

Computer Hardware/Software & Security Assessment Report Spring 2019

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1 INTRODUCTION

Florida SouthWestern State College's Computer Studies Department gathers a multitude of data from various courses as assessment tools in support of the Florida Department of Education Curriculum Framework. These courses included in assessment are CTS 1131 *Computer Hardware*, CTS 1133 *Computer Software*, CTS 2120 *Computer and Network Security*, and CTS 2334 *Microsoft Windows Server*. The assessment outcomes are intended to provide a baseline and measurement of achievement moving forward as well as investigate the strength and performance of items in the exam. The assessment plan also provides comparisons between dual enrollment (concurrent) and non-dual enrollment students, online versus traditional students, and by site, where possible. Where data is sufficient, additional analyses are provided including distribution studies and longitudinal studies.

For additional detail or further analysis not provided in this report, please contact Dr. Joseph F. van Gaalen, Asst. Vice President of Institutional Research, Assessment & Effectiveness, Academic Affairs (jfvangaalen@fsw.edu; x16965).

2 CTS 1131

2.1 LEARNING OUTCOMES, OBJECTIVES, AND DESCRIPTIVE STATISTICS

The FSW Computer Studies faculty defined six areas of interest for evaluation in support of the state framework for the spring 2019 term. The outcomes related to CTS 1131 are:

- LO-1 Describe common tools and diagnostic devices.
- LO-2 Describe the primary hardware components.
- LO-3 Develop hardware troubleshooting methodologies.
- LO-4 Explain functionality of hard drive devices.
- LO-5 Formulate customer support procedures.
- LO-6 Summarize legacy and current hardware technologies.

During the spring 2019 semester, an enrollment of 25 contributed to scores tallied from 2 of 2 sections of CTS 1131. Descriptive statistics for achievement of outcomes are shown in Table 1. Note that the “% Meets Expectations” is the percentage of students whose average learning mastery score is equal to ‘3’ or higher since the count (n) refers to the number of averages of learning masteries (i.e., # of students), not the number of assessments. The graphical representation of the percentage meeting expectations is shown in Figure 1. The highest “% Meets Expectations” is LO 6 at 45%. The lowest “% Meets Expectations” is LO 5 at 9%.

<i>Outcomes</i>	<i>n</i>	<i>Mean</i>	<i>% Meets Expectations</i>
LO-1 Describe common tools and diagnostic devices result	22	2.2	14%
LO-2 Describe the primary hardware components. result	22	2.2	23%
LO-3 Develop hardware troubleshooting methodologies result	22	2.1	18%
LO-4 Explain functionality of hard drive devices result	22	2.1	23%
LO-5 Formulate customer support procedures result	22	1.8	9%
LO-6 Summarize legacy and current hardware technologies result	22	2.7	45%

Table 1. Student achievement level by outcome for CTS 1131.

