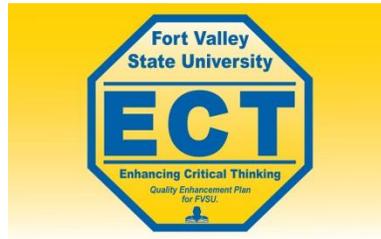


***ENHANCING CRITICAL THINKING  
In  
The General Education Curriculum***

**Year-Two Report  
of  
The Quality Enhancement Plan**



**For  
FORT VALLEY STATE UNIVERSITY**

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**The 2011- 2012 Report  
Prepared  
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# **Enhancing Critical Thinking In The General Education Curriculum**

## **I. Overview:**

### **A. SACS APPROVED QEP**

The On-Site Review Committee of the Southern Association of Colleges and Schools (SACS) visited Fort Valley State University during the period from March 16 – 18, 2010 as required by the reaffirmation of accreditation process. Upon reviewing FVSU's Quality Enhancement Plan (QEP), entitled, "Enhancing Critical Thinking in the General Education Curriculum (ECT)," the Visiting Committee commended the plan and in an atypical move, offered no recommendations. FVSU's accredited status was reaffirmed at the December, 2010 SACS Annual Meeting. The institution was authorized, as of this date, to implement the ECT.

### **B. ESTABLISHING YEAR 1 OF THE QEP**

The QEP Steering Committee began implementing the ECT plan upon departure of the SACS Visiting Team from campus in March, 2010. SACS advisor, Dr. Michael Johnson, had informed the committee that this would be the expected date for implementing the QEP. Vice President of Academic Affairs, Dr. Julius Scipio, stated that July 2011 was the starting date for the QEP owing to the December 2010 SACS official approval date of FVSU's reaffirmation of accreditation process. He indicated that the QEP budgeted funds would be available as of the July 2011 date. With this delayed implementation date, the Steering Committee decided to support the offering of a limited number of "QEP courses" alongside the traditional core courses in mathematics and English in the 2011 Fall Semester. With this clarification of starting dates for the QEP now ECT for FVSU, the 2011 – 2012 Year was determined to be Year 1 of the ECT.

### **C. QEP GOAL AND OBJECTIVES**

The following original goal and objectives of the SACS approved QEP continue to guide the ECT implementation efforts:

**GOAL:** The ECT aims to improve student retention and enhance institutional competitiveness at national and state levels by preparing students as expert, critical thinkers capable of lifelong learning.

**Student Learning Outcomes:** Students will evidence critical thinking when using the logic of their disciplines of study to resolve problem situations or learning tasks. The ECT will provide teaching/learning opportunities that:

- 1. Enhance students' critical thinking abilities through writing and reflections.**

- 2. Enhance students' critical thinking abilities through problem solving and evaluation.**
- 3. Enable students to demonstrate intellectual persistence in solving complex or challenging problems or when resolving ambiguous academic tasks.**

To advance these student learning outcomes, the ECT Steering Committee established faculty development as a priority focus of the plan as reflected in the following objective:

All ECT faculty will:

- 4. Be prepared to implement and assess students' growth in critical thinking in their courses.**

## **II. Highlights of the Baseline Year (Fall 2010 – Fall 2011)**

### **A. ECT LEADERSHIP IDENTIFIED**

By Fall, 2010, Dr. Ian Toppin and Ms. Erica Barnes were employed as the ECT Director and Administrative Assistant, respectively. As the new ECT director, Dr. Toppin endeavored to implement the approved QEP, working with faculty in the Department of English and Foreign Languages and the Department of Mathematics and Computer Sciences.

### **B. BASELINE YEAR RECOMMENDATIONS**

In the Baseline Year report, Dr. Toppin highlighted student achievement and faculty development efforts while noting that future directions were needed as follows:

- To broaden the use of the reasoning strategies and use them as the compass which guides course redesign. Such revisions would make the assessment and tangible proof of critical thinking easier to measure.
- To remove QEP/ ECT course designations since this might result in an unwarranted perception of stigma among students. All faculty would be trained to implement critical thinking strategies.
- To provide more faculty training and partner with departments to offer training that is discipline unique.
- To improve incentives and accountability procedures for faculty who implement critical thinking strategies in his/her classes.
- To promote and expand research as a means of enhancing critical thinking.
- To create greater campus awareness of critical thinking by broadening the number of honorees at *Critical Thinking Day*.
- To create a QEP/ECT website.

These suggested changes constituted the framework within which the Quality Enhancement Plan was fully transitioned to “The Center for Enhancing Critical Thinking.” The acronym, ECT, was designated henceforth as the frame of reference for the plan. Meanwhile, unanticipated fiscal challenges further altered the directions of the planning process. Upon his resignation from FVSU in December, 2011, Dr. Toppin summarized the programmatic impact of the lack of fiscal resources on the proposed ECT plan.

### **C. BUDGET CONSTRAINTS**

According to the Fall 2011 Toppin Report, the 2011-2012 budget, originally promised by July 1, 2011, was actually issued on September 29, 2011. In a meeting with Dr. Julius Scipio, Dr. Toppin was informed that the actual ECT salaries targeted for The Reading Lab, and Writing Lab Coordinators, had been allocated to the Department of English and Foreign Languages. With these coordinators housed in that department, ECT students were only able to receive formal assistance in writing or reading on an “as-available” basis. Priority commitment of the coordinators’ time, justifiably, was given to the English Department.

**Personnel:** Dr. Toppin submitted a request on October 5, 2011 to hire the Math Lab Coordinator who had been recommended for hiring a year earlier. The hiring was postponed due to budget constraints. A position announcement was submitted on November 14, 2011 for the ECT Writing Lab Coordinator’s position. No request was submitted for the Reading Coordinator’s position since the employed person was willing to assist the ECT as needed. Other personnel appropriated in the SACS approved QEP budget, included: student tutors, a Faculty Development Coordinator and three faculty positions.

