Information Literacy University-Wide Assessment Results at California Polytechnic State University (2016-21)

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Author Note

Katherine O'Clair is now Associate Dean for Academic Services.

Debra Valencia-Laver has retired from Cal Poly.

Abstract

This report outlines the 2016-21 assessment cycle for information literacy, one of five core competencies assessed at California Polytechnic State University, San Luis Obispo (Cal Poly). This assessment included both direct and indirect measures to evaluate student proficiency. The rubric-based evaluation of upper-division work was the first to include artifacts completed by students in groups; Cal Poly is committed to a Learn by Doing pedagogy and high-impact practices, which frequently include group work especially at the upper-division level. Including these artifacts was an important step in Cal Poly's assessment practices as it confirmed the university's commitment to remain true to reviewing authentic student learning. The results of the multipart evaluation show that students may be performing below expectations, and Cal Poly is taking steps to address ways in which to improve student learning and achievement of this core competency.

Keywords: academic assessment, information literacy, core competency, higher education, interdisciplinary, group work

Information Literacy Upper-Division Assessment Results at California Polytechnic State University (2016-21)

As an accredited university with the WASC Senior College and University Commission (WSCUC), California Polytechnic State University (Cal Poly) is required to measure and document its assessment of five core competencies "at a point close to graduation" at the university level (WSCUC, 2013). These core competencies, which are required for all WSCUC-accredited institutions, are as follows: information literacy, critical thinking, written communication, oral communication, and quantitative reasoning. The information literacy assessment was the final competency Cal Poly assessed under the new 2013 WSCUC accrediting guidelines.

At Cal Poly, the office of Academic Programs and Planning (APP) leads the assessment activities for each of these core competencies for the purposes of fulfilling accreditation requirements and measuring educational effectiveness. Each core competency is assessed independently on a multi-year cycle (Figure 1) with three distinct phases: (1) Research and Development; (2) Evaluation and Communication; and (3) Education and Improvement. For each competency, Academic Programs and Planning forms a learning community with administrators and faculty experts from the respective disciplines (e.g., English faculty for written communication; Mathematics for quantitative reasoning) in an effort to ensure both faculty buy-in and rigor in the assessment activities. The learning community works together to explore the scope of the competency, plan for the Evaluation and Communication phase of the assessment, document the assessment effort, and help determine recommendations and next steps for continuous improvement.

Figure 1

Cal Poly Course-Based Core Competency Assessment Timeline, 2012 – 2022

CAL POLY CORE COMPETENCY ASSESSMENT TIMELINE*

WASC Senior College and University Commission (WSCUC) Core Competencies:

Critical Thinking, Written Communication, Quantitative Reasoning, Oral Communication, and Information Literacy

Important Accreditation Dates:
Spring 2012 – End of Previous Cycle (based on WSCUC Commission Action)
Spring 2019 – Submission of Proposal for Next Self-Study
Spring 2022 – Accreditation Visit

2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Critical Thinking	Critical Thinking		Critical Thinking				Critical Thinking	Critical Thinking	
	Written Communication	Written Communication		Written Communication				Written Communication	Written Communication
		Quantitative Reasoning	Quantitative Reasoning		Quantitative Reasoning	Quantitative Reasoning	Quantitative Reasoning		Quantitative Reasoning
			Oral Communication	Oral Communication		Oral Communication			Oral Communication
				Information Literacy	Information Literacy		Information Literacy		

Phase 1: Research and Development *Year 1*	Organize learning communities to research and develop the core competency; create a common definition; identify artifact; sampling plan and assessment tool(s).
Phase 2: Evaluation and Communication *Years 2 and 3*	Artifact collection and analysis; collection and evaluation of artifacts from across campus representing lower-division courses in GE and senior-level work; communication.
Phase 3: Education and Improvement *Years 4 and 5*	Continued sharing of results and determination of appropriate curricular areas for improvement. Develop educational workshops to enhance learning of core competency.

* *Last updated July 10, 2019*

To begin its evaluation, Cal Poly reviewed definitions from information literacy disciplinary experts across the nation. In one instance, information literacy is defined as "the ability to know when there is a need for information, to be able to identify, locate, evaluate, and effectively and responsibly use and share that information for the problem at hand" (Association of American College & Universities, 2013). In another instance, the definition has been expanded to include dispositions and habits of mind in a "set of integrated abilities encompassing

the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning" (Association of College and Research Libraries, 2016). Together, these definitions provided an important foundation for organizing goals and establishing a rubric-based assessment at Cal Poly.

The assessment cycle for information literacy started in 2016-17 and concluded in the 2020-21 academic year. This report outlines the efforts for each of the three phases for the assessment of information literacy at Cal Poly.

Method

Phase 1: Research and Development of Information Literacy Assessment

Forming the Information Literacy Learning Community

In following with the practice used for the other core competency assessment cycles, one of the first steps in Phase 1: Research and Development was for Academic Programs and Planning to form a learning community to guide and direct the development of the information literacy assessment. A campus-wide invitation was sent to administrators, faculty, and staff with an interest in information literacy and assessment. Dr. Jack Phelan[1], the Director of Academic Assessment, and Katherine O'Clair, a faculty librarian with expertise in information literacy and experience with assessment, served as leads for the Information Literacy Learning Community (ILLC, Table 1). They worked closely with Melinda Weaver[2], the academic assessment staff

[1] Dr. Jack Phelan left Cal Poly in December 2018; Dr. Michael V. Nguyen joined Cal Poly as its newest Director of Academic Assessment in August 2019.

[2] Melinda Weaver left Cal Poly in 2019; Shannon Sullivan-Danser joined in September 2019.

coordinator in APP. The ILLC was charged with the following activities during its work from 2016-18:

- develop a definition of "information literacy" for the purposes of assessing student learning at Cal Poly;
- determine the direct and indirect measures to be used to assess student competency in information literacy;
- create a rubric to assess artifacts of student learning with respect to information literacy; and
- identify the target level and courses to be assessed.

Table 1

Information Literacy Learning Community Membership (2016-18)

Name	Department	College/Division
Kaila Bussert	Kennedy Library	University Library
Beth Chance	Statistics	College of Science and Mathematics
Carol Curiel	English	College of Liberal Arts
Mary Glick	Journalism	College of Liberal Arts
Martin Mehl	Communication Studies	College of Liberal Arts
Katherine O'Clair *Faculty Lead*	Kennedy Library	University Library
Jack Phelan *University Lead*	Academic Programs and Planning	Academic Affairs
Marilyn Tseng	Kinesiology	College of Science and Mathematics
Amy Wiley	English	College of Liberal Arts

Academic Programs and Planning also coordinated two workshops with renowned information literacy expert Dr. Megan Oakleaf, currently with the School of Information Studies at Syracuse University. Dr. Oakleaf visited Cal Poly in January 2017 in an effort to energize the entire campus, particularly members of the ILLC, as it began its work. The first workshop focused on teaching information literacy and the second workshop focused on how to design a rubric for the competency.

Working Definition of Information Literacy at Cal Poly

The ILLC established a working definition of "information literacy" that incorporated elements of the definitions from the Association of American Colleges & Universities (AAC&U) and the Association of College and Research Libraries (ACRL) and addressed Cal Poly's Learn by Doing curriculum. This working definition, like those for the other four core competencies, was developed to apply across disciplines and to be utilized for both lower-division and upper-division work. This definition would help to guide the development of the information literacy rubric to assess students' written artifacts. The ILLC agreed on the following definition:

> Information literacy encompasses knowledge that allows one to understand how information is produced and valued, to engage with a variety of information domains, to understand the potential and limitations of sources within those domains as well as one's personal bias towards those sources. It requires the ability to utilize a critical stance and reflective approach for defining, articulating, and refining a need for information; locating trustworthy information using a variety and diversity of sources; and critically evaluating credibility and appropriateness of the information one finds in order to distinguish fact from

> opinion and data from interpretation. The information-literate student is able to use and synthesize information to solve complex problems and create new knowledge in a way that is ethically, legally, and socially sound.

Information Literacy Rubric

The ILLC opted to create a rubric for assessing information literacy that, like the working definition, could be applied across disciplines as well as for lower-division and upper-division work. Of particular note with the rubric, the ILLC felt it important to have an interdisciplinary approach to developing the criteria for measurements that broadly represented student learning and faculty expectations towards student achievement. The ILLC referred to existing information literacy rubrics from AAC&U and Champlain College to design a developmental rubric. After many iterations, the rubric was finalized in January 2019 (Appendix A).

Assessment Measurements

The ILLC selected one direct method and two indirect methods to measure information literacy competency in Cal Poly undergraduate students. This use of multiple measures provided the opportunity for a more complete assessment of students' information literacy knowledge, skills, and practices. The two campus-specific measures included one direct method, which was a rubric-scored written artifact, and one indirect method, a survey in which students documented their impressions of the research process used for completing the written artifact. The campus-specific artifact collection and survey targeted students at or near graduation in upper-division courses. The National Survey of Student Engagement (NSSE) Information Literacy module served as another indirect method of assessment, and it targeted first-year students and seniors at or near graduation. The NSSE Information Literacy module was a supplemental addition to the standard NSSE survey and asked students to self-report their engagement with educational

programs and practices across the university. Cal Poly included this module in its 2017 administration of NSSE.

Targeted Courses

In order to fulfill WSCUC's requirement, the goal for this assessment was to target courses in each of Cal Poly's six colleges with students at or near graduation. A campus-wide call for participation was sent by Academic Programs and Planning to solicit courses with a significant writing assignment that required students to employ their information literacy skills. Members of the ILLC also assisted with the identification and solicitation of courses from their respective colleges. The courses selected for this information literacy assessment cycle can be found in Table 2.

Table 2

Information Literacy Course Inventory for Upper-Division Assessment

College	Department	Course
College of Liberal Arts	Communication Studies	COMS 419: Media Effects
College of Architecture and Environmental Design	Construction Management	CM 462: Construction Management Senior Project II
Orfalea College of Business	Economics	ECON 464: Economics Applied Senior Project
College of Agriculture, Food and Environmental Sciences	Food Science and Nutrition	FSN 416: Community Nutrition
College of Engineering	Industrial and Manufacturing Engineering	IME 482: Senior Design Project II
College of Science and Math	Kinesiology	KINE 319: Introduction to Research Methods in Kinesiology

Data Collection

Phase 2: Evaluation and Communication of Information Literacy Assessment

The NSSE Information Literacy module was the first assessment activity completed, which occurred in spring quarter 2017. Fourteen supplemental questions measured engagement with information literacy in students at first-year and senior levels. The office of Academic Programs and Planning worked with the office of Institutional Research to coordinate and execute the survey, which was marketed to first-year and senior-level students via targeted email communications and advertisements in the Cal Poly student portal. The NSSE Information Literacy module data were collected, aggregated, analyzed, and reported by the Center for Postsecondary Research at Indiana University – Bloomington.

The second phase of evaluation came through the direct assessment of written research papers collected from each of the targeted courses in spring quarter 2018. Each of these courses required students to complete a significant written research project using outside sources to support their findings and arguments. In addition, students in each course were asked to complete the Record of Research survey to comment on their ability to search for, locate, and evaluate sources for their research. The survey was given to students twice – at the beginning and again at the end of their project – with the same set of questions so that evaluators could see changes in the students' process and refinement of information literacy skills. The online surveys were submitted to Academic Programs and Planning in real-time as students completed them via SurveyGizmo (now known as "Alchemer"), and written artifacts of student work in the targeted courses were collected from the instructors in summer 2018.

Personnel Changes

By the end of 2018, Dr. Phelan, the director of academic assessment had retired, and Melinda Weaver had left Cal Poly. While a search was underway for a new director, APP was able to hire a new coordinator, Shannon Sullivan-Danser, who began in September 2018. In order to successfully conclude Phase 2 of the assessment, Katherine O'Clair, the faculty lead, closely collaborated with the Associate Vice Provost in Academic Programs and Planning, Dr. Bruno Giberti, and assessment coordinator. Dr. Michael V. Nguyen joined Cal Poly in August of 2019 as their new Director of Academic Assessment, after the conclusion of Phase 2.

Rubric-Based Assessment of Research Papers

Building on the efforts of prior core competency assessment, Academic Programs and Planning used a new model to score the 64 written artifacts collected (Table 3) in this assessment cycle. Similar disciplines were paired together (Figure 2); in all but one instance, the pairings worked as planned. The Kinesiology faculty were unable to participate due to scheduling conflicts; however, the Food Science and Nutrition department is technically comprised of two sets of faculty – one more specialized in Food Science and one in Nutrition. Though the artifacts came from a nutrition class, faculty from both programs in the department participated in the evaluation session. In that way, an interdisciplinary pairing still took place, though not as originally conceived. Additionally, scorers were recruited from a variety of groups (Figure 3).

Table 3

Number of Artifacts per Course

Course	Number of Artifacts
COMS 419: Media Effects	17
CM 462: Construction Management Senior Project II	25
ECON 464: Economics Applied Senior Project	8
FSN 416: Community Nutrition	8*
IME 482: Senior Design Project II	6
KINE 319: Introduction to Research Methods in Kinesiology	33**
Total	**97**

*FSN 416 collected group work.

**KINE 319 artifacts were collected but not assessed due to scheduling conflicts with the faculty.

Figure 2

Similar Disciplines Paired for Scoring Written Artifacts

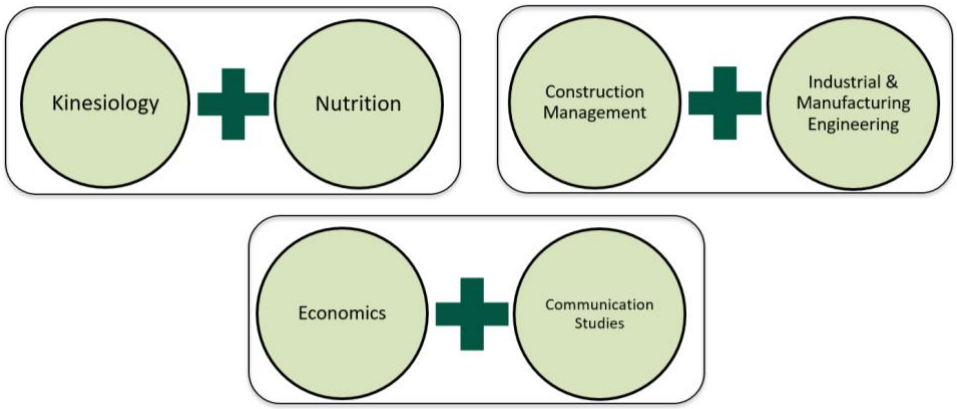
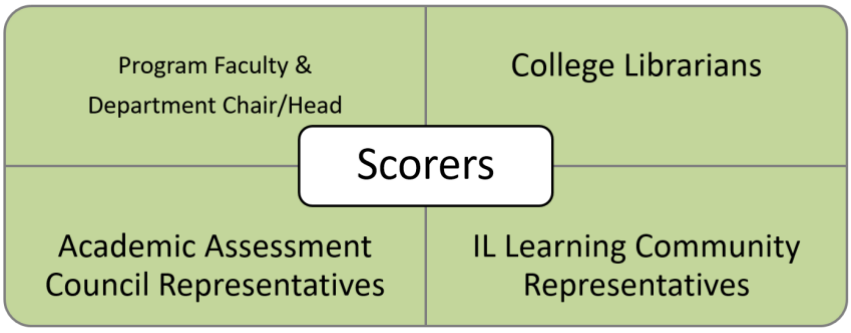


Figure 3

Scoring Session Participants



Evaluation Sessions

Planning and Preparation. Prior to the evaluation sessions, the assessment coordinator reviewed the submitted artifacts. After compiling a list of students, the coordinator researched the students' background via available Cal Poly dashboards to note their grade level and major. Artifacts from students who were taking the upper-division class but who were technically at a sophomore standing were not included in the scoring of the results. Also uncovered during this time was the fact that some students were not from the program offering the course. This notation was important because, while all artifacts from upper-division students were graded, departments would be able to disaggregate, if they so desired, the results from students within their major and the results from those who came from a different major (e.g., a student from the Journalism program took the Communication Studies course).

Artifacts were deidentified prior to being copied and collated for the scoring. A minimum of five copies was made of each artifact: one copy for what was intended to be two sets of readers; one copy for the second set of readers; and a third copy kept in reserve in case there was a discrepancy in the scores (more than 2 points). After the first evaluation session, it was determined that the norming session combined with the paired readers was sufficient to establish

inter-rater reliability. As such, only one extra set for each artifact was needed for the remaining scoring sessions. Included in the packets, too, were the assignments (Appendix B), scoring sheets (Appendix C), notepads, sticky notes, and an assortment of pens, pencils, and highlighters (Image 2). This latter step was taken with the awareness that participants might have particular preferences for the tools available throughout the norming and scoring parts of the day.

Three scoring sessions were held during winter quarter 2019, one day for each of the aforementioned disciplinary pairings[3]. The faculty lead worked with the department head on determining a day, and the department head recruited faculty to participate in the scoring. Prior to the session, scorers were emailed copies of the information literacy rubric, the assignment from the course, as well as two artifacts of student work to review and score independently. Of the two artifacts chosen for prior review, one represented a higher level of information literacy proficiency and the other represented an emerging level of proficiency. The faculty lead consulted with the chair of the Academic Assessment Council and the faculty lead from the most recent core competency assessment, written communication, to select artifacts for the norming as well as to organize each session.

In order to encourage participation, each session occurred on a Friday, a day when fewer classes are scheduled, and participants were in a dedicated conference room from 9 a.m. until roughly 2 p.m. On the morning of each session, the room was cleaned, the tables were arranged into columns to make it easier for the pairs to collaborate, and name tags, supplies, and catering were set-up (Images 1-3, all images courtesy Shannon Sullivan-Danser).

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[3] Due to unforeseen scheduling conflicts, faculty from Kinesiology were not able to join and their artifacts were not scored.

Image 1

Information Literacy Assessment Table Arrangement (participants' names have been deidentified)

Image 2

Supply Arrangement for Scorers (participants' names have been deidentified)

Image 3

Hospitality Arrangement for Participants

Summary of the Day. To start each session, the Senior Vice Provost in Academic Programs and Planning welcomed and thanked each person for being there, acknowledging their service in this important university project. As an extension of the office's appreciation, and in an effort to build community between participants who had never met before, catered breakfast, snacks, lunch, and beverages were provided.

Pairs were predetermined by the faculty lead and assessment coordinator. Participants were grouped in an interdisciplinary manner in order to create a balance between departments as well as expertise. During the norming session, the assignment was introduced by the instructor[4] and discussed along with a general conversation as to the disciplinary expectations for

[4] The instructor was not required to be there to introduce nor score the artifact. They were encouraged to share notes setting up the assignment with the faculty lead or their department head in advance.

information literacy. The group discussed each of the independently normed artifacts and addressed concerns that were encountered with both the artifact and the rubric to ensure that all the scorers were aligned on how to apply the rubric criteria to evaluate the written artifacts.

Each student artifact was evaluated and scored once by each member of the assigned pair. They reviewed and scored the artifact independently and then discussed their findings with their partner. If there was discrepancy with their scores, they discussed their rationale before deciding on a final number to submit. Whole number scores (e.g., 1, 2, 3, or 4) were used to encourage individual scorers not to split the performance ratings per artifact, average scores (e.g., 1.5 for scorers who gave a 1 and a 2) were recorded as the ultimate score for the overall disciplinary results based on each dimension listed on the rubric. They submitted their scoring sheets to the assessment coordinator who tallied the results by criterion and averaged the scores for each criterion and the overall score in order to provide real-time results.

For the first scoring session, in which the artifacts the Nutrition class (FSN: 416) were reviewed, each artifact was reviewed by a second pair of readers as a test of interrater reliability and as a mechanism to ensure that the norming calibrated readers to a discrepancy no wider than one point per criterion. Based on this, it was determined that the pairing was sufficient to score each artifact as well as could be done by independent reviewers; thus, having a second set of readers review the artifacts was not necessary. This protocol for scoring the artifacts was different from previous evaluations of other core competencies in which artifacts were scored independently by two different scorers with a third scorer providing additional review if there was a wide discrepancy in the two initial scores. Rather make assessment an isolated, solitary activity, the pairing helped promote professional development and interdisciplinary partnership between the readers.

Each scoring session concluded with a debrief session about the experience and the level of information literacy competency of students in the discipline. Though no time constraints were provided for these sessions, each session ended with a lively (on average) 45-minute discussion. Notes were collected from each of these debrief sessions to provide a record of the conversation that could be used to inform future meetings with departmental faculty and college librarians.

Results

Phase 3: Education and Improvement

The final phase of this assessment cycle focused on "closing the loop" to connect the results of this evaluation as well as the NSSE scores with strategies to improve students' information literacy skills and abilities, to document this project for the institution, and to use the knowledge gained from planning and designing this assessment to inform the next university-wide core competency assessment: quantitative reasoning.

NSSE Information Literacy Module (2017) – Data Analysis

The complete report from the NSSE Information Literacy module is included in Appendix D. The data show that first-time freshmen are performing adequately; they are near or slightly below the average of students from the other institutions that included this module in 2017. On only one item[5] in the set of fourteen questions did first-year students exceed the national average. In contrast, senior-level students were found to be performing slightly below

[5] The question asked students how often in the current school year that they have "Decided not to use an information source in a course assignment due to its questionable quality." They were asked to provide a response based on a four-point Likert Scale, where 1 = Never; 2 = Sometimes; 3 = Often; and 4 = Very Often. Cal Poly first-year students' mean was 2.3 while the national average was 2.1, which, per NSSE, was "an effect size less than .3 in magnitude.

the national average and are infrequently meeting national averages. For no item in the same set of fourteen questions did senior-level students exceed the national average.

Rubric-Based Assessment of Research Papers – Data Analysis

The full rubric can be found in Appendix A and a summary of proficiency levels in Table 4. The rubric was designed so that the criteria build on one another, moving from "Establishing Information Need," to "Identifying & Selecting Sources," then "Evaluating & Incorporating Source Information," next "Synthesizing Source Information," and concluding with "Attributing Source Information." The overall average scores for upper-division students in each dimension of information literacy are shown in Figure 4. Average scores by course for each dimension of information literacy evaluated are shown in Figures 5-9. Figure 10 shows a side-by-side comparison of average scores by course for each dimension of information literacy evaluated. A bar has been added at the 3.0 score to remind readers of the "Proficient" level.

