

Office of Institutional Research and Assessment

2013-2017 Longitudinal Panel Study

Executive Summary

The 2013-2017 Longitudinal Panel Study is a powerful tool to examine students' perceived intellectual growth over time. The panel study compares students' self-reported skill on 18 learning outcomes from the 2013 to 2016 Foundations of Learning Assessment (FLA), taken by incoming freshman, to the 2017 Drake Student Survey (DSS), taken by all students.

Analysis revealed statically significant gains in students' self-rating over time on 17 of 18 possible learning outcomes. Further analysis of effect size (the magnitude of significance), showed moderate to strong effect sizes for 10 of the 18 outcomes. In particular, the following four learning outcomes were reported strengths, sorted by effect sizes (effect size ≥ 0.40):

- Knowledge of how to participate effectively in the democratic process,
- Evaluate the quality or reliability of information,
- Read and understand scientific writings written for an informed lay audience, and
- Ability to use educational experiences to analyze civic and global issues.

Only analysis of learning outcome #12 ("Execute appropriate mathematical operations for a given question") did not indicate significant differences between students' self-rating on the FLA and DSS.

A comparison of the 2013-2017 Longitudinal Panel Study with the previous 2011-2014 Longitudinal Panel Study indicated an increase in the number of learning outcomes showing significant growth (12 significant in 2011-2014). The following three learning outcomes showed significant growth and moderate to strong effect sizes on both 2013-2017 and 2011-14 Longitudinal Panel Studies:

- Evaluate the quality or reliability of information,
- Read and understand scientific writings written for an informed lay audience, and
- Employ evidence effectively in writing.

Only learning outcome #12 ("Execute appropriate mathematical operations for a given question") did not show significant difference in scores on both panel studies.

Growth in student self-reported skills from the 2011-2014 to 2013-2017 Longitudinal Panel Study could be attributed to the following:

- Changes in curriculum,
- Focus areas or events that Drake emphasized in recent years,
- The current social, cultural, political climate, and
- Differences in student populations.

Additional analysis investigated interaction effect, or the effect of a variable (gender, college/school, etc.) on student learning (e.g., "Ability to read carefully") across time. College/school interaction effects largely align with natural strengths and weaknesses of each college/school.

Office of Institutional Research and Assessment

Overview

The Longitudinal Panel Study is a study of the change over time in students' self-reported skill on a set of 18 student learning outcomes relevant to the Drake Curriculum and the Drake mission. The study's two data points come from the Foundations of Learning Assessment (pre-test) and the Drake Student Survey (post-test). The Foundations of Learning Assessment is administered to first-year students prior to the start of the semester, usually during orientation. The Drake Student Survey is administered to all Drake students during the Spring semester. Both instruments ask students to rate their current skill level for 18 student learning outcomes on a 5-point Likert scale, ranging from 1 ("Very Weak") to 5 ("Very Strong"). This data set provides a robust tool for examining overall patterns in student learning growth along with a mechanism for exploring the impact of programmatic interventions (e.g., study abroad, service learning).

The 2013-2017 Longitudinal Panel Study combines data from the four previous administrations of the Foundations of Learning Assessment (2013-2016) and data from the Spring 2017 administration of the Drake Student Survey. A total of 2843 students completed a Foundations of Learning Assessment from 2013 to 2016, and a total of 1419 students completed a Drake Student Survey in 2017. From 2013 to 2017, **672 Drake students** self-reported skill level on both a Foundation of Learning Assessment and a Drake Student Survey. Table 1 shows the results for this set of students. For full, technical results of statistical tests, please see Appendix A.

Table 1 – Results of the 2013-2017 Longitudinal Panel Study sorted by effect size

		Pretest Mean (FLA)	Posttest Mean (DSS)	Repeated Measures Mean Comparison	
				Significance (2-tailed)	Effect Size
Pair 14	Knowledge of how to participate effectively in the democratic process.	3.48	3.95	Significant Difference	Moderate to Strong
Pair 5	Evaluate the quality or reliability of information	3.86	4.26	Significant Difference	Moderate to Strong
Pair 11	Read and understand scientific writings written for an informed lay audience	3.36	3.85	Significant Difference	Moderate to Strong
Pair 13	Ability to use educational experiences to analyze civic and global issues.	3.58	3.96	Significant Difference	Moderate to Strong
Pair 2	Employ evidence effectively in writing	3.88	4.18	Significant Difference	Moderate
Pair 6	Understand the ethical issues related to use and misuse of information	3.92	4.27	Significant Difference	Moderate
Pair 15	Communicate effectively with people from other cultures and backgrounds.	3.79	4.13	Significant Difference	Moderate
Pair 3	Construct reasoned arguments	3.96	4.24	Significant Difference	Moderate
Pair 17	Apply understanding of ethical issues when developing solutions	3.84	4.15	Significant Difference	Moderate
Pair 4	Evaluate reasoned arguments	3.97	4.23	Significant Difference	Moderate
Pair 18	Ability to integrate skills and knowledge from different sources and experiences	4.03	4.28	Significant Difference	Weak to Moderate
Pair 10	Understand the perspectives and experiences of people who are different than you	4.05	4.23	Significant Difference	Weak
Pair 1	Ability to read carefully	4.18	4.29	Significant Difference	Weak
Pair 9	Analyze differences between industrialized and developing areas of the world	3.59	3.73	Significant Difference	Weak
Pair 16	Articulate a vision of my own values, ethics, or core beliefs	4.15	4.24	Significant Difference	Weak
Pair 8	Understand the historical, political, and social connections of past events	3.60	3.68	Significant Difference	Weak
Pair 7	Create or interpret art (ex. Sculpture, painting, music, theatre)	3.02	3.12	Significant Difference	Weak
Pair 12	Execute appropriate mathematical operations for a given question	3.84	3.87	No Significant Difference	Weak

