

Persistence and PDSA Impact

Overview

On a yearly basis, First2 campuses provide the Network with persistence information for all of their STEM students and also for all STEM students who have participated in, or been impacted by, First2 change work (i.e., “PDSA impact”). Across all 5 campuses for which we currently have data (West Virginia University, Fairmont State University, Shepherd University, West Virginia University Institute of Technology, and Eastern Kentucky University), STEM students who participated in First2 change ideas during the 2024-25 academic year persisted in a STEM major at a greater percentage than similar groups of students who did not participate in First2 change ideas. This is consistent with the persistence and PDSA impact findings from the 2023-24 academic year, which were used as the basis for creating “value propositions” for First2 change work and shared with administrators at each campus.

West Virginia University

Detailed information about PDSA participation and persistence at WVU was compiled by WVU faculty member Marjorie Darrah and undergraduate researcher Ella Moats and is appended at the end of this document. Over 3000 students were impacted by First2 change work in the 2024-25 academic year and 64% of those entered as STEM majors. Whether their participation was passive or active, their retention rates were over 90% whereas the retention rate for all STEM students who started about the same time was 55%. About 7% of all PDSA participants (221) were first generation students who entered as STEM majors and they saw an 87% retention rate compared to a 10% retention rate for all first-generation STEM majors who entered at the same time.

Data for the other institutions involves fewer total students, higher proportions of first-generation students, and tells the same story.

Fairmont State University

Fairmont State University reports high overall persistence rates for students engaged in First2 change ideas. Of the 164 STEM students impacted by PDSAs in the 24-25 academic year, 111 started college as declared STEM majors and 39 of those were first-generation. The 111 STEM majors have substantially higher persistence rates (98% overall average to date and 97% retention for first-generation STEM majors) than the overall STEM population during those years. For comparison, the 1, 2, and 3-year retention rates are 59%, 47%, and 34% respectively for all STEM students who started between 2019 and 2024.

Note: Fairmont reports persistence longitudinally for each cohort as opposed to a one year persistence rate.

	First Generation STEM persistence number and persistence rate for first-year STEM cohort*						
cohort year	cohort*	soph/year2 persistence		junior/year 3 persistence		senior/year 4 persistence	
	N	#	%	#	%	#	%
Fall 2019	86	56	65%	47	55%	34	40%
Fall 2020	64	43	67%	36	56%	26	41%
Fall 2021	62	28	45%	24	39%	20	32%
Fall 2022	72	39	54%	30	42%	17	24%
Fall 2023	93	57	61%	35	38%		
Fall 2024	90	46	51%				

ALL STEM persistence number and persistence rate for first-year STEM cohort*								STEM students who participated in at least 1 PDSA		
cohort year	cohort*	soph/year2 persistence		junior/year 3 persistence		senior/year 4 persistence				
	N	#	%	#	%	#	%	Total	Persisted	%
Fall 2019	281	188	67%	150	53%	114	41%			
Fall 2020	207	148	71%	123	59%	96	46%			
Fall 2021	211	125	59%	99	47%	72	34%			
Fall 2022	219	149	68%	115	53%	79	36%			
Fall 2023	218	146	67%	90	41%					
Fall 2024	200	95	48%							
TOTAL	1336	851	64%	577	43%	361	27%	111	109	98%

Shepherd University

Shepherd's data say that at least 94% of the 114 students who participated in PDSAs during 24-25 are retained (currently STEM majors), and at least 27 of the 114 were first-generation and STEM. In contrast, 37% of the 78 first-generation entering STEM students in 2023 made it to fall

2024 as STEM majors. 51-79% of second or third year students in 2022 and 2023 persisted to their third or fourth year, respectively.

Note: Shepherd reports fall to fall persistence for each year.