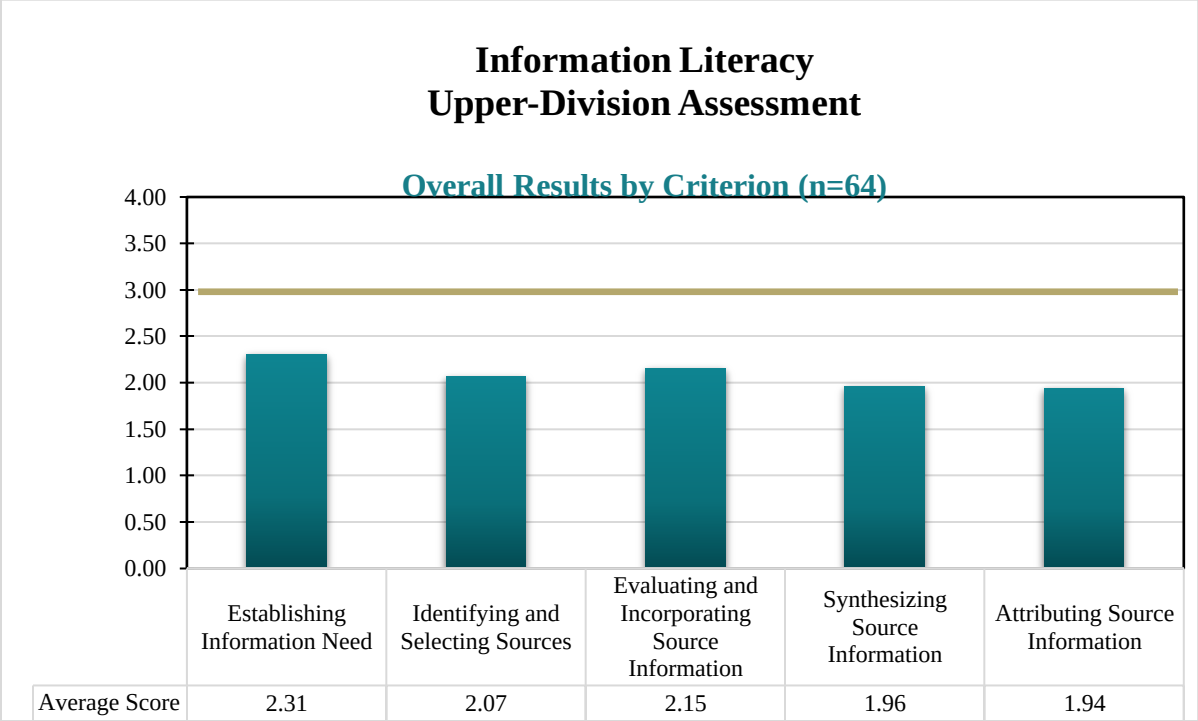
Table 4

Cal Poly Rubric-Based Proficiency Levels for Information Literacy

Score	Level
1	Limited Proficiency
2	Emerging Proficiency
3	Proficient
4	Highly Proficient

Figure 4

Overall Average Scores for Each Criterion of Information Literacy



	Establishing Information Need	Identifying and Selecting Sources	Evaluating and Incorporating Source Information	Synthesizing Source Information	Attributing Source Information
Average Score	2.31	2.07	2.15	1.96	1.94

Figure 5

Average Scores for Each Criterion of Information Literacy from COMS 419 Artifacts

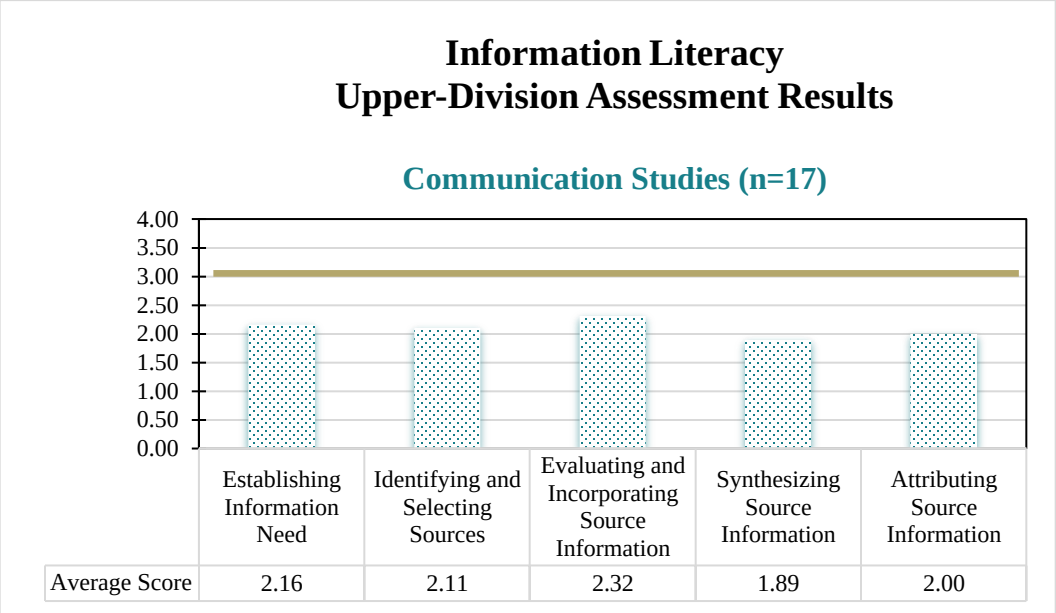


Figure 6

Average Scores for Each Criterion of Information Literacy from CM 462 Artifacts

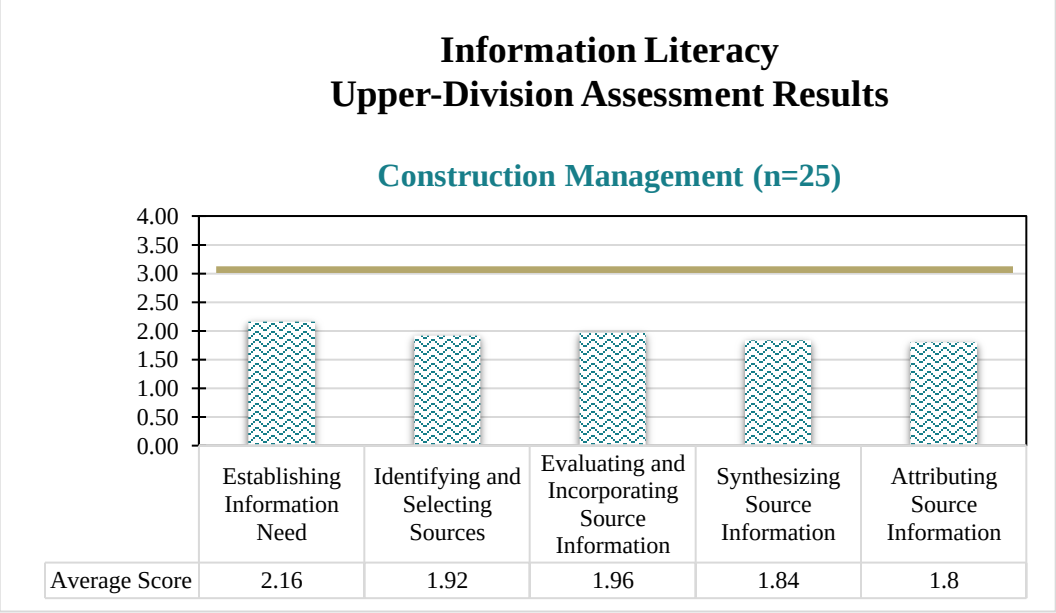


Figure 7

Average Scores for Each Criterion of Information Literacy from ECON 464 Artifacts

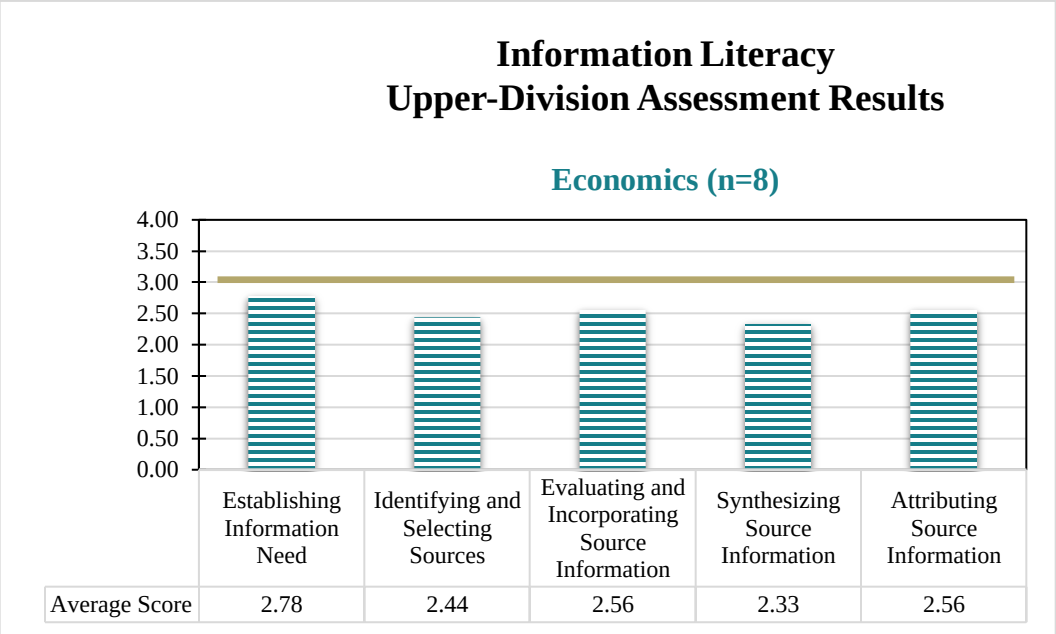


Figure 8

Average Scores for Each Criterion of Information Literacy from FSN 416 Artifacts

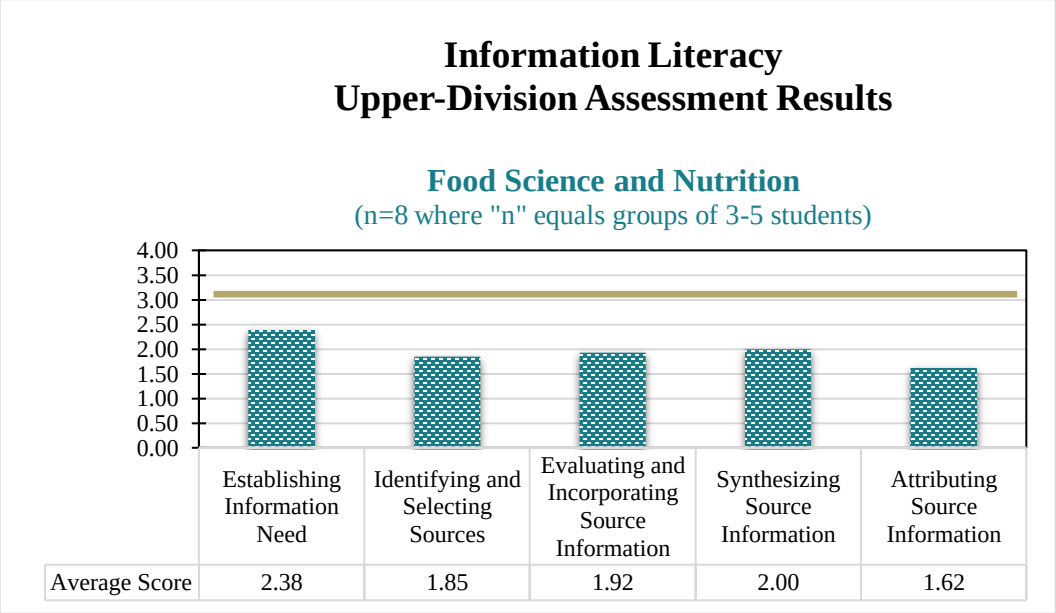


Figure 9

Average Scores for Each Criterion of Information Literacy from IME 482 Artifacts

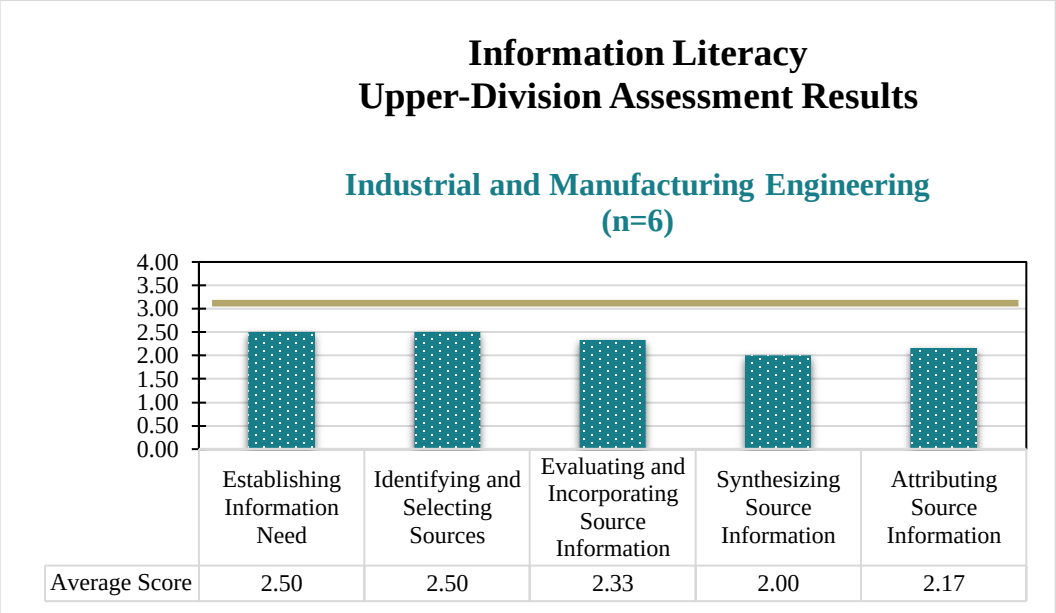
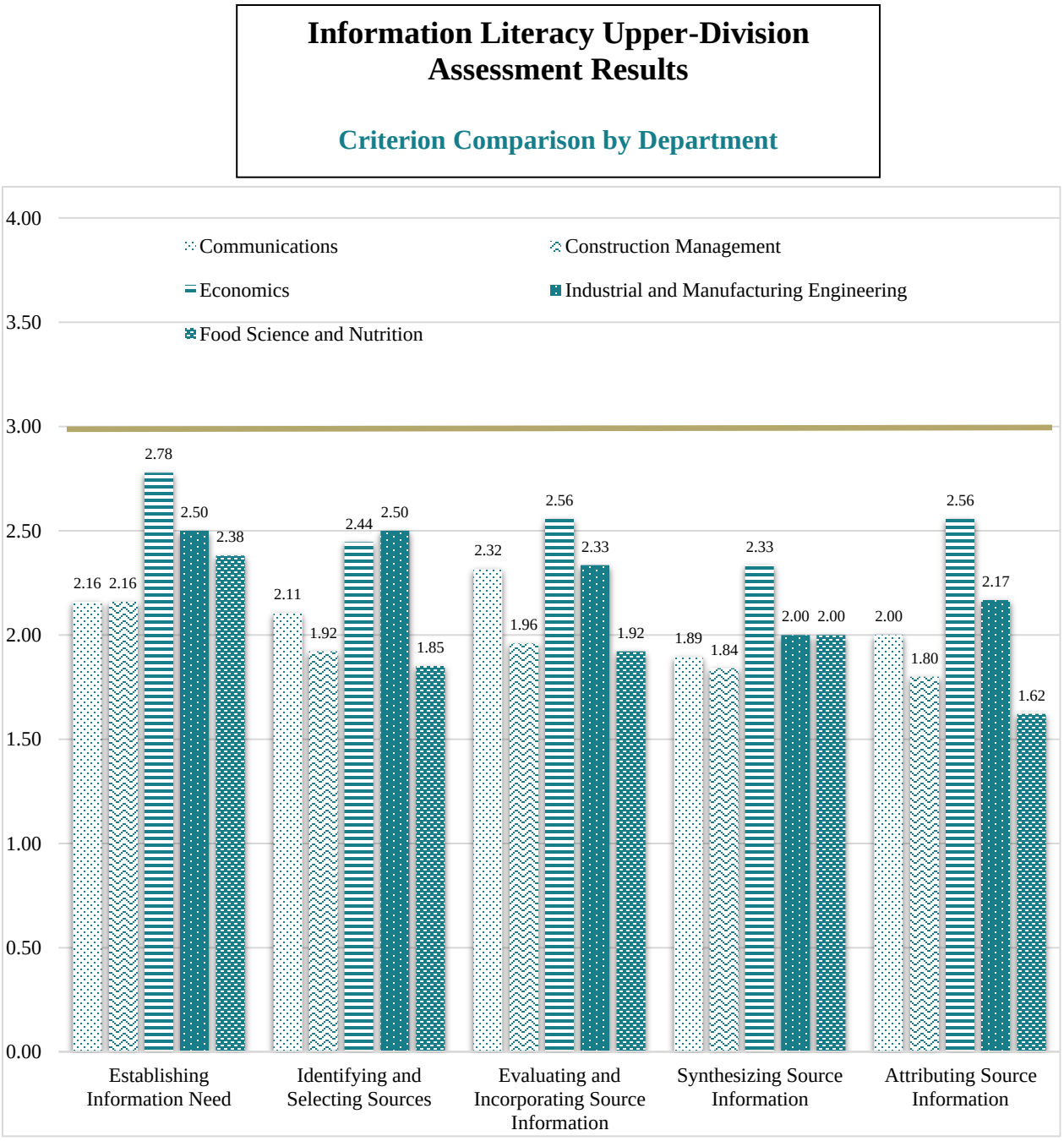


Figure 10

Average Scores for Each Criterion of Information Literacy by Department



Sharing the Results

In Fall 2019, Cal Poly recruited a new Director of Academic Assessment, and one of his first actions was to reconnect with the departments and faculty who participated in the scoring of students' written work. During his first quarter, he partnered with colleagues in Academic Programs and Planning as well as the faculty lead to review Phases 1 and 2. Together with the faculty lead, they guided the conversation with the librarians as to how to present recommendations with the college stakeholders. An important goal for all was to further integrate information literacy into the curriculum not only at the course level with the instructional faculty but also to identify other opportunities within the program's curriculum to incorporate information literacy. The focus of these discussions was to demonstrate how to scaffold information literacy into the curriculum in a way that allows the concepts to be introduced, developed, and mastered throughout the entire curriculum. This framework will provide the best opportunity to move students' skills and abilities to more proficient levels. The rubric, which was designed to identify key areas of information literacy from emerging levels to mastery levels can be used as a guide for scaffolding and mapping.

After initial conversations with the college librarians and the faculty lead, who had been promoted to Associate Dean for Academic Services by the conclusion of this assessment, the Director of Academic Assessment let the college librarians within Academic Services to continue improvement measures at a pace that best suited their initiatives and the priorities or commitment levels of the colleges. The onset of the COVID-19 pandemic at the conclusion of this phase delayed some of those curricular plans.

Discussion

Overall, the data from both the NSSE Information Literacy module and the rubric-based assessment indicate that upper-division students are performing at a level that is approaching emerging proficiency. While the ILLC did not specify benchmarks for information literacy competency in these students, one might expect them to be performing at a proficient level, yet they are performing at a level one might expect from a student newly engaged with information literacy. This result suggests that there is ample need and opportunity for instructional faculty and college librarians to work together to improve students' competency levels for information literacy. Although this assessment only targeted courses and students in these six disciplines, the results from the NSSE, which found that Cal Poly students scored below other institutions[6] on all 14 items measured, suggest that similar results would be seen in upper-division students from other disciplines at Cal Poly.

From the rubric-based assessment, the data show that upper-division students, although performing at a lower level than expected, scored highest in the area of establishing the information need, which includes clearly defining and articulating the topic, problem, or research question. The data also show that they scored the lowest on synthesizing information from multiple sources and attributing source information in a responsible and accurate manner. Faculty observed that, if students scored poorly in the first criterion, they rarely were able to

[6] When comparing Cal Poly's scores from the NSSE Information Literacy module with the other 76 institutions that participated, it must be noted that only a few of these institutions are similar to Cal Poly in terms of the curriculum. Cal Poly is a comprehensive polytechnic institution that requires all incoming students to declare a major prior to matriculation. Most of the institutions in the comparison cohort are large research-intensive universities or small liberal arts colleges, making it difficult to directly compare data from Cal Poly's students with data from the cohort institutions' students.

score higher by the last content-based criterion[7], "Synthesizing Source Information." When compared by discipline, students in the ECON 464: Applied Senior Project course scored highest in four of the five criteria evaluated in this assessment, and students in the CM 462: Construction Management Senior Project II course scored lowest in all five criteria (Figure 10).

There are three circumstances worth noting from the rubric-based assessment of student work. First, not all the students were majors in the discipline of the targeted course. Consequently, students may have had varied exposure to information literacy instruction and assignments with a focus on developing such skills and abilities. Although evaluators treated all student work equally based in the discipline of the targeted course, this factor may have influenced the overall results because, at Cal Poly, some disciplines have more attention to and integration of information literacy in the curriculum than others. Second, while Cal Poly attempted to target only students who were at or near graduation, this was very difficult to execute in reality. Many of the upper-division courses targeted for this assessment included students who were third-, or even second-year, students. Cal Poly's very competitive admissions standards often result in many students having course credits that make them eligible to enroll in upper-division courses sooner than usual. Moreover, these same students may be awarded pre-matriculation credit for the lower-division courses in which foundation information literacy skills are taught, thus exempting them from information literacy instruction at the college level. Thirdly, a stronger emphasis on assignment design and artifact planning during the first phase of this assessment is essential. This conclusion is similar in nature to one of the findings from the

[7] The last criterion in the rubric is "Attributing Source Information," which focuses more on a student's technical knowledge.

critical thinking assessment, which also noted that a focus on assignment design during the first phase was vital. With a signature assignment and a stronger emphasis on a pedagogical collaboration with faculty whose classes participated in this assessment, the results could have been more telling. The delays in finalizing the rubric meant faculty were not evaluate the criteria, clarify their own understanding of information literacy (as one faculty member noted in the Friday evaluation session, she typically evaluated her students' information literacy proficiency only by their ability to cite sources appropriately), let alone be able to revise their assignments accordingly to meet the criteria established in the rubric.

Lastly, as previously addressed, this assessment marked the first time that group work was evaluated at the university level. Without additional information, such as peer assessments, it would be impossible to determine the individual contributions to the group paper. Thus, the artifacts were treated as belonging to one author, even though one artifact included a group member at the graduate level. By better identifying courses during Phase 1, stakeholders could have adjusted their own goals and expectations, collaborated more with faculty in their artifact collection, or even sought a different exemplar from the college.

Next Steps and Recommendations

The norming protocol used in the scoring of the written research papers was very effective and could be used in the scoring of artifacts in future assessments of the core competencies. Giving the scorers the rubric, assignment, and sample artifacts in advance proved to be a very useful way to begin the norming session. Rather than coming to the scoring session without any information and be trained on the spot, faculty were able to study the material in advance and come to the evaluation with specific notes and questions. During the scoring

session, the entire group was able to come together for a meaningful dialogue about the competency and that reflected the work they had already done in advance.

Not all possible analyses for this project were conducted. Depending on the need and interest, there could be further research as to course-level differences between students within the major and students from a different major. The surveys can also be compared to see changes between pre- and post-artifact responses and to see how that connects with an individual student's results.

The next core competency assessment for Cal Poly – upper-division quantitative reasoning – includes artifacts that are almost exclusively group work. While using group work for a university core competency assessment first occurred with information literacy, it assuredly will not be the last time.

References

Association of American Colleges & Universities (2013). Information Literacy VALUE Rubric. Retrieved from https://www.aacu.org/value/rubrics/information-literacy.

Association of College & Research Libraries (2016). Framework for Information Literacy for Higher Education. Retrieved from http://www.ala.org/acrl/sites/ala.org.acrl/files/content/issues/infolit/framework1.pdf.

Appendices

Appendix A

Cal Poly Information Literacy Rubric

Information literacy encompasses knowledge that allows one to understand how information is produced and valued, to engage with a variety of information domains, to understand the potential and limitations of sources within those domains as well as one's personal bias toward those sources. It requires the ability to utilize a critical stance and reflective approach for defining, articulating, and refining a need for information; locating trustworthy information using a variety and diversity of sources; and critically evaluating credibility and appropriateness of the information one finds in order to distinguish fact from opinion and data from interpretation. The information literate student is able to use and synthesize information to solve complex problems and create new knowledge in a way that is ethically, legally, and socially sound.