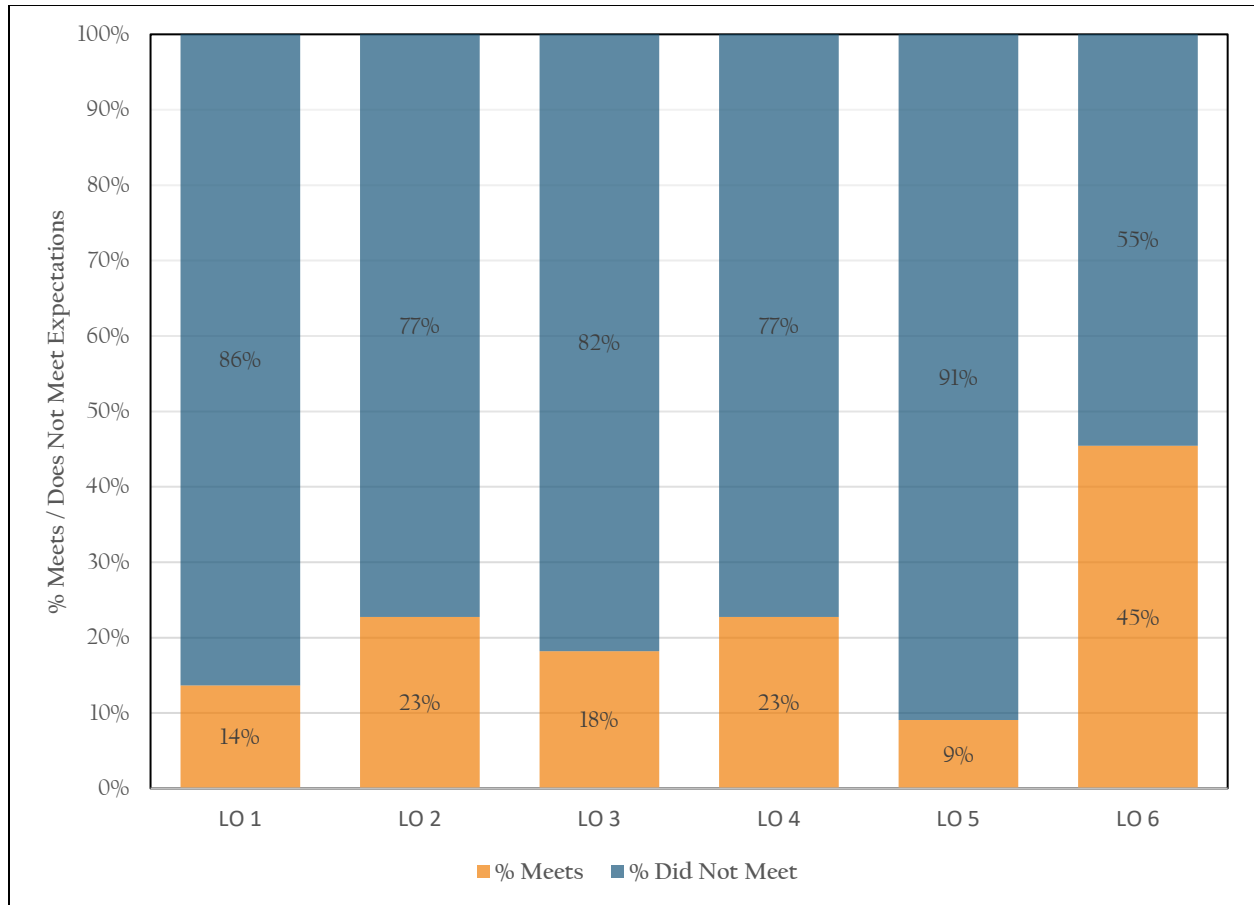


Figure 1. Bar graph of percentage of students (average learning mastery scores) meeting expectations of 3 or higher.

2.2 EXPLORATORY ANALYSIS AND SIGNIFICANCE TESTING

Multiple comparisons of artifact scores across varying formats, campuses, and student types were made, where possible, in order to add depth to the causes of the distribution of the artifacts. Each course was divided into the appropriate subgroups to perform the analysis. In cases where a subgroup is not represented in the course comparisons were not conducted and are noted for comprehensiveness.

2.2.1 Dual Enrollment (Concurrent) to Non-Dual Enrollment Comparison

No dual enrollment (concurrent) sections of the course were run during spring 2019 so no comparison study between dual enrollment and non-dual enrollment could be completed.

2.2.2 Online to Traditional Comparison

During the spring 2019 semester, one course section was offered online while one was offered traditionally. Mean scores for traditional sections ranged from 1.8 to 3.5 (Table 2, Figure 2). Mean scores for online sections ranged from 1.5 to 2.3. The “% Meets Expectations” for traditional sections range from 0% to 57%. The “% Meets Expectations” for online sections range from 7% to 40%. Differences in the “% Meets Expectations” were tested for significance using a Fisher’s Exact Test according to standard methods (McDonald, 2009; Wilkinson, 1999). None are found to be statistically significant difference.

