



A Report of the Course-Embedded  
Texas Assessment of Critical Thinking Skills (TACTS)  
PHIL 2303  
Fall 2025-Spring 2026

## Description of Texas Assessment of Critical Thinking Skills (TACTS)

Each fall and spring semester, the Texas Assessment of Critical Thinking Skills (TACTS) is administered within sections of PHIL 2303: Critical Thinking. The TACTS is a locally developed, proprietary instrument designed to measure critical thinking skills and empirical and quantitative skills. The instrument consists of 20 multiple-choice questions and is administered to students enrolled in those courses at the start and end of each semester. Because the instrument was developed by faculty with expertise in teaching and assessing critical thinking, it is assumed to have content-related validity (Banta & Palomba, 2015). Additionally, as this test was embedded within normal sections of PHIL 2303, the student scores represent authentic student work (Banta & Palomba, 2015; Kuh et al., 2015).

The student data presented within this report reflect student performance regarding the Texas Higher Education Coordinating Board's Core Learning Objectives of Critical Thinking Skills and Empirical and Quantitative Skills (THECB, 2026). The THECB defines these concepts as follows:

- Critical Thinking Skills: creative thinking, innovation, inquiry, analysis, evaluation, and synthesis of information
- Empirical and Quantitative Skills: manipulation and analysis of numerical data or observable facts resulting in informed conclusions

Therefore, these data should be used in conjunction with other data to fully understand student knowledge and ability regarding these Core Learning Objectives.

## Methodology

Starting in fall 2025 links to the pretest and posttest were included in Blackboard for each section of PHIL 2303: Critical Thinking. A mass email was sent to all enrolled students for the pretest, and targeted emails for the posttest were sent to students who completed the pretest. A total of 409 students took the pretest, and 140 students took the posttest for all sections for the 2025-2026 academic year; however, not all student test scores were used for analysis. To determine whether student performance increased from pre- to posttest, a dependent samples *t*-test was used for analysis. Student identification numbers were collected along with student scores to identify each student's score on both the pretest and posttest. A total of 129 students could be identified as taking both the pre- and posttests. All statistical analysis was therefore conducted on only those students for whom both pre- and posttest scores could be identified.

Before conducting inferential statistics to determine whether differences were present between the students' pre- and posttest scores, checks were conducted to determine the extent to which these data were normally distributed. All four standardized skewness and kurtosis coefficients were within the limits of normality of +/-3 (Onwuegbuzie & Daniel, 2002) for the face-to-face, online, and combined student population. Therefore, a parametric dependent samples *t*-test was used to analyze the student performance data for the combined populations.

## Results

A parametric dependent samples *t*-test did not reveal a statistically significant difference between the pre- to posttest scores for students enrolled in face-to-face sections of PHIL 2303: Critical Thinking for the 2025-2026 academic year,  $t(29) = -0.17, p = .86$ . The average student score remained about the same from pre- to posttest. Readers are directed to Table 1 for a breakdown of these results.

**Table 1**

*Descriptive Statistics for Student Pre- and Posttest Scores on Course-Embedded Test in PHIL 2303: Critical Thinking for 2025-2026 (Face-to-Face)*

Test Version	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M %</i>	<i>SD %</i>
Pretest Scores	30	9.60	2.90	48.00	14.48
Posttest Scores	30	9.73	3.36	48.67	16.81

A parametric dependent samples *t*-test revealed a statistically significant difference between the pre- to posttest scores for students enrolled in online sections of PHIL 2303: Critical Thinking for the 2025-2026 academic year,  $t(98) = -3.37, p = .001$ . This difference represented a small effect size (Cohen's *d*) of 0.34 (Cohen, 1988). The average student score increased by almost 6%. This equated to an average increase of about one question answered correctly from pre- to posttest. Readers are directed to Table 2 for a breakdown of these results.

**Table 2**

*Descriptive Statistics for Student Pre- and Posttest Scores on Course-Embedded Test in PHIL 2303: Critical Thinking for 2025-2026 (Online)*

Test Version	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M %</i>	<i>SD %</i>
Pretest Scores	99	8.36	3.03	41.82	15.14
Posttest Scores	99	9.51	3.22	47.52	16.07

A parametric dependent samples *t*-test revealed a statistically significant difference between the pre- to posttest scores for all students enrolled in sections of PHIL 2303: Critical Thinking for the 2025-2026 academic year,  $t(128) = -2.86, p = .005$ . This difference represented a small effect size of 0.25 (Cohen, 1988). The average student score increased by about 4 ½%. This equated to an average increase of almost one question answered correctly from pre- to posttest. Readers are directed to Table 3 for a breakdown of these results.

