GULL Week 2021 - Test of Scientific Literacy Skills (TOSLS)

The Test of Scientific Literacy Skills was administered to Salisbury University students in September of 2021 as part of

Table 3

Institution (N)	Mean % Correct - Pre-test	Mean % Correct - Post-test	GPA	% of male participants
Salisbury University Overall (409)	55.59*	N/A	3.24	30.56 (125)
Public research university traditional nonmajors (296)	58.33	64.45	3.53	26.4
Public research university biology majors (544)	61.72	67.13	3.27	40.1
Private research university - nonmajors (50)	84.63	84.95	3.62	32
Midsized state college - nonmajors (80)	44.29	42.50	Not reported	28.78

*GULL Week does not follow a pre- and post-testing model; pre- and post-test scores for other institutions reflect student performance before and after taking a biology course at those institutions.

Participant Demographics

Table 4

Race/Ethnicity	N (%)
Black	43 (11)
White	307 (75)
Asian/Pacific Islander	21 (5)
Hispanic	8 (2)
American Indian/Alaskan Native	5 (1)
Unknown/More than one race	14 (3)
Foreign	11 (3)

Discussion

Results from the 2021 administration of the TOSLS show Salisbury University students improving on the assessment as they progress through their studies, with first-year students and sophomores scoring lower on average that juniors and seniors. The learning gain is significant from first-year to sophomore year, with students average score jumping by nearly 2 points (out of 28 total). Curiously, seniors in this sample score slightly lower than juniors. First-time students score slightly higher than transfer students on the TOSLS, which raises the possibility that students doing their undergraduate general education science courses at other institutions are not getting the same quality educational experience and outcomes as students who take their undergraduate science courses at Salisbury University.

Salisbury University is a midsized, public regional university whose non-science major students scored 3 percentage points less than nonmajors (.84 questions of 28) at a public research university with very high research activity (R1).[2] SU students in 2021 had a mean percentage of correct answers that was more than 10 percentage points higher than those of a -granting) students when assessed in 2011. SU s institutional profile fits somewhere in between the large public research university and the midsized state college, with SU students performance on the TOSLS nearing that of the large, public research university.

The TOSLS subscales (see Table 5 below) show SU students are most proficient in Skills 1 (Identify a valid scientific argument), 3 (Evaluate the use and misuse of scientific information), and 6 (Read and interpret graphical representations of data). Students need the most learning and practice in subskills 2 (Conduct an effective literature search), 5 (Make a graph), and 8 (Understand and interpret basic statistics).

[2] American Council on Education (2024). *Basic classification*. Retrieved August 27, 2024 from https://carnegieclassifications.acenet.edu/carnegie-classification/classification-methodology/basic-classification/

Table 5

SKILL	SUBSSCALES DESCRIPTIONS	Question	Correct Answer	# of SU Students answering correction (%)
1 (3 Qs)	Identify a valid scientific argument (e.g., recognizing when scientific evidence supports a hypothesis)	1	B	254 (62)
		8	D	265 (65)
		11	B	278 (68)
2 (5 Qs)	Conduct an effective literature search (e.g.			

Item Difficulty on the TOSLS

Item difficulties range from 0 to 1.0,
ranging from 0.30 to 0.80 are acceptable, particularly when difficulties are symmetrically distributed across a test. The average item difficulty for the TOSLS was 0.59 on the pretest and 0.68 on the posttest (Figure 1). [3]