Outcomes	Traditional			Online		
	n	Mean	% Meets Expectations	n	Mean	% Meets Expectations
LO-1 Describe common tools and diagnostic devices result	7	3.5	57%	15	2.3	40%
LO-2 Describe the primary hardware components. result	7	1.8	0%	15	1.7	13%
LO-3 Develop hardware troubleshooting methodologies result	7	3.2	43%	15	1.5	13%
LO-4 Explain functionality of hard drive devices result	7	2.5	14%	15	2.0	20%
LO-5 Formulate customer support procedures result	7	2.9	43%	15	1.9	13%
LO-6 Summarize legacy and current hardware technologies result	7	2.7	29%	15	2.0	7%

Table 2. Comparison of basic statistics of student achievement level by Outcome for online and traditional. Statistically significant differences in the ‘% Meets Expectations’ between online and traditional sections is in **bold/italics**.

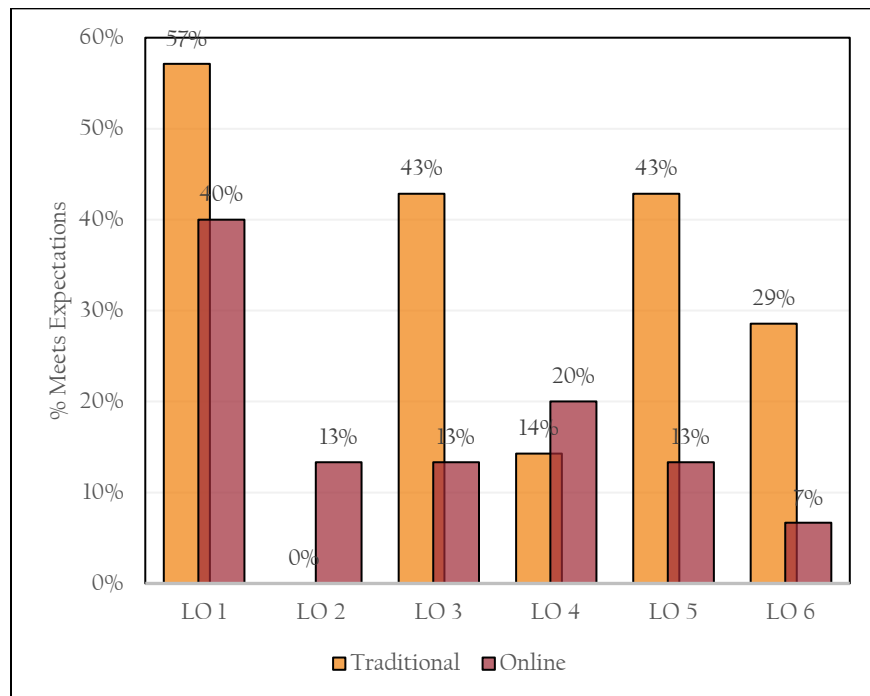


Figure 2. Comparison of ‘% Meets Expectations’ between online and traditional sections.

2.2.3 Comparison by Campus/Site

Since only two sections of the course were run, an online and a traditional, this study is comprised wholly within Section 2.2.2 above.

2.3 LONGITUDINAL STUDY

As further data is collected in coming terms, this section will track achievement through time and highlight strengths, weaknesses and any long-term trends, beginning fall 2019.

3 CTS 1133

3.1 LEARNING OUTCOMES, OBJECTIVES, AND DESCRIPTIVE STATISTICS

The FSW Computer Studies faculty defined six areas of interest for evaluation in support of the state framework for the spring 2019 term. The outcomes related to CTS 1133 are:

- LO-1 Choose a Windows installation.
- LO-2 Configure Windows networking and resources.
- LO-3 Describe desktop virtualization.
- LO-4 Describe function of operating system.
- LO-5 Formulate maintenance and security procedures for Windows clients.
- LO-6 Summarize troubleshooting procedures.

