND AND USE BASIC RESEARCH TECHNIQUES						
Outcome ID	**Description**	#	-	|	+
PROBLEMS	engage in problem finding and problem space analysis			x	
SCIENTIFICMETHOD	articulate and apply aspects of the scientific method				x
PATTERNS	distinguish between big data ideas and traditional design methods				x
COMPUTATIONS	discuss big ideas associated with computational modeling				x
INTERDISCIPLINARITY	define and discuss approaches to interdisciplinary research				x

Learning outcome 2: AGGREGATE DATA					
UNDERSTAND AND USE BASIC RESEARCH TECHNIQUES					
Outcome ID	**Description**	#	-	—	+
PROBLEMS	engage in problem finding and problem space analysis	0	0	1	2
SCIENTIFICMETHOD	articulate and apply aspects of the scientific method	0	0	1	2
PATTERNS	distinguish between big data ideas and traditional design methods	0	0	1	2
COMPUTATIONS	discuss big ideas associated with computational modeling	0	0	1	2
INTERDISCIPLINARITY	define and discuss approaches to interdisciplinary research	0	0	0	3
Outcome 2	**data representing assessment of Outcome 2**	0	0	4	11

LO 3: Locate, evaluate, and synthesize information from a variety of sources

Learning outcome 3: S1					
LOCATE, EVALUATE, AND SYNTHESIZE INFORMATION FROM A VARIETY OF SOURCES					
Outcome ID	**Description**	#	-	|	+
SOURCES	find, classify, and evaluate source materials				x
NOTES	paraphrase notes and synthesizes notes from other notes				x
TEXTS	craft short narratives which judiciously incorporate source information				x
DESIGN	articulate and apply principles of design				x
DCOG	interact mindfully with cognitive artifacts in DCog environments				x

Learning outcome 3: S2					
LOCATE, EVALUATE, AND SYNTHESIZE INFORMATION FROM A VARIETY OF SOURCES					
Outcome ID	**Description**	#	-	|	+
SOURCES	find, classify, and evaluate source materials				x
NOTES	paraphrase notes and synthesizes notes from other notes				x
TEXTS	craft short narratives which judiciously incorporate source information				x
DESIGN	articulate and apply principles of design				x
DCOG	interact mindfully with cognitive artifacts in DCog environments			x	

Learning outcome 3: S3					
LOCATE, EVALUATE, AND SYNTHESIZE INFORMATION FROM A VARIETY OF SOURCES					
Outcome ID	**Description**	#	-	|	+
SOURCES	find, classify, and evaluate source materials				x
NOTES	paraphrase notes and synthesizes notes from other notes				x
TEXTS	craft short narratives which judiciously incorporate source information				x
DESIGN	articulate and apply principles of design				x
DCOG	interact mindfully with cognitive artifacts in DCog environments				x

Learning outcome 3: AGGREGATE DATA					
LOCATE, EVALUATE, AND SYNTHESIZE INFORMATION FROM A VARIETY OF SOURCES					
Outcome ID	**Description**	#	-	—	+
SOURCES	find, classify, and evaluate source materials	0	0	0	3
NOTES	paraphrase notes and synthesizes notes from other notes	0	0	0	3
TEXTS	craft short narratives which judiciously incorporate source information	0	0	0	3
DESIGN	articulate and apply principles of design	0	0	0	3
DCOG	interact mindfully with cognitive artifacts in DCog environments	0	0	1	2
Outcome 3	**data representing assessment of Outcome 3**	0	0	1	14

Computer and Information Literacy Assessment Report
Cognitive Science Program

Context

- Calendar year: CY 2021
- Course in which assessment took place: Cog468 “Cognitive Science Capstone Seminar”
- Semester: Fall, 2021
- Number of sections: 1

Learning Outcomes

These are the three learning outcomes that we are given to use as the basis for our assessment of the computer and information literacy component of general education:

- Learning Outcome 1: Perform basic operations of personal computer use
- Learning Outcome 2: Understand and use basic research techniques
- Learning Outcome 3: Locate, evaluate, and synthesize information from a variety of sources

Results in Tabular Form

Learning Outcome	Information			Results							
	Date of Data Collection	Students Assessed		Exceeding Standards		Meeting Standards		Approaching Standards		Not Meeting Standards	
	Sem/Yr	#	%	#	%	#	%	#	%	#	%
Perform the basic operations of personal computer use	Fall ‘21	3	100	3	100	0	0	0	0	0	0
Understand and use basic research techniques	Fall ‘21	3	100	3	100	0	0	0	0	0	0
Locate, evaluate, and synthesize information from a variety of sources	Fall ‘21	3	100	3	100	0	0	0	0	0	0

Assessment Tool and Measure

We used the assessment tool and measure identified in our assessment plan update.

Method of Analysis

Our computational method of analysis is detailed in the final section of the assessment plan. In abstract terms, our process of analysis for individual students with respect to each learning outcome consists of:

1. Recording, in symbolic terms, some observations about the student's behavior with respect to the learning outcome, which indicate the degree to which we feel that student is meeting our expectations.
2. Mapping the symbols to numbers and averaging the numbers in a manner that performs an abstraction operation over the observations.
3. Mapping the numeric results back to the domain of symbols, the result of which denotes the degree to which we believe that the student has met our expectations with respect to the learning outcome.