Year	First Generation STEM+STEM adjacent one-year persistence number and persistence rate								
	Sophomore			Junior			Senior		
	N previous fall	Persisted	%	N previous fall	Persisted	%	N previous fall	Persisted	%
2019	100	52	52%	77	44	57%	66	45	68%
2020	79	38	48%	69	46	67%	83	59	71%
2021	79	27	34%	54	34	63%	78	51	65%
2022	60	23	38%	38	24	63%	71	54	76%
2023	79	26	33%	37	28	76%	42	33	79%
2024	78	29	37%	41	21	51%	48	35	73%

Year	ALL STEM+STEM adjacent one-year persistence number and persistence rate									STEM students who participated in at least 1 PDSA		
	Sophomore			Junior			Senior					
	N previous fall	Persisted	%	N previous fall	Persisted	%	N previous fall	Persisted	%	Total	Persisted	%
2019	263	138	52%	212	136	64%	208	147	71%			
2020	235	108	46%	191	128	67%	250	180	72%			
2021	257	113	44%	150	96	64%	221	154	70%			
2022	198	93	47%	155	104	67%	202	148	73%			
2023	249	105	42%	147	106	72%	159	125	79%			
2024	256	118	46%	145	93	64%	185	138	75%			
TOTAL	1458	675	46%	1000	663	66%	1225	892	73%	114	107	94%

WVU-Tech

WVU Tech reports 100% retention for the 30 STEM majors impacted by PDSAs; 14 of them were first-generation. By comparison, first-time full-time first-generation students stayed in STEM at a 51% level from fall 2023 first year to fall 2024 second year, and 28-42% persistence for first-generation students through to Y3 or Y4. For first-time full-time NON first-generation students, persistence for the fall 2023 cohort was 67% to the second year and 39-51% through to Y3 or Y4, for 2020- 2022 cohorts.

Note: WVU-Tech reports persistence longitudinally for each cohort as opposed to a one year persistence rate.

WVUIT - FTFTF First Generation - Persistence of STEM/STEMADJ Students back to System AND STEM													
cohort_year	Cohort Total	year2_ret			year3_ret			year4_ret					
		No	Yes	%	No	Yes	%	No	Yes	%			
2014	62	26	36	58%	37	25	40%	42	20	32%			
2015	40	21	19	48%	27	13	33%	28	12	30%			
2016	43	19	24	56%	24	19	44%	27	16	37%			
2017	57	34	23	40%	39	18	32%	42	15	26%			
2018	54	25	29	54%	31	23	43%	35	19	35%			
2019	54	29	25	46%	35	19	35%	36	18	33%			
2020	53	27	26	49%	34	19	36%	36	17	32%			
2021	41	24	17	41%	26	15	37%	24	17	41%			
2022	39	23	16	41%	28	11	28%						
2023	51	25	26	51%									

Total Student Persistence of STEM, STEM Adj Students in STEM													
cohort_year	Cohort Total	year2_ret			year3_ret			year4_ret			STEM Students who participated in at least 1 PDSA		
		No	Yes	%	No	Yes	%	No	Yes	%	Total	Persisted	%
2014	141	67	74	52%	86	55	39%	94	47	33%			
2015	134	54	80	60%	69	65	49%	73	61	46%			
2016	154	64	90	58%	86	68	44%	90	64	42%			
2017	150	73	77	51%	86	64	43%	93	57	38%			
2018	175	82	93	53%	109	66	38%	113	62	35%			
2019	130	68	62	48%	81	49	38%	85	45	35%			
2020	136	65	71	52%	81	55	40%	87	49	36%			
2021	142	69	73	51%	78	64	45%	74	68	48%			
2022	147	71	76	52%	84	63	43%						
2023	146	56	90	62%									
Total	1455	669	786	54%	760	549	42%	709	453	39%	30	30	100%

At ECU, 80 students participated in at least one PDSA for AY 2024-25. All 67 STEM majors in this group were retained, including all 20 who were first-generation. *Comparison group:* For the fall 2023 entering STEM cohort, ECU reports 49% retention from first to second year for 139 first-generation students and 57% retention from first to second year for 154 non-first-generation STEM majors, resulting in an overall first-year retention of 53% for the 293 total STEM majors. Sophomore to junior year persistence for the Fall 2022 cohort and junior to senior year persistence for the Fall 2021 cohort was 51% for all STEM students and 44-45% for first-generation STEM students.