During the spring 2019 semester, an enrollment of 4 contributed to scores tallied from 2 of 2 sections of CTS 1133. Descriptive statistics for achievement of outcomes are shown in Table 3. Note that the “% Meets Expectations” is the percentage of students whose average learning mastery score is equal to ‘3’ or higher since the count (n) refers to the number of averages of learning masteries (i.e., # of students), not the number of assessments. The graphical representation of the percentage meeting expectations is shown in Figure 3. Note that only one of six learning outcomes recognized from previous studies was recorded in the Learning Management System (LMS). The highest “% Meets Expectations” is LO 6 at 50%, as it is the only recorded outcome.

<i>Outcomes</i>	<i>n</i>	<i>Mean</i>	<i>% Meets Expectations</i>
LO-1 Choose a Windows installation	~	~	~
LO-2 Configure Windows networking and resources	~	~	~
LO-3 Describe desktop virtualization	~	~	~
LO-4 Describe function of operating system	~	~	~
LO-5 Formulate maintenance and security procedures for Windows clients	~	~	~
LO-6 Summarize troubleshooting procedures	36	3.1	50%

Table 3. Student achievement level by Outcome for CTS 1133.

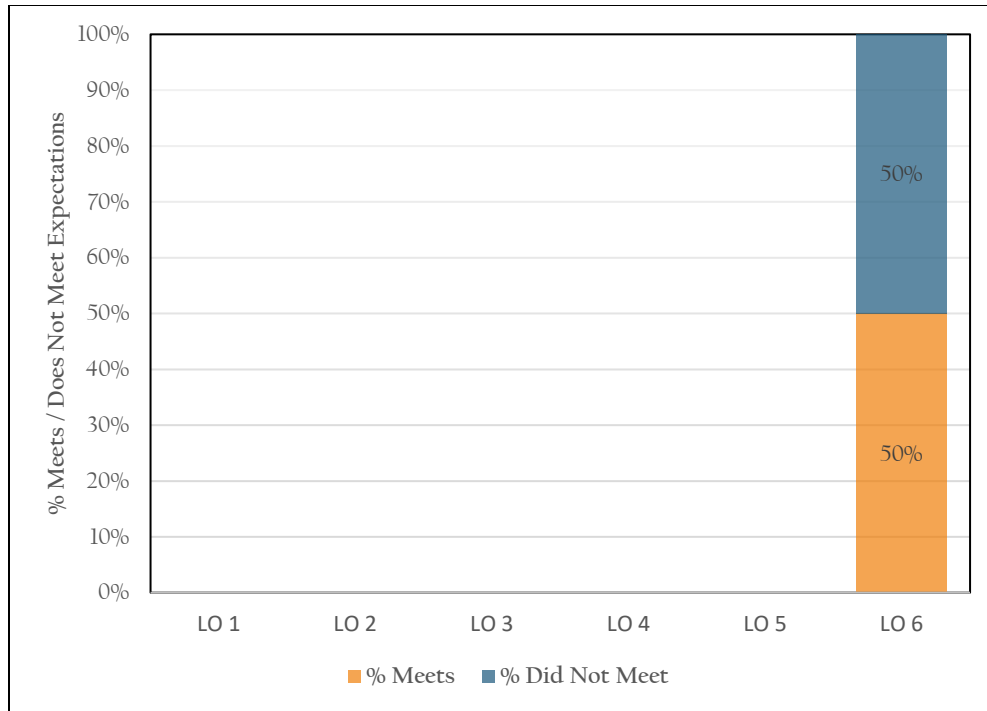


Figure 3. Bar graph of percentage of students (average learning mastery scores) meeting expectations of 3 or higher.

3.2 EXPLORATORY ANALYSIS AND SIGNIFICANCE TESTING

Multiple comparisons of artifact scores across varying formats, campuses, and student types were made, where possible, in order to add depth to the causes of the distribution of the artifacts. Each course was divided into the appropriate subgroups to perform the analysis. In cases where a subgroup is not represented in the course comparisons were not conducted and are noted for comprehensiveness.