– Working Definition from the Cal Poly Information Literacy Learning Community

Dimension	Limited Proficiency – 1	Emerging Proficiency – 2	Proficient – 3	Highly Proficient - 4
Establishing Information Need *Establishes a specific need for information based on a clearly defined and articulated topic, problem, research question.*	The topic, problem, or research question is too vague, too narrow, or too broad (i.e. the need for information is not defined or articulated).	The topic, problem, or research question is somewhat defined and/or only somewhat articulated.	The topic, problem, or research question is defined and clearly articulated.	The topic, problem, or research question is well defined and articulated with a high level of sophistication.
Identifying & Selecting Sources *Identifies and draws from an extensive and varied set of sources (e.g., websites, journal articles, books, reports, data sets) appropriate to the topic, problem, or research question; assignment guidelines; or research practices within a discipline.*	Information draws from a limited number or single type of source; sources are not appropriate given the research purpose, audience, and context.	Information draws from a somewhat sufficient number and variety of sources; sources are only somewhat appropriate given the research purpose, audience, and context.	Information draws from a sufficient number and variety of sources; sources are appropriate given the research purpose, audience, and context.	Information draws from an extensive and varied set of sources; sources are exceedingly appropriate given the research purpose, audience, and context.
Evaluating & Incorporating Source Information *Demonstrates the ability to incorporate information from sources based on an evaluation of the sources' quality and relevance to the discipline; critically evaluates source information using appropriate criteria considering authority, credibility, reliability, currency, and purpose.*	Incorporates information from inappropriate, non-credible, and/or low quality sources including those not appropriate and relevant to the discipline, which represents an inadequate level of source evaluation.	Incorporates information from a minimal number of appropriate, credible, and/or quality sources including those somewhat appropriate and relevant to the discipline, which represents a somewhat adequate level of source evaluation.	Incorporates information from an adequate number of suitable, credible, and quality sources that are appropriate and relevant to the discipline, which represents an adequate level of source evaluation.	Incorporates information only from appropriate, credible, and high quality sources that are appropriate to the discipline, which represents a sophisticated level of source evaluation.
Synthesizing Source Information *Synthesizes information from multiple sources, making explicit connections among them and effectively integrating source information to support ideas related to the topic, problem, or research question.*	Incorporates source information one by one and does not establish any connections among them; does not integrate source information in a way that clearly and sufficiently supports ideas related to the topic, problem, or research question.	Inconsistently incorporates information from multiple sources and attempts to establish connections among them; integrates source information in a way that somewhat clearly and sufficiently supports ideas related to the topic, problem, or research question.	Consistently incorporates information from multiple sources and adequately establishes the general connections among them; integrates source information in a way that clearly and sufficiently supports ideas related to the topic, problem, or research question.	Consistently and eloquently incorporates information from multiple sources and establishes the complex connections among them; integrates sources information in a way that strongly supports ideas related to the topic, problem, or research question.
Attributing Source Information *Represents and attributes sources responsibly and accurately within the text; provides complete citations within the text and in the References list; employs the citation style required by the assignment or appropriate to the discipline.*	Does not attribute information to sources within the text; is neither complete nor consistent when citing sources within the text and in the References list; does not follow the citation style required by the assignment or follows a style inappropriate to the discipline.	Occasionally attributes information to sources within the text; is incomplete and /or inconsistent when citing sources within the text or in the References list; somewhat follows the citation style required by the assignment or follows a style that may not be appropriate to the discipline.	Consistently attributes information to sources within the text; is mostly complete and consistent when citing sources within the text and in the References list; mostly follows the citation style required by the assignment or most likely appropriate to the discipline.	Consistently and eloquently attributes information to sources within the text; is always complete and consistent when citing sources within the text and in the References list; strictly follows the citation style required by the assignment or most appropriate to the discipline.

Appendix B

Paper Structure

Outlined below are three distinct elements for paper content... 1) Research and Topical papers in Construction 2) Education and 3) Practice.

Research

Papers in **Construction Education or Construction Practice - Research** should include the following elements:

- **Introduction**

  statement of the research problem as it relates to construction education:
  - feasibility
  - clearly stated
  - significance
  - relationships investigated

  variables and hypotheses:
  - variable descriptions
  - measures
  - independent/dependent/extraneous

  literature review:
  - value of knowledge
  - generalized sources
  - primary sources
  - problem relationship

- **Method**
  - sample description:
    - population
    - size
    - external and internal validity
  - instrumentation:
    - description
    - procedure
    - measurement scales
    - data scoring

- **Results**
  - analysis of data:
    - descriptive statistics
    - inferential statistics
  - significance of effect

- **Discussion**
  - interpretation of data
  - examination of variable relationships
  - qualify results
  - clear statement of problem statement support or non-support
  - similarities and differences relating to other's work

- **References**
- **Appendix**

Submissions will be blind peer reviewed by a minimum of three members of the ASC Review Board. If the manuscript is inadequate, the manuscript will be returned to the author(s) for revision.

Topical Papers in Education

Papers in **Construction Education - Undergraduate Education**, **Graduate Education**, and **General Topics** need pedagogical content and should include the following elements:

- context of course/program
- professional knowledge, skills, and attitudes to be developed
- content and rationale
- teaching strategies/methods
- some other clearly stated pedagogical component
- appeal to either:
    - a general audience (the majority of our readers)
    - a clearly identifiable special audience (a specialized portion of our readers)
- unique aspects:
    - how the subject discussed would fit into the curriculum
    - how it might improve presentation of construction in classrooms, laboratories, textbooks, or other media
- usefulness to its intended audience
- resources utilized

- students' evaluations and perceptions
- descriptive analysis
- include thoroughly researched list of references of those references cited within the text, according to the *JCE* Style. It is expected that papers include references from the *Annual Conference Proceedings* and the *Journal*

Submissions will be reviewed by a minimum of three members of the ASC Review Board. If the papers are inadequate, the papers will be returned to the author(s).

Topical Papers in Practice

Papers in **Construction Practice - General Topics** should include the following elements:

- context of program/method/material
- professional knowledge, skills, and attitudes to be developed
- content and rationale
- strategies/methods
- appeal to either:
    - a general audience (the majority of our readers)
    - a clearly identifiable special audience (a specialized portion of our readers)
- unique aspects:
    - the importance of the subject discussed
    - how it might improve the practice of construction
- usefulness to its intended audience
- resources utilized

- evaluations and perceptions
- descriptive analysis
- include thoroughly researched list of references of those references cited within the text, according to the *IJCER* Style. It is expected that papers include references from the *Annual Conference Proceedings* and the *Journal*

Submissions will be reviewed by a minimum of three members of the ASC Review Board. If the papers are inadequate, the papers will be returned to the author(s).

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Associated Schools of Construction *International Proceedings of the Annual Conference*

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Comments and suggestions are welcome; direct them to asceditor@ascweb.org
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This page was last updated on August 25, 2017
AA/EOE/ADAI

Appendix B

ASC Proceedings (Only) Style Guide

Quick Manuscript Guide Table

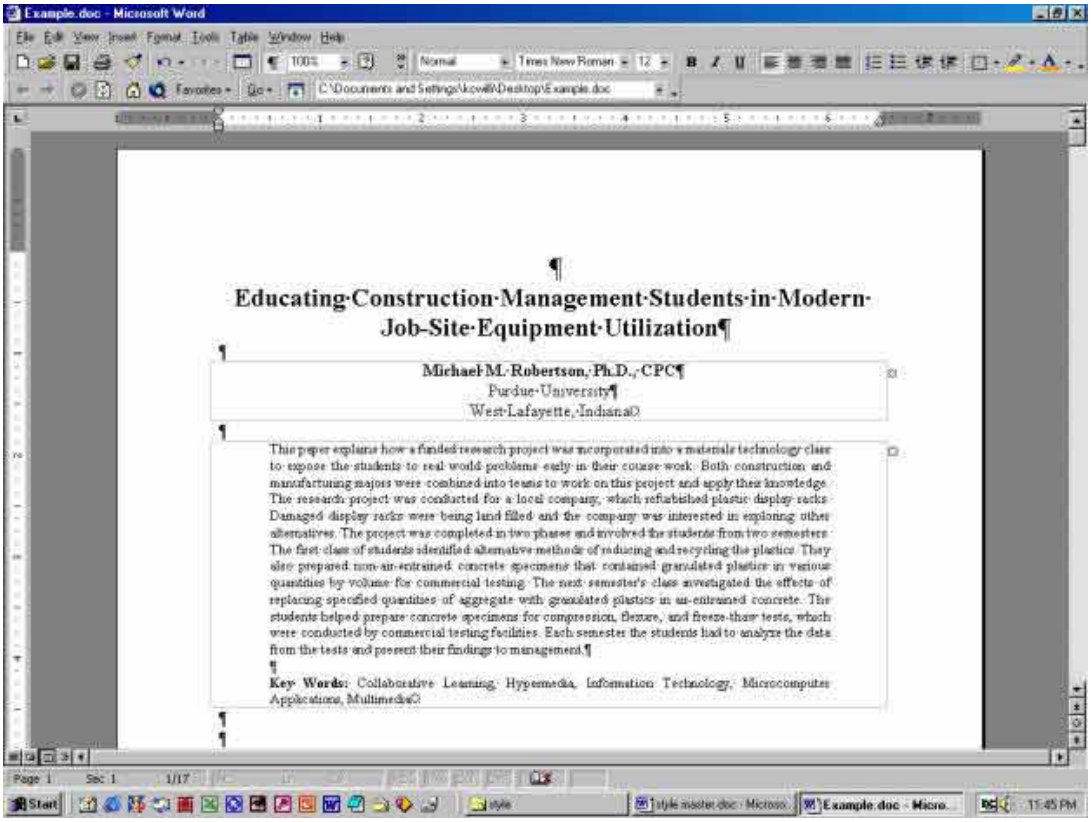
Manuscript Specifications:		
Paper and Layout:		Paper size will be – letter - 8½ in. x 11 in. Page orientation is to be portrait. "Layout - section start" is set to "new page" and "vertical alignment" is to be "top".
Margins:		**All margins** are to be set at **one inch (1")**. The gutter is set at zero inches (0"). The header and footer are set at one-half inch (.5").
Font:		Font size is 10 pt., Times New Roman. Limit character enhancement to: **bold**, underline, *italics*, superscript, and subscript. Color is not encouraged. Color may only be used if the author arranges to do so and pays the additional publishing costs to the publisher.
Paragraph:	Example	Each paragraph is single spaced, aligned left only, no indents. There is only one (1) hard return between paragraphs.
Proccedings Paper Length (NEW)		Manuscripts shall not exceed **8-pages** in length TOTAL, including references, appendices, etc. Longer manuscripts will NOT be accepted.
Do Not Include in Manuscript:		
Text Styles:		**Do not** use any preformatted text style. (i.e., Heading 1, Body Text)
Tabs:		**Do not** use tabs to indent text anywhere within the document. Do not use tabs to build tables. Use the table options of your text editor. You may use the increase indent or decrease indent button of your text editor.
Bibliography:		**It is not recommended** to include works for further reading.
Footnotes or Comments:		**Do not** use footnotes or comments within manuscript. (Citations are to be placed within the text and not at the bottom of the page.).
Headers And Footers:		**No headers or footers** are to be placed in the document.
Abstract:	Example	**Do not** include the word **"Abstract"** above the abstract paragraph.
Language:	Example	Language should remain non-gender specific unless germane to the content. **Do not use "he/she", "he or she"** or like wordings.
Page Numbers:		**Do not** include page numbers in the document.
Section Breaks:		**Do not** include section or page breaks in the document.
Special Formats:		**Do not** include date and time stamps, auto text, fields, captions, cross-references, or indexes in the document.
Body of Manuscript:		
Title:	Example	The title is one 18 pt. space from the top of the first page. Title font size will be 18 pt., Times New Roman, bold, centered, and upper and lower case (Title Case). The title summarizes the main idea of the manuscript, short, and descriptive of the contents. **No hard returns** are to be within the title.
Author's Table:	Example	Author information will be formatted within a single table, one aligned left 10 pt. hard return between the title and the author table. The table size is established by setting the table's width to 100%" and alignment to "centered". Borders and shading must be set to "none." Authors from the same institution are placed within the same cell, joined by the word "and." The number of cells will depend upon the number of authors from differing institutions. No table will be over two cells wide, but may contain multiple rows. The first line is **(bold)** and contains the author's first name, middle initial, and surname followed by their degree i.e., Ph.D., MSCS and certifications and licenses i.e., CPC, PE. The second line **(not bold)** is their institutional affiliation. The third line **(not bold)** is their institution's city and state. Papers are BLIND REVIEWED so please do not include authors name or any identifying associations in the papers content (example: University of **** at ****) until the paper has been accepted (or accepted with modifications) for publication and presentation in the conference.
Abstract and Key Words:	Example	**Do not** include the heading **"Abstract."** The abstract will be formatted within a single table, one aligned left 10 pt. return between the author table and the abstract table. The table size is

		established by setting the table's width to 100%" and alignment to "centered". The text within the table is justified left and right and is indented one-half inch from both side margins. Borders and shading must be set to "none." Font is 10 pt., Times New Roman, and is limited to **one paragraph** under **200 words**. **No hard returns** are to be included within the abstract. The key words are to be included within the abstract table one hard return below the abstract. Provide no more than five key reference words. Bold only the text **"Key Words:".**
1st Level Headings:	Example	Font size is 12 pt., Times New Roman, and **bold**. Headings are **centered**, upper and lower case (Title Case). Two (2) hard returns before the heading and one (1) hard return after the heading.
2nd Level Headings:	Example	Font size is 12 pt., Times New Roman. Headings are **centered**, ***italicized***, uppercase and lowercase heading, 1 line space before, and 1 line space after.
3rd Level Headings:	Example	Font size is 12 pt., Times New Roman. Headings are **flush left**, **italicized**, uppercase and lowercase side heading, 1 line space before, and 1 line space after.
4th Level Headings:	Example	Font size is 12 pt., Times New Roman and are **flush left**, **italicized**, lowercase paragraph heading **ending with a period (.)**, 1 line space before, 3 character spaces after, paragraph begins same line.
Citations:	Example	Citations are within parenthesis, place (author's surname and publication year) within the text at the appropriate point. All citations must refer to sources listed in the references, and all sources listed must be cited from within the text. See the references examples (under the support material section of the manuscript specifications) for proper listing of sources.
Tables:	Example	Textual information presented in column and row format. All tables must be created using the table function within the same word processing system as the manuscript. No table may be included as an image file or inserted as a reference to another file document, i.e. Excel, Access. The table size is established by setting the table's width to 100%" and alignment to "centered". Table titles (use 12 pt.) Appear at top of table (note punctuation, capitalization, and formatting displayed by the examples) and within its own row cell. Borders and shading must be set to "none" except the title cell, header cells, and the last cell which should have the bottom cell boundary as a 1/2 pt. line. Column headings can be bold. Information within the table (except for the title cell) is to be formatted font size 10 pt., times roman. There should be a hard return before and after the table. **Tables in excess of 40 lines in total will be included as an appendix**.
Figures:	Example	Figures include **non-text** entries such as graphs, illustrations, photos, and artwork (tables are not figures). Figures should be drawn using a suitable drawing package and embedded within the manuscript document. The use of color is not encouraged. Color may only be used if the author arranges to do so and pays the additional publishing costs to the publisher. **Only .gif and .jpg file formats are considered acceptable. Submitted images should adhere to the resolution setting of 300 dpi.** A two (2) celled table contains the figures (center justified) and figure title (center justified). Figures will not have borders drawn around them and should be limited to two-thirds (⅔'s) of a page. The table size is established by setting the table's width to 100%" and alignment to "centered". Figure titles use 12 pt and appear in the bottom cell of the figure table (note punctuation, capitalization and formatting displayed by the examples). **Do not include the figure title in the figure itself**.
Bullets And Numbering	Example	Items listed should be syntactically and conceptually parallel to the other items in the list and should be limited to itemized conclusions or steps in a procedure. Only minimal round bullets or Arabic numerals are to be used. The list is one space below the previous paragraph and indented 0.25" and is followed by one left justified space. Each of the separate items in the series is followed by a comma or period. Do not force or hard text your own bullets or numbering using tabs or indents. Use auto formatted only. You may format them to your specific needs.
Support Material for Manuscript:		
References:	Example	Alphabetical listing of sources that were used in the research and preparation of paper. Manuscripts should conform to the Publication Manual of the American Psychological Association, 5th Edition (2001). References should be indicated in the manuscript by giving the author's name, with the year of publication in parentheses, e. g. Jones (2004) or (Jones, 2004) as appropriate. If several publications are cited by the same author and from the same year, a, b, c, etc. should be put after the year of publication. All references cited in the text should be listed in full at the end of the paper.
Appendix:	Example	Appendices are labeled A, B, and C (when there is more than one), and are placed in the order they are first referenced in the text. Please limit number of pages. Information within the appendix is to be formatted font size 10 pt., Times New Roman.

Titles:

The title is one 18 pt. space from the top of the first page. Title font size will be 18 pt., Times New Roman, bold, centered, and upper and lower case (Title Case). The title summarizes the main idea of the manuscript, short, and descriptive of the contents. No hard returns are to be within the title.

Example:



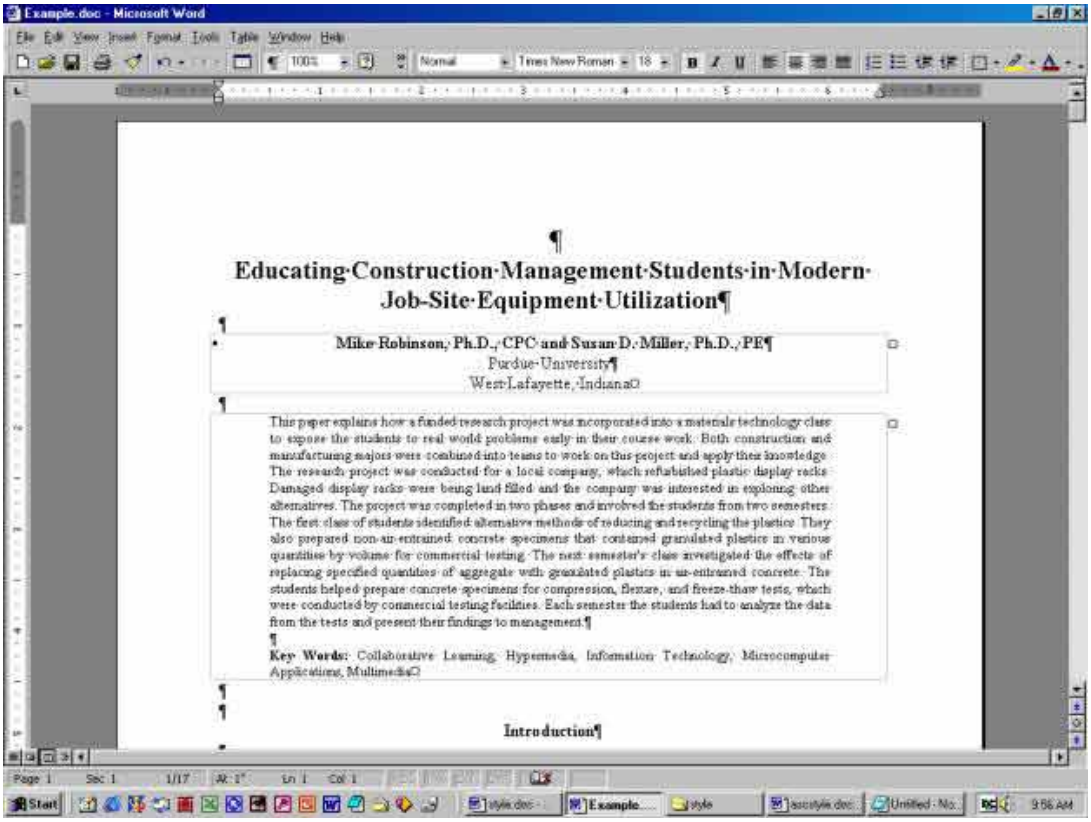
Authors:

Single Author

Author information will be formatted within a single table, one aligned left 10 pt. hard return between the title and the author table. The table size is established by setting the table's width to 100%" and alignment to "centered". Borders and shading must be set to "none." Authors from the same institution are placed within the same cell, joined by the word “and.” The number of cells will depend upon the number of authors from differing institutions. No table will be over two cells wide, but may contain multiple rows. The first line is (bold) and contains the author’s first name, middle initial, and surname followed by their degree i.e., Ph.D., MSCS and certifications and licenses i.e., CPC, PE. The second line (not bold) is their institutional affiliation. The third line (not bold) is their institution’s city and state.

Two authors same university: same as above except names are joined by the connective "and" and are contained within the same table cell.

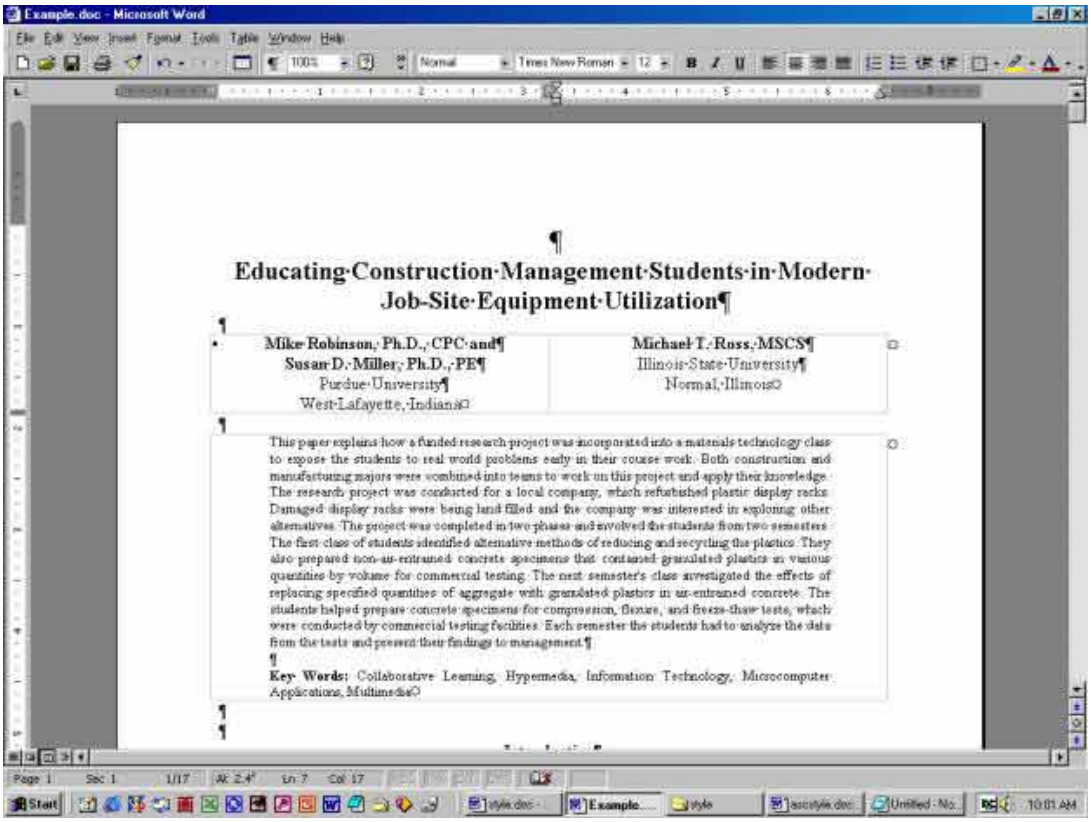
Example:



Two Authors at Different Universities

The table is the same as single author name only each author and information is contained in its own table cell.