EKU First Generation STEM persistence number and persistence rate for first-year STEM cohort*							
cohort year	cohort*	soph/year2 persistence		junior/year 3 persistence		senior/year 4 persistence	
	N	#	%	#	%	#	%
Fall 2018	93	unk	unk	unk	unk	23	25%
Fall 2019	134	unk	unk	unk	unk	71	53%
Fall 2020	98	unk	unk	unk	unk	36	37%
Fall 2021	86	unk	unk	unk	unk	38	44%
Fall 2022	111	unk	unk	50	45%	NA	NA
Fall 2023	139	68	49%	NA	NA	NA	NA
Fall 2024	169	NA	NA	NA	NA	NA	NA
EKU STEM persistence number and persistence rate for FULL first-year STEM cohort*							
cohort year	cohort*	soph/year2 persistence		junior/year 3 persistence		senior/year 4 persistence	
	N	#	%	#	%	#	%
Fall 2018	307					133	43%
Fall 2019	343					186	54%
Fall 2020	215					103	48%
Fall 2021	307					157	51%
Fall 2022	276			141	51%		
Fall 2023	293	156	53%				
Fall 2024	335						
Persistence values include the Fall 2024 enrollment data for each cohort.							
Numbers: Fall to fall persistence as a STEM major from indicated first year STEM cohort through senior status.							

EKU Students impacted by PDSAs any time in Academic Year 2024-25			
	Number	Percentage	
Total # of students	80		
# of STEM majors	67		
# STEM majors persisting*	67	100%	
# of first gen STEM majors	20		
# first gen STEM persisting*	20	100%	
<i>*persisting means remained in STEM major or graduated to date</i>			

PDSA experiences at WVU
Marjorie Darrah & Ella Moats
5/6/25

In the spring semester of 2025, we asked all professors who engaged in PDSA work at WVU in the Fall and Spring Semesters to submit the names of any student who participated and the activity type they implemented. In total, we collected 3,349 student names. We then requested information from Institutional Research about their entering major and their current major. Of the 3,349 students, there were 2152 (64.26%) who entered the university as STEM majors. These were the focus of our study.

The PDSA activities included:

- Embedded PDSA in Math 126/Chem 110/Biol 117 (1088 Students)
- Professor Panel PDSA (397 Students)
- Learning Assistants in the Chem 115 Classroom (98 Students)
- Enhancing Student Voices (6 Students)
- Listserv (2380 Students)

Some students participated in more than one PDSA. The total number of PDSA participants was 3998 students.

Active Involvement

This included PDSA work where the students interact or engage in the activity (participating in class, attending a panel discussion, etc.) This is considered active, as these students are attentive and engaged in the change work. The PDSAs that fit this category included:

- Embedded PDSA in Math 126/Chem 110/Biol 117 (1088 Students)
- Professor Panel PDSA (397 Students)
- Learning Assistants in the Chem 115 Classroom (98 Students)
- Enhancing Student Voices (6 Students)

There were 1410 total students who participated in these PDSAs, 816 of them entered WVU as STEM majors. Out of the 816 STEM majors that participated in at least one First2 PDSA activity, 752 (92.16%) remained in a STEM degree and 64 (7.84%) left STEM as of Spring Semester 2025.

Of the 64 students that left the STEM pathway:

- 36 (56.25%) switched their major to a non-STEM degree
- 17 (26.56%) of the students who left switched to a Health related major
- 11 (17.84%) of the students switched to an Agriculture related major

Students participating in at least one *ACTIVE* First2 activity had a higher persistence rate in STEM (92.16%) than the persistence rate of our comparison group (55.6%). The comparison group consisted of all students from the same STEM majors as our study group who started in the same timeframe.

Passive Involvement

This included PDSA work where the students receive information through a virtual method (receive emails). This is considered passive, since we cannot be sure that they read the emails or acted on the information. The PDSA change work that fits this category is the Listserv.

Out of the 1939 students who received emails in a passive activity, 1336 (68.90%) students entered WVU as STEM majors. Of these students, 1210 (90.57%) persisted in STEM as of the Spring Semester of 2025.

