

Computer Hardware/Software & Security Assessment Report Fall 2017

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1 INTRODUCTION

Florida SouthWestern State College's Business 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 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, Director of Assessment & Effectiveness, Academic Affairs (jfvangalen@fsw.edu; x16965).

2 CTS 1131

2.1 LEARNING OUTCOMES, OBJECTIVES, AND DESCRIPTIVE STATISTICS

The FSW Business faculty defined six areas of interest for evaluation in support of the state framework which was clarified for the fall 2017 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 fall 2017 semester, an enrollment of 25 contributed to scores tallied from 1 of 1 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" are LO 2 and LO 6 at 33%. The lowest "% Meets Expectations" is LO 4 at 0%.

<i>Outcomes</i>	<i>n</i>	<i>Mean</i>	<i>% Meets Expectations</i>
LO-1 Describe common tools and diagnostic devices result	18	2.2	28%
LO-2 Describe the primary hardware components. result	18	2.6	33%
LO-3 Develop hardware troubleshooting methodologies result	18	2.3	11%
LO-4 Explain functionality of hard drive devices result	18	1.3	0%
LO-5 Formulate customer support procedures result	18	1.8	11%
LO-6 Summarize legacy and current hardware technologies result	18	2.2	33%

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

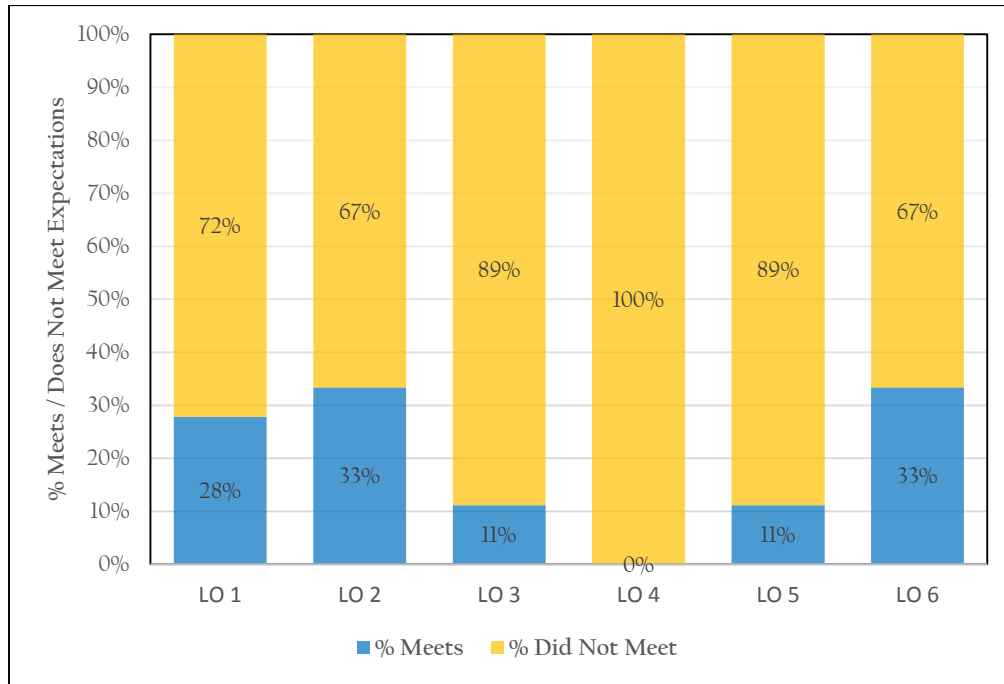


Figure 1. Bar graph of percentage of students (average learning mastery scores) meeting expectations of 3 or higher.

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 to Non-Dual Enrollment Comparison

No dual enrollment sections of the course were run during fall 2017 so no comparison study between dual enrollment and non-dual enrollment could be completed.

2.2.2 Online to Traditional Comparison

Only one section of the course was offered in fall 2017, so no online to traditional comparison could be completed.

2.2.3 Comparison by Campus/Site

Only one section of the course was offered in fall 2017, so no cross-campus comparison could be completed.

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.