3.2.1 Dual Enrollment (Concurrent) to Non-Dual Enrollment Comparison

No dual enrollment (concurrent) sections of the course were run during spring 2019 so no comparison study between dual enrollment and non-dual enrollment could be completed.

3.2.2 Online to Traditional Comparison

During the spring 2019 semester, one course section was offered online while one was offered traditionally. The mean score for traditional sections for LO 6 is 3.7 (Table 4, Figure 4). The mean score for online sections for LO 6 is 2.6. The “% Meets Expectations” for traditional sections is 69%. The “% Meets Expectations” for online sections is 35%. Differences in the “% Meets Expectations” were tested for significance using a Fisher’s Exact Test according to standard methods (McDonald, 2009; Wilkinson, 1999). None are found to be statistically significantly different.

Outcomes	Traditional			Online		
	<i>n</i>	<i>Mean</i>	<i>% Meets Expectations</i>	<i>n</i>	<i>Mean</i>	<i>% Meets Expectations</i>
LO-1 Choose a Windows installation	~	~	~	~	~	~
LO-2 Configure Windows networking and resources	~	~	~	~	~	~
LO-3 Describe desktop virtualization	~	~	~	~	~	~
LO-4 Describe function of operating system	~	~	~	~	~	~
LO-5 Formulate maintenance and security procedures for Windows clients	~	~	~	~	~	~
LO-6 Summarize troubleshooting procedures	16	3.7	69%	20	2.6	35%

Table 4. Comparison of basic statistics of student achievement level by Outcome for online and traditional. Statistically significant differences in the '% Meets Expectations' between online and traditional sections is in ***bold/italics***.

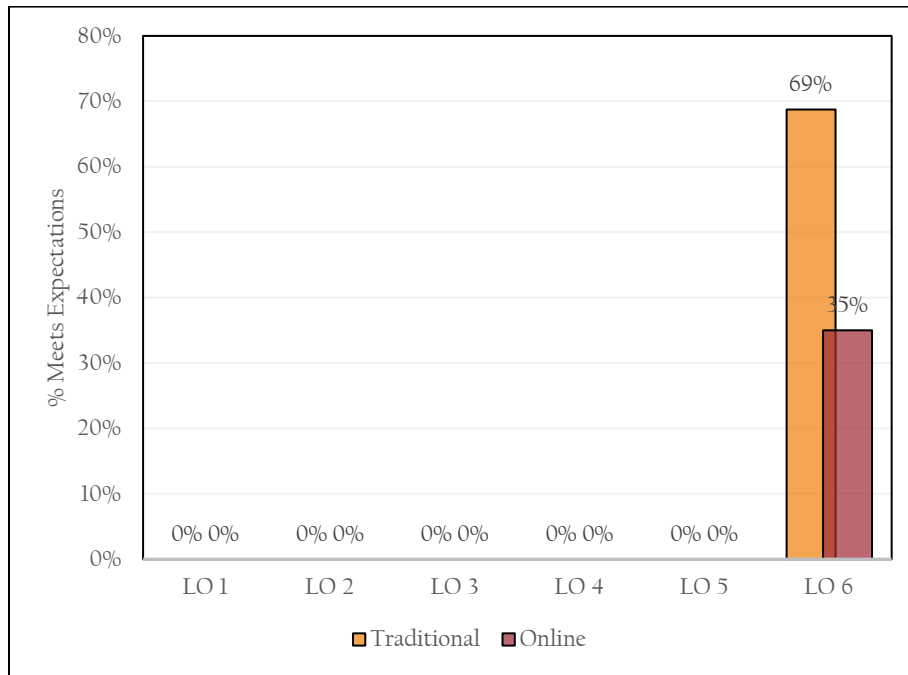


Figure 4. Comparison of '% Meets Expectations' between online and traditional sections.

3.2.3 Comparison by Campus/Site

Since the only two sites in which courses were offered was Thomas Edison (Lee) and FSW Online, results of this comparison are exhibited in 3.2.2 (see above).

