Office of Academic Planning and Assessment

A Report of the Course Embedded

Texas Assessment of Critical Thinking Skills (TACTS)

2020-2021

Description of Texas Assessment of Critical Thinking Skills (TACTS)

Each fall and spring semester, the Texas Assessment of Critical Thinking Skills (TACTS) test is administered within sections of PHIL 2303: Critical Thinking. The TACTS is a locally developed, proprietary instrument designed to measure critical thinking, 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 that the instrument has 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, 2021). The THECB (2021) defines these concepts as follows:

- Critical Thinking Skills – creative thinking, innovation, inquiry, and analysis, evaluation, and synthesis of information

- Empirical and Quantitative Skills – manipulation and analysis of numerical data or observable facts resulting in informed conclusions

These data should therefore be used in conjunction with other data to fully understand student knowledge and ability with regards to these Core Learning Objectives.

Methodology

A total of 153 students took the pretest, and a total 45 students took the posttest for all sections of PHIL 2303: Critical Thinking for the 2020-2021 academic year; however, not all student test scores were used for analysis. To determine whether student performance increased

from pretest to posttest, dependent samples *t*-tests were used for analysis. Students' SamIDs

were collected along with student scores to identify each student's score on both the pretest and

posttest. Statistical analysis was only conducted on those students for whom both pretest and

posttest scores could be identified. Therefore, analysis was conducted on a total of 20 students.

Results

Prior to conducting inferential statistics to determine whether differences were present

between the students' pretest to posttest scores, checks were conducted to determine the extent to

which these data were normally distributed. Two of the four coefficients of the standardized

skewness and kurtosis coefficients were within the limits of normality of +/-3, and two were

outside the range of normality (Onwuegbuzie & Daniel, 2002). Because two of the coefficients

were normally distributed and because only one of the coefficients was just outside of the range

of normality, parametric paired samples *t*-tests were used for all statistical analysis. Readers are

directed to Table 1 for these standardized skewness and kurtosis results and to Table 2 for

aggregated pretest-to-posttest descriptive statistics.

Table 1

Standardized Skewness and Kurtosis Values for Student Pretest and Posttest Scores

Test Version	Standardized Skewness Coefficient	Standardized Kurtosis Coefficient
Pretest Scores	3.28	0.25
Posttest Scores	6.85	-0.47

Note. n = 20

Table 2

Descriptive Statistics for Student Pretest and Posttest Scores on Course-Embedded Assessments

Test Version	*n*	*M*	*SD*	*M %*	*SD %*
Pretest Scores	20	7.20	2.40	36.00	11.99
Posttest Scores	20	7.45	2.62	37.25	13.13

A parametric paired samples *t*-test revealed no statistically significant difference between the pretest to posttest scores (*p* = .708). The average student score only increased from 36.00% to 37.25%, representing a small increase of 1.25%. Additional information regarding student performance could potentially be gained through a disaggregated or item analysis of student performance on individual test questions. This item analysis revealed no statistically significant difference at the *p* < .05 level for each of the 20 test questions. The results for a breakdown of item analysis data are presented in Table 3.

Table 3

Percentage of Students Correctly Answering Pre and Posttest Questions for 2020-2021

	Pretest	Posttest	Mean Difference	*p*
Question 1	50.00%	85.00%	35.00%	.031
Question 2	55.00%	60.00%	5.00%	.748
Question 3	5.00%	5.00%	0.00%	1.000
Question 4	25.00%	25.00%	0.00%	1.000
Question 5	65.00%	45.00%	(20.00%)	.214
Question 6	5.00%	0.00%	(5.00%)	.330
Question 7	40.00%	35.00%	(15.00%)	.577
Question 8	20.00%	35.00%	15.00%	.330
Question 9	50.00%	45.00%	(5.00%)	.577
Question 10	20.00%	20.00%	0.00%	330
Question 11	25.00%	50.00%	25.00%	.666
Question 12	40.00%	20.00%	(20.00%)	1.000
Question 13	80.00%	65.00%	(15.00%)	.056
Question 14	10.00%	10.00%	0.00%	.104
Question 15	10.00%	10.00%	0.00%	.330
Question 16	55.00%	70.00%	15.00%	.267
Question 17	35.00%	40.00%	5.00%	.748
Question 18	35.00%	35.00%	0.00%	1.000
Question 19	25.00%	(20.00%)	(5.00%)	.666
Question 20	70.00%	70.00%	0.00%	1.000

Note. n = 20. (Decrease from pretest to posttest)

Discussion

It should be noted that this assessment was given to all students enrolled in all sections of PHIL 2303, regardless of teaching and learning modality. A total of 790 students (513 face-to-

face/hybrid and 277 fully online) received an invitation via Qualtrics to complete the pretest

during the first week of class, and 681 students (446 face-to-face/hybrid and 235 fully online)

received an invitation to complete the posttest near the end of the semester prior to finals. Out of

the 20 students who completed both the pretest and posttest, 12 were fully online students. Since

the number of participants was so small during 2020-2021, the decision was made to aggregate

the results rather than to disaggregate to show any differences between online and face-to-face

students.

Prior to spring 2020 the pretests and posttests were given in class using a paper test and

scantrons, but this meant that only the face-to-face students could take the test, leaving out the

entire online student population. To capture these missing data, OAPA started a partnership with

SHSU Online at the beginning of spring 2020 to move these types of assessments into Qualtrics,

which prepared OAPA for the complete shift to online learning due to the COVID-19 pandemic.

After administering several pretests and posttests through Qualtrics, the low participation

rates were apparent across all course sections. Rather than re-implement paper tests and

scantrons in fall 2021, the plan is to be more targeted in how students are asked to take the tests.

During 2020-2021, professors were asked to announce the test dates and to encourage students to

participate, but class time to take the tests was not requested due to the hybrid learning

environment. For fall 2021, OAPA is requesting additional reminders from the chair to

professors to pass along to their students, and for professors to allow time in face-to-face classes

on specific days at the beginning and end of the semesters for their students to complete the tests

in Qualtrics using their personal devices. It is expected that these measures, along with returning

to traditional face-to-face learning, will positively affect participation rates.

References

Banta, T. W., & Palomba, C. A. (2015). *Assessment essentials: Planning, implementing, and improving assessment in higher education* (2nd ed.). Jossey-Bass.

Kuh, G. D., Ikenberry, S. O., Jankowski, N. A., Cain, T. R., Ewell, P. T., Hutchings, P., & Kinzie, J. (2015). *Using evidence of student learning to improve higher education*. Jossey-Bass.

Onwuegbuzie, A. J., & Daniel, L. G. (2002). Uses and misuses of the correlation coefficient. *Research in the Schools, 9*(1)*,* 73–90.

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