Office of Institutional Research and Assessment

An analysis of student data indicates a **significant difference in student learning on 17 of 18 outcomes**. Analysis did not indicate a significant difference for outcome 12 (“Execute appropriate mathematical operations for a given question”). To determine if students scored significantly different between the FLA and DSS, a paired sample t-test was performed (see results in Table 1). A significance value (p-value) less than 0.05 indicates a significance difference between the FLA and DSS.

Effect size was calculated to determine how large the difference was between student self-reported learning on the FLA and DSS. An effect size greater than 0.30 indicates moderate variance in student scores from FLA to DSS. Analysis indicated a **moderate effect size for 10 of the 18 outcomes**. In particular, the top four learning outcomes received moderate to strong effect sizes, indicating a large significant difference between student self-reported learning on the FLA (before First-Year) and the DSS (at least 6-months to 4-years later). Please see Table 1 to view these 10 outcomes indicated by the blue text in the “Effect Size” column.

Comparison to the 2011-2014 Longitudinal Panel Study

The 2011-2014 Longitudinal Panel Study indicated significant difference in 12 of 18 outcomes, with moderate effect sizes for 3 of 18 outcomes. For both 2014 and 2017 studies, student ratings for the following three outcomes were significantly different with moderate effect sizes:

- Evaluate the quality or reliability of information (2017, 0.45; 2014, 0.32),
- Read and understand scientific writings written for an informed lay audience (2017, 0.44; 2014, 0.34), and
- Employ evidence effectively in writing (2017, 0.36; 2014, 0.33).

When compared to results of the 2013-2017 Longitudinal Panel Study (significant differences in 17 of 18 outcomes; moderate effect sizes for 10 of 18 outcomes), Drake has added more value to the student experience. For a comparison of 2014 and 2017 Panel Study results, please see Appendix A.

One commonality from both the 2014 and 2017 panel study is Outcome 12 (“Execute appropriate mathematical operations for a given question”). Analysis from both 2014 and 2017 panel studies indicate that student self-ratings on Outcome 12 are not significantly different from FLA to DSS. On both the FLA and DSS, students scored in the 3.80 to 3.90 range on a 5-point scale (3=Moderate, 4=Strong). As students self-reported moderate to strong skills in this outcome, particularly in the pre-test Foundations of Learning Assessment, Drake should consider if the results of the panel study are consistent with its mission or require further study.

When interpreting results to determine growth in student self-reported skills, please consider the following:

- Changes in curriculum,
- Focus areas or events that Drake emphasized in recent years,
- The current social, cultural, political climate, and
- Differences in student populations.

Changes in outcomes for Areas of Inquiry (AOI) in the Drake Curriculum may have caused differences in student perceptions of learning. The change in learning outcomes for the

Office of Institutional Research and Assessment

Information Literacy AOI could account for significant differences in student self-ratings for Outcome 5 (“Evaluate the quality or reliability of information”).

During this period (2013-17), Drake began to focus more on issues of diversity and global citizenship through the Quality Initiative for Strategic Diversity (roll-out began in Fall 2013) and growing efforts to expand internationalization throughout the institution. Growth in outcomes such as Outcome 13 (“Ability to use educational experiences to analyze civics and global issues”) and 15 (“Communicate effectively with people from other cultures and backgrounds”) could be related to internal growth in these areas.

Global factors might account for variation in student self-reported learning. Some differences in student self-reported skill could be attributed to the 2016 Election Cycle and the current social, cultural, political climate. In particular, Drake’s participation in the democratic process and its emphasis of this process on campus could account for significant differences in student self-ratings for Outcome 14 (“Knowledge of how to participate effectively in the democratic process”). Additionally, recent news and popular culture could have affected student self-ratings of outcomes (i.e., Outcome 5, “Evaluate the quality or reliability of information”).

Interaction Effects

For the 2013-17 Longitudinal Panel Study, we looked at the effect of several variables on student self-reported learning. For our dataset, interaction effect is the effect of a variable (gender, college/school, etc.) on student learning (e.g., “Ability to read carefully”) across time. We examined the following variables for their effect on student learning:

- Gender,
- Class,
- College/School,
- Race/Ethnicity,
- Citizenship,
- LEAD, and
- Full-time/Part-time.

Table 2 shows the results of this analysis.