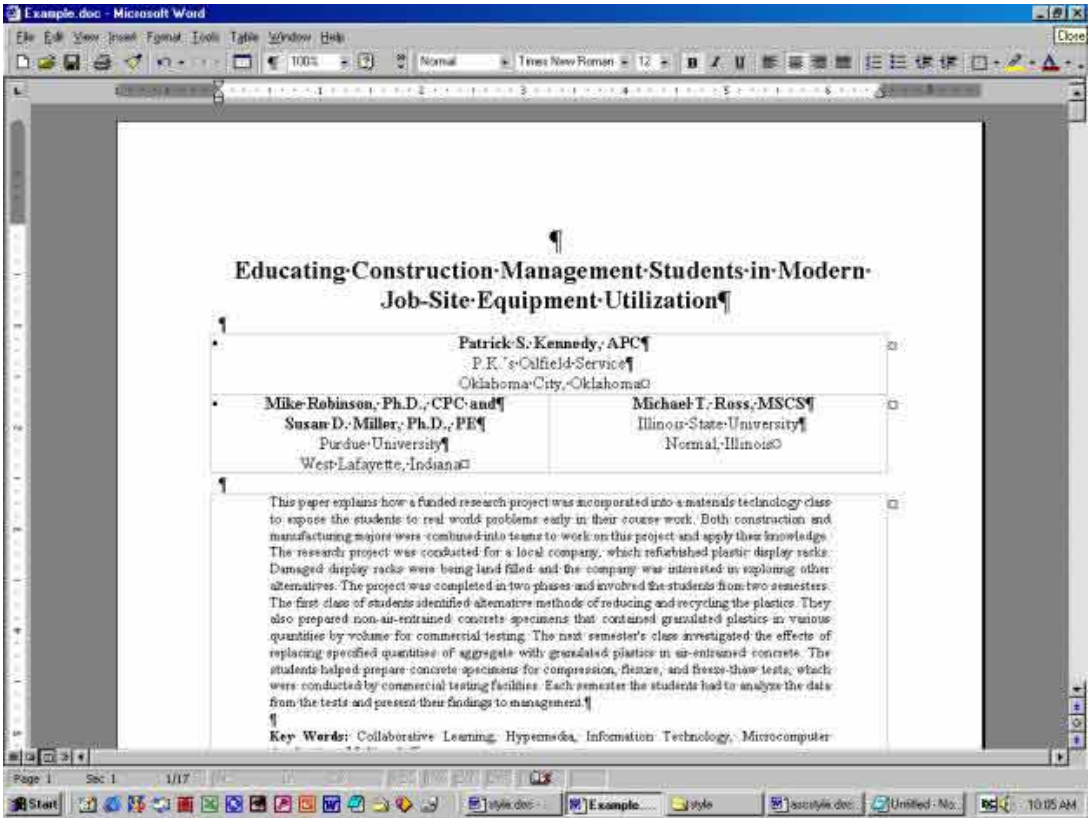
Example:



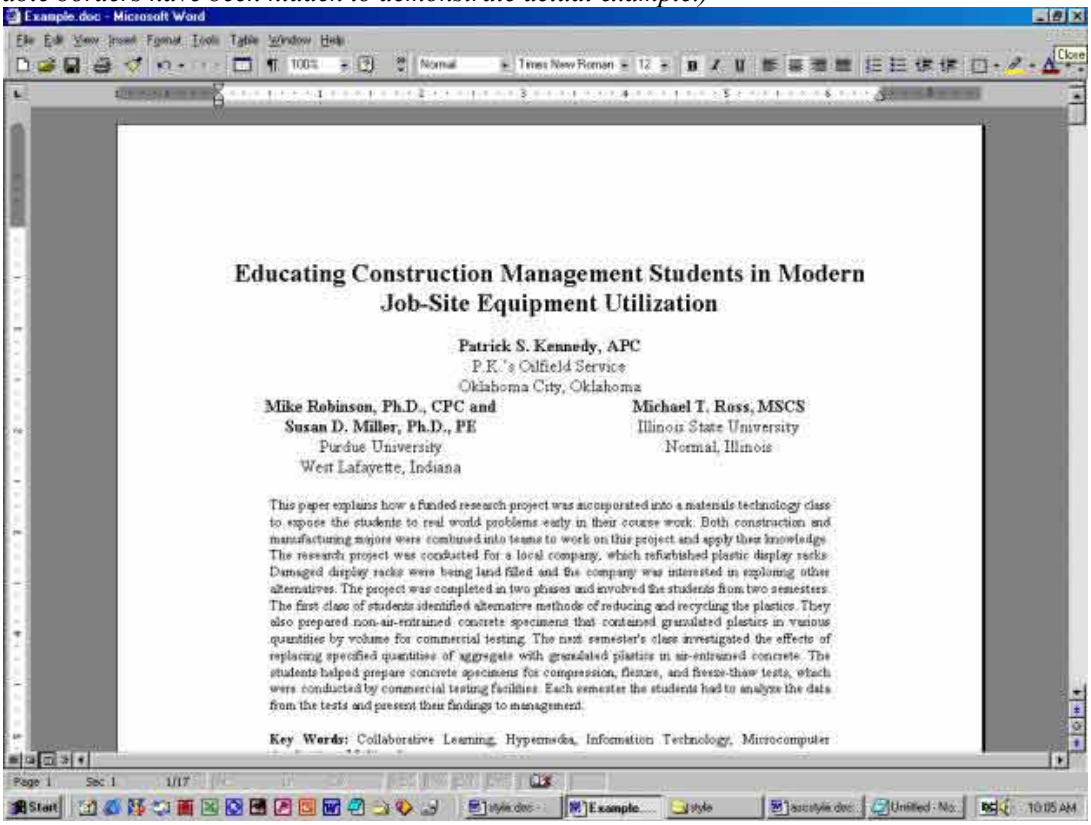
Three or More Authors

Author tables including authors with the same and different institutions: Same as single author name table only each author group and information is contained in its own table cell.

Example #1a:



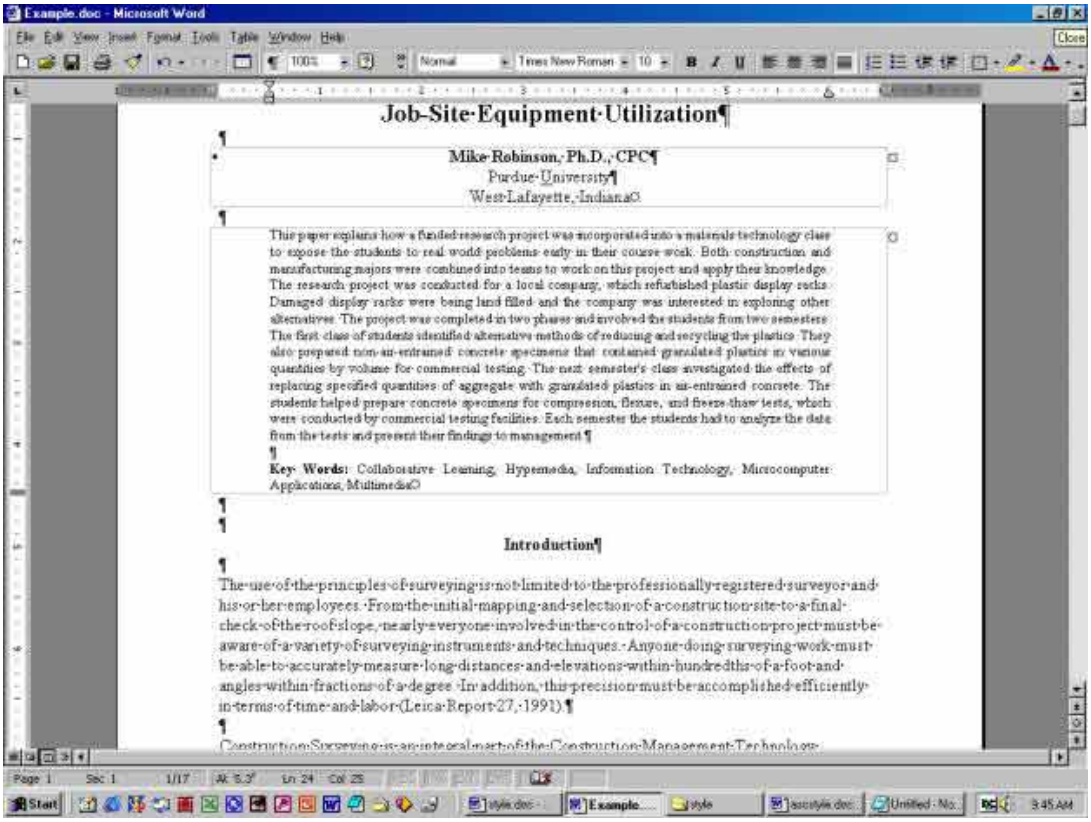
Example #1b: *(Table borders have been hidden to demonstrate actual example.)*



Abstract and Key Words:

Do not include the heading "Abstract." The abstract will be formatted within a single table, one aligned left 10 pt. return between the author table and the abstract table. The table size is established by setting the table's width to 100%" and alignment to "centered". The text within the table is justified left and right and is indented one-half inch from both side margins. Borders and shading must be set to "none." Font is 10 pt., Times New Roman, and is limited to one paragraph under 200 words. No hard returns are to be included within the abstract. The key words are to be included within the abstract table one hard return below the abstract. Provide no more than five key reference words. Bold only the text “Key Words:.”

Example:

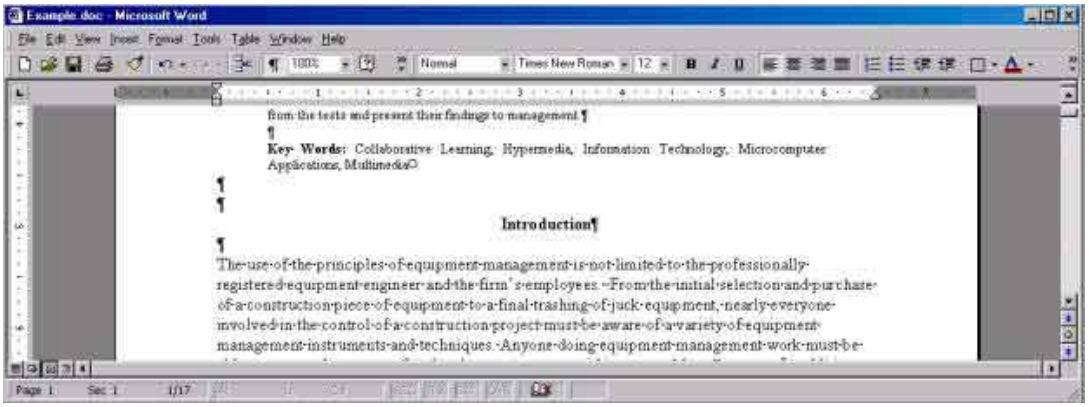


Headings:

Level 1

Headings are font size is 12 pt., Times New Roman, and bold. Headings are centered, upper and lower case (Title Case). Two (2) hard returns are before the heading and one (1) hard return after the heading.

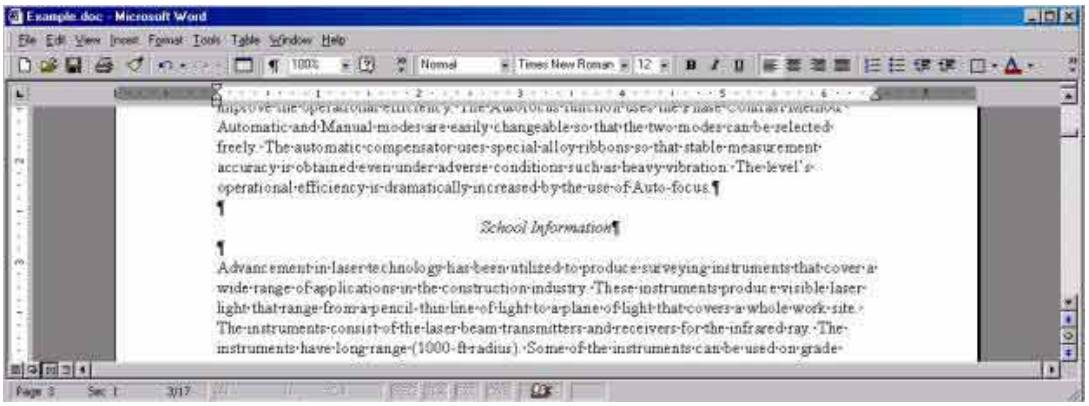
Example:



Level 2

Headings are font size is 12 pt., Times New Roman. Headings are centered, *italicized*, uppercase and lowercase heading, 1 line space before, and 1 line space after.

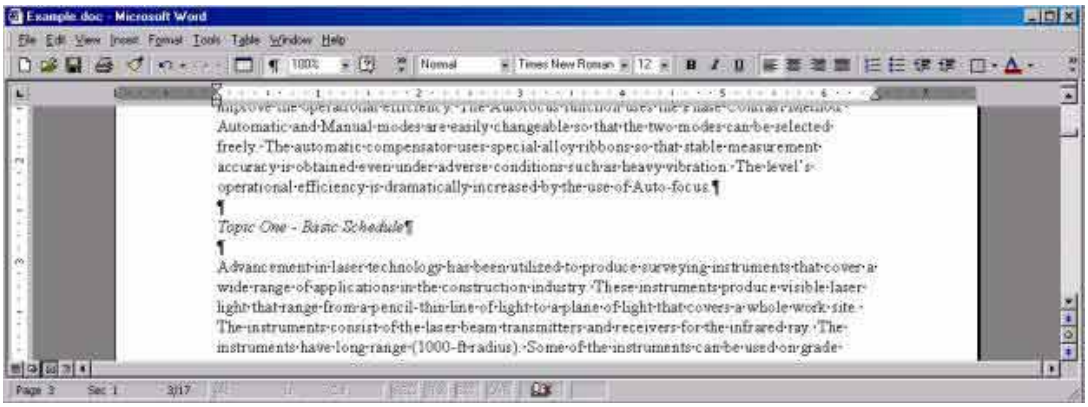
Example:



Level 3

Headings are font size is 12 pt., Times New Roman. Headings are flush left, italicized, uppercase and lowercase side heading, 1 line space before, and 1 line space after.

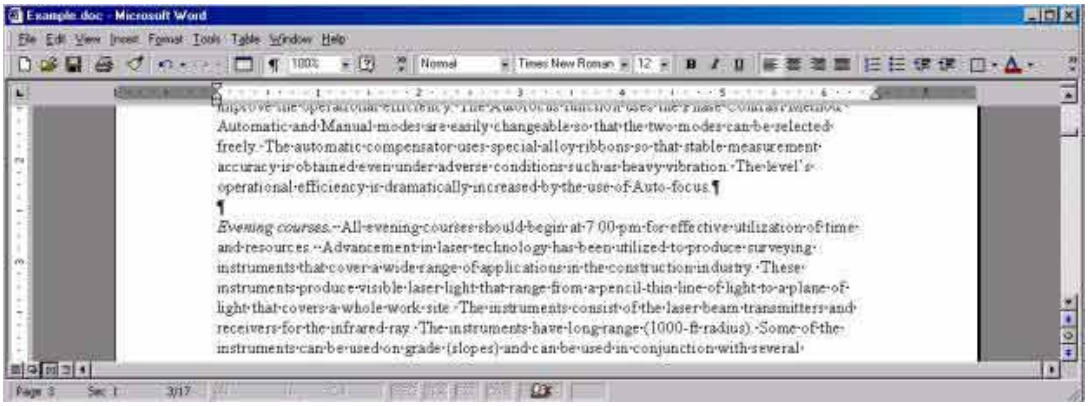
Example:



Level 4

Headings are font size is 12 pt., Times New Roman and are flush left, italicized, lowercase paragraph heading ending with a period (.), 1 line space before, 3 character spaces after, paragraph begins same line.

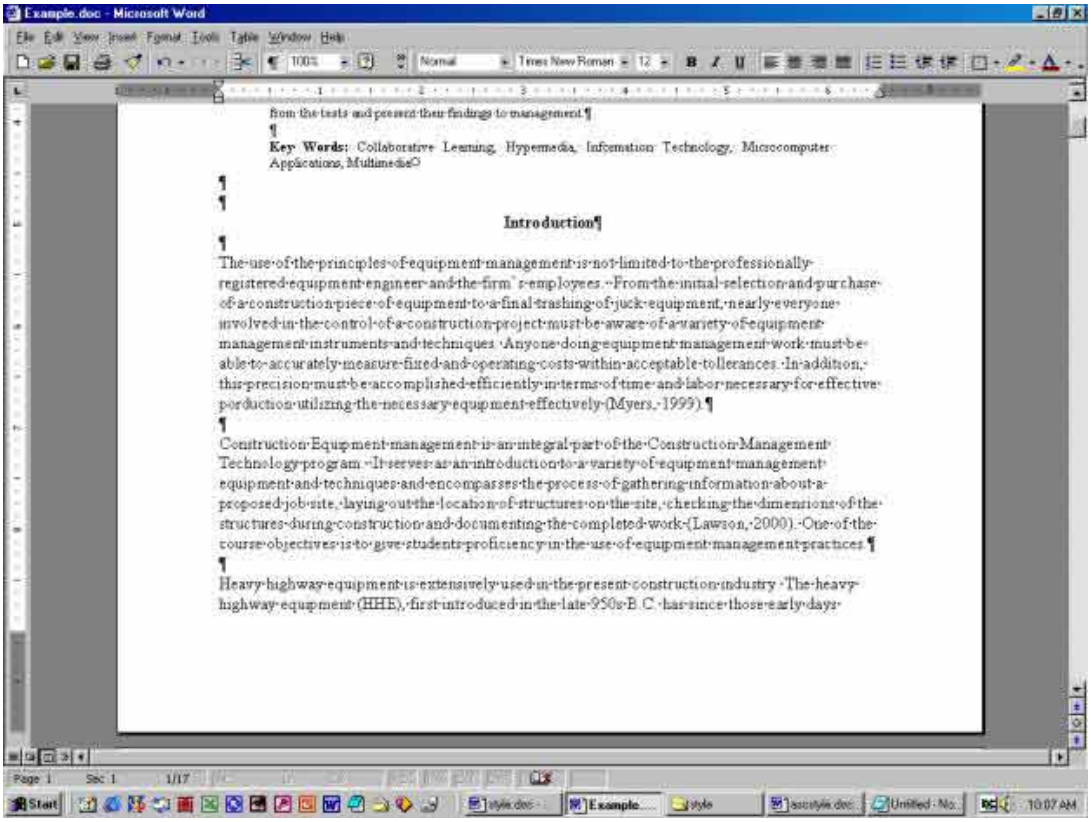
Example:



Paragraphs:

Each paragraph is single spaced, aligned left only, no indents. There is only one (1) hard return between paragraphs. Sentence structure requires one (1) space after a period.

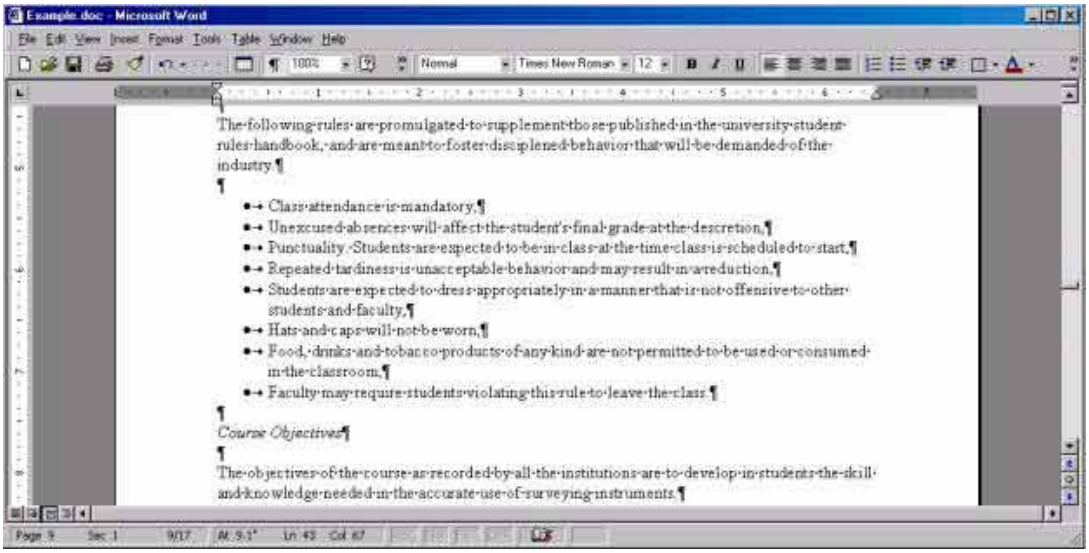
Example:



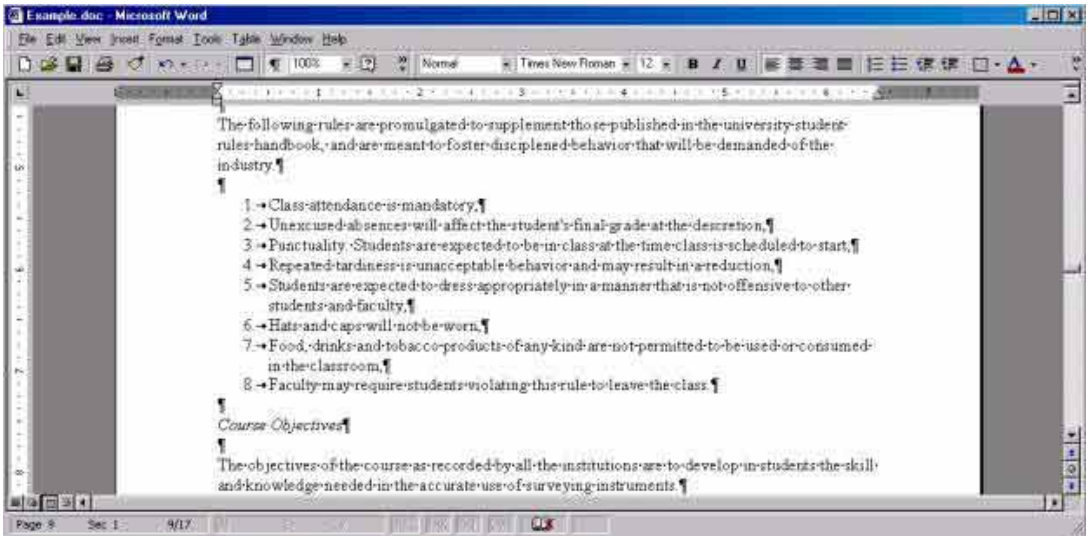
Bulleted and Numbered Lists:

Items listed should be syntactically and conceptually parallel to the other items in the list and should be limited to itemized conclusions or steps in a procedure. Only minimal round bullets or Arabic numerals are to be used. The list is one space below the previous paragraph and indented 0.25" and is followed by one left justified space. Each of the separate items in the series is followed by a comma or period. Do not force or hard text your own bullets or numbering using tabs or indents. Use auto formatted only. You may format them to your specific needs.