Our computational process of analysis for the students in aggregate with respect to each learning outcome consists of:

1. Averaging the averages computed in step 2 of the analysis for the individuals.
2. Mapping the average of the averages to the domain of symbols.

Computation of Results

LO 1: Perform basic operations of personal computer use

- Student 1: (0*0)+(0*1)+(0*2)+(5*3) = 15; (15/5) = 3.0; 3.0 → +
- Student 2: (1*0)+(0*1)+(0*2)+(4*3) = 13; (13/5) = 2.6; 2.6 → +
- Student 3: (0*0)+(0*1)+(0*2)+(5*3) = 15; (15/5) = 3.0; 3.0 → +

- Aggregate: (3.0+2.6+3.0)/3 = 2.867; 2.867 → +

LO 2: Understand and use basic research techniques

- Student 1: (0*0)+(0*1)+(0*2)+(5*3) = 15; (15/5) = 3.0; 3.0 → +
- Student 2: (1*0)+(0*1)+(3*2)+(2*3) = 12; (12/5) = 2.6; 2.6 → +
- Student 3: (0*0)+(0*1)+(1*2)+(4*3) = 13; (15/5) = 2.8; 2.8 → +

- Aggregate: (3.0+2.6+2.8)/3 = 2.800; 2.800 → +

LO 3: Locate, evaluate, and synthesize information from a variety of sources

- Student 1: (0*0)+(0*1)+(0*2)+(5*3) = 15; (15/5) = 3.0; 3.0 → +
- Student 2: (0*0)+(0*1)+(1*2)+(4*3) = 14; (14/5) = 2.8; 2.8 → +
- Student 3: (0*0)+(0*1)+(0*2)+(5*3) = 15; (15/5) = 3.0; 3.0 → +

- Aggregate: (3.0+2.8+3.0)/3 = 2.933; 2.933 → +

Analysis of Results

Instruction: Please be sure to address each learning outcome and both strengths and weaknesses revealed by the assessment, if any.

Note: My analysis here is virtually identical to what it was during our previous round of computer and information literacy assessment. Moreover, I don't think that I can better articulate my thoughts with respect to our students and the learning outcomes than I did three years ago. Consequently, I am just going to echo the analysis that I wrote in our last assessment report.

By performing this assessment, and observing that each of the students "exceeded expectations" on all three learning outcomes, we confirmed our intuition that senior cognitive science majors are capable of effectively using computing machines to support their research activities and present their research findings.

LO 1: Perform basic operations of personal computer use

Our experience is that most cognitive science majors enter the program with pretty good computer use skills. Those few who may not enter the program with those skills, surely develop them in the course of taking their computer science requirements (programming and cognitive computational modeling) and their psychology requirements (statistics and research methods).

LO 2: Understand and use basic research techniques

Cognitive science embraces science as its principle way of knowing, assumes an interdisciplinary stance, fosters a deep relationship with computation, and explicitly incorporates courses in statistics and research methods. All things considered, it is not surprising that cognitive science students can hold their own with respect to basic research techniques.

LO 3: Locate, evaluate, and synthesize information from a variety of sources

One of the defining assumptions of the field of cognitive science is the interdisciplinary assumption which incorporates within it the idea of integrating knowledge from different disciplines. We highlight the idea of integrating knowledge from disparate disciplines in order to enhancing our understanding of the mind/brain right from the start of our curriculum, in our two introductory cognitive science courses. Beyond that, a number of required courses for cognitive science majors feature research methodologies directly incorporating the ideas associated with this learning outcome (e.g., research methods, semiotics, language and culture). Consequently, it is not surprising that our students are have considerable skill when it comes to locating, evaluating, and synthesizing information from a variety of sources.

Action to be taken

Instruction: Please indicate the connection between the assessment findings and the proposed action(s); if no action is to be taken, please indicate why you think none is necessary.

It is not clear from the findings that any action needs to be taken. The students are required to take computer science courses, which focus on a range of computational and design skills, psychology courses, including statistics and research methods, and cognitive science courses, which, by virtue of the interdisciplinary assumption that underlies the field, tend to focus on locating, evaluating, and synthesizing information from a variety of sources. Consequently, cognitive science majors tend to learn to be very capable with respect to the three computer and information literacy learning outcomes.

That said, it is easy to make a suggestion that would surely benefit cognitive science students. On the whole, cognitive science students tend to be pretty good with standard text editors and document preparation systems. I would like to encourage the cognitive science faculty to challenge the students to use better tools, especially when it comes to text editors and document preparation systems. For example, through advisement, we might encourage first and second year cognitive science students to take the LaTeX course that is now regularly offered on campus. This would enhance their document preparation skills, and position them to comfortably prepare articles which require the use of particular LaTeX templates, as is the case for a number of cognitive science related meetings and journals.

Suggestions for others doing CIL assessment

Althought the computer and information literacy learning outcomes tend to transcend fields of study, it may be more meaningful to do this sort of assessment if you can find compelling ways to flavor assessment of the the three learning outcomes with ideas, methodologies, and technological skills that are associated with your particular field of study.