3.3 LONGITUDINAL STUDY

As further data is collected in coming terms, this section will track achievement through time and highlight strengths, weaknesses and any long-term trends beginning fall 2019.

4 CTS 2120

4.1 LEARNING OUTCOMES, OBJECTIVES, AND DESCRIPTIVE STATISTICS

The FSW Computer faculty defined eight areas of interest for evaluation in support of the state framework for the spring 2019 term. The outcomes related to CTS 2120 are:

- LO-1 Configure secure systems
- LO-2 Secure network infrastructure and explain three major concerns related to data communications.
- LO-3 Implement computer system access control and configure access lists to limit traffic and enhance security
- LO-4 Create security assessments and audits addressing security issues related to remote server access
- LO-5 Employ cryptographic technology
- LO-6 Implement organizational security, document security policies and violations, and establish, document, and disseminate user security guidelines
- LO-7 Identify and discuss technical issues related to emerging security technologies
- LO-8 Design a directory and security structure

During the spring 2019 semester, an enrollment of 12 contributed to scores tallied from 1 of 1 sections of CTS 2120. Descriptive statistics for achievement of outcomes are shown in Table 5. Note that the “% Meets Expectations” is the percentage of students whose average learning mastery score is equal to ‘3’ or higher since the count (n) refers to the number of averages of learning masteries (i.e., # of students), not the number of assessments. The graphical representation of the percentage meeting expectations is shown in Figure 5. The highest “% Meets Expectations” is LO 7 50%. The lowest “% Meets Expectations” is LO 6 at 8%.

<i>Outcomes</i>	<i>n</i>	<i>Mean</i>	<i>% Meets Expectations</i>
LO-1 Configure secure systems	12	2.0	33%
LO-2 Secure network infrastructure and explain three major concerns related to data communications.	12	2.1	33%
LO-3 Implement computer system access control and configure access lists to limit traffic and enhance security	12	2.8	42%
LO-4 Create security assessments and audits addressing security issues related to remote server access	12	2.1	25%
LO-5 Employ cryptographic technology	12	2.2	25%
LO-6 Implement organizational security, document security policies and violations, and establish, document, and disseminate user security guidelines	12	2.4	8%
LO-7 Identify and discuss technical issues related to emerging security technologies	12	3.4	50%
LO-8 Design a directory and security structure	12	2.2	17%

Table 5. Student achievement level by Outcome for CTS 2120.