A primary concern is the effect of college/school on student learning. Results largely align with natural strengths and weaknesses of each college/school. Students from the College of Arts and Sciences (CAS) and students from the School of Journalism and Mass Communication (SJMC) self-report higher gains for writing, although SJMC students self-report lower gains for scientific writing. Students from the College of Pharmacy and Health Sciences (CPHS) self-report higher gains for scientific writing, but self-report lower gains for traditionally liberal arts skills, such as writing and constructing a reasoned argument.

Office of Institutional Research and Assessment

Table 2: Interaction effects for the 2013-17 Longitudinal Panel Study.

		Interaction Effect (Difference in Change Over Time by Group)						
		Gender	Class	College	Race/Ethnicity	Citizenship	LEAD	FT/PT
Pair 14	Knowledge of how to participate effectively in the democratic process.	Female+						
Pair 5	Evaluate the quality or reliability of information							
Pair 11	Read and understand scientific writings written for an informed lay audience	Female+		AS+, BN-, JO-, PH+	White+			
Pair 13	Ability to use educational experiences to analyze civic and global issues.							
Pair 2	Employ evidence effectively in writing			AS+, JO+, PH-				
Pair 6	Understand the ethical issues related to use and misuse of information							
Pair 15	Communicate effectively with people from other cultures and backgrounds.				White+			
Pair 3	Construct reasoned arguments	Female+		PH-				
Pair 17	Apply understanding of ethical issues when developing solutions							
Pair 4	Evaluate reasoned arguments							
Pair 18	Ability to integrate skills and knowledge from different sources and experiences	Female+						
Pair 10	Understand the perspectives and experiences of people who are different than you							
Pair 1	Ability to read carefully					Non-		
Pair 9	Analyze differences between industrialized and developing areas of the world							
Pair 16	Articulate a vision of my own values, ethics, or core beliefs							
Pair 8	Understand the historical, political, and social connections of past events	Female+						
Pair 7	Create or interpret art (ex. Sculpture, painting, music, theatre)							
Pair 12	Execute appropriate mathematical operations for a given question		Freshman-					PT-

Office of Institutional Research and Assessment

Appendix A

Full technical results of the 2013-2017 Longitudinal Panel Study sorted by effect size. **Blue text** indicates a significant value. For an abbreviated version, see Table 1.

		Pretest Mean (FLA)	Posttest Mean (DSS)	95% Confidence Interval of the Difference		Repeated Measures Mean Comparison				2014 Comparison	
				Lower	Upper	t	df	Sig. (2-tailed)	Effect Size	Sig. (2-tailed)	Effect Size
Pair 14	Knowledge of how to participate effectively in the democratic process.	3.48	3.95	.542	.388	11.844	668	.000	0.46	0.008	0.11
Pair 5	Evaluate the quality or reliability of information	3.86	4.26	.474	.338	11.701	669	.000	0.45	0.000	0.32
Pair 11	Read and understand scientific writings written for an informed lay audience	3.36	3.85	.569	.401	11.300	667	.000	0.44	0.000	0.34
Pair 13	Ability to use educational experiences to analyze civic and global issues.	3.58	3.96	.448	.306	10.393	668	.000	0.40	0.000	0.23
Pair 2	Employ evidence effectively in writing	3.88	4.18	.358	.234	9.417	668	.000	0.36	0.000	0.33
Pair 6	Understand the ethical issues related to use and misuse of information	3.92	4.27	.432	.283	9.391	670	.000	0.36	0.000	0.26
Pair 15	Communicate effectively with people from other cultures and backgrounds.	3.79	4.13	.412	.265	9.059	666	.000	0.35	0.005	0.12
Pair 3	Construct reasoned arguments	3.96	4.24	.342	.217	8.822	671	.000	0.34	0.000	0.20
Pair 17	Apply understanding of ethical issues when developing solutions	3.84	4.15	.377	.236	8.534	668	.000	0.33	0.000	0.25
Pair 4	Evaluate reasoned arguments	3.97	4.23	.325	.196	7.980	667	.000	0.31	0.000	0.25
Pair 18	Ability to integrate skills and knowledge from different sources and experiences	4.03	4.28	.316	.184	7.439	666	.000	0.29	0.000	0.19
Pair 10	Understand the perspectives and experiences of people who are different than you	4.05	4.23	.265	.115	4.984	663	.000	0.19	0.854	0.01
Pair 1	Ability to read carefully	4.18	4.29	.163	.045	3.468	671	.001	0.13	0.604	0.02
Pair 9	Analyze differences between industrialized and developing areas of the world	3.59	3.73	.221	.055	3.276	666	.001	0.13	0.320	0.04
Pair 16	Articulate a vision of my own values, ethics, or core beliefs	4.15	4.24	.166	.019	2.476	667	.014	0.10	0.039	0.09
Pair 8	Understand the historical, political, and social connections of past events	3.60	3.68	.163	.010	2.218	668	.027	0.09	0.091	0.07
Pair 7	Create or interpret art (ex. Sculpture, painting, music, theatre)	3.02	3.12	.189	.008	2.134	668	.033	0.08	0.687	0.02
Pair 12	Execute appropriate mathematical operations for a given question	3.84	3.87	.102	-.048	0.712	663	.476	0.03	0.821	0.01