3 CTS 1133

3.1 LEARNING OUTCOMES, OBJECTIVES, AND DESCRIPTIVE STATISTICS

The FSW Business faculty defined six areas of interest for evaluation in support of the state framework which was clarified for the fall 2017 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 fall 2017 semester, an enrollment of 47 contributed to scores tallied from 2 of 2 sections of CTS 1133. Descriptive statistics for achievement of outcomes are shown in Table 2. 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 2. The highest “% Meets Expectations” is LO 1 at 66%. The lowest “% Meets Expectations” is LO 4 at 11%.

<i>Outcomes</i>	<i>n</i>	<i>Mean</i>	<i>% Meets Expectations</i>
LO-1 Choose a Windows installation	35	3.2	66%
LO-2 Configure Windows networking and resources	35	2.4	17%
LO-3 Describe desktop virtualization	35	2.6	51%
LO-4 Describe function of operating system	35	1.6	11%
LO-5 Formulate maintenance and security procedures for Windows clients	35	2.1	23%
LO-6 Summarize troubleshooting procedures	35	2.0	26%

Table 2. Student achievement level by Outcome for CTS 1133.

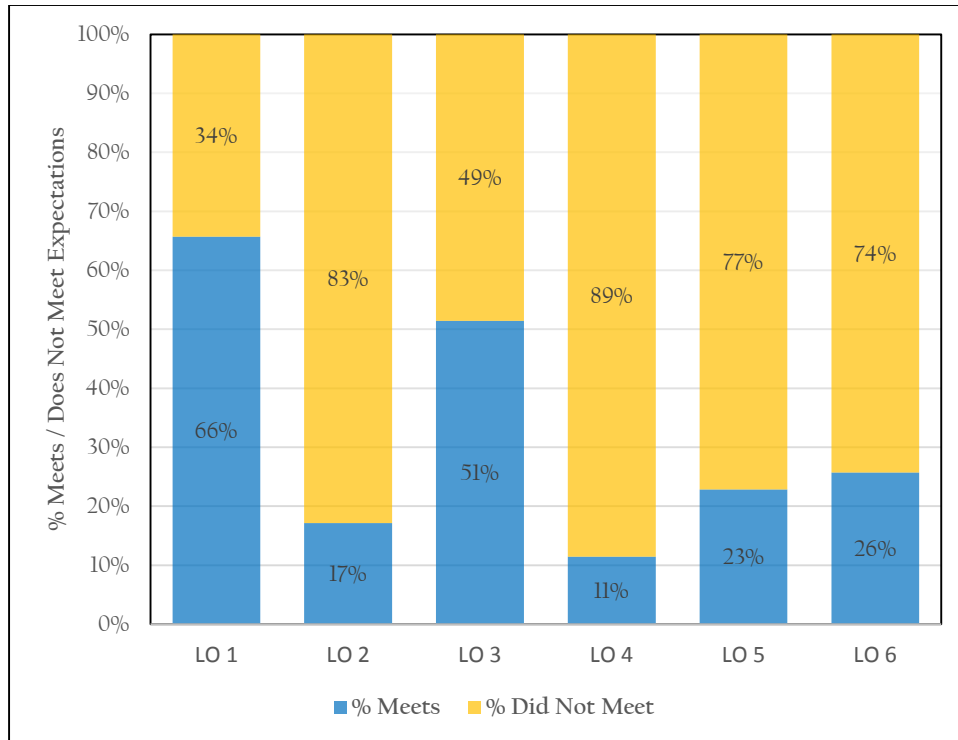


Figure 2. Bar graph of percentage of students (average learning mastery scores) meeting expectations of 3 or higher.

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 to Non-Dual Enrollment Comparison

No dual enrollment sections of the course were run during fall 2017 so no comparison study between dual enrollment and non-dual enrollment could be completed.

3.2.2 Online to Traditional Comparison

During the fall 2017 semester, one course section was offered online while the other was offered traditionally. Mean scores for traditional sections ranged from 1.9 to 3.2 (Table 3, Figure 3). Mean scores for online sections ranged from 1.2 to 3.4. The “% Meets Expectations” for traditional sections range from 18% to 59%. The “% Meets Expectations” for online sections range from 0% to 81%. Differences in the “% Meets Expectations” were tested for significance using a Fisher’s Exact Test according to standard methods (McDonald, 2009; Wilkinson, 1999). LO 2 exhibits a statistically significant difference.