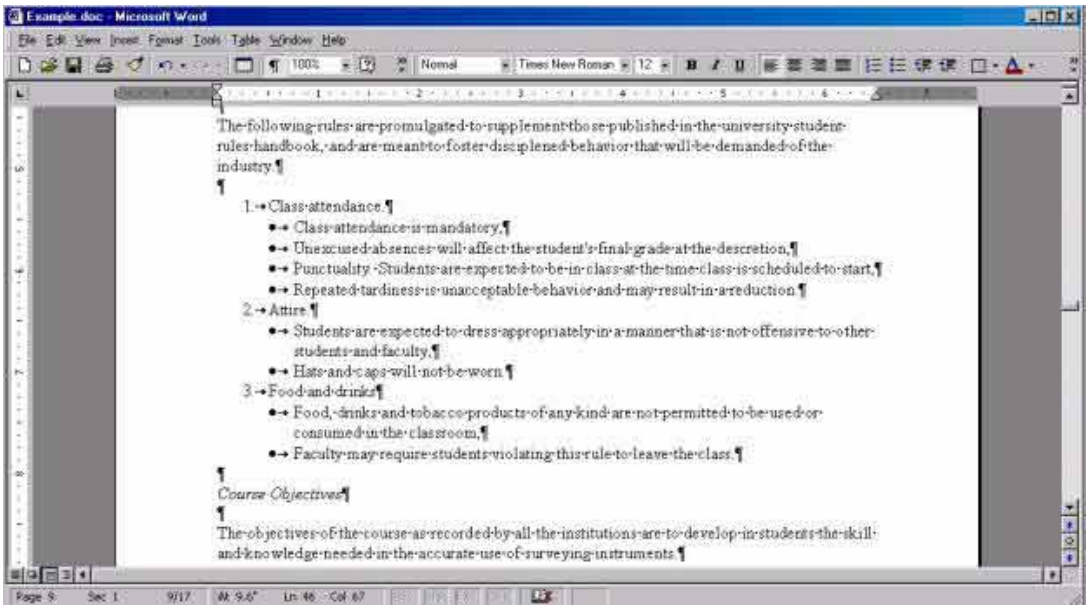
Bulleted List
Example:



Numbered List
Example:



Bulleted and Numbered List
Example:



Tables:

Textual information presented in column and row format. All tables must be created using the table function within the same word processing system as the manuscript. No table may be included as an image file or inserted as a reference to another file document, i.e. Excel, Access. The table size is established by setting the table's width to 100%" and alignment to "centered". Table titles (use 12 pt.) Appear at top of table (note punctuation, capitalization, and formatting displayed by the examples) and within its own row cell. Borders and shading must be set to "none" except the title cell, header cells, and the last cell which should have the bottom cell boundary as a 1/2 pt. line. Column headings can be bold. Information within the table (except for the title cell) is to be formatted font size 10 pt., times roman. There should be a hard return before and after the table. **Tables in excess of 40 lines in total will be included as an appendix**.

Example #1: *(table borders are shown here only as graphic representation of the table formatting and for clarity)*

Table 4

Sample analysis of data table explicitness

	Measurement			
Equipment Load	**Time**	**Distance**	**Method**	**Total Reserve**
Sand	1:54 hr.	2.5 mi.	2 ton dual axle	75%
Dirt	2:17 hr.	2.3 mi.	1.5 ton single axle	16%
Gravel	1:47 hr.	1.3 mi.	18 yd. Dump	54%
Note. The reserve values represent the mean percentages of correctly traveled loads				

Example #2: *(table borders have been hidden to demonstrate actual example)*

Table 4

Sample analysis of data table explicitness

	Measurement			
Equipment Load	**Time**	**Distance**	**Method**	**Total Reserve**
Sand	1:54 hr.	2.5 mi.	2 ton dual axle	75%
Dirt	2:17 hr.	2.3 mi.	1.5 ton single axle	16%
Gravel	1:47 hr.	1.3 mi.	18 yd. Dump	54%

Note. The reserve values represent the mean percentages of correctly traveled loads

Figures:

Figures include **non-text** entries such as graphs, illustrations, photos, and artwork (tables are not figures). Figures should be drawn using a suitable drawing package and embedded within the manuscript document. The use of color is not encouraged. Color may only be used if the author arranges to do so and pays the additional publishing costs to the publisher. **Only .gif and .jpg file formats are considered acceptable. Submitted images should adhere to the resolution setting of 300 dpi.** A two (2) celled table contains the figures (center justified) and figure title (center justified). Figures will not have borders drawn around them and should be limited to two-thirds (⅔'s) of a page. The table size is established by setting the table's width to 100%" and alignment to "centered". Figure titles use 12 pt and appear in the bottom cell of the figure table (note punctuation, capitalization and formatting displayed by the examples). **Do not include the figure title in the figure itself**.

Example #1a: *(table borders are shown here only as graphic representation of the table formatting and for clarity)*

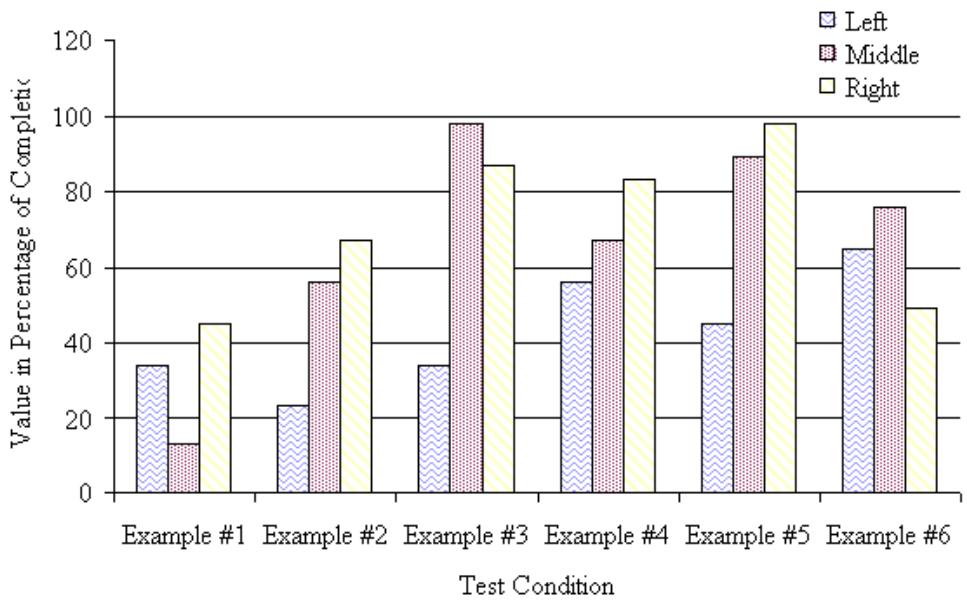


Figure 3: Mean overall motor activity of the 374 hp. Grade changer.

Example #1b: *(table borders have been hidden to demonstrate actual example)*

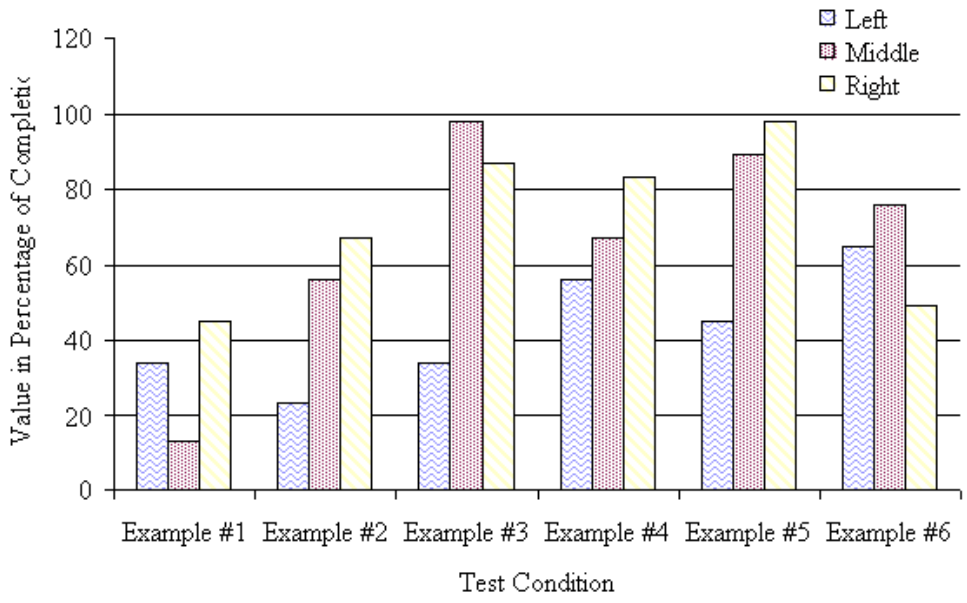


Figure 3: Mean overall motor activity of the 374 hp. Grade changer.

Photos and Artwork

These figures should remain in their correct place within the document. Photos and artwork are embedded within a centered table cell.

Example #1a: *(table borders are shown here only as graphic representation of the table formatting and for clarity)*

Figure 4: Equipment source.

Example #1b: *(table borders have been hidden to demonstrate actual example)*

Figure 4: Equipment source.

Citations:

Citations are within parenthesis, place (author's surname and publication year) within the text at the appropriate point. All citations must refer to sources listed in the references, and all sources listed must be cited from within the text. See the references examples (under the support material section of the manuscript specifications) for proper listing of sources.

Citation Table of Contents

Examples:

Paraphrasing:

. . . As written (Jones & Moss, 1997). Or . . . As written (Jones & Moss, 1997) in the . .

Directly quoting:

". . . As written" (Jones & Moss, 1997, p.17). Or . . . "as written" (Jones & Moss, 1997, p.17) in the . . .

Citing figures and tables:

. . . As written (see figure 5).

. . . As written (see table 5) in the . . .

References:

The reference list placed at the end of a journal manuscript documents the manuscript and provides the information necessary to identify and easily retrieve sources. Authors should choose references judiciously and must include only the sources that directly support and substantiate the manuscript. References must be listed in alphabetical order according to the name of the first author and not numbered. All sources (25 maximum) are listed alphabetically at the end of the manuscript under the heading references.

Citation Table of Contents

Examples

Style

Listing sources

Arrange entries in alphabetical order by the surname of the first author. Alphabetize corporate authors, such as associations or government agencies, by the first significant word of the name. Full official names should be used. If there is no author, the title moves to the title position, and the entry is alphabetized by the first significant word of the title.

Spacing
One hard return, aligned left, will provide a space between all entries. Single-space each entry.
Indentation
Do not indent paragraphs. Indent 0.25' all bullets and numbered listings.
Capitalization
Capitalize all major words in the title of a journal or newspaper. Capitalize only the first word of a manuscript's title and subtitle. Capitalize the first word of a book's title and subtitle, and any proper names. Capitalize the first word and the first word of subtitles in theses, unpublished manuscripts, and non-print media. Capitalize all names of universities and their departments, and the names of all publishers.
Italicize
Italicize the title of all journals, newspapers, books, theses, unpublished manuscripts, and non-print media. Volume numbers of journals are also to be italicized.
Punctuation
Periods are to be placed after dates, journal, and book titles (no periods however, between the title and parenthetical information), and at the end of each reference entry. All abbreviations should also be followed with a period. In a reference to a work with a corporate author, the period follows the corporate author. In a reference to a work with no author, the period follows the title, which is moved to the author position. (When an author's initial with a period ends the element, do not add an extra period.)

- *Comma* - use commas to separate authors and to separate surnames and initials. Use a comma to separate the parts of a reference entry not already separated by a period.
- *Ampersand* - when listing two or more authors, use a comma, space, and ampersand (&) before the last author.

Spacing and punctuation

- after commas and semicolons: one space.

- after colons: two spaces, with the exception of one space after the colon in two-part titles, and one space after the colon that follows the publisher location in the reference list.
- after periods that separate parts of a reference citation: two spaces.
- after the periods of the initials in personal names: one space - after internal periods in abbreviations: no space.

Listing volume and issue numbers

In journal references, give the volume number and italicize it. Do not use "vol." before the number. If, and only if, each issue begins on page 1, give the issue number in parentheses immediately after the volume number, then follow with the page numbers. E.g. 3, 635-647. or 27 (2), 1-7.

While listing encyclopedias or books of several volumes, give the volume number as (v. 1, p. 191) or (vols. 1-4) for several volumes.

Authors

Invert all author names; give only surnames and initials of the author's first and middle names if known.

Examples

Journal Manuscript, One Author

Paivio, A. (1975). Perceptual comparisons through the mind's eye. *Memory & Cognition, 23* (3), 635-647.

Journal Manuscript, Two Authors

Becker, L. J. & Seligman, C. (1981). Welcome to the energy crisis. *Journal of Social Issues, 37* (2), 1-7.

Legal Citations

Freeman Contractors, Inc. v. Central Sur. & Ins. Corp., 205 F.2d 607 (8th Cir. 1953)

Freeman & Co. v. Bolt, 968 P.2d 247 (Idaho App. 1998)

T. Brown Constructors, Inc. v. Pena, 132 F.3d 724 (Fed. Cir. 1997)

United States v. Spearin, 248 U.S. 132, 136 (1918)

Magazine Manuscript

Gardner, H. J. (1981, December). Do babies have a universal song? *Psychology Today*, *102*, 70-77.

Newspaper Manuscript

Study finds free care used more. (1982, April 3). *Wall Street Journal*, p. A1, A25.

Books, One Author

Bernstein, T. M. (1965). *The careful writer: A modern guide to English usage*. New York: Athenaeum.

Book, Two Authors

Strunk, W., Jr., & White, E. B. (1979). *The elements of style* (3rd ed.). New York: Macmillan

Edited Book

Letheridge, S., & Cannon, C. R. (Eds.). (1980). *Bilingual education*. New York: Praeger.

Videotape

Mass, J. B. (Producer), & Gluck, D. H. (Director). (1979). *Deeper into hypnosis* [Videotape]. Englewood Cliffs, NJ: Prentice-Hall.

Eric Document

Smith, L. S. (1990). *How valid are GRE scores?* (Report No. CSOS-R-121). Baltimore, MD: Johns Hopkins University, Center for Social Organization of Schools. (ERIC Document Reproduction Service No. ED 123 234).

Unpublished Doctoral Dissertation

Devins, G. M. (1981). *Helplessness, depression, and mood in endstage renal disease*. Unpublished doctoral dissertation, McGill University, Montreal.

Government document, available from the GPO

National Institute of Mental Health. (1982). *Television and behavior* (DHHS Publication No. ADM 82-1234). Washington, DC: US Government Printing Office.

Electronic Format

Visiting date: optionally, one may choose to list the date a document was downloaded or viewed online, should there be a concern that the document might expire in the foreseeable future. Such dates come at the end of the reference, parenthesized in the form " (visited year, month date)"

> Note: provided here are two examples of electronic-format examples (the first and third examples are slightly different). Also provided are several addresses for resources of online referencing.

Examples:

Beckleheimer, J. (1994). *How do you cite URL's in a bibliography?* [WWW document]. URL http://www.nrlssc.navy.mil/meta/bibliography.html

Bleuel, J. (1995, November 8). *Zitieren von Internetquellen* ["Citing sources on the internet"]. [WWW document]. URL http://www.uni-mainz.de/~bleuj000/zitl.html

Ivey, K. C. (1996, September 2). *Citing internet sources* [WWW document]. URL http://www.eei-alex.com/eye/utw/96aug.html. Also in *The Editorial Eye*, *19*(8), 10-11. Alexandria: EEI.

Li, X., and Crane, N. (1996, May 20). *Bibliographic formats for citing electronic information* [WWW document]. URL

http://www.uvm.edu/~xli/reference/estyles.html

Quinion, M. (1996, March 10). Citing online sources. *World Wide Words: Michael Quinion on aspects of English* [WWW document]. URL http://clever.net/quinion/words/citation.htm

Tent, J. (1995, February 13). Citing e-texts summary. *Linguist List*, *6*(210) [Online serial]. URL http://lamp.cs.utas.edu.au/citation.txt

Walker, J. R. (1995, April). *Walker/ACW style sheet; MLA-style citations of electronic sources* [WWW document]. URL http://www.cas.usf.edu/english/walker/mla.html

Appendix:

Appendices are labeled A, B, and C (when there is more than one), and are placed in the order they are first referenced in the text. Please limit number of pages. Information within the appendix is to be formatted font size 10 pt., Times New Roman.

Example #1a: *(table borders are shown here only as graphic representation of the table formatting and for clarity)*

Appendix A
Peer Evaluation Form

**NOTE: Complete this form privately. This information will be used to help determine individual contribution Grade and will not be available to anyone but the instructor.

Student Name _____
Group Number _____
Date _____

I. Distribute 17 points to the members of your group (excluding yourself) for each of the following categories. Total points for each category should add up to 17. A higher number point implies more contribution and lower points implies less contribution.

(Alphabetical last name here)	1	2	3	4	5
1. Amount of work contributed					
2. Attendance at group meetings					
3. Quality of individual meeting participation					
4. Completion of assigned work within schedule					
5. Quality of assigned work					
6. Individual' value and over all contribution to the group					

II. Rank the members of your group (excluding yourself) in the categories below. Do not place all members in the same category.
1. Best performer (s) _____
2. Good performer (s) _____
3. Average performers (s) _____
4. Minimal performer (s) _____

III. Add any comments you would like to make

Example #1b: *(table borders are shown here only as graphic representation of the table formatting and for clarity)*

Appendix A
Peer Evaluation Form

**NOTE: Complete this form privately. This information will be used to help determine individual contribution Grade and will not be available to anyone but the instructor.

Student Name _____
Group Number _____
Date _____

I. Distribute 17 points to the members of your group (excluding yourself) for each of the following categories. Total points for each category should add up to 17. A higher number point implies more contribution and lower points implies less contribution.

(Alphabetical last name here)	1	2	3	4	5
1. Amount of work contributed					
2. Attendance at group meetings					
3. Quality of individual meeting participation					
4. Completion of assigned work within schedule					
5. Quality of assigned work					
6. Individual' value and over all contribution to the group					

II. Rank the members of your group (excluding yourself) in the categories below. Do not place all members in the same category.
1. Best performer (s) _____
2. Good performer (s) _____
3. Average performers (s) _____
4. Minimal performer (s) _____

III. Add any comments you would like to make

Language:
Language should remain non-gender specific unless germane to the content. Do not use “he/she”, “he or she” or like wordings.
Example:
- replacing . . . "men" at the jobsite . . . With . . . "workers" at the jobsite . . .;
- replacing . . . Information to a superintendent for "her" . . . With . . . Information to a superintendents for" their," etc.

Dr. Tulio Sulbaran, ASC Proceedings Editor/Publisher
Department of Construction Science
The University of Texas at San Antonio
San Antonio, TX 78249

Associated Schools of Construction *International Proceedings of the Annual Conference*

This Page is maintained by: Dr. Tulio Sulbaran at University of Texas at San Antonio at http://www.utsa.edu/
Comments and suggestions are welcome; direct them to asceditor@ascweb.org
URL for this page is http://ascpro.ascweb.org
This page was last updated on August 25, 2017
AA/EOE/ADAI

Appendix B

COMS 419 Paper Assignment

Media Analysis Paper

For this paper, you will analyze a piece of media (keep in mind you must provide this piece of media to me either in the form of a link or in an appendix at the end of your paper if it comes in the form of a document [including pictures]). More specifically, you will discuss the effects your media form may have on the audience, drawing insights from your previous research (paper 1) and the theory that you choose to apply. This paper should be 6-7 pages (not including references and appendices). Here are the particulars:

1. You need to pick one piece of media to analyze (e.g. video clip, movie, news article, advertisement).
2. This piece of media must be analyzed through the lens of one of the theories in the first or second half of the quarter. These include: (1) uses and gratifications (paper can incorporate mood management theory, disposition theory, entertainment, or emotion), (2) cultivation theory, (3) social learning/cognitive theory, (4) priming, (5) agenda setting, (6) framing, (7) third-person effect, or (8) diffusion.
3. Your paper should have the following sections:
    a. **Introduction** (one to 1 ½ pages - 5 points)**:** In this section, you will provide a brief description of the goals of your paper, including a description of your topic of interest and the piece of media you are analyzing (BRIEFLY—you will discuss the media form in much more detail later in the paper). This section needs a proper thesis statement (what media effects would result or why is it a good example of the theory?).
    b. **Theoretical overview and past findings** (approximately 3 pages - 15 points): In this section, you will provide an overview of the theory that you will apply in your analysis, as well as previous findings related to your topic of interest.
        i. You need to discuss the basic tenets of the theory (i.e., in general what does the theory predict? What are the outcomes of interest? Independent variables?).
            1. Use the textbook (including articles cited within the text) and research to provide support for the theory's claims.
        ii. You need to discuss your topic in relation to your theory of interest. What has been found previously concerning your topic and how do such findings relate to your theory of interest?
            1. Are the basic tenets of the theory empirically supported by research on your topic?
        iii. Please note—You need to provide a cogent and succinct overview of the theory you choose.
        iv. Please note—if you cite one particular study mentioned in the book, it should appear in your references (citing the book does not cut it).
    c. **Analysis of the media form** (approximately 2 pages – 20 points): In this section, you will provide a critical analysis of your chosen media form in light of the theory you just reviewed. There are several ways this can be achieved and, as long as it is sensible, it does not matter which you choose. Here are two ways that may work for you:

i. Begin by providing an overview of the media form. Then, in subsequent paragraphs, apply one tenet/aspect of the theory at a time to discuss the likely effects of the media form on the audience.
ii. Begin by highlighting the overall theoretical assumptions. Then in each paragraph discuss one aspect of the media form and how it relates to the theory's assumptions.
iii. Please note—you may find yourself needing to discuss certain aspects of the methodological designs from the textbook (or class discussion) to bolster your argument in this section.

d. **Conclusion** (½ - ¾ page - 5 points): In this section, you will discuss the utility of the theory in relation to your topic (i.e. why did the theory provided insight into how your media form may influence audience members?). Basically, I want the main "take away" messages from your analysis.

4. Formatting
   a. Your paper should be Times New Roman 12-point font, double spaced and have the name in the upper right-hand corner.
   b. Your paper should follow proper APA style, including the references.
   c. Your paper should be well-written and thoughtful. Please see the writing tips page on PolyLearn for the writing expectations.
   d. You may want to consider section headers (except for the introduction).
   e. You can lose up to 5 points for not adhering to the writing/formatting rules or not having a reference page.
5. Things not to do in your paper.
   a. Dilute my lecture notes—particularly for pages on end.
      i. I expect my notes to be cited—if not this is plagiarism.
      ii. Make sure my notes are adding something meaningful to your paper that cannot be found in the book.
   b. Use rhetorical questions as transition statements. (e.g., "How does SCT posit that the individuals can learn from the media? Well, Bandura puts forth a compelling four-stage model describing how individuals learn from the media.")
   c. Use informal language to describe your media clip (e.g., "Snooki was acting really lame in this clip").

This paper is due on Thursday, June 7. You will turn in an electronic copy to PolyLearn, but must also submit a hard copy to me (either in class or to my the COMS front office by 5pm).

NOTE: Along with turning in the actual paper, you are required to fill out two surveys over the course of the quarter on your research process. Much of the information needed for the surveys will come straight from the paper. THOSE WHO FAIL TO COMPLETE THE TWO SURVEYS WILL NOT GET CREDIT FOR THE ACTUAL PAPERS.

APA Format for References and Citations
(See guidelines on PolyLearn and on the Purdue University's OWL site)

In your reference list, follow the format below. **Alphabetize your reference list by the first author's last name**, and **use hanging indents**. List only items that you cite in your paper, and

cite everything in your reference list. References should include: each author's last name and first/middle initials, year in parentheses, article/book titles with only first word capitalized, journal titles with all major words capitalized, journal/book titles and volume #s italicized, page numbers for articles and chapters, place of publication and publishers for books. See examples of reference formats below:

Format for a journal article, one author:

Auter, P. J. (1992). TV that talks back: An experimental validation of a parasocial interaction scale. *Journal of Broadcasting & Electronic Media, 36,* 173-181.

Format for a journal article, three authors (same format for two, four, etc.):

Weiss, A. J., Imrich, D. J., & Wilson, B. J. (1993). Prior exposure to creatures from a horror film: Live versus photographic representations. *Human Communication Research, 20,* 41-66.