Of the 126 students who left the STEM pathway:

- 90 (71.43%) switched their major to a non-STEM degree
- 27 (21.43%) of the students who left switched to a Health related major
- 9 (7.14%) of the students switched to an Agriculture related major

Students in a PASSIVE First2 activity had a higher persistence rate in STEM (90.57%) than the current persistence rate (55.6%) of our comparison group. The comparison group consisted of all students from the same STEM majors as our study group who started in the same timeframe.

First Generation Students

In our data set, there were 395 first-generation students. Out of the 395 first-generation students, 221 students started in a STEM degree at WVU and participated in a First2 activity. 192 (86.88%) remained in a STEM degree and 29 (13.12%) left as of the Spring Semester of 2025.

Of the 29 first-generation students who left the STEM pathway:

- 20 (68.97%) switched their major to a non-STEM degree
- 4 (13.79%) of the students who left switched to a Health related major
- 5 (17.24%) of the students switched to an Agriculture related major

First-generation students that participated in First2 activities had a higher persistence rate in STEM (86.88%) than the persistence rate of our comparison group (10.1%) of first-generation students. The comparison group consisted of all first-generation students from the same STEM majors as our participants who started in the same timeframe.

APPENDIX

STEM Majors

- Aerospace Engineering
- Biochemistry
- Biology
- Biology Pre-medical
- Biomedical Engineering
- Biometric Systems Engineering
- Chemical Engineering
- Chemistry
- Civil Engineering
- Computer Engineering
- Computer Science
- Cybersecurity
- Data Science
- Earth & Environmental Science
- Electrical Engineering
- Engineering
- Engineering Technology
- Engineering Track 1
- Engineering Track 2
- Engineering Track 3
- Environ, Soil & Water Science
- Environmental Geoscience
- Environmental Microbiology
- Forensic Biology
- Forensic Chemistry
- Forensic Examiner
- General Engineering
- Geology
- Health and Well-Being
- Immunology & Medical Microbiology
- Industrial Engineering
- Mathematics
- Mechanical Engineering
- Mining Engineering
- Neuroscience
- Physics
- Pre-Forensic & Investigative Science
- Pre-Immunology & Medical Microbiology

- Pre-Nursing
- STEM Pathway
- WVUIT-Civil Engineering

Health Related Majors

- Biomedical Lab Diagnostics
- Exercise Physiology
- Health Services Admin
- Healthcare Business Admin
- Healthcare Pathway
- Health Services Mgmt & Ldrshp
- Human Nutrition & Foods
- Human Nutrition and Foods
- Medicine
- Mental Health and Addiction St
- Nursing
- Nutritional and Food Science
- Pharmacy - UG Direct Admit
- Physical Therapy Professional
- Physician Assistant
- Sport and Exercise Psychology
- Sport, Exercise & Perform Psyc

Agricultural Majors

- Agricultural & Extension Ed
- Animal & Nutritional Sciences
- Energy Land Management
- Env & Energy Resources Mgmt
- Environ, Energy, & Land Mgmt
- Forest Resources Management
- Forestry
- Horticulture
- Sustainability Studies
- Wildlife & Fisheries Resources

Non-STEM Majors

- Accounting
- Acting
- Anthropology
- Business
- Business and Comm Pathways
- Comm Sciences and Disorders
- Criminology

- Dance
- Economics
- Elementary Education
- English
- Entrepreneurship & Innovation
- Exploratory Pathway
- Finance
- General Business
- Global Initiative
- Global Supply Chain Management
- High School Special
- History
- Hospitality & Tourism Management
- Human Resource Management
- Integrated Studies
- Intermedia/Photography
- International Studies
- Liberal Arts and Hum Pathway
- Management Information Systems
- Marketing
- Multidisciplinary Studies
- Multidisciplinary Studies Pwy
- Multidisciplinary Studies/BMdS
- Music and Health
- Music Education
- Music Therapy
- Non-Degree
- Political Science
- Psychology
- Rck Parks & Tourism Resources
- Regents Bachelor of Arts
- Social Sciences Pathway
- Social Studies/Secondary Education
- Spanish
- Special Education
- Sport Management
- Theatre
- Undecided
- WVUIT-Accounting