Outcomes	Traditional			Online		
	n	Mean	% Meets Expectations	n	Mean	% Meets Expectations
LO-1 Choose a Windows installation	17	2.2	29%	16	2.0	38%
LO-2 Configure Windows networking and resources	17	2.7	47%	16	1.5	0%
LO-3 Describe desktop virtualization	17	1.9	18%	16	1.2	0%
LO-4 Describe function of operating system	17	2.4	47%	16	3.4	69%
LO-5 Formulate maintenance and security procedures for Windows clients	17	2.5	24%	16	2.3	13%
LO-6 Summarize troubleshooting procedures	17	3.2	59%	16	3.3	81%

Table 3. 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**.

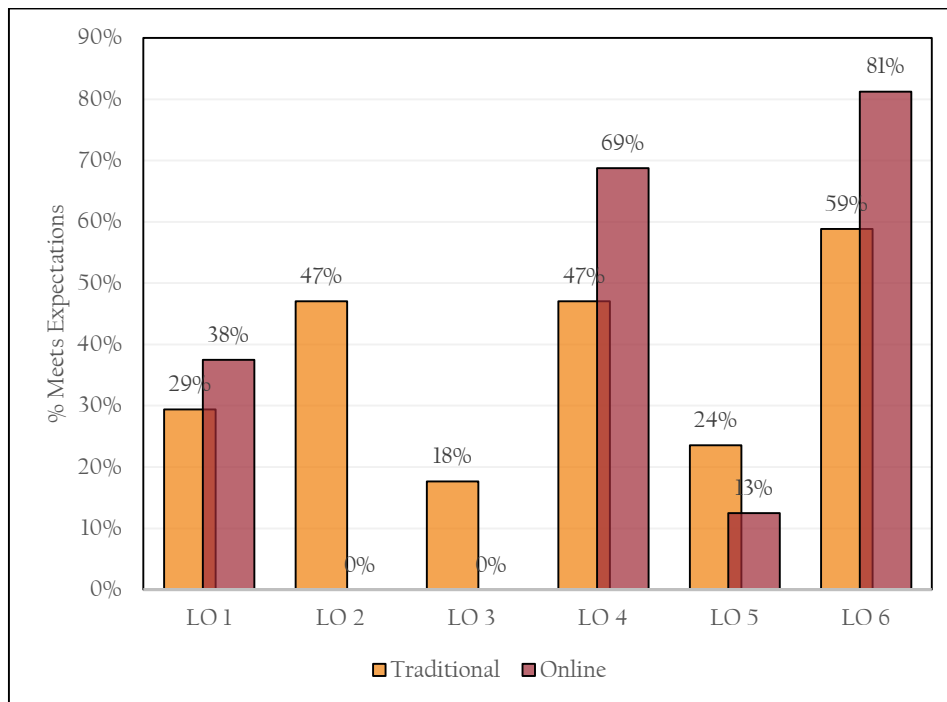


Figure 3. Comparison of '% Meets Expectations' between online and traditional sections.

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 2.2.2 (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.

4 CTS 2120

4.1 LEARNING OUTCOMES, OBJECTIVES, AND DESCRIPTIVE STATISTICS

The FSW Business faculty defined eight areas of interest for evaluation in support of the state framework which was clarified for the fall 2017 term. The outcomes related to CTS 2120 are:

- LO-1
- LO-2 Secure network infrastructure and explain three major concerns related to data communications.
- LO-3
- LO-4
- LO-5
- LO-6 Implement organizational security.
- LO-7 Create and manage groups, resources, and security policies.
- LO-8

During the fall 2017 semester, an enrollment of 6 contributed to scores tallied from 1 of 1 sections of CTS 2120. Descriptive statistics for achievement of outcomes are shown in Table 4. 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 4. The highest “% Meets Expectations” are LOs 2, 6, and 8 at 50%. The lowest “% Meets Expectations” are LOs 4 and 5 at 17%.

<i>Outcomes</i>	<i>n</i>	<i>Mean</i>	<i>% Meets Expectations</i>
LO-1	6	2.8	33%
LO-2 Secure network infrastructure and explain three major concerns related to data communications.	6	3.3	50%
LO-3	6	2.5	33%
LO-4	6	2.1	17%
LO-5	6	1.8	17%
LO-6 Implement organizational security.	6	2.9	50%
LO-7 Create and manage groups, resources, and security policies.	6	2.6	33%
LO-8	6	3.0	50%

Table 4. Student achievement level by Outcome for CTS 2120.