**Table 3**

*Descriptive Statistics for Student Pre- and Posttest Scores on Course-Embedded Test in PHIL 2303: Critical Thinking for 2025-2026 (All Students)*

Test Version	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M %</i>	<i>SD %</i>
Pretest Scores	129	8.65	3.03	43.26	15.16
Posttest Scores	129	9.56	3.23	47.79	16.19

Additional important information regarding student performance can also be gained through an item analysis of student pre- and posttest performance on individual test questions for each of the examined student populations. This item analysis revealed that students in face-to-face sections scored statistically significantly higher on two of the 20 questions from pre- to posttest. Readers are directed to Table 4 for a complete breakdown of item analysis data for face-to-face students.

**Table 4**

*Percentage of Face-to-Face Students Correctly Answering Pre- and Posttest Questions for 2025-2026*

	Pretest %	Posttest %	Mean Difference	<i>p</i>	Cohen's <i>d</i>
Question 1	43	70	27	.030*	0.42
Question 2	67	40	(27)		
Question 3	10	3	(7)		
Question 4	47	40	(7)		
Question 5	60	70	10		
Question 6	3	7	4		
Question 7	73	57	(16)		
Question 8	53	73	20		
Question 9	57	83	26	.030*	0.42
Question 10	7	10	3		
Question 11	60	63	3		
Question 12	33	57	24		
Question 13	83	63	(20)		
Question 14	23	23	0		
Question 15	23	37	14		
Question 16	80	80	0		
Question 17	53	37	(16)		
Question 18	77	63	(14)		
Question 19	37	30	(7)		
Question 20	70	67	(3)		

*Note.*  $n = 30$ . (Decrease in score from pretest to posttest); \* significant at  $p < .05$ ; \*\* significant at  $p < .01$ ; \*\*\* significant at  $p < .001$ . Cohen's *d* from 0.2 – 0.49 indicates a small effect size, 0.50-0.79 indicates a moderate effect size, and 0.80 and higher indicates a large effect size (Cohen, 1988).

Item analysis for students in online sections revealed they scored statistically significantly higher on six of the 20 test questions and statistically significantly lower on Question 20 from pre- to posttest. Readers are directed to Table 5 for a complete breakdown of item analysis data for online students.

**Table 6**

*Percentage of Online Students Correctly Answering Pre- and Posttest Questions for 2025-2026*

	Pretest %	Posttest %	Mean Difference	<i>p</i>	Cohen's <i>d</i>
Question 1	35	59	24	< .001***	0.41
Question 2	46	54	8		
Question 3	18	9	(9)		
Question 4	32	26	(6)		
Question 5	57	58	1		
Question 6	6	5	(1)		
Question 7	65	67	2		
Question 8	52	60	8		
Question 9	57	73	16	.013*	0.26
Question 10	10	10	0		
Question 11	45	59	14	.047*	0.20
Question 12	30	52	22	< .001***	0.38
Question 13	69	80	11	.048*	0.20
Question 14	30	31	1		
Question 15	23	23	0		
Question 16	62	72	10		
Question 17	47	53	6		
Question 18	46	68	22	< .001***	0.37
Question 19	40	51	11		
Question 20	65	44	(21)	< .001***	0.38

*Note.*  $n = 99$ . (Decrease in score from pretest to posttest); \* significant at  $p < .05$ ; \*\* significant at  $p < .01$ ; \*\*\* significant at  $p < .001$ . Cohen's  $d$  from 0.2 – 0.49 indicates a small effect size, 0.50-0.79 indicates a moderate effect size, and 0.80 and higher indicates a large effect size (Cohen, 1988).

An item analysis for students in all sections combined revealed that face-to-face and online students scored statistically significantly higher on five of the 20 questions and statistically significantly lower on two of the questions (Questions 3 and 20) from pre- to posttest. Readers are directed to Table 6 for a complete breakdown of item analysis data for all students.

**Table 6**

*Percentage of All Students Correctly Answering Pre- and Posttest Questions for 2025-2026*

	Pretest %	Posttest %	Mean Difference	<i>p</i>	Cohen's <i>d</i>
Question 1	37	61	24	< .001***	0.41
Question 2	51	50	(1)		
Question 3	16	8	(8)	.034*	0.19
Question 4	36	29	(7)		
Question 5	57	60	3		
Question 6	5	5	0		
Question 7	67	64	(3)		
Question 8	52	63	11	.039*	0.18
Question 9	57	75	18	.001**	0.29
Question 10	9	10	1		
Question 11	49	60	11		
Question 12	31	53	22	< .001***	0.37
Question 13	72	76	4		
Question 14	29	29	0		
Question 15	23	26	3		
Question 16	66	74	8		
Question 17	49	49	0		
Question 18	53	67	14	.017*	0.21
Question 19	40	46	6		
Question 20	66	50	(16)	.001**	0.29

*Note.*  $n = 129$ . (Decrease in score from pretest to posttest); \* significant at  $p < .05$ ; \*\* significant at  $p < .01$ ; \*\*\* significant at  $p < .001$ . Cohen's  $d$  from 0.2 – 0.49 indicates a small effect size, 0.50-0.79 indicates a moderate effect size, and 0.80 and higher indicates a large effect size (Cohen, 1988).

## References

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