Format for a chapter in an **edited** book:

Anderson, D. R., & Burns, J. (1991). Paying attention to television. In J. Bryant & D. Zillmann (Eds.), *Responding to the screen: Reception and reaction processes* (pp. 3-25). Hillsdale, NJ: Erlbaum.

Format for an **authored** book:

Jowett, G. S., & O'Donnell, V. (1992). *Propaganda and persuasion.* Newbury Park, CA: Sage.

<u>Examples of citations</u>:

1. Entire citations in parentheses (alphabetize):
   Two studies (Auter, 1992; Weiss, Imrich, & Wilson, 1993) show...

2. Authors named in the sentence:
   Weiss, Imrich, and Wilson (1993) reported that...

3. Three or more authors: Use all authors' names for first cite; then first author's name with "et al.":
   Weiss et al. (1993) also argued that...

Appendix B

Department of Economics, Cal Poly State University **Spring 2018**

Syllabus for ECON 464: Senior Project

Please read this syllabus carefully. "I didn't read the syllabus" is not an acceptable excuse for missing a deadline, not following the style requirements of the senior project, and so on. **You will be deducted points for failing to follow the guidelines stated in the syllabus**.

Professor: Dr. Carlos A. Flores
E-mail: cflore32@calpoly.edu
Office: 426 Orfalea College of Business
Office Hours: Wednesdays from 3:45pm to 5:00pm, Thursdays from 3:45pm to 5:00pm, or by appointment
Office Phone: (805) 756-2907

Introduction

Econ 464 requires students to pursue and complete independent research projects. The senior project is the capstone experience for the economics major; it is an opportunity to apply economics to a subject you are passionate about; it also provides a chance to match yourself to potential employers. A high-quality senior project will give you something to talk about when interviewing for jobs and may increase your chances of landing a job you enjoy.

Important Dates (Percent of Grade)

- Research Proposal (due April 13, 2018) (10%)
- Literature Review (due April 27, 2018) (10%)
- Comprehensive ETS Exam (Friday May 11, 2018, 9am-12pm) (10%)
- Draft of Paper (due May 25, 2018) (20%)
- Final Paper (due Monday June 11, 2018 by 11:59pm) (50%)

Penalties for Missing Deadlines

It is critical that your research proceed at the pace dictated by the above deadlines. Missed deadlines will trigger a 20% reduction in grade each day beginning the next *business* day following the deadline; e.g., a Proposal turned in on April 16 will be automatically reduced by 20%. I will start grading in the order I receive the documents, so the longer it takes you to give me your work the longer it will take me to grade it. Also note, that you must turn in each of the above assignments even if you choose to not meet the deadline; i.e., you will not receive credit for turning in the Literature Review assignment if you have not turned in the proposal. ***Failure to complete the final paper will end in a failing grade in the course.*** Only extraordinary circumstances will be considered for incompletes and they must be timely and fully documented.

Comprehensive ETS Exam: This is an in-class comprehensive exam in economics that will be administrated on ***Friday May 11, 9am-12pm in a room to be determined (probably 3-303 or 3-306).*** This exam will complement your senior project as a capstone experience representing your cumulative knowledge of economics. The exam is administered online by ETS and sample exams of the economics subject test are available on their website at: http://www.ets.org under the tab "Major Field Tests". ***Failure to take the exam will result in a grade of F for the course.*** Students requiring testing accommodations will need to see me after class.

Group Size: Writing a good senior thesis involves a lot of work. Given you will have only 10 weeks to finish it, I strongly encourage you to work with somebody else. If you choose to work in groups, the limit on group size is two. The proposal must carefully document how individual responsibility is to be allocated within the group.

Academic Honesty: Plagiarism and cheating are serious offenses and may be punished by failure on the exam, paper, or project, failure in the course and/or expulsion from the University. This course operates under the academic code.

Special Needs: Students needing special accommodations or special services should contact the Disability Resource Center at 756-1395. The needs for specialized services must be documented, verified by these units, and presented to me by the second week of class.

Project Requirements Deadlines

Note: ***All files are to be submitted via PolyLearn***. The file for each of the requirements below must be in either PDF or word format, and must be named "LASTNAME_X", where X stands for "Proposal", "Literature", "Draft", or "FinalProject", corresponding to each of the parts below. For example, my file for the proposal would be called "Flores_Proposal.pdf", and the one for my final project would be called "Flores_FinalProject.pdf". If there are two students in the group, name the file "LASTNAME1_LASTNAME2__X", with the last names in alphabetical order; e.g., "Flores_Smith_Proposal.pdf". Failure to do this may result in points be deducted.

- **Project Proposal (due April 13, 2018) (10%)**. It must contain two parts. In the *first part*, call it "Topic", you must clearly state what you intend to study, why the problem or issue is important, and what methods you intend to use. For a group project, the proposal must clearly state how responsibility for the project is to be shared among members. **The first part is limited to 250 words.** This word limit forces you to narrow your focus and foster a project that can be finished on a timely basis. In the *second part*, call it "Plan", you must list your next steps (e.g., complete your literature search, collect data, research statistical methods, develop or extend a model) in your research. Enough details should be provided regarding your proposed methods and data availability (if applicable) so that I can evaluate the feasibility of the project. **The second part is limited to 200 words.** Finally, the Project Proposal must also include a tentative title for your project.

- **Literature Review (due April 27, 2018) (10%).** You need to convince me that you are on a clear path toward achieving successful completion of this project *and* that your project adds something to the existing literature. A literature review summarizes previous published work related to your project. Instead of simply writing one paragraph summarizing each article you find, you should strive to summarize the conclusions of the published literature in a cohesive narrative form. Focus on different approaches taken in the various articles as well as different results. Do the articles all attempt to answer the same research question or are there differences? Do all of the articles have similar findings? If not, why not? Do they use different data sets, different econometric techniques? What else is different between the articles that may explain different results? Is there a significant debate on the issue? If so, discuss the various sides of the issue. In addition, briefly discuss problems with the existing literature (e.g., issues not addressed, implausible assumptions, various biases, data problems, statistical method problems, or inaccurate conclusions). You should have at least 3 articles in the review, although for many topics you may include many more articles. You do not need to go in great detail into the methods or models used except to the extent that you think these methods explain differences between articles or unless you plan to use the same methods yourself. Make sure to explain how your paper fits in (i.e. how your research question is different or how your methods are different) *and* what is the contribution of your paper to the existing literature (e.g., use a new data set, consider a new assumption, consider a different econometric method, analyze problem from a different perspective). At the end of your literature review, add a reference section that includes the articles you mentioned in it. For the format to follow, see "References" under the section "Required Components of All Final Research Papers" in this syllabus. Finally, be sure to *write this literature review as if it were the one for your final research project* (rather than writing it as a summary of papers to show me that you read some papers related to your topic). As a guide, you can check some of the past outstanding senior projects available in the economics website (http://www.cob.calpoly.edu/undergrad/economics/senior-economic-projects/past-outstanding-senior-project-awards/). For example, you can check the ones by Danny Klinenberg (Fall 2016) and Daniel Estes (Spring 2015), which I am familiar with. If you check some of those past projects, place special attention to the general structure of their literature review and how the references are cited in the main text (you may also want to check their reference section for guidance on the reference section you need to include with your literature review).

- **Draft of Paper (due May 25, 2018) (20%).** The draft must contain the elements of the paper (see below). Clear progress must be demonstrated. You need to convince me that you continue to be on a clear path toward achieving successful and timely completion of this project. It is expected that you will have edited the draft many times before you submit by the due date (*e.g., draft must be clean of typos*). The draft should already follow the style requirements of the paper detailed below *(here, put special emphasis on how you cite your references)*. Sections of the paper that are not well developed at this stage should contain comments on what steps you are taking to complete them.

- **Final Project (due Monday June 11, 2018 by 11:59pm) (50%)** The grade received for the final project will be based on (1) discussion of the significance and relevance of the project chosen, including your critique of the existing literature and your discussion of what your project adds to this literature; (2) quality of analysis – the care, thoroughness and professionalism of the study; and (3) execution – the quality of the written report, including writing quality, appropriate use of references and logical flow of the report. The final report should normally be in the 10-20 page range, excluding tables, figures, references, and title page. Guidelines for final style of the paper are detailed below. You may also look at the learning objectives associated with this course at the end of this syllabus for further information on the main features on which your final project will be evaluated.

Required Components of All Final Research Papers (these sections must be included in your paper, though you may include other sections if necessary).

- ***Introduction***. You must have a title page that also contains your name and the quarter in which you conducted your project. What is your issue and why should the reader be interested in it? You must convince the reader that this paper is worth their time. Are there public policy implications? Did previous literature address this issue? What general conclusions have been drawn? How does the present paper contribute to this existing literature? Where does it fit in? Why has the issue not been fully developed in the existing literature? List hypotheses you will test. Finally, how will the remainder of the paper be structured?

- ***Full literature review***. See above. Discuss what has been previously done, how it was done, and what conclusions were drawn by previous studies. Discuss problems with the existing literature (e.g., issues not addressed, various biases, data problems, statistical method problems, or inaccurate conclusions). Explain any controversy surrounding your topic. Is there a significant debate on the issue? If so, discuss the various sides of the issue and always differentiate between positive and normative analysis. Be sure to explain what important problems with the existing literature you are going to address, as well as what problems you are not going to address (and then briefly explain why you are not addressing them).

- ***Develop your economic model of the issue*** (assuming your paper is not entirely empirical, in which case, the next section represents the main part of your study). Fully discuss any assumptions you make and explain how your model differs from the existing literature. If your model is of supply and demand, then you must explain to the reader what supply and demand represent, and explain any other relevant issues that help the reader understand the logical process by which you are developing your hypotheses. All equations and graphs must be clearly presented and discussed. What hypotheses do you draw from this model? Discuss what hypotheses you will test and how you will test them. Place these hypotheses within the context of why readers should be interested in continuing to read this paper. Finally, explain the reason for going to the next section of

the paper. (If your paper is mostly empirical, in this part you need to briefly discuss economic models that are related to the topic you are analyzing. For example, if you empirically analyze the effect of a policy on labor supply, in this section you need to briefly describe economic models of labor supply and what they imply about the problem you are analyzing).

- ***Conduct your empirical analysis*** (assuming your paper is not entirely theoretical, in which case, the previous section represents the main part of your study). What data are you going to examine? How does this data differ from previous studies? What problems are associated with your data? Explain what trade-offs might exist in choosing this data. Explain your statistical techniques, including reference to basic textbooks (e.g., econometrics or applied regression analysis). Explain what your empirical analysis will suggest about your hypotheses. Then conduct your tests and fully explain their meaning. Do your results conflict with your expectations, or with previous studies? What ambiguities might there be in interpreting your empirical tests. Clearly present all tests of hypotheses and provide clear and concise tables and charts of your empirical work. It is extremely important that you produce your own figures and tables, even if some of them come directly from other sources, in which case you are required to cite the source (otherwise is plagiarism).

- ***Conclusion***. Restate why are you doing this study and briefly summarize results of the paper in mostly non-technical terms. Does your study accomplish what you set out to study? What might you do differently if you were to study this issue again? Discuss any policy implications that you draw from this study. How do they differ from those in the existing literature? Are they any other related areas that might benefit from what you have done in this paper? Has the study generated new research questions? Should the model be tested further and in what contexts?

- ***References*** Use the Chicago Manual of Style author-date system for the references sections at the end of your paper. Examples can be found at: http://library.williams.edu/citing/styles/chicago2.php. When citing in the text, cite as "Last Name(s) (year)" if within the text, or "(Last Name(s), year)" if a citation refers to a preceding sentence or paragraph. All works cited in the text must be included in the reference section and all works listed in the reference section must be cited in the text.

- ***Appendix*** Anyone working with data must also turn in an electronic appendix containing their data in CSV or XLS format along with a text or word document which (briefly) explains the format of the data file. If your data analysis involves programming, you should also turn in the programs and include in the text or word document a brief explanation of how to run the programs. Include all files (the data, the documentation, and any programs) in a single ZIP file. It should be possible to replicate your results using the files included in the ZIP file.

Style Requirements

- Papers are to be double-spaced, paginated, and I prefer Times New Roman 12 font. Margins are to be one inch on all sides.

- There must a title page that includes the paper title, student name, and the quarter in which the paper is completed.

- Each section of the paper must be clearly shown and numbered (1, 2, 3,…), with subsections numbered as well if applicable (1.2, 1.2,…), and the form of this sectioning must be consistent throughout the paper. You should place all major sections in boldface.

- The paper must be neatly done, grammatically correct, and contain logical arguments and observations. Avoid clichés, casual jargon, contractions or abbreviations in your writing. Always define an acronym the first time you use it. Poorly written papers will cost you at least one full letter grade.

- You are doing technical work and there is no room for unsupported personal opinions. You may interject your personal opinions to a limited extent, but make it clear that you are delving into normative and not positive analysis when doing so.

- You may not use economic terms (e.g., efficient, equitable, costly, social welfare) without first providing clear definitions. Similarly, expressions such as "too high," "too low," appropriate, desirable, responsible, greedy, dishonest, "too many," may not be used without providing clear meanings to these expressions.

- Copying work of others (plagiarizing) is unacceptable. Copying small parts of the work of others is perfectly acceptable as long as you appropriately cite their work. Paraphrasing is also acceptable, as long as you make it clear where the ideas came from.

- You must discuss in the text all information contained in tables, charts or graphs. Do not put a table or graph in the paper without referencing and explaining it somewhere in the text. All tables and figures must be clearly labeled and numbered, with footnotes or captions explaining sources of information used. Number tables 1,2,3…, and separately number figures 1,2,3… In the text, you can then reference Table 1 or Figure 3, etc.

- Read your work carefully, edit, and then edit many more times. Each and every sentence should be unambiguous for the reader. A sign of very bad writing is when readers must re-read sentences. I will significantly reduce grades of papers that require me to re-read sentences multiple times.

- Keep paragraphs relatively short, and with a specific and clear purpose. A page-long paragraph is hardly ever justified. There should be a logical flow with each succeeding paragraph and it is critical for the writer to make these paragraphs flow easily for the reader. Similarly, there should be a logical flow from section to section of the paper.

- When using the internet, identify websites and your time of viewing. Use honest skepticism when deciding if information is reliable. It is very unlikely that you can convince me that the majority of your documentation should be from the web.

Senior Project Ideas

I have listed a few possibilities below (in no intentional order), but I am open to any ideas you choose to discuss in your proposal as long as they clearly relate to economics. The following project ideas were collected from many of the faculty in the Economics department. I have not personally considered each and every idea on this list, so I cannot tell you how to do them. They are listed only to provide ideas. In each case, the feasibility of the project depends on how YOU choose to implement it. You probably want to check out published research related to each topic to get ideas. (*Warning:* some of these ideas are very general and need to be made more specific).

- Is College Worth It?
- Do Academic Rankings of Colleges Signal Quality of Investment?
- Do Websites Containing Student Reviews of Professors Signal Quality?
- Which College Majors Offer the Highest Return?
- Which Jobs are Most Likely to be "Out-Sourced"?
- What is "Benevolent Paternalism"? Implications for Public Policy
- Might More Competition Improve Performance of Public Schools?
- Will Spending More on Public Schools Necessarily Raise Performance?
- Might More Competition in Health Markets Lower Health Costs?
- Effects of Bans on Trans-Fats or Soda: Economic Incidence and Equity Issues
- Economics of Housing or Stock Market Bubbles
- Is the Core Inflation Rate a Better Predictor of Inflation?
- How Independent of Politics is the Central Bank?
- Does Money Still Predict Inflation?
- Economics of Flat Taxes: Fairer, Simpler and More Efficient?
- Do "Fair Trade" Products Improve Lives of the Poor?
- Accounting for Regulatory Costs Through a "Regulatory Budget"
- Is Demand for a College Education Very Price Sensitive?
- Do Futures Markets in Commodities Raise Oil Prices?
- Are Current Gasoline Taxes Near the "Correct" Pigovian Tax?
- Do Countercyclical Policies Influence the Rate of "Creative Destruction"?
- Effects of Tax, Regulatory, Spending and Monetary Policies on Housing Prices
- Public Policies and the Housing Market Bubble? A Case of Moral Hazard?
- Are College Applications Very Sensitive to the Business Cycle?
- Publicly-Funded Sports Stadiums: Costs and Benefits
- Has Rising Homeownership Raised Unemployment Rates?
- Do States That Spend More on Crime Prevention Spend Less on Education?
- Is College Worth It? Costs and Benefits
- How Much Does Income Depend Upon Where You Were Educated?
- Was Milton Friedman Correct About the Role of Business in Society?

- The Economics of "Sustainable Development"
- Effects of Toll Roads on Traffic Issues
- Should There Be A Tax on Fat?
- Universal Preschool: Costs and Benefits
- Lowering the Legal Drinking Age: Costs and Benefits
- Examination of the Tax and Spending Policies of California Governments
- Happiness Research: Implications for the Study of Economics and Public Policy
- Is Economic Freedom an Important Ingredient For Economic Growth?
- Does the Media Present a Biased View on the Economy?
- A Generational Accounting of (Future) Government Programs
- Costs (and Benefits) of "Bailing Out" the Housing Market
- Is America in Decline?
- Laws on Disclosure of Food Characteristics
- Effects of Bans on Cell Phone Use While Driving
- Costs and Benefits of Government Intervention in the Fast Food Industry
- Costs and Benefits of Drilling For More Oil in the US
- Costs and Benefits of Gun Control
- Economics of University Rankings
- Is There Rising Income Inequality? If So, Is it Necessarily Bad?
- Is There Such a Thing as Price-Gouging?
- Issues Related to the Kelo Case, Public Use and Eminent Domain
- Should Fannie Mae and Freddie Mac Be Privatized?
- What Degree of Publicness is Associated with Public Education?
- Effects of Foreign Aid on Developing Nations
- Do Private Markets Offer Too Many Choices For Consumers?
- Are Voters Rational?
- Is Wal-Mart Good for Society?
- How Well Do Private Markets Provide Fuel "Efficient" Cars?
- Is There A Credit Crunch?
- Has Monetary Policy Been Too Loose?
- Effects of Flat Taxes in Countries That Have Adopted Them
- Do Temporary Changes in Government Policies Influence Much of Anything?
- How Well Do Economists Predict Recessions?
- Do Americans Save Too Little?
- Is Size of the US Budget Deficit A Problem?
- Alternative Views on How to Reduce Budget Deficits
- Should Tuition Vouchers Be Given to College Students?
- Are (Many) Economists Fooled by Randomness?
- Why Did Japan Experience Deflation?
- Should the Internet Be Taxed?
- Should Some Businesses Be Not Allowed to Fail?
- Is the Price of Water Too Low in California?
- Are Profits of Oil Companies Above Those of Other Industries?
- Are Profits of Pharmaceuticals Above Those of Other Industries?

- Are Textbooks Over-Priced?
- Central Bank Credibility: What Is It, and Does it Matter?
- Tax Reform: Efficiency vs. Equity Issues
- Does the US Corporation Tax Place Our Economy at a Global Disadvantage?
- Who Bears the Burden of the Corporation Tax?
- Effects of an Aging Society on the Economy
- Implications of The Graying of College Faculties
- Do Special Interest Groups Promote More Efficient Government?

Research Within the Economics Profession

Economics as a profession takes research very seriously. Members of the profession (professors, researchers, government economists, private consultants) communicate through newsletters of professional economics associations, blogs, at annual conferences, and through economics journals. Journals are often peer-reviewed periodical publications focusing on a specific academic field. Peer-reviewed means that other experts in the field review an author's article for correctness, completeness, and importance before it is published.

Search Engines for Published Economic Research

• EconLit
http://www.lib.calpoly.edu/datagenie/viewsource.jsp?sourceid=2052&catid=1115
• Google Scholar link via Cal Poly Library
http://www.lib.calpoly.edu/datagenie/viewsource.jsp?sourceid=6623&catid=1115
• Economics Journals of the Web
http://www.oswego.edu/~economic/journals.htm
• JSTOR
http://www.jstor.org/
• Elsevier Science
http://www.elsevier.com/wps/find/S04.cws_home/main
• Google Scholar
http://scholar.google.com/

General Information for Economists

• Resources for Economists
http://rfe.org/
• Social Science Information Gateway
http://sosig.esrc.bris.ac.uk/economics/
• Research Papers in Economics (RePEc)
http://repec.org/
• National Bureau of Economic Research (NBER)
http://www.nber.org/
• AEA Web (Research Links for the American Economic Association)
http://www.aeaweb.org/

Podcasts on Economics at EconTalk (Many great interviews of economists about their work).
http://www.econtalk.org/

Magazines and Newspapers that Discuss Current Economics Issues
The Economist, The Wall Street Journal, The Financial Times, the New York Times

"Think Tanks" Provide Useful Information and Economics Studies
American Enterprise Institute
Brookings Institution
Bruton Center
Cambridge Energy Research Associates
Carnegie Endowment for International Peace
Cato Institute
Center for Economic Policy Analysis
Center for Economic and Policy Research
Center for Full Employment and Price Stability
Center for Strategic and International Studies (CSIS)
Century Foundation
Committee for Economic Development
Conference Board
Council on Foreign Relations
Economic Policy Institute
Economic Research Council (London)
Employment Policy Foundation
Economic Strategy Institute
Freedom Forum
Heritage Foundation
Institute for International Economics
Jerome Levy Economics Institute
Joint Center for Political and Economic Studies
Kiel Institute of World Economics
National Bureau of Economic Research
National Center for Public Policy Research
Progressive Policy Institute
RAND
Rochester Center for Economic Research
Theoretical Research Institute
United for a Fair Economy
Urban Institute
Washington Institute for Policy Studies

Many Bloggers Address Interesting Economics Issues
see for a comprehensive listing:
http://www.academicblogs.org/wiki/index.php/Economics

Some Data Sources
Links to, and descriptions of, many publicly available data sets can be found at:

- National Bureau of Economic Research (www.nber.org).

- Bureau of Labor Statistics: http://www.bls.gov/bls/proghome.htm#employment (click on one of the Subject Area Categories)
- Census Bureau: http://www.census.gov
- National Center for Education Statistics: http://nces.ed.gov/
- For easy access to lots of data sets: http://sodapop.pop.psu.edu/data-collections/ecls
- In addition, many important journals in economics now require authors to submit the data sets and programs used in their paper. You can check these journal webpages to see if a data set that is of interest to you is publicly available there. Some of these journals are: *American Economic Review*, *Review of Economics and Statistics* and *Journal of Applied Econometrics*.

Learning Objectives

The Economics Undergraduate Program Learning Objectives associated with this course are:

2a. Students will be able to apply microeconomic theory or macroeconomic theory to explain and compare solutions to important business, economic or social problems.

2b. Students will be able to apply algebraic, graphical or statistical methods to explain and compare solutions to important business, economic or social problems.

2c. Students will be able to employ economic research methodology (including literature surveys, data gathering, data analysis, and policy implications) to explain and compare solutions to important business, economic or social problems.

2d. Students will be able to employ technical writing skills to explain and compare solutions to important business, economic or social problems.

3a. Whenever relevant and appropriate, students will identify and examine diverse perspectives when explaining and comparing solutions to important business, economic or social problems.

3b. Whenever relevant and appropriate, students will identify and examine the ethical implications of proposed solutions to important business, economic or social problems.