The Faculty Development Coordinator’s position was not pursued because Dr. Toppin perceived that the duties of those responsible for the existing Faculty Center for Improving Instruction and Leadership (FCIIL) would be in conflict with this person’s duties. Faculty development in critical thinking is a necessary component for implementing the ECT, a targeted need quite distinct from the broader university goals for general faculty development. No faculty has been hired to date for the ECT. Student tutors were provided this year for the first time through the Office of Financial Aid’s Federal Work/ Study program rather than ECT budgeting.

**Furniture and Equipment:** The administrative assistant’s furniture was ordered and has arrived and the October 27, 2011 requisition for purchasing 30 computers for the ECT Math lab was filled in May, 2012. The mathematics ECT Lab has yet to be furnished due to the need for funding to purchase computer tables. Furniture for the director’s office was postponed in anticipation that a more permanent location for the ECT Center would be identified. Computers have yet to be ordered for the Reading and Writing labs. The ECT is located on the third floor of the library, in a less than ideal location. Plans for relocating the office are being discussed.

**Community Reactions:** In the face of these and other fiscal concerns identified by the ECT Director prior to his departure, the newly appointed Interim Director, the continuing ECT Administrative Assistant, The ECT Advisory Council and the FVSU community-at-large committed to return to the original plan. Concentrated efforts were undertaken to restore as much of the approved QEP as possible, given the budget climate. The 2010-2012 ECT Advisory Committee reviewed the resolution calling the administration’s attention to the need to either commit needed funding for the ECT or approve a modified plan for the campus. The original budget and funds expended to date are appended to this report (Appendix A).

**FVSU’s Administrative Response:** Vice President Scipio restated the administration’s position that the budgeted funds for the ECT were targeted to commence in July, 2011, the starting date for FY 1 of the QEP. Year 1 of the ECT spans the period from Fall 2011 – Summer, 2012. Consistent with this analysis, the July 2011 budget was provided in September, 2011.

**III. Year 1 Accomplishments (Fall 2011 – Summer 2012)**

**A. RESPONSE TO THE BASELINE YEAR RECOMMENDATIONS**

In addition to adhering to the expectations as stated in the original QEP, the ECT personnel gave priority attention in Year 1 to responding to the recommendations of the Baseline Year Report as follows:

**Table 1: Response to the Baseline Year Recommendations**

RECOMMENDATION	RESPONSES
<p>To broaden the use of the reasoning strategies and use them as the compass which guides course redesign. Such revisions would make the assessment and tangible proof of critical thinking easier to measure.</p>	<ol style="list-style-type: none"> <li>1) <b>Specific Critical reasoning strategies have been identified by discipline usage</b></li> <li>2) <b>Critical Reasoning Exercises have been developed for the redesigned classroom</b></li> <li>3) <b>Pre-and post-assessment items are identified according to the critical reasoning required for success. Final Exams will be so aligned.</b></li> </ol>
<p>To remove QEP/ ECT course designations since this might result in an unwarranted perception of stigma among students. All faculty would be trained to implement critical thinking strategies</p>	<ol style="list-style-type: none"> <li>1) <b>All math and English sections are ECT infused. The QEP label is no longer in use.</b></li> <li>2) <b>Faculty Development Sessions in critical reasoning strategies for all math and English faculty are scheduled for August 7, 2012 and follow-up training scheduled</b></li> </ol>

	<b>throughout the academic year.</b>
To provide more faculty training and partner with departments to offer training that is discipline unique.	<b>Faculty received training in critical thinking illustrating best practices that are being used in their disciplines.</b>
To improve incentives and accountability procedures for faculty who implement critical thinking strategies in his/her classes.	<ol style="list-style-type: none"> <li><b>1) Recommendations were submitted to the Vice President for Academic Affairs to incorporate critical thinking accountability measures in the “Expected Duties” for Faculty as stated in the Annual Evaluation instrument</b></li> <li><b>2) Faculty is honored on Critical Thinking Day for outstanding and noteworthy efforts.</b></li> </ol>
To create greater campus awareness of critical thinking by broadening the number of honorees at <i>Critical Thinking Day</i> .	<b>A substantially larger number of faculty and students were honored on Critical Thinking Day 2012. High performers on the CAAP were given cash awards and in-class achievers received medallions and plaques. Students were also given greater visibility as speakers.</b>
To promote and expand research as a means of enhancing critical thinking.	<b>Research Day was broadened to include representation from all colleges. This year’s attendance exceeded all expectations. Additionally, a women’s conference was conducted in advance of the research presentations.</b>
To create a QEP/ECT website.	<b>The website is operational.</b>

## **B. THE OPERATIONAL DEFINITION OF CRITICAL THINKING**

A major advancement in understanding the QEP came as a result of the reformulation of the operational definition of critical thinking.

### **CRITICAL THINKING AT FVSU**

Critical thinking has different meanings to different individuals. To ensure universal understanding of intent, the operational definition of critical thinking at FVSU has evolved to mean:

*The ability to persevere in the successful resolution of a learning task or problem solving situation using critical reasoning processes that adhere to established intellectual standards of critical thinking.*

**Intellectual Standards of Critical Thinking:** clarity, precision, accuracy, relevance, depth, logic, fairness, completeness, breadth, significance

**The Critical Thinking Model:** Students are trained to follow an algorithm that improves critical thinking processes by:

- a) identifying, analyzing and evaluating arguments and truth claims;
- b) discerning points of view and/or eliminating personal bias in decision making;
- c) justifying conclusions and/or drawing reasonable and intelligent decisions about their thoughts or perceptions.

### **C. The ECT Curriculum**

In **mathematics**, the QEP label was removed from the courses. All college algebra and Precalculus courses were offered on a four-day basis. On alternate days, students meet in laboratories to complete homework assignments, quizzes and tests using MYMathLab. Class sizes are limited to 25 students as requested in the QEP.