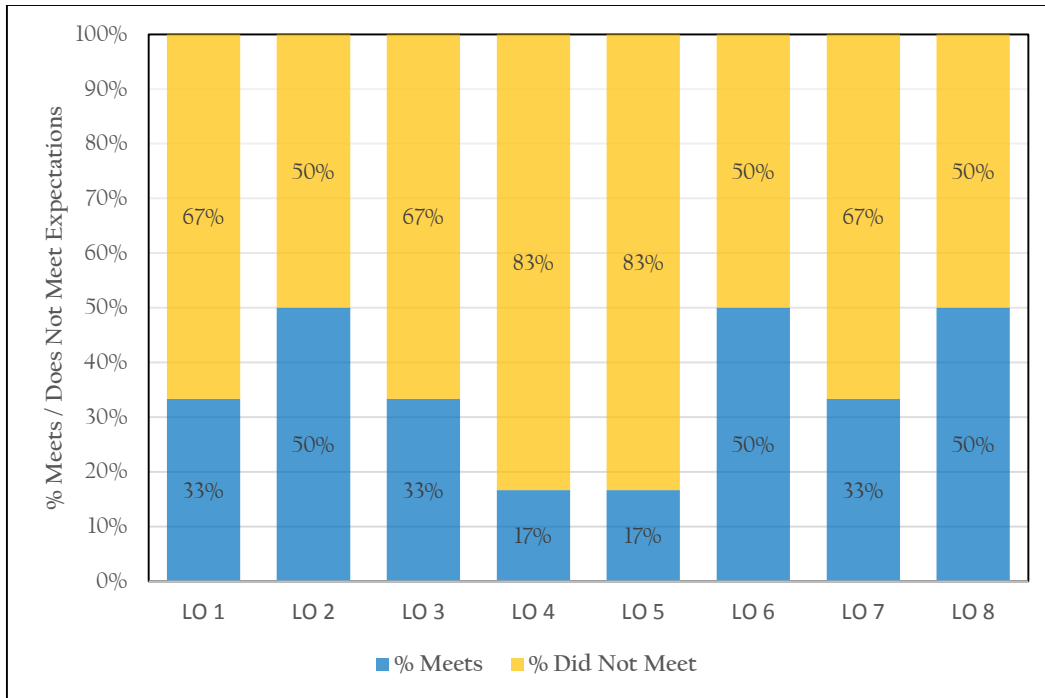


Figure 4. Bar graph of percentage of students (average learning mastery scores) meeting expectations of 3 or higher.

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 to Non-Dual Enrollment Comparison

No dual enrollment sections of the course were run during fall 2017 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 fall 2017, so no online to traditional comparison could be completed.

4.2.3 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 2.2.2 (see above).

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.

5 CTS 2334

5.1 LEARNING OUTCOMES, OBJECTIVES, AND DESCRIPTIVE STATISTICS

The FSW Business faculty defined seven areas of interest for evaluation in support of the state framework which was clarified for the fall 2017 term. The outcomes related to CTS 2334 are:

- LO-1 Install and configure a server operating system.
- LO-2 Secure network infrastructure and explain three major concerns relate to data communications.
- LO-3 Analyze network connectivity problems using industry standard tools and procedures.
- LO-4 Describe the IEEE 802 standards.
- LO-5 Configure network IP addressing and server based support services.
- LO-6
- LO-7 Create and manage groups, resources, and security policies and install and configure firewall security and rule based access permissions.

During the fall 2017 semester, an enrollment of 23 contributed to scores tallied from 1 of 1 sections of CTS 2334. 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” are LOs 1, 2, 3, and 5 at 100%. The lowest “% Meets Expectations” is LO 6 at 80%.