Appendix B

GRANT PROPOSAL PROJECT

FSN 416: Community Nutrition

SUMMARY OF ASSIGNMENT

This is a ***three-part assignment*** that includes learning how to complete ***two new processes***:

1. Conducting a Community Needs Assessment

2. Writing a grant proposal

Community nutrition and health problems are often found to be associated with a shared unmet need. The purpose of this project is to determine if a need exists and how to resolve the unmet need in order to restore health to your community or target population. You will first conduct your needs assessment (Part 1 of assignment), and then propose a solution through a written grant proposal (Part 2 of the assignment) and an oral presentation of your proposal (Part 3 of the assignment) to the review board (your peers).

Your assignment has been broken into 3 different parts.

Assignment Component	Due Dates	% of Course Grade
Part 1: Community Needs Assessment		10
Part 2: Grant Proposal		10
Part 3: Oral Presentations (1-min & 12-15-min)		5

INSTRUCTIONS

****If you have questions at any time, please do not hesitate to contact me**. I want you to be successful in this project! If you have detailed questions, please see me during my office hours or set up an appointment. If you have a brief question, a text or e-mail will suffice.

PART 1: COMMUNITY NEEDS ASSESSMENT — 10% of Course Grade

* You must follow formatting expectations as provided on PolyLearn.

You are tasked to conduct a needs assessment to determine if your community has a health and nutrition need that is not being met, and determining why this need is not being met. Essentially, you are conducting assessment and diagnosis of your community and you are identifying and inventorying the resources and services currently available to the community (this is also called asset mapping).

TO BEGIN: Choose a community and a Healthy People 2020 nutrition-related objective. You will be assessing the community for the existence of the problem and unmet nutrition-related needs.

NEXT…

Develop your outline:

- STEP 1: Define your parameters (Refer to Table 4.1 in your book) – this sets the scope of what information you will be collecting.
- STEP 2: Develop your data collection plan (Refer to Table 4.2, 4.3, 4.4 for data sources related to community, background, and target population, respectively)

- Data collection **MUST match your stated objectives** that were defined in your parameters.
- Plan to use **existing data**, relevant **literature**, and **new data** generated via interviews, focus groups, surveys, direct analysis (please speak with me if you believe that you will not be able to generate any new data).

Conduct your assessment:

- STEP 3: Collect your data. This will require some library and internet searching, phone calls, and possible visits to the public health department.
  - Follow your plan in step 2 (which **must** correlate back to the objectives stated in step 1).
  - If you are unable to collect certain data, be sure that you still indicate the *plan to collect the data*, but that you were unable to collect the data due to some specific limitation (state the limitation).
- STEP 4: Analyze and interpret your data. (This last step will lead you to the program/proposal planning stage, which is PART 2: GRANT PROPOSAL.)

Write up your CNA and disseminate:

- STEP 5: Share your findings (via the final draft of this assignment)
  - Provide a brief literature review of the focus of your CNA, i.e. why is this CNA needed?
  - Provide essential data, figures, tables, data analysis and interpretation.
- STEP 6 & 7: Set your priorities and choose a plan of action (leads to PART 2: Grant Proposal)

GRANT PROPOSAL PROJECT

FSN 416: Community Nutrition

PART 2: GRANT PROPOSAL **10% of Course Grade**

In this part of the assignment, you will be writing a grant proposal to support a program (with a research component) to address the priorities from your CNA and HP2020. You will complete a literature review and use data/information from you CNA to show the problem, the gap, and the need. Next, you will state your program goal and objectives and then the program delivery and assessment methods. The last part of the proposal is the budget – you must get estimations for your expenses.

The final proposal shall be no more than **6 pages, and should be no less than 5**. Follow the formatting expectations posted on PolyLearn. Please **number the pages**, starting on the first page of the full proposal (the beginning of the narrative, not cover/title page).

You will finish your project by presenting your project to your peers. You will present in two forms, first in a 60-sec "speed round" presentation, then in a 12-15-min full presentation.

Below are additional details to support your project:

TITLE PAGE (Example of info that must be present):

Project Title: Reducing childhood obesity through novel nutrition and physical activity programming in community-based children's museums.

Total Funding Requested: $ 180,000.00

Project Duration: 2 years

Project Director: Kari D. Pilolla, PhD, RDN

Organization: California Polytechnic State University

GRANT NARRATIVE (should not be bulleted, unless section warrants bulleting)

A. Needs Statement

1. Evidence of a PROBLEM (Problem Statement) in a target population
   - Significance:
     Prevalence
     Severity
   - Known contributors
2. Establish a NEED by showing the existence of a GAP – *Review of relevant literature (≥5 recent peer-reviewed sources must be used) and programs.*
   - Review current organizations, programs, or activities targeting the problem
   - Discuss the different components of the programs and their strengths and weaknesses.
   - Critically evaluate these programs and determine where a gap (or more) exists.

For example: How can the current programs be improved to make the solution to the problem to have a greater impact and/or be more cost effective?

- State the critical need! This is the driving force for a SOLUTION (next section). *For example: Thus, there is a critical need to develop a food safety program targeting parents and caregivers of toddlers and preschool-aged children… (be sure to connect the need back with the RFA/RFP purpose).*
- Do NOT provide your solution here, leave the reader to really absorb the severity of the problem and the critical need

B. **Goals & Objectives** – Now, provide the SOLUTION! – Discuss goals and objectives of the proposed program for meeting the established critical need

Remember - collectively, the PROBLEM + GAP = NEED! – Your program is the solution to this need!

1. Purpose of the project through your goals and objectives – these should closely match the critical need and the HP 2020 objectives.
2. Distinguish between your broad goal(s) and the specific, measurable objectives of your intervention.
   - See chapter 20 to define your goals versus your objectives.
   - Objectives are specific; use strong, specific action verbs.
   - Objectives will be completed when the project is completed.

C. Methods & Participants

1. Describe the target population, including the number and demographics of participants.
2. Describe the activities you propose to carry out to achieve your objectives.
3. Describe your evaluation plan
   - How will you test your objectives?
   - What type/s of evaluations will you be performing?
     i. Formative
     ii. Summative
     iii. Process
     iv. Impact
   - Summarize your measureable outcomes in a table
4. Describe partnerships (for this project, you must include at least one community partner, preferably more). List who they are, and what they will do.
5. Prepare sustainability and dissemination plans:
   - How will the program continue if funding is cut?
   - How will you share the results of the program?
6. Provide a timeline of activities
   - Example table on p. 687 & 688 in textbook.
   - You can use a flow chart to show the timing and flow of activities.
   - Do not use specific dates or personnel involved.

BUDGET (not included in page limitations)

1. Budget Table – Create a table showing your expenses. Pg 690 in your textbook provides an example. The table should include major categories of expenses included within direct and indirect costs.
2. Budget Justification/Narrative – this is a text explanation of the line item requests in the budget spreadsheet. *For example:*
   Laptop ($1500.00): A laptop is needed for onsite data entry and analysis and to generate reports at each of the program sites.
   Printer ($200.00): A printer is needed to print generated reports for participants at each program site.

REFERENCES (see formatting expectations)

APPENDICES

1. Applicable appendices can strengthen your proposal.
2. This can include figures, maps, anything that supports your grant but is not part of the narrative.

PART 3: ORAL PRESENTATIONS — 5% of Course Grade

The final component of your Grant Proposal Project requires you to present your grant proposal to your peers. You need to prepare two presentations, as follows:

Speed Round Presentation – Your goal is to convince your fellow peers that your proposal is worth funding. **You have only 60 seconds so be CREATIVE!** At the end of the Speed/Express Round Presentations, you will vote on the top 2 or 3 proposals to fund. The following formats are examples of what students have done in the past: 1-2 slide presentations in class, in-class skits, songs, and videos. You should address the following:

- What is the problem?
- Who will be served?
- What are the primary activities?

12-15-minute Full Presentation – Your goal is to **fully** present your proposal.

- Present needs, goals, objectives and outcomes, methods, population served, stakeholders, etc. Only present the total budget amount; do not present other budget details.
- PRACTICE!!! Alone and with your group.
- Remember to speak slowly, and clearly.
- *Dress appropriately for a presentation*; business or business casual (no jeans).
- You need to *provide me with an electronic and a hard copy of your presentation (4 slides to a page)* at the start of class on the day you present.
- Be succinct and ENGAGE your audience.

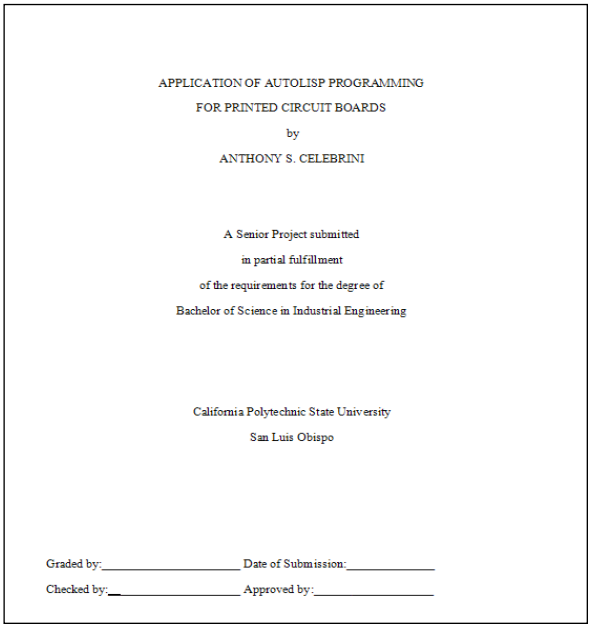
NOTE: Additional supportive guidelines may follow. All documents will be posted to PolyLearn for your reference. It is your responsibility to check PolyLearn for additional guiding documents.

WRITING THE REPORT

Organizing the report

Most reports should be organized in the following manner. Sometime there is a valid reason to include extra chapters in within the body of the report.

1. Title page
2. Executive Summary or Abstract
3. Preface and/or Acknowledgements (optional)
4. Table of Contents
5. List of Tables (if appropriate)
6. List of Figures, or illustrations (if appropriate)
7. Notation or symbols (if appropriate)
8. Chapters
    1. Introduction
    2. Background and Literature Review
    3. Design
    4. Methodology
    5. Results
    6. Conclusion
9. References/Bibliography
10. Appendices (if appropriate)



APPLICATION OF AUTOLISP PROGRAMMING
FOR PRINTED CIRCUIT BOARDS
by
ANTHONY S. CELEBRINI

A Senior Project submitted
in partial fulfillment
of the requirements for the degree of
Bachelor of Science in Industrial Engineering

California Polytechnic State University
San Luis Obispo

Graded by:_____ Date of Submission:_____
Checked by:_____ Approved by:_____

Figure 1 - Title Page

Title Page

Title page must be of the same format as shown in the sample (Figure 1). The title must be the same in all the senior project related documents i.e. title page, abstract, senior project requirement form.

Table of Contents

The table of contents should only contain the major divisions of the project, including the list of tables and list of figures, the chapters of the text and their headings exactly as in the text, the bibliography/references cited, the appendices, and their respective page numbers. See Figure 2 for a sample Table of Contents. Consider using the automatic Table of contents function within Word. It can be found under the "Insert" menu, "Reference" option, "Index

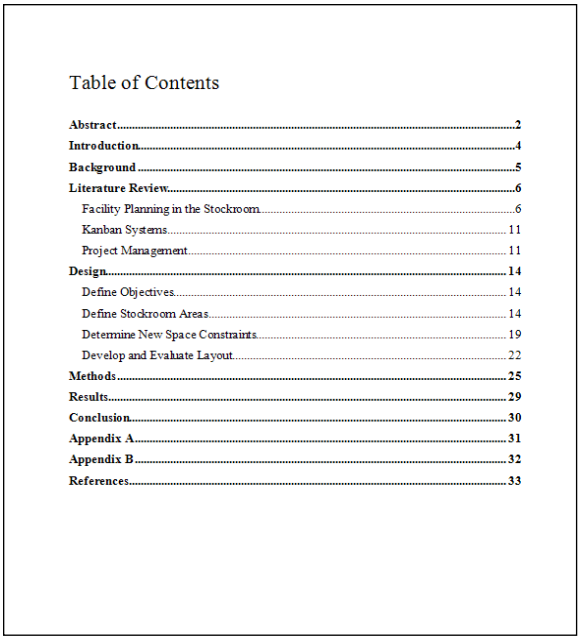


Table of Contents

Figure 2 – Example Table of Contents

and Tables" option, "Table of Contents" tab. This is a very useful method of organizing the document and updating tables, figure and the table of contents.

Executive Summary (or Abstract)

The executive summary is usually less than 500 words. It summarizes all the important points of the study: context, problem, objective, approach, conclusions, and recommendations. When writing this section, imagine that the reader is incredibly simple-minded, or has so little time to think about the report that only the most simple and direct statements are appropriate. Avoid technical vocabulary. Be sure to include the most important findings in your study, but be careful not to promise more than you actually found. Express results in quantifiable financial terms. Note an Executive Summary self-contained and is a substitute for the report itself. The executive summary will fulfill the Library's need for an abstract. An abstract is also usually less than 500 words, is a guide to the report, but does not summarize the report content.

Introduction

This section should present the background/problem addressed by the study. The background/problem tells the reader WHY you performed the study, i.e., what problem you are attempting to solve. The progression is often from a very general background statement to a very specific and concise "problem statement." Though much background may be needed to get the reader ready for the report, only a summary is presented here in the introduction. The rest is placed in the next section (see below).

State the objectives or purpose of the study, i.e., what you hope to accomplish with the project or hope to convey with the report. A set of two to eight objectives is often appropriate and should be listed with bullets. These objectives should clearly define the scope of the project so that the reader is not surprised later by information or is not expecting something that isn't there. Any bulleted list of objectives (or any other list) must have 'parallel' structure; e.g., all starting with action verbs – study, design, investigate, select, etc.

Summarize the solution approach you will take to reach your objectives. If you will experiment, say so, and say why. List the key tasks you will accomplish as you solve the problem. At least some of these tasks must be related to engineering content found in your coursework or related activities and should be generally aligned with your major.

Regardless of the organization of the introduction section, it should answer the following questions:

- What is this report about?
- How did the idea for this project originate?
- What is the problem that needs to be solved?
- What needs to be accomplished to solve this problem?
- What do you intend to complete as part of this project?

- What deliverables will result from your work? Prototype, product design, process design, recommendations, etc.
- How will you meet each of your objectives?
- What will not be included in the scope of the project?
- What main tasks will you perform on the way to completing the project?

Make sure you include a few sentences telling the reader how the rest of the report is organized.

Background (includes Literature Review)

The background should provide a context for the project and should describe any important information the reader needs to know in order to understand what you've done. This may include information concerning existing products, processes, systems, or organizations. Company literature, catalogue or manual information, advertising material, or other literature may be referenced here.

The background may also include important theory that has been developed by others (literature review). This is information the reader should know (or be reminded of) before reading the rest of the report. The theory is what is known (or believed) about the important concepts under study. It may describe a link between process/system inputs and outputs or define how quality, productivity, or cost is related to design decisions. The theory can usually be found in textbooks or landmark articles about the subject. Include references to give credit to the originators of the theory.

The background should also indicate what has been completed or attempted with regards to solving this or similar problems in the past (literature review). The published literature may include those that have attempted to solve the same problem as you, similar problems related to your work, or simply problems related to some of the methods you will use. References to recent works may include journal or magazine articles, theses or previous senior projects, conference proceedings, or other sources. Explain why your project is still necessary in the face of this prior work.

Literature Review

Many students commit themselves to work on their senior project before they have done sufficient background reading on the topic, dismissing the literature search as completed after a few books and articles have been reviewed. Wide reading in the topic is strongly recommended as a means of discovering a suitable project and/or an appropriate approach to analyzing the selected problem. Often as result of such reading, an already selected senior project may be modified extensively or redefined.

A review of the related literature is an essential part of a senior project. The topic must relate to existing knowledge on the subject and must demonstrate an ability to locate, organize, and use the literature in the field. The literature search should be almost complete before proceeding with the project. This literature review will help in defining the problem, and provide insight into the methods and approaches used by others.

The review of the related literature involves locating, reading, and evaluating materials in your area of interest in the library and online. The library is, therefore, an indispensable resource for those engaged in project writing. The efficiency with which materials relevant to problem are located depends considerably on students' knowledge of the University Library and its various resources.

Generally you will need to have at least fifteen references; at least ten of them should be non-internet sources. There is much information online, but you must be diligent in evaluating the sources of the material. Cited material must be pear reviewed and published by a reputable source. Wikipedia is not an acceptable source in a literature review.

The methods of conducting the literature review differ to some extent from subject to subject. However, in most fields the first step consists of locating or identifying key words related to the topic under investigation. This is usually done by checking the main reference sources and textbooks on the subject. These key words are needed to locate specific references in the indexes and abstracts.

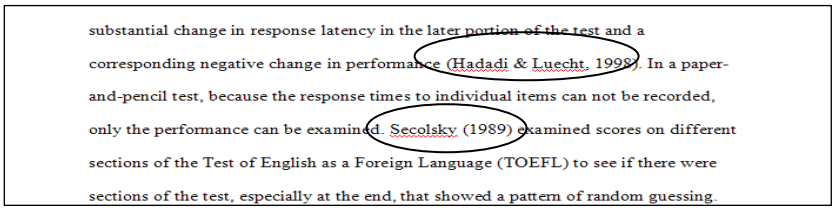
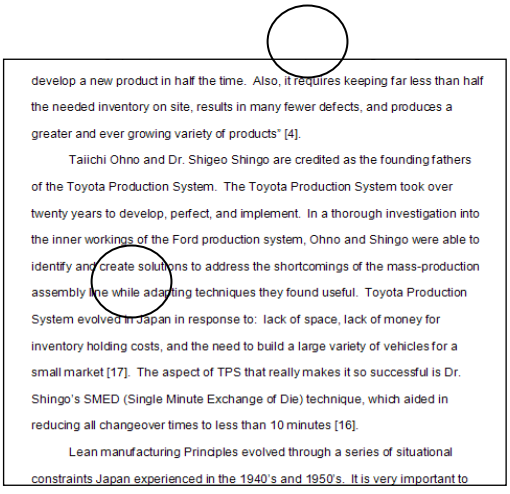

substantial change in response latency in the later portion of the test and a corresponding negative change in performance (Hadadi & Luecht, 1998). In a paper-and-pencil test, because the response times to individual items can not be recorded, only the performance can be examined. Secolsky (1989) examined scores on different sections of the Test of English as a Foreign Language (TOEFL) to see if there were sections of the test, especially at the end, that showed a pattern of random guessing.

Figure 3 - Reference by Author and Year

During the search of indexes and abstracts a bibliography card should be prepared for each book title, report or article which might contain material pertinent to the project. The bibliography card should include all the information necessary to identify the reference, such as author, title, publisher, date, periodical title, volume number, and inclusive paging. PolyCat in the Library will provide this information. Libraries will also have facilities to search for references using key word search through database of current periodicals. Some of the needed materials may not be available in the library, but may be obtained on interlibrary loan.

The review of the literature should include those articles and other references that bear a valid relationship to the problem under study. They should provide the background information that is needed to understand the project's contribution to the field and a point of reference in discussing and interpreting the conclusions in the project.


develop a new product in half the time. Also, it requires keeping far less than half the needed inventory on site, results in many fewer defects, and produces a greater and ever growing variety of products" [4].

Taiichi Ohno and Dr. Shigeo Shingo are credited as the founding fathers of the Toyota Production System. The Toyota Production System took over twenty years to develop, perfect, and implement. In a thorough investigation into the inner workings of the Ford production system, Ohno and Shingo were able to identify and create solutions to address the shortcomings of the mass-production assembly line while adapting techniques they found useful. Toyota Production System evolved in Japan in response to: lack of space, lack of money for inventory holding costs, and the need to build a large variety of vehicles for a small market [17]. The aspect of TPS that really makes it so successful is Dr. Shingo's SMED (Single Minute Exchange of Die) technique, which aided in reducing all changeover times to less than 10 minutes [16].

Lean manufacturing Principles evolved through a series of situational constraints Japan experienced in the 1940's and 1950's. It is very important to

When writing the Literature Review all sources must be cited within the report and in the reference list of the bibliography. One method of citing sources includes a reference to the source by author and year. An example

is included in Figure 3. Another method is to reference the sources by number in the reference list. This is shown in figure 4. Anything reproduced from another source must be cited. Pictures taken by others or figures created by someone else must be referenced.

Design (or Theory)

This is often the longest chapter and usually has subheadings that show the steps used in the design of the solution. For a product, process, or system design, describe the overall approach and the specific steps taken (calculations, reasoning, modeling, etc) to arrive at the initial design. This includes defining requirements, constraints, or user specifications and explaining the initial concept for the design solution and any alternative concepts. Justify each major decision by describing the theory or logic used. Justify any unusual or unique aspects of the design.

Present the original design in the form of drawings, process plans, or system specifications. Your initial cost, quality, or productivity estimates should be presented here. Refer to any drawings, tables, or diagrams in your text - whether these are embedded in the text or placed in an appendix.

If you have developed new theory for this project, derive it in detail in this section. You may change the title from Design to something more appropriate.

Methods (or Experimentation)

In this section you will explain how you tested your design. If a virtual or physical prototype is produced for the product, process, or system design, explain how, including all equipment and methods. Include visual aids. If you ran experiments, indicate what you did, especially detailing your set-up. Describe all equipment and techniques used and conditions of the tests. Justify any non-standard methods. Describe any statistical tests or simulations used to evaluate the design. Include as much information as you feel is relevant. No results, however, should be included unless they are preliminary results used to justify a certain method.

Results and Discussion

In this section you will present the resulting data – whether numerical measurements or subjective observations. You should include only the important results in this section; the rest should be placed in an appendix (you should refer to them in the text). Any tables or figures should be referred to in the text.

Figure 4 - Reference by Number

Describe and explain the results. Answer the following questions:

- Were the results as expected? Why or why not?
- Did the theory hold?
- Is the design a good one?
- Were your cost, quality, or productivity estimates on track

- How should the design or theory be changed based on results? Your progression should be from facts to opinions.

Describe any problems or limitations with the methods or experiment. Answer the following questions:

- Were any unusual conditions present?
- Were any results difficult to interpret?
- Are there some questions that remain unanswered?

Interpret the results in terms of how successful you believe the actual implementation of the design will be. Answer the following:

- Based on the results, what do you predict for the future?
- Where might legitimate problems crop up?
- How should use of the design or theory be limited?

Describe the impacts of implementing the design:

- What are the economic impacts?
- What are the ethical, societal, and environmental impacts?

Conclusions (or Summary and Conclusions)

In this section you will summarize the project: problem, objectives, and solution approach.

List a set of conclusions as bullets. Summarize the results by answering the following:

- What were your most important results?
- What can you say about the theory or the topic in general based on your experimental results?
- Did you accomplish each objective listed in the introduction?

What did you learn in the project? How would you do the project differently next time or what would you try next? What do you recommend based on your findings?

Explicitly include the social and environmental impact of the project. This includes a systems view of our design including a thorough exploration of the consequences, both intended and unintended.

Bibliography

All published literature referred to by the student to carry out any of the project tasks must be listed in the bibliography. MLA or APA should be used to format the bibliography. There are several books and online resources that can help in this formatting. The following essential information must be included in the listing: authors,

literature title, journal name or publisher's name, volume, number and year of publication, and page numbers referred.

Appendices

Appendices include materials that cannot be presented in the text (due to length, form, or complexity) without interrupting its continuity, but which are helpful in clarifying the meaning of the text. Materials that are valuable in providing supporting evidence, (i.e. summary tabulations, forms, documents, letters, manuals and questionnaires) may also be provided in the appendix.

General Writing Guidelines

Use this as a guide only. Each project has unique elements and may require a different structure or different sections for the report.