While the QEP Steering Committee anticipated that small class sizes and hands-on laboratory opportunities would significantly enhance the teaching/learning process, progress towards this vision was significantly impeded by several factors.

- Either the laboratory computers were often inoperative or crashed during testing or homework time or the Internet access was so slow that assignments could not be completed as desired. Valuable class time was lost due to the instability of the technology.
- The overwhelming majority of enrolled students attained a “course readiness” score below the cut-off 70% on the pre-assessment. The students’ need for in-class remediation coupled with their poor attendance rates limited the depth and breadth with which the course content could be covered for mastery.
- The need for the proposed mathematics laboratory instructor who would be available to assist instruction and conduct and monitor students’ engagement went unfulfilled.
- Tutors were employed to assist with the grading of papers.

### **English**

The original English ECT Coordinator and half of the QEP trained faculty are no longer employed at the university. Most currently trained ECT faculty is temporary, full time employees. Few full-time faculty are ECT trained. Moreover, the person who conducted the ECT faculty training and prepared the modules did not return to campus.

Funds were not available to employ a replacement ECT English Coordinator. Additionally, the Academic Advisement Center assumed the position that ECT students could not be served by the existing Reading and Writing Labs. Then, the English faculty found the remedial demands of students enrolled in ENGL 1101 so great that it was not possible to implement the critical thinking strategies in this course. The department subsequently proposed introducing critical thinking in ENGL 1102. This revision was approved by the ECT Advisory Committee. Other limiting concerns were:

- QEP course labels were removed because students were reluctant to enroll in the targeted courses thinking that these courses were different and harder.
- No ECT labs were available owing to the need for computers – The WIN Lab computers crashed. There were few English QEP Tutors to meet the demand (requests were made for suggested names of qualified students; the ECT did not receive recommendations).
- The majority of students are entering the English classes underprepared with basic need for developmental work in reading and the mechanics of grammar.
- Students did not purchase their books in a timely manner owing to delays in the issuance of financial aid refunds.

#### D. STUDENT ACHIEVEMENT

In general, Student success in the ECT is benchmarked by direct measures such as the end of course grades and the pre-and post- assessments. Indirect measurements are obtained using the scaled scores on the Critical Thinking component of the CAAP.

**End of Course Grades:** Because of the compatibility of the time periods in which the end of course grades were captured (Table 2), trend growth (or the lack of) is not realistically measurable. Typically, grades captured in the same semester tend to reflect populations that approximate each other. Fall semester enrollees in introductory core courses contrast with Spring enrollees in that a disproportionately large number of repeaters enroll in the English and Mathematics Core courses during the Spring semester.

Table 2: Comparison of End of Course Grades Fall 2008 with Spring 2012:

	Per Cent A-C Grades			Per Cent D W F Grades	
	Fall 2008	Spring 2012		Fall 2008	Spring 2012
<b>English 1101</b>	64%	45.1%		35%	52%
<b>English 1102</b>	80%	61.3%		20%	34.3%
<b>Math 1111</b>	44%	33.1%		57%	66.2%
<b>Math 1113</b>	38%	46.5%		61%	52.6%

With the exception of MATH 1113 Precalculus, an overall decline in the passing rates of students in introductory mathematics and English Core Courses occurred. In English 1101, there was a 9 percentage point drop and a 17 percentage point decline in the passing rates in English 1102. Math 111 experienced an 11 percentage point decline in performance. Interviewed faculty attributes the students' performance challenges to a range of factors such as:

- a) Instability of the technology in the laboratories;
- b) Extremely limited readiness skills for college level work;
- c) High absentee rates among students;
- d) Reading challenges;
- e) Resistance of students to purchasing textbooks in a timely manner; and
- f) Students' short attention spans when engaging in academic learning on the computer.

Without constant monitoring and oversight, students were prone to check into Face book, Instant Messaging and Twitter at the time that they were expected to be engaged in the laboratory on their assigned class work.

## **STUDENTS' PERFORMANCES ON THE PRE- AND POST- ASSESSMENTS**

### **English**

**Objective 1. Enhance students' critical thinking abilities through writing and reflections**

## **ENGL 1102 and ENGL 1101 DATA ANALYSIS PRELIMINARY REPORT**

### **Methodology**

Data were captured from the seven ENGL 1102 ECT sections in which a total of 84 students took both pre-assessment and post-assessment tests. In the ENGL 1102 non-ECT sections, 171 students took both pre-assessment and post-assessment tests. More students took either the pre- or the post-assessments. However, the statistical analysis was conducted only on the sub-population that completed both assessments. The pre-assessment and the post- assessment items that were administered to each of the ECT and non-ECT students were identical. The pre-and post- assessment items were also similar in competencies measured.

With regards to ENGL 1101, data were taken from the three ENGL 1101 ECT sections enrolling 34 students who took each of the pre-and post-assessments.

There were two ENGL 1101 non-ECT sections in which data were captured on the 30 students who took both pre- and post-assessments. Again, the assessment items were comparably structured. These data were analyzed statistically to determine whether the

The following research question was pursued using Excel data analytic tools:

**Does the ECT intervention make a difference in student achievement?**

**Question 1:** Is there a statistically significant difference in the pre-assessment scores of ENGL 1102 ECT sections when compared with ENGL 1102 non-ECT sections?

The experimental group consists of students enrolled in the ECT sections; the control group consists of the students enrolled in the non-ECT sections from the beginning of the semester. The analysis examines whether the students were performing at the same level of proficiency prior to instruction. If the students were not indistinguishable at the beginning of the semester, or if the ECT sections were not at a lower level of proficiency when compared to the students in non-ECT sections, there would be no point of pursuing this investigation further.

**Question 2:** Is there a statistically significant difference in the pre-assessment and post-assessment scores in ENGL 1102 ECT sections?

**Question 3:** Is there a statistically significant difference in the pre-assessment and post-assessment scores in ENGL 1102 non-ECT sections?