<i>Outcomes</i>	<i>n</i>	<i>Mean</i>	<i>% Meets Expectations</i>
LO-1 Install and configure a server operating system.	20	5.0	100%
LO-2 Secure network infrastructure and explain three major concerns relate to data communications.	19	5.0	100%
LO-3 Analyze network connectivity problems using industry standard tools and procedures.	19	4.9	100%
LO-4 Describe the IEEE 802 standards.	20	4.5	90%
LO-5 Configure network IP addressing and server based support services.	20	4.9	100%
LO-6	20	4.1	80%
LO-7 Create and manage groups, resources, and security policies and install and configure firewall security and rule based access permissions.	20	4.8	95%

Table 5. Student achievement level by Outcome for CTS 2334.

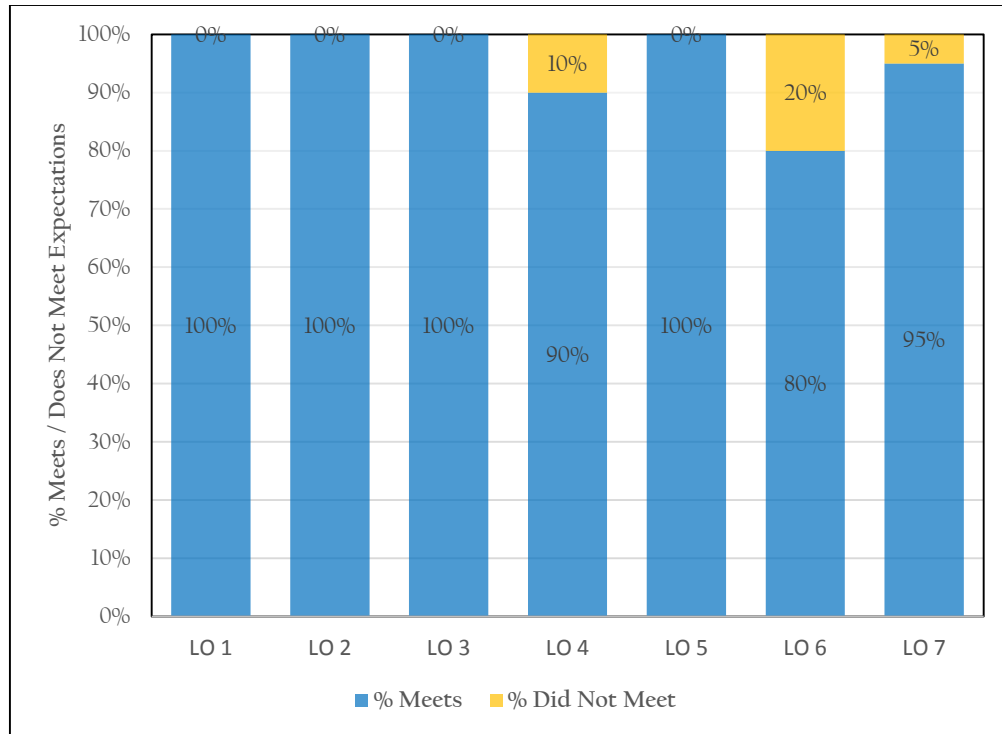


Figure 5. Bar graph of percentage of students (average learning mastery scores) meeting expectations of 3 or higher.

5.2 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.

5.2.1 Dual Enrollment to Non-Dual Enrollment Comparison

No dual enrollment sections of the course were run during fall 2017 so no comparison study between dual enrollment and non-dual enrollment could be completed.

5.2.2 Online to Traditional Comparison

Only one section of the course was offered in fall 2017, so no online to traditional comparison could be completed.

5.2.3 Comparison by Campus/Site

Only one section of the course was offered in fall 2017, so no cross-campus comparison could be completed.

5.3 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.

6 CONCLUSIONS

FSW's Business 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, "LO-1 Describe common tools and diagnostic devices." the average "% Meets Expectations" across 18 students from one course section is 28%. 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.
2. In a study of outcome achievement, "LO-2 Describe the primary hardware components." the average "% Meets Expectations" across 18 students from one course section is 33%.
3. In a study of outcome achievement, "LO-3 Develop hardware troubleshooting methodologies." the average "% Meets Expectations" across 18 students from one course section is 11%.
4. In a study of outcome achievement, "LO-4 Explain functionality of hard drive devices." the average "% Meets Expectations" across 18 students from one course section is 0%.
5. In a study of outcome achievement, "LO-5 Formulate customer support procedures." the average "% Meets Expectations" across 18 students from one course section is 11%.
6. In a study of outcome achievement, "LO-6 Summarize legacy and current hardware technologies." the average "% Meets Expectations" across 18 students from one course section is 33%.
7. No comparison between online and traditional course sections was completed because only one section of the course was offered.
8. No cross-campus comparison could be completed because course data was only collected from one site.

