STATE COUNCIL OF HIGHER
EDUCATION FOR VIRGINIA

Progress in Meeting Degree Production in Data Science & Technology, Education, Healthcare and Science & Engineering

February 2024

In the 2018 legislative session, the General Assembly appropriated $28.4 million to increase production of degree awards in the areas of data science and technology, education, healthcare, and science and engineering. The funding, targeted toward 14 public four-year institutions (University of Virginia's College at Wise was excluded), included budget language that identified an expected annual increase by institution and area/field, totaling 880 awards over the baseline year, which is 2017. The awards included degrees at the bachelor, master, doctoral and first professional levels, identified primarily via the field-of-study taxonomy of the federal Classification of Instructional Programs (CIP codes).

Between 2017 and 2023, across the 14 institutions and all degree levels, total degree awards in the identified areas/fields grew by 3,719 and exhibited a continuous annual increase. For one field – data science and technology – the trend was similar; degree awards in data science and technology also grew annually from the base year, increasing 58% from 2017 to 2023. However, the other three identified fields did not experience uninterrupted growth, showing both increases and decreases over the period. Notably, the annual number of degree awards in science and engineering did not change much between 2017 and 2023, and in fact declined by 0.5% over the period.

At the institution level, large variations occurred in annual awards in these degree areas/fields. In data science and technology, the awards at UVA and VT accounted for 69% of the field's total increase between 2017 and 2023; growth at GMU accounted for another 18.6%. In education, JMU and UVA had continuous annual increases and were the driving forces