**Question 4:** Is there a correlation between the pre-assessment and post assessment scores ( $X_2 - X_1$ ), and the end of course grades? What other co-relationships exist between pre-assessment scores and post assessment scores of ECT and non-ECT sections?

**Question 1:** The mean pre-assessment score for students in ENGL 1102 ECT sections was 71.89%; for ENGL 1102 non-ECT sections, the mean pre-assessment score was 73.96. Students in the ECT sections presented a slightly lower level of proficiency at the beginning of the semester than the control group, their non-ECT counterparts. A non-paired t-Test was conducted to ascertain whether this “slight difference” was actually statistically significant.

*Null hypothesis ( $H_0$ ):* There is no significant difference between the pre-assessment scores of students in ENGL 1102 ECT sections and the pre-assessment scores of students in ENGL 1102 non-ECT sections.

*Alternative hypothesis ( $H_a$ ):* There is a significant difference between the pre-assessment scores of students in ENGL 1102 ECT sections and the pre-assessment scores of students in ENGL 1102 non-ECT sections. The results are shown in Table 3.

The two tail P-value for this t-Test is 0.22 (0.220341) and “t Stat”=-1.233. The t-critical (two-tail) values are  $\pm 1.989$ . Since the P-Value is not small (is greater than  $\alpha=0.05$ ) or since the absolute value of the “t-Stat” is not greater than 1.982, there is not enough evidence to reject the Null hypothesis ( $H_0$ ). Hence, there is no statistically significant difference (at the level  $\alpha = 0.05$ ) between the two means. Statistically speaking,

therefore, both the ECT and non ECT ENGL 1102 sections were at the same level of proficiency at the beginning of the semester. Moreover, students were randomly enrolled in these course sections.

Table 3. ENGL 1102: ECT and non-ECT pre-assessment scores comparison.		
t-Test: Two ( independent) Sample Assuming Unequal Variances		
	Variable 1 (ENGL 1102 ECT)	Variable 2 (ENGL 1102 non-ECT)
Mean	71.89286	73.96176
Variance	203.5667	67.3853
Observations	84	171
Hypothesized Mean Difference	0	
Df	111	
t Stat	-1.23257	
P(T<=t) one-tail	0.110171	
t Critical one-tail	1.658697	
P(T<=t) two-tail	0.220341	
t Critical two-tail	1.981567	

Question 2: A paired t-Test was performed to determine whether there is a statistically significant difference in the pre-assessment and post-assessment scores at alpha = 0.05 significance level in the ENGL 1102 ECT sections

*Null hypothesis (H<sub>0</sub>):* There is no significant difference between pre-assessment scores and post-assessment scores of students in ENGL 1102 ECT sections

*Alternative hypothesis (H<sub>a</sub>):* There is a significant difference between pre-assessment scores and post-assessment scores of students in ENGL 1102 ECT sections.

As shown in Table 4 below, the two tail P-value for this t-Test is 0.001 (0.000986781) and “t Stat”=-3.416. The t-critical (two-tail) values are ±1.989. Since the P-Value is small (less than alpha=0.05) or since the absolute value of the “t-Stat” is greater than 1.989, we reject the Null hypothesis (H<sub>0</sub>).

<b>Table 4. ENGL 1102 ECT PRE- AND POST - ASSESSMENT.</b>		
<b>t-Test: Paired Two Sample for Means</b>		
	<i>pre-assessment (X<sub>1</sub>)</i>	<i>post-assessment (X<sub>2</sub>)</i>
Mean	71.89285714	78.05952381
Variance	203.5666954	186.8518359
Observations	84	84
Pearson Correlation	0.299028986	
Hypothesized Mean Difference	0	
Df	83	
t Stat	-3.415780524	
P(T<=t) one-tail	0.000493391	
t Critical one-tail	1.663420175	
P(T<=t) two-tail	0.000986781	
t Critical two-tail	1.988959743	

To understand the above results, further statistical measures of the difference between the means were done at the 95% confidence interval level.

<b>Table 5. Column (X<sub>2</sub> - X<sub>1</sub>)</b>	
Mean	6.166666667
Standard Error	1.805346281
Median	5
Mode	0
Standard Deviation	16.54627198
Sample Variance	273.7791165
Kurtosis	3.653568869
Skewness	0.801029737
Range	110
Minimum	-35
Maximum	75
Sum	518
Count	84
Confidence Level (95.0%)	3.590761076

As shown in Table 4, the mean score gain in the post-assessment ( $\bar{d} = 6.167$ ,  $SD = 16.546$ ,  $N=84$ ) was significantly greater than zero. The value “t Stat” = -3.416 with  $df=83$ , and two tail P-value = 0.001 provides strong evidence that the ECT intervention made a difference. The 95% confidence interval about the mean score gain ( $\bar{d}$ ) is  $6.167 \pm 3.591 = (2.576, 9.758)$ . Thus, with the variability of differences between the pre-assessment and post-assessment scores ( $SD=16.546$ ) in mind, one may conclude that **the ECT intervention helped students increase their assessment scores by at least 2.6 points and as high as 9.8 point in ENGL 1102.**

**Question 3:** Comparing differences between the pre- and post-assessment scores of student enrolled in the ENGL 1102 non-ECT sections, a paired t-Test was performed at  $\alpha = 0.05$  significance level.

*Null hypothesis ( $H_0$ ):* There is no significant difference between pre-assessment scores and post-assessment scores of students in ENGL 1102 non-ECT sections

*Alternative hypothesis ( $H_a$ ):* There is a significant difference between pre-assessment scores and post-assessment scores of students in ENGL 1102 non-ECT sections.