6.2 CTS 1133

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

1. In a study of outcome achievement, "LO-1 Choose a Windows installation." the average "% Meets Expectations" across 35 students from two course sections is 66%. 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.
2. In a study of outcome achievement, "LO-2 Configure Windows networking and resources." the average "% Meets Expectations" across 35 students from two course sections is 17%.
3. In a study of outcome achievement, "LO-3 Describe desktop virtualization." the average "% Meets Expectations" across 35 students from two course sections is 51%.
4. In a study of outcome achievement, "LO-4 Describe function of operating system." the average "% Meets Expectations" across 35 students from two course sections is 11%.

5. In a study of outcome achievement, “LO-5 Formulate maintenance and security procedures for Windows clients.” the average “% Meets Expectations” across 35 students from two course sections is 23%.
6. In a study of outcome achievement, “LO-6 Summarize troubleshooting procedures.” the average “% Meets Expectations” across 35 students from two course sections is 26%.
7. In a study comparing Online with Traditional course sections, the “% Meets Expectations” for traditional sections range from 18% to 59%. The “% Meets Expectations” for online sections range from 0% to 81%. LO 2 exhibits a statistically significant difference.
8. No cross-campus comparison could be completed because course data was only collected from online and one site, a study completed in #7 above.

6.3 CTS 2120

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

1. In a study of outcome achievement, for LO-1 the average “% Meets Expectations” across 6 students from one course section is 33%. 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.
2. In a study of outcome achievement, “LO-2 Secure network infrastructure and explain three major concerns related to data communications.” the average “% Meets Expectations” across 6 students from one course section is 50%.
3. In a study of outcome achievement, for LO-3 the average “% Meets Expectations” across 6 students from one course section is 33%.
4. In a study of outcome achievement, for LO-4 the average “% Meets Expectations” across 6 students from one course section is 17%.
5. In a study of outcome achievement, for LO-5 the average “% Meets Expectations” across 6 students from one course section is 17%.
6. In a study of outcome achievement, “LO-6 Implement organizational security.” the average “% Meets Expectations” across 6 students from one course section is 50%.
7. In a study of outcome achievement, “LO-7 Create and manage groups, resources, and security policies.” the average “% Meets Expectations” across 6 students from one course section is 33%.
8. In a study of outcome achievement, for LO-8 the average “% Meets Expectations” across 6 students from one course section is 50%.
9. No comparison between online and traditional course sections was completed because only one section of the course was offered.
10. No cross-campus comparison could be completed because course data was only collected from one site.

6.4 CTS 2234

A drill-down of CTS 2234 results are as follows:

1. In a study of outcome achievement, “LO-1 Install and configure a server operating system.” the average “% Meets Expectations” across 23 students from one course section is 100%. 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.

2. In a study of outcome achievement, “LO-2 Secure network infrastructure and explain three major concerns relate to data communications.” the average “% Meets Expectations” across 23 students from one course section is 100%.
3. In a study of outcome achievement, “LO-3 Analyze network connectivity problems using industry standard tools and procedures.” the average “% Meets Expectations” across 23 students from one course section is 100%.
4. In a study of outcome achievement, “LO-4 Describe the IEEE 802 standards.” the average “% Meets Expectations” across 23 students from one course section is 90%.
5. In a study of outcome achievement, “LO-5 Configure network IP addressing and server based support services.” the average “% Meets Expectations” across 23 students from one course section is 100%.
6. In a study of outcome achievement, for LO-6 the average “% Meets Expectations” across 23 students from one course section is 80%.
7. In a study of outcome achievement, “LO-7 Create and manage groups, resources, and security policies and install and configure firewall security and rule based access permissions.” The average “% Meets Expectations” across 23 students from one course section is 95%.
8. No comparison between online and traditional course sections was completed because only one section of the course was offered.
9. No cross-campus comparison could be completed because course data was only collected from one site.

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.