- Write the Introduction first, the Executive Summary last.
- Do not use first person in the senior project write up.
- Headings and subheadings should mean something.
- Start each major section with a short explanation of what will be covered.
- Keep in mind who you're writing for and what you want to say. Most senior projects should target a general audience (not your advisor!). Imagine that the most likely people that will read it are a future boss or a future student who wants to know what you did.
- Use headings, subheadings, bulleted lists, tables and figures whenever possible. Refer to all tables and figures in the text (same for Appendices).
- Be honest, cite others, and don't conclude more than your results tell you.
- You don't have to sound like an encyclopedia, but technical writing is meant to inform, not entertain. Shorter sentences often work better.
- Spell-check. It's easy. Consult a resource on grammar and word usage if unsure. Have a friend or colleague read over your work to catch mistakes and suggest changes.

Note: See Senior Project Template posted at PolyLearn.

Appendix C

Student/Group # _____

CRITERIA	SCORE
Establishing Information Need	
Establishes a specific need for information based on a clearly defined and articulated topic, problem, research question.	
Identifying and Selecting Sources	
Identifies and draws from an extensive and varied set of sources (e.g., websites, journal articles, books, reports, data sets) appropriate to the topic, problem, or research question; assignment guidelines; or research practices within a discipline.	
Evaluating and Incorporating Source Information	
Demonstrates the ability to incorporate information from sources based on an evaluation of the sources' quality and relevance to the discipline; critically evaluates source information using appropriate criteria considering authority, credibility, reliability, currency, and purpose.	
Synthesizing Source Information	
Synthesizes information from multiple sources, making explicit connections among them and effectively integrating source information to support ideas related to the topic, problem, or research question.	
Attributing Source Information	
Represents and attributes sources responsibly and accurately within the text; provides complete citations within the text and in the References list; employs the citation style required by the assignment or appropriate to the discipline.	

Total Score: _____

Notes:

Appendix D

NSSE 2017 Topical Module Report
Experiences with Information Literacy

California Polytechnic State University-San Luis Obispo

IPEDS: 110422

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NSSE 2017 Experiences with Information Literacy

Administration Summary

California Polytechnic State University-San Luis Obispo

About This Topical Module

Developed in collaboration with college and university librarians, this module asks students about their use of information and how much their instructors emphasized the proper use of information sources. This module complements questions on the core survey about higher-order learning and how much writing students do.

Comparison Group

This section summarizes how this module's comparison group was identified, including selection criteria and whether the default option was taken. This is followed by the resulting list of institutions represented in the 'Information Literacy' column of this report.

Group label	Information Literacy
Date submitted	5/19/17
How was this comparison group constructed?	Your institution retained the default comparison group (all module participants).
Group description	All other current- and prior-year NSSE institutions who administered module "Experiences with Information Literacy"

Information Literacy (N=77)

Albright College (Reading, PA)*
American Public University System (Charles Town, WV)*
Assumption College (Worcester, MA)*
ASU Online (Scottsdale, AZ)
Becker College (Worcester, MA)
Berkeley College (New York, NY)
Berry College (Mount Berry, GA)*
Brenau University (Gainesville, GA)*
Briercrest College and Seminary (Caronport, SK)
Brigham Young University (Provo, UT)
Brigham Young University-Hawaii (Laie, HI)*
California Lutheran University (Thousand Oaks, CA)
California State University San Marcos (San Marcos, CA)*
California State University-Stanislaus (Turlock, CA)
California State University, Monterey Bay (Seaside, CA)
Cameron University (Lawton, OK)*
Central Connecticut State University (New Britain, CT)
Chadron State College (Chadron, NE)
Cheyney University of Pennsylvania (Cheyney, PA)*
Christopher Newport University (Newport News, VA)
Claremont McKenna College (Claremont, CA)
Dakota Wesleyan University (Mitchell, SD)
Dominican College of Blauvelt (Orangeburg, NY)
Eastern Connecticut State University (Willimantic, CT)
Eastern Michigan University (Ypsilanti, MI)*
Ferris State University (Grand Rapids, MI)*
Grand Valley State University (Allendale, MI)*
Greensboro College (Greensboro, NC)
Grinnell College (Grinnell, IA)
Indiana University of Pennsylvania (Indiana, PA)*
Longwood University (Farmville, VA)
Loyola Marymount University (Los Angeles, CA)
Marian University (Indianapolis, IN)
Mars Hill University (Mars Hill, NC)
Maryland Institute College of Art (Baltimore, MD)
Mercy College (Dobbs Ferry, NY)
Middle Tennessee State University (Murfreesboro, TN)*
Nevada State College (Henderson, NV)
New York Institute of Technology (Old Westbury, NY)
Northwest Nazarene University (Nampa, ID)
Northwestern Oklahoma State University (Alva, OK)
Ohio State University at Newark, The (Newark, OH)*
Ohio State University-Lima Campus (Lima, OH)*
Ohio State University-Mansfield Campus (Mansfield, OH)*
Ohio State University-Marion Campus (Marion, OH)*
Ohio State University, The (Columbus, OH)*
Ouachita Baptist University (Arkadelphia, AR)*
Point Loma Nazarene University (San Diego, CA)
Samford University (Birmingham, AL)
Southern Utah University (Cedar City, UT)*
Southwestern Adventist University (Keene, TX)
St. Bonaventure University (Saint Bonaventure, NY)*
State University of New York at Geneseo, The (Geneseo, NY)
Suffolk University (Boston, MA)
SUNY Empire State College (Saratoga Springs, NY)
Temple University (Philadelphia, PA)*
Tennessee Technological University (Cookeville, TN)
Towson University (Towson, MD)
United States Naval Academy (Annapolis, MD)
University of Baltimore (Baltimore, MD)*

*2016 participant

Information Literacy (N=77), continued

University of California-Merced (Merced, CA)
University of Charleston (Charleston, WV)*
University of Hawai‘i-West O‘ahu (Kapolei, HI)*
University of Louisiana at Lafayette (Lafayette, LA)*
University of Maine at Fort Kent (Fort Kent, ME)
University of Massachusetts Lowell (Lowell, MA)*
University of Montana (Missoula, MT)*
University of Montevallo (Montevallo, AL)*
University of North Carolina at Greensboro, The (Greensboro, NC)*
University of Phoenix - Arizona/ONLINE (Tempe, AZ)
University of Phoenix - California (Costa Mesa, CA)
University of Tampa, The (Tampa, FL)
University of Toledo (Toledo, OH)
Ursuline College (Pepper Pike, OH)*
Wartburg College (Waverly, IA)*
West Chester University of Pennsylvania (West Chester, PA)*
William Paterson University of New Jersey (Wayne, NJ)*

*2016 participant

NSSE 2017 Experiences with Information Literacy

Frequencies and Statistical Comparisons

California Polytechnic State University-San Luis Obispo

First-Year Students

Item wording or description	Variable name	Values[c]	Response options	Frequency Distributions[a] Cal Poly Count	Cal Poly %	Information Literacy Count	Information Literacy %	Statistical Comparisons[b] Cal Poly Mean	Information Literacy Mean	Effect size[d]
1. During the current school year, about how often have you done the following?										
a. Completed an assignment that used an information source (book, article, website, etc.) other than required course readings	INL01a	1	Never	10	2	437	3	**3.0**	3.1 *** ▽	-.18
		2	Sometimes	133	29	3,899	22			
		3	Often	187	40	6,431	36			
		4	Very often	136	29	6,302	38			
			Total	466	100	17,069	100			
b. Worked on a paper or project that had multiple smaller assignments such as an outline, annotated bibliography, rough draft, etc.	INL01b	1	Never	16	3	929	6	**2.8**	2.9 * ▽	-.11
		2	Sometimes	169	37	4,638	28			
		3	Often	172	38	6,680	38			
		4	Very often	107	22	4,765	28			
			Total	464	100	17,012	100			
c. Received feedback from an instructor that improved your use of information resources (source selection, proper citation, etc.)	INL01c	1	Never	44	10	956	6	**2.5**	2.9 *** ▼	-.39
		2	Sometimes	193	42	4,824	28			
		3	Often	157	33	6,913	39			
		4	Very often	70	15	4,305	27			
			Total	464	100	16,998	100			
d. Completed an assignment that used the library's electronic collection of articles, books, and journals (JSTOR, EBSCO, LexisNexis, ProQuest, etc.)	INL01d	1	Never	67	15	3,070	18	**2.5**	2.5	-.05
		2	Sometimes	181	40	5,883	33			
		3	Often	129	27	4,826	28			
		4	Very often	89	18	3,229	21			
			Total	466	100	17,008	100			
e. Decided not to use an information source in a course assignment due to its questionable quality	INL01e	1	Never	93	19	4,582	28	**2.3**	2.1 ** △	.15
		2	Sometimes	200	43	7,057	41			
		3	Often	128	28	3,789	21			
		4	Very often	44	10	1,552	10			
			Total	465	100	16,980	100			
f. Changed the focus of a paper or project based on information you found while researching the topic	INL01f	1	Never	81	17	2,732	18	**2.2**	2.3 ** ▽	-.11
		2	Sometimes	228	50	7,636	45			
		3	Often	131	28	4,821	27			
		4	Very often	24	5	1,775	11			
			Total	464	100	16,964	100			
g. Looked for a reference that was cited in something you read	INL01g	1	Never	87	18	2,688	15	**2.3**	2.5 *** ▽	-.21
		2	Sometimes	206	45	6,472	37			
		3	Often	123	27	5,457	32			
		4	Very often	48	10	2,342	16			
			Total	464	100	16,959	100			
h. Identified how a book, article, or creative work has contributed to a field of study	INL01h	1	Never	127	28	3,330	19	**2.1**	2.4 *** ▽	-.30
		2	Sometimes	198	43	6,632	39			
		3	Often	107	23	4,930	29			
		4	Very often	32	7	2,036	13			
			Total	464	100	16,928	100			

*p<.05, **p<.01, ***p<.001 (2-tailed); Refer to the endnotes page for the key to triangle symbols.

NSSE 2017 Experiences with Information Literacy

Frequencies and Statistical Comparisons

California Polytechnic State University-San Luis Obispo

First-Year Students

Item wording or description	Variable name	Values[c]	Response options	Frequency Distributions[a] Cal Poly Count	Cal Poly %	Information Literacy Count	Information Literacy %	Statistical Comparisons[b] Cal Poly Mean	Information Literacy Mean	Effect size[d]
2. During the current school year, how much have your instructors emphasized the following?										
a. Not plagiarizing another author's work	INL02a	1	Very little	5	1	303	2			
		2	Some	40	9	1,229	7			
		3	Quite a bit	138	30	3,839	21	**3.5**	3.6 ** ▽	-.15
		4	Very much	282	60	11,602	70			
			Total	465	100	16,973	100			
b. Appropriately citing the sources used in a paper or project	INL02b	1	Very little	11	2	311	2			
		2	Some	49	11	1,643	9			
		3	Quite a bit	165	36	4,895	27	**3.3**	3.5 *** ▽	-.18
		4	Very much	239	51	10,121	62			
			Total	464	100	16,970	100			
c. Using scholarly or peer-reviewed sources in your course assignments	INL02c	1	Very little	14	3	682	4			
		2	Some	60	13	2,576	15			
		3	Quite a bit	160	36	5,262	30	**3.3**	3.3	.04
		4	Very much	229	48	8,430	50			
			Total	463	100	16,950	100			
d. Questioning the quality of information sources	INL02d	1	Very little	20	5	989	7			
		2	Some	86	19	3,447	20			
		3	Quite a bit	165	36	5,512	31	**3.1**	3.1	.05
		4	Very much	192	40	6,987	42			
			Total	463	100	16,935	100			
e. Using practices (terminology, methods, writing style, etc.) of a specific major or field of study	INL02e	1	Very little	48	10	1,448	9			
		2	Some	145	31	4,288	25			
		3	Quite a bit	143	32	5,280	30	**2.8**	2.9 *** ▽	-.20
		4	Very much	125	27	5,810	37			
			Total	461	100	16,826	100			
3. How much has your experience at this institution contributed to your knowledge, skills, and personal development in using information effectively?										
	INL03	1	Very little	24	6	483	4			
		2	Some	117	26	3,182	19			
		3	Quite a bit	205	44	7,512	43	**2.9**	3.1 *** ▽	-.24
		4	Very much	116	25	5,782	34			
			Total	462	100	16,959	100			

*p<.05, **p<.01, ***p<.001 (2-tailed); Refer to the endnotes page for the key to triangle symbols.

NSSE 2017 Experiences with Information Literacy

Frequencies and Statistical Comparisons

California Polytechnic State University-San Luis Obispo

Seniors

Item wording or description	Variable name	Values[c]	Response options	Frequency Distributions[a] Cal Poly Count	Cal Poly %	Information Literacy Count	Information Literacy %	Statistical Comparisons[b] Cal Poly Mean	Information Literacy Mean	Effect size[d]
1. During the current school year, about how often have you done the following?										
a. Completed an assignment that used an information source (book, article, website, etc.) other than required course readings	INL01a	1	Never	18	3	603	3	3.1	3.3 *** ▽	-.23
		2	Sometimes	148	24	3,869	16			
		3	Often	191	31	7,159	30			
		4	Very often	260	42	11,898	52			
			Total	617	100	23,529	100			
b. Worked on a paper or project that had multiple smaller assignments such as an outline, annotated bibliography, rough draft, etc.	INL01b	1	Never	56	9	1,999	9	2.8	2.9 ** ▽	-.12
		2	Sometimes	203	34	6,288	27			
		3	Often	187	29	7,587	31			
		4	Very often	172	28	7,607	32			
			Total	618	100	23,481	100			
c. Received feedback from an instructor that improved your use of information resources (source selection, proper citation, etc.)	INL01c	1	Never	95	16	2,227	10	2.5	2.8 *** ▽	-.26
		2	Sometimes	204	34	6,838	29			
		3	Often	190	30	7,913	33			
		4	Very often	126	20	6,466	28			
			Total	615	100	23,444	100			
d. Completed an assignment that used the library's electronic collection of articles, books, and journals (JSTOR, EBSCO, LexisNexis, ProQuest, etc.)	INL01d	1	Never	103	18	3,211	15	2.6	2.8 *** ▽	-.18
		2	Sometimes	183	31	5,934	25			
		3	Often	154	24	6,133	26			
		4	Very often	177	27	8,198	35			
			Total	617	100	23,476	100			
e. Decided not to use an information source in a course assignment due to its questionable quality	INL01e	1	Never	144	23	6,695	30	2.2	2.1	.06
		2	Sometimes	270	44	9,117	38			
		3	Often	134	21	4,933	20			
		4	Very often	69	11	2,720	12			
			Total	617	100	23,465	100			
f. Changed the focus of a paper or project based on information you found while researching the topic	INL01f	1	Never	107	18	3,988	18	2.3	2.3	-.04
		2	Sometimes	293	48	10,504	45			
		3	Often	147	23	6,091	25			
		4	Very often	66	11	2,855	12			
			Total	613	100	23,438	100			
g. Looked for a reference that was cited in something you read	INL01g	1	Never	81	13	3,088	13	2.5	2.6	-.07
		2	Sometimes	234	38	8,147	34			
		3	Often	187	30	7,364	31			
		4	Very often	113	18	4,834	21			
			Total	615	100	23,433	100			
h. Identified how a book, article, or creative work has contributed to a field of study	INL01h	1	Never	136	22	3,918	17	2.3	2.5 *** ▽	-.17
		2	Sometimes	235	39	8,549	36			
		3	Often	154	25	6,951	29			
		4	Very often	86	14	3,948	17			
			Total	611	100	23,366	100			

*p<.05, **p<.01, ***p<.001 (2-tailed); Refer to the endnotes page for the key to triangle symbols.

NSSE 2017 Experiences with Information Literacy

Frequencies and Statistical Comparisons

California Polytechnic State University-San Luis Obispo

Seniors

Item wording or description	Variable name	Values[c]	Response options	Frequency Distributions[a] Cal Poly Count	Cal Poly %	Information Literacy Count	Information Literacy %	Statistical Comparisons[b] Cal Poly Mean	Information Literacy Mean	Effect size[d]
2. During the current school year, how much have your instructors emphasized the following?										
a. Not plagiarizing another author's work	INL02a	1	Very little	14	3	810	3			
		2	Some	78	14	2,369	9			
		3	Quite a bit	152	25	5,264	22	**3.4**	3.5 ** ▽	-.11
		4	Very much	372	59	15,004	66			
			Total	616	100	23,447	100			
b. Appropriately citing the sources used in a paper or project	INL02b	1	Very little	29	5	859	4			
		2	Some	86	15	2,562	11			
		3	Quite a bit	181	30	6,023	25	**3.3**	3.4 *** ▽	-.21
		4	Very much	319	50	13,972	61			
			Total	615	100	23,416	100			
c. Using scholarly or peer-reviewed sources in your course assignments	INL02c	1	Very little	36	6	1,341	6			
		2	Some	101	17	3,008	13			
		3	Quite a bit	153	26	5,968	25	**3.2**	3.3 * ▽	-.09
		4	Very much	321	51	13,076	55			
			Total	611	100	23,393	100			
d. Questioning the quality of information sources	INL02d	1	Very little	54	9	2,295	11			
		2	Some	161	27	5,115	22			
		3	Quite a bit	182	29	6,603	27	**2.9**	3.0	-.06
		4	Very much	215	35	9,330	40			
			Total	612	100	23,343	100			
e. Using practices (terminology, methods, writing style, etc.) of a specific major or field of study	INL02e	1	Very little	44	7	1,360	6			
		2	Some	134	22	4,328	19			
		3	Quite a bit	185	31	7,044	30	**3.1**	3.1 * ▽	-.08
		4	Very much	250	41	10,491	45			
			Total	613	100	23,223	100			
3. How much has your experience at this institution contributed to your knowledge, skills, and personal development in using information effectively?										
	INL03	1	Very little	23	4	516	3			
		2	Some	106	18	3,137	15			
		3	Quite a bit	230	38	8,884	37	**3.2**	3.3 ** ▽	-.13
		4	Very much	256	41	10,907	45			
			Total	615	100	23,444	100			

*p<.05, **p<.01, ***p<.001 (2-tailed); Refer to the endnotes page for the key to triangle symbols.

NSSE 2017 Experiences with Information Literacy

Detailed Statistics[e]

California Polytechnic State University-San Luis Obispo

First-Year Students

Variable name	N	Mean		Standard error[f]		Standard deviation[g]		DF[h]	Sig.[i]	Effect size[d]
	Cal Poly	Cal Poly	Information Literacy	Cal Poly	Information Literacy	Cal Poly	Information Literacy	*Comparisons with:* Information Literacy		
INL01a	466	2.96	3.11	.04	.01	0.82	0.84	506	.000	-.18
INL01b	465	2.79	2.89	.04	.01	0.82	0.88	12,061	.017	-.11
INL01c	465	2.53	2.87	.04	.01	0.86	0.88	12,061	.000	-.39
INL01d	466	2.48	2.53	.04	.01	0.96	1.02	508	.313	-.05
INL01e	466	2.27	2.13	.04	.01	0.88	0.93	12,040	.001	.15
INL01f	464	2.20	2.30	.04	.01	0.78	0.88	512	.008	-.11
INL01g	465	2.29	2.48	.04	.01	0.88	0.93	507	.000	-.21
INL01h	465	2.09	2.37	.04	.01	0.87	0.94	508	.000	-.30
INL02a	466	3.48	3.59	.03	.01	0.71	0.71	503	.002	-.15
INL02b	464	3.35	3.48	.04	.01	0.77	0.75	12,030	.000	-.18
INL02c	464	3.29	3.26	.04	.01	0.81	0.88	508	.422	.04
INL02d	464	3.13	3.08	.04	.01	0.87	0.94	507	.268	.05
INL02e	462	2.75	2.95	.04	.01	0.97	0.98	11,920	.000	-.20
INL03	463	2.87	3.08	.04	.01	0.85	0.83	12,012	.000	-.24

See the endnotes on the last page of this report.

NSSE 2017 Experiences with Information Literacy

Detailed Statistics[e]

California Polytechnic State University-San Luis Obispo

Seniors

Variable name	N	Mean		Standard error[f]		Standard deviation[g]		DF[h]	Sig.[i]	Effect size[d]
	Cal Poly	Cal Poly	Information Literacy	Cal Poly	Information Literacy	Cal Poly	Information Literacy	*Comparisons with:* Information Literacy		
INL01a	615	3.11	3.30	.04	.01	0.88	0.84	20,028	.000	-.23
INL01b	616	2.76	2.87	.04	.01	0.96	0.97	19,982	.003	-.12
INL01c	613	2.54	2.79	.04	.01	0.98	0.96	19,947	.000	-.26
INL01d	615	2.61	2.80	.04	.01	1.07	1.07	19,976	.000	-.18
INL01e	615	2.20	2.14	.04	.01	0.92	0.97	658	.098	.06
INL01f	611	2.26	2.30	.04	.01	0.88	0.90	19,938	.309	-.04
INL01g	613	2.54	2.61	.04	.01	0.94	0.96	19,942	.085	-.07
INL01h	608	2.31	2.47	.04	.01	0.97	0.97	19,874	.000	-.17
INL02a	614	3.40	3.49	.03	.01	0.81	0.80	651	.009	-.11
INL02b	613	3.25	3.42	.04	.01	0.89	0.83	646	.000	-.21
INL02c	608	3.22	3.30	.04	.01	0.94	0.92	19,884	.029	-.09
INL02d	610	2.90	2.96	.04	.01	0.98	1.02	19,848	.149	-.06
INL02e	611	3.05	3.13	.04	.01	0.95	0.93	19,745	.047	-.08
INL03	613	3.15	3.25	.03	.01	0.84	0.80	19,944	.002	-.13

See the endnotes on the last page of this report.

Endnotes

a. Column percentages are weighted by institution-reported sex and enrollment status (and institution size for comparison groups). Percentages may not sum to 100 due to rounding. Counts are unweighted; column percentages cannot be replicated from counts.

b. All statistics are weighted by institution-reported sex and enrollment status (and institution size for comparison groups). Unless otherwise noted, statistical comparisons are two-tailed independent *t* -tests. Items with categorical response sets are left blank.

c. These are the values used to calculate means. For the majority of items, these values match the codes in the data file and codebook.

d. Effect size for independent *t*- tests uses Cohen's *d* ; *z*- tests use Cohen's *h* .

e. Statistics are weighted by institution-reported sex and enrollment status (and institution size for comparison groups). Categorical items are not listed.

f. The 95% confidence interval for the population mean is equal to the sample mean plus or minus 1.96 times the standard error of the mean.

g. A measure of the amount individual scores deviate from the mean of all the scores in the distribution.

h. Degrees of freedom used to compute the *t* -tests. Values differ from Ns due to weighting and whether equal variances were assumed.

i. Statistical comparisons are two-tailed independent *t* -tests or *z* -tests. Statistical significance represents the probability that the difference between your students' mean and that of the students in the comparison group is due to chance.

j. Statistical comparison uses *z*- test to compare the proportion who responded (depending on the item) "Done or in progress" or "Yes" with all who responded otherwise.

k. Mean represents the proportion who responded (depending on the item) “Done or in progress” or "Yes."

Key to symbols:

▲ **Your students' average** was significantly higher ($p < .05$) with an effect size at least .3 in magnitude.

△ **Your students' average** was significantly higher ($p < .05$) with an effect size less than .3 in magnitude.

▽ **Your students' average** was significantly lower ($p < .05$) with an effect size less than .3 in magnitude.

▼ **Your students' average** was significantly lower ($p < .05$) with an effect size at least .3 in magnitude.

Note: It is important to interpret the direction of differences relative to item wording and your institutional context.