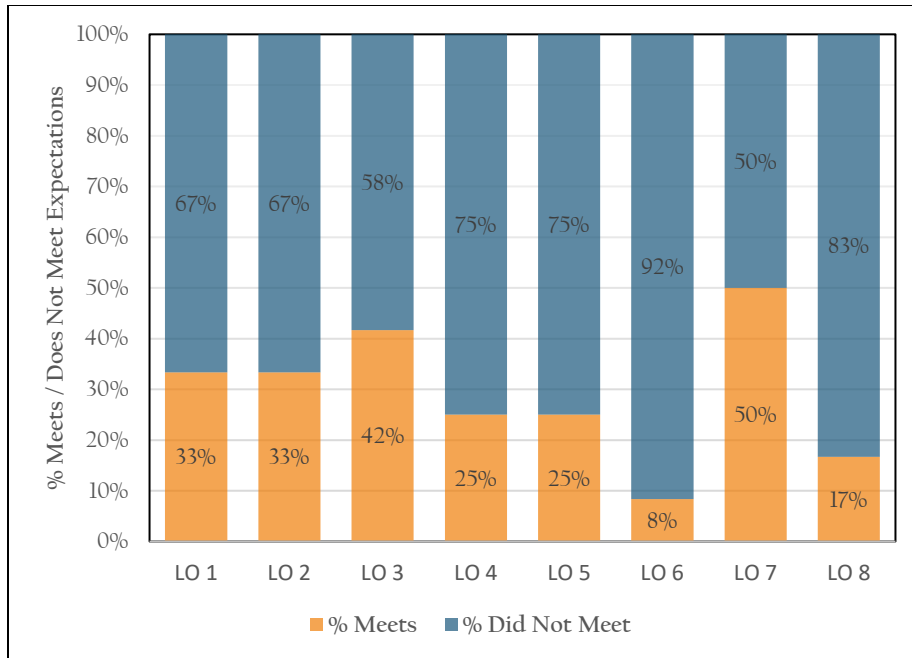


Figure 5. Bar graph of percentage of students (average learning mastery scores) meeting expectations of 3 or higher.

4.2 EXPLORATORY ANALYSIS AND SIGNIFICANCE TESTING

Multiple comparisons of artifact scores across varying formats, campuses, and student types were made, where possible, in order to add depth to the causes of the distribution of the artifacts. Each course was divided into the appropriate subgroups to perform the analysis. In cases where a subgroup is not represented in the course comparisons were not conducted and are noted for comprehensiveness.

4.2.1 Dual Enrollment (Concurrent) to Non-Dual Enrollment Comparison

No dual enrollment (concurrent) sections of the course were run during spring 2019 so no comparison study between dual enrollment and non-dual enrollment could be completed.

4.2.2 Online to Traditional Comparison

Only one section of the course was offered in spring 2019, so no online to traditional comparison could be completed.

4.2.3 Comparison by Campus/Site

Online one section of the course was offered in spring 2019, so no cross-site comparison could be completed.

4.3 LONGITUDINAL STUDY

As further data is collected in coming terms, this section will track achievement through time and highlight strengths, weaknesses and any long-term trends beginning fall 2019.

5 CTS 2334

No courses were run during spring 2019, so no study could be completed.

6 CONCLUSIONS

FSW's Computer Studies Department gathers a multitude of data from various courses as assessment tools in support of the Florida Department of Education Curriculum Framework. The courses included in assessment are CTS 1131 *Computer Hardware*, CTS 1133 *Computer Software*, CTS 2120 *Computer and Network Security*, and CTS 2334 *Microsoft Windows Server*. The assessment outcomes are intended to provide a baseline and measurement of achievement moving forward.

6.1 CTS 1131

A drill-down of CTS 1131 results are as follows:

1. In a study of outcome achievement, the highest “% Meets Expectations” is LO 6 at 45%. The lowest “% Meets Expectations” is LO 5 at 9%.
2. In a comparison between online and traditional artifacts, the “% Meets Expectations” for online sections range from 7% to 40%. None are found to be statistically significant difference.
3. Since only two sections of the course were run, an online and a traditional, this study is comprised wholly within #2 above.

6.2 CTS 1133

A drill-down of CTS 1133 results are as follows:

1. In a study of outcome achievement, the highest “% Meets Expectations” is LO 6 at 50%, as it is the only recorded outcome.
2. In a study comparing online with traditional course sections, the “% Meets Expectations” for traditional sections is 69%. The “% Meets Expectations” for online sections is 35%. None are found to be statistically significantly different.
3. Since only two sections of the course were run, an online and a traditional, this study is comprised wholly within #2 above.

6.3 CTS 2120

A drill-down of CTS 2120 results are as follows:

1. In a study of outcome achievement, the highest “% Meets Expectations” is LO 7 50%. The lowest “% Meets Expectations” is LO 6 at 8%.
2. No comparison between online and traditional course sections was completed because only one section of the course was offered.
3. No cross-campus comparison could be completed because course data was only collected from one site.

6.4 CTS 2234

No courses were run during spring 2019, so no study could be completed.

7 REFERENCES

McDonald, J.H. 2009. *Handbook of Biological Statistics* (2nd ed.). Sparky House Publishing, Baltimore, Maryland.

Wilkinson, L. 1999. APA Task Force on Statistical Inference. *Statistical Methods in Psychology Journals: Guidelines and Explanations*. *American Psychologist* 54 (8), 594–604.