Table 6. ENGL 1102 NON ECT		
t-Test: Paired Two Sample for Means		
	Pre-assessment ( $X_1$ )	Post-assessment ( $X_2$ )
Mean	73.96176471	75.15941176
Variance	67.38530277	91.86905848
Observations	171	171
Pearson Correlation	0.504432813	
Hypothesized Mean Difference	0	
df	170	
t Stat	-1.752338363	
P(T<=t) one-tail	0.040759281	
t Critical one-tail	1.653866318	
P(T<=t) two-tail	0.081518563	
t Critical two-tail	1.974016669	

The two tail P-value for this t-Test is 0.08 and “t Stat”=0.75. The t-critical (two-tail) values are  $\pm 1.97$ . Since the P-Value is not small (is greater than  $\alpha=0.05$ ) or since the absolute value of the “t-Stat” is not greater than 1.97, there is not enough evidence to reject the Null hypothesis ( $H_0$ ). Hence, there is no statistically significant difference (at the level  $\alpha = 0.05$ ) between the pre-assessment scores and post-assessment scores of students registered in ENGL 1102 non-ECT sections.

**Question 4:** Comparing end of course grades with pre-and post-assessment gains, resulted in the following analysis. First, end of course grades reported in terms of letters were converted to numerical equivalents as follows: A=95, B=85, C=75, D= 65 and F=55.

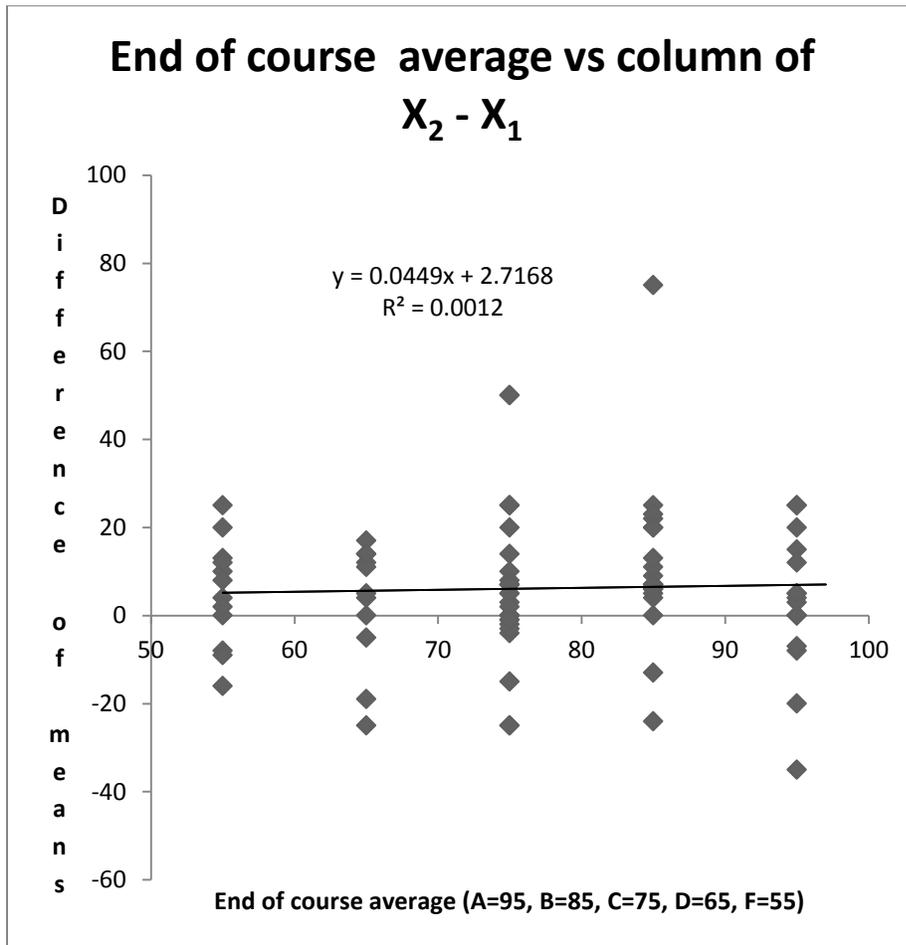


Chart 1: Correlation of End of Course Grades and Differences of Pre-Post-Assessment Means

No correlation was found between the end of course grades and the gains on the post assessment.

**Question 5:** Is there a statistically significant difference in the pre-assessment scores in ENGL 1101 ECT sections and ENGL 1101 non-ECT sections?

The mean pre-assessment score of ENGL 1101 ECT students was 67.09%; for ENGL 1101 non-ECT students, the mean score was 74.7%. Students in the ECT sections were at a lower entering proficiency level than their counterparts. The test for significance differences follows:

*Null hypothesis ( $H_0$ ):* There is no significant difference between the pre-assessment scores of students in ENGL 1101 ECT sections and the pre-assessment scores of students in ENGL 1101 non-ECT sections.

*Alternative hypothesis ( $H_a$ ):* There is a significant difference between the pre-assessment scores of students in ENGL 1101 ECT sections and the pre-assessment scores of students in ENGL 1101 non-ECT sections.

<b>Table 7.</b> ENGL 1101: ECT and non-ECT pre-assessment scores comparison.		
t-Test: Two ( independent) Sample Assuming Unequal Variances		
	Variable 1 (ENGL 1101 ECT)	Variable 2 (ENGL 1101 non-ECT)
Mean	67.08571	74.7
Variance	271.9042	14.68276
Observations	35	30
Hypothesized Mean Difference	0	
Df	38	
t Stat	-2.64965	
P(T<=t) one-tail	0.005838	
t Critical one-tail	1.685954	
P(T<=t) two-tail	0.011677	
t Critical two-tail	2.024394	

The two tail P-value for this t-Test is 0.012 (0.011677) and “t Stat”=-2.65. The t-critical (two-tail) values are  $\pm 2.024$ . Since the P-Value is small (is less than  $\alpha=0.05$ ) or since the absolute value of the “t-Stat” is greater than 2.024, the Null hypothesis ( $H_0$ ) is rejected. Hence, there is a statistically significant difference (at the level  $\alpha = 0.05$ ) between the two means. Students in the ECT sections were performing at a lower level than those in the non ECT ENGL 1101 sections at the start of the semester. Of interest is the determination of how students in the ECT sections, compared to those in the non-ECT sections by the end of the semester.

**Question 6:** Is there a statistically significant difference in the pre-assessment and post-assessment scores in ENGL 1101 ECT sections?

A paired t-Test was performed to test for statistically significant difference in the pre-assessment and post-assessment scores at the  $\alpha = 0.05$  significance level for ENGL 1101 ECT students.

*Null hypothesis ( $H_0$ ):* There is no significant difference between pre-assessment scores and post-assessment scores of students in ENGL 1101 ECT sections

*Alternative hypothesis ( $H_a$ ):* There is a significant difference between pre-assessment scores and post-assessment scores of students in ENGL 1101 ECT sections.

<b>Table 8. ENGL 1101 ECT PRE- AND POST - ASSESSMENT.</b>		
<b>t-Test: Paired Two Sample for Means</b>		
	<i>Pre-assessment(<math>X_1</math>)</i>	<i>Post-assessment(<math>X_2</math>)</i>
Mean	67.08571429	74.05714286
Variance	271.9042017	137.5260504
Observations	35	35
Pearson Correlation	0.475733332	
Hypothesized Mean Difference	0	
Df	34	
t Stat	-2.746881931	
P(T<=t) one-tail	0.004775796	
t Critical one-tail	1.690924198	
P(T<=t) two-tail	0.009551592	
t Critical two-tail	2.032244498	

The two tail P-value for this t-Test is 0.01 (0.009551592) and “t Stat”= - 2.747. The t-critical (two-tail) values are  $\pm 2.032$ . Since the P-Value is small (less than  $\alpha=0.05$ ) or since the absolute value of the “t-Stat” is greater than 2.032, the Null hypothesis is rejected. There is a significant difference between pre-assessment scores and post-assessment scores of students in ENGL 1101 ECT sections.

Further statistical analyses are shown in Table 9 using the 95% level of confidence. The mean score gain in the post-assessment ( $\bar{d} = 6.971$ ,  $SD = 15.015$ ,  $N=35$ ) was significantly greater than zero. The value “t Stat” = - 2.747 with  $df=34$ , and two tail P-value = 0.01 is a strong evidence that the ECT intervention made a difference in performance outcomes. The 95% confidence interval about the mean score gain ( $\bar{d}$ ) is  $6.971 \pm 5.158 = (1.813, 12.129)$ . Thus, with the variability of differences between the pre-assessment and post-assessment scores ( $SD=15.015$ ) in mind, one may again conclude that the ECT intervention helped students increase their assessment scores by at least 1.813 points and as high as 12.129 points.

<b>Table 9.</b> Column ( $X_2 - X_1$ )	
Mean	6.971428571
Standard Error	2.537942565
Median	6
Mode	7
Standard Deviation	15.0146707
Sample Variance	225.4403361
Kurtosis	0.132366079
Skewness	0.066611006
Range	64
Minimum	-28
Maximum	36
Sum	244
Count	35
Confidence Level(95.0%)	5.157719813

**Question 7:** Is there a statistically significant difference in the pre-assessment and post-assessment scores in ENGL 1101 non-ECT sections?

*Null hypothesis ( $H_0$ ):* There is no significant difference between pre-assessment scores and post-assessment scores of students in ENGL 1101 non-ECT sections

*Alternative hypothesis ( $H_a$ ):* There is a significant difference between pre-assessment scores and post-assessment scores of students in ENGL 1101 non-ECT sections

<b>Table 10. ENGL 1101 NON ECT</b>		
t-Test: Paired Two Sample for Means		
	<i>Pre-assessment (<math>X_1</math>)</i>	<i>Post assessment (<math>X_2</math>)</i>
Mean	74.7	75.54166667
Variance	14.68275862	23.78053161
Observations	30	30
Pearson Correlation	0.29964467	
Hypothesized Mean Difference	0	
Df	29	
t Stat	-0.882872297	
P(T<=t) one-tail	0.192282773	
t Critical one-tail	1.699126996	
P(T<=t) two-tail	0.384565545	
t Critical two-tail	2.045229611	

The two tail P-value for this t-Test is 0.385 and “t Stat”=-0.883. The t-critical (two-tail) values are  $\pm 2.045$ . Since the P-Value is not small (is greater than  $\alpha=0.05$ ) or since the absolute value of the “t-Stat” is not greater than 2.045, there is not enough evidence to reject the Null hypothesis ( $H_0$ ). Hence, there is no statistically significant difference (at the level  $\alpha = 0.05$ ) between the pre-assessment scores and post-assessment scores of students registered in ENGL 1101 non-ECT sections.

## SUMMARY

	<b>ENGL 1102 ECT</b>	<b>ENGL 1102 non-ECT</b>	<b>ENGL 1101 ECT</b>	<b>ENGL 1101 non-ECT</b>
Number of sections	7	11	3	2
Number of Students with pre- and post assessment scores	84	171	34	30
There was a difference between pre- and post assessment scores	Yes	Yes	Yes	Yes
There was a statistically significant difference between pre- and post assessment scores	Yes	No	Yes	No
ECT intervention made a difference in student achievement	Yes	N/A	Yes	N/A
ECT intervention made a statistically significant difference in student achievement	Yes	N/A	Yes	N/A

As shown in the previous table, students who were enrolled in the ECT sections did not enter, at the beginning of the course, with better levels of preparation for the coursework than their counterparts in the non-ECT sections of ENGL 1101 and ENGL 1102.

## MATHEMATICS

### MATH 1113 and MATH 1111 Analysis of Data

**Objective 2. Enhance students’ critical thinking abilities through problem solving and evaluation.**

#### Methodology

In Precalculus, data were used from three MATH 1113 ECT sections having 44 students who took both pre- and post-assessments. There was no MATH 1113 nor MATH 111 non-ECT sections to use for comparison purposes. Data were used from the eight MATH 1111 ECT sections in which a total of 83 students took both pre-assessment and post-assessment tests. All students were administered similar versions of the assessments.

**Question:** Does the ECT intervention make a difference in student achievement?

## Data Analysis for MATH 1113 ECT SECTIONS

**Question 1:** Is there a statistically significant difference in the pre-assessment and post-assessment scores in MATH 1113 ECT sections?

A paired t-Test was performed to determine whether there were statistically significant differences between the pre- and post-assessment scores at the  $\alpha = 0.05$  level of significance of students enrolled in the MATH 1113 ECT sections.

*Null hypothesis ( $H_0$ ):* There is no significant difference between pre-assessment scores and post-assessment scores of students in MATH 1113 ECT sections

*Alternative hypothesis ( $H_a$ ):* There is a significant difference between pre-assessment scores and post-assessment scores of students in MATH 1113 ECT sections

	<i>pre- assessment (<math>X_1</math>)</i>	<i>post- assessment (<math>X_2</math>)</i>	
Mean	30.29545455	59.15909	
Variance	206.1199789	352.4625	
Observations	44	44	
Pearson Correlation	0.211641355		
Hypothesized Mean Difference	0		
Df	43		
t Stat	9.081239195		
P(T<=t) one-tail	7.39467E-12		
t Critical one-tail	1.681070704		
P(T<=t) two-tail	1.47893E-11		
t Critical two-tail	2.016692173		

The two tail P-value for this t-Test is 0.000 and “t Stat”=9.081. The t-critical (two-tail) values are  $\pm 2.017$ . Since the P-Value is small (much less than  $\alpha=0.05$ ) or since the absolute value of the “t-Stat” is greater than 2.017, the Null hypothesis ( $H_0$ ) is rejected.

Additional measures were examined using differences of means at the 95% confidence interval level.

The above table shows that the mean score gain in the post-assessment ( $\bar{d} = 28.864$ ,  $SD = 21.083$ ,  $N=44$ ) was significantly greater than zero. The value “t Stat” = 9.08 with  $df=43$ , and two tail P-value = 0.00 is a strong evidence that the ECT intervention has made a significant difference. The 95% confidence interval about the mean score gain

$(\bar{d})$  is  $28.864 \pm 6.41 = (22.454, 35.274)$ . Thus, with the variability of differences between the pre-assessment and post-assessment scores (SD=21.083) in mind, one may conclude that the ECT intervention has helped students increase their assessment scores by at least 22.454 points and as high as 35.274 points which is very impressive.

Mean	28.86363636
Standard Error	3.178380807
Median	30
Mode	20
Standard Deviation	21.08299316
Sample Variance	444.4926004
Kurtosis	0.580003752
Skewness	-0.637798108
Range	92
Minimum	-30
Maximum	62
Sum	1270
Count	44
Confidence Level(95.0%)	6.409815698

## MATH 1111 ECT SECTIONS

**Question 2:** Is there a statistically significant difference in the pre-assessment and post-assessment scores in MATH 1111 ECT sections?

*Null hypothesis ( $H_0$ ):* There is no significant difference between pre-assessment scores and post-assessment scores of students in MATH 1111 ECT sections.

*Alternative hypothesis ( $H_a$ ):* There is a significant difference between pre-assessment scores and post-assessment scores of students in MATH 1111 ECT sections.

The two tail P-value for this t-Test is 0.11 and "t Stat" = - 1.6108. The t-critical (two-tail) values are  $\pm 1.9892$ . Since the P-Value is not small (is greater than  $\alpha=0.05$ ) or since the absolute value of the "t-Stat" is greater than 1.9892, there is no sufficient evidence to reject the Null hypothesis ( $H_0$ ).

<b>Table 14. MATH 1111 ECT PRE- AND POST - ASSESSMENT.</b>		
t-Test: Paired Two Sample for Means		
	<i>pre- assessment (X<sub>1</sub>)</i>	<i>post-assessment (X<sub>2</sub>)</i>
Mean	54.71687	58.12650602
Variance	286.9646	331.0844108
Observations	83	83
Pearson Correlation	0.399321	
Hypothesized Mean Difference	0	
Df	82	
t Stat	-1.61082	
P(T<=t) one-tail	0.055531	
t Critical one-tail	1.663649	
P(T<=t) two-tail	0.111062	
t Critical two-tail	1.989319	

Descriptive statistics comparing the means were conducted at the 95% confidence interval level.

<b>Table 15 Column (X<sub>2</sub> - X<sub>1</sub>)</b>	
Mean	3.158537
Standard Error	2.127555
Median	4.5
Mode	-1
Standard Deviation	19.26583
Sample Variance	371.1721
Kurtosis	0.071048
Skewness	-0.27675
Range	100
Minimum	-55
Maximum	45
Sum	259
Count	82
Confidence Level(95.0%)	4.233166

The above table shows that the mean score gain in the post-assessment ( $\bar{d} = 3.159$ ,  $SD = 19.266$ ,  $N=82$ ) was greater than zero. However, the 95% confidence interval about the mean score gain ( $\bar{d}$ ) is  $3.159 \pm 4.233 = (-1.074, 7.392)$ . The fact that this interval contains zero is in agreement with previous results showing no significant difference between pre-assessment scores and post-assessment scores of students in MATH 1111 ECT sections.

Nevertheless, it does appear that the ECT intervention helped students increase their assessment scores as high as 7.4 points. The lack of significant difference between the pre-assessment scores and post-assessment scores of students in MATH 1111 ECT sections might be linked to the fact that the pre-assessment questions administered to all students in MATH 1111 ECT sections were simpler versions of the post-assessment questions.

### SUMMARY

<b>Table 16 Summary of Mathematics Assessment Results</b>				
	<b>MATH 1113 ECT</b>	<b>MATH 1113 non-ECT</b>	<b>MATH 1111 ECT</b>	<b>MATH 1111 non-ECT</b>
Number of sections	3	0	8	0
Number of Students with pre- and post assessment scores	44		83	
ECT intervention made a difference in student achievement	Yes	N/A	Yes	N/A
ECT intervention made a statistically significant difference in student achievement	Yes	N/A	No enough evidence	N/A

SPRING 2012  
CAAP RESULTS FOR Fort Valley State University

The Core Curriculum Requirement, implemented Fall 2011, is to be required of 62 or better on the CAAP.

### **Baseline Information**

As shown in Table 17, FVSU students perform below the national mean in each area, writing (6.1%), mathematics (3.7%), reading (4.2%), critical thinking (2.3%) and science (3.5%). That reading is the area of the greatest need has been a frequent topic of discussion among members of the ECT Committee.

The data in Table 18 show that a total of 100 FVSU students took the CAAP exam during Spring 2012 semester. To meet graduation requirements, students must score at or above the 56<sup>th</sup> national percentile on the Critical Thinking component of the examination. For this administration of the CAAP, the 56<sup>th</sup> percentile equates to a

scaled score of 62 or above. Of the 100 students who took the 2012 Spring administration of the CAAP in Critical Thinking, 73 students (73 %) scored less than the scaled score of 62, while 27 students (27%) achieved a scaled score of 62 or higher. The lowest scaled score was 50 and the highest was 72 on the critical thinking subsection of the test.

**Table 17: Overall Spring 2012 CAAP Results**

Area	FVSU Mean	National Mean
Writing Skills	57.5	63.6
Math	54.8	58.5
Reading	57.7	61.9
Critical Thinking	58.3	60.6
Science	57.7	61.2

**Table 18: CAAP Results Relative to Core Curriculum Expectations for Critical Thinking**

CAAP Critical Thinking Summary	Spring 2012
No. of students tested	100
No. of scaled Scores <62	73 (73 %)
No. of scaled Scores 62 or >62	27 (27%)
Scaled Score Range	50-72

**ECT Objective 3. Enable students to demonstrate intellectual persistence in solving complex or challenging problems or when resolving ambiguous academic tasks.**

**Table 19: Students' Self-Reported Efforts on CAAP 2009 - 2012**

Test	Performance Effort	March	Nov.	March	Percent Showing Moderate to Best Effort
		2009 N=81	2011 N= 83	2012 N = 87	
Writing Skills	Tried My Best	48%	63	59	88%
	Moderate Effort	40%	17	23	84%
	Little Effort	12%	2	4	98%
	No Effort		1	1	
<b>Math</b>	Tried My Best	43%	49	54	43%
	Moderate Effort	41%	26	20	90%
	Little Effort	15%	5	11	85%
	No Effort	.01	1	2	
Reading	Tried My Best	33	49	50	33%
	Moderate Effort	32	26	31	90%
	Little Effort	25	4	3	93%
	No Effort	1	2	3	
Critical Thinking	Tried My Best	26	54	56	26%
	Moderate Effort	42	21	21	90%
	Little Effort	27	6	7	89%
	No Effort	.05	1	3	

The data in Table 19 show that students report a tripled intensity in their efforts on each tested area of the CAAP since the inception of the ECT at FVSU.

### Summary Assessment

**GOAL:** The ECT aims to improve student retention and enhance institutional competitiveness at national and state levels by preparing students as expert, critical thinkers capable of lifelong learning.

Relative to the overall goal of the ECT, the pre-and post-assessment results show that the ECT intervention makes a statistically significant difference in student learning. Students' self-reported data show that their efforts are intensifying in trying to do their best on national assessments. However, even though students are being prepared as lifelong learners in terms of improved reasoning skills and attitudes towards learning, they are not obtaining the letter grades to reflect this heightened understanding of the

course content. Thus, retention is being impacted adversely by the higher failure rates occurring in these core courses. Attendance and the low rate of book purchases appear to be major contributing factors.

#### **IV. Recommendations**

To achieve the goal and stated objectives of the original QEP as outlined, it is recommended that:

A. A significant outlay of budget resources be made available to the ECT to support the attainment of reasonably benchmarked outcomes, particularly the hiring of full-time faculty in the disciplines and the laboratory assistant.

B. The Center for Enhancing Critical Thinking be restructured to provide supervisory oversight of the reading, writing, and mathematics laboratories so that faculty and student access is not limited.

C. A full-time academic counselor and staff and a computer laboratory technician be employed to support student retention efforts.

D. The collection and grading of objective items on the Pre-and Post-Assessments be centralized in the ECT Office. Faculty are to continue to take responsibility for grading open-ended items and essays and reporting those results promptly to the ECT.

E. The “Expected Duties” component of the faculty annual evaluation instrument be revised to include expectations that faculty comply with the administration of assessments, as appropriate and meet the data submission requirements for critical thinking.

F. The ECT Director provide an annual evaluation of faculty who are teaching critical-thinking enhanced courses and his/her evaluation be included as a part of the faculty’s overall annual evaluation.

G. The Vice President of Academic Affairs be asked to develop an accountability model to garner the full cooperation and participation of Deans and Department Chairs in support of the Core Curriculum and QEP assessment expectations.

H. The Financial Aid Office be asked to provide book vouchers so that students can purchase their books in a timely manner.

I. All faculty teaching core English and Mathematics courses complete the technology and critical thinking training provided by their discipline coordinators.

J. The ECT be assigned responsibility for developing and implementing a mastery learning module for students who fail to attain the minimum CAAP score on the Critical Thinking component of the test.

K. A reasonable office space for the ECT be identified immediately.

This Year One Report is submitted with approval by The Advisory Council for The Center for Enhancing Critical Thinking this 19<sup>th</sup> Day of July, 2012

  
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Dr. Josephine D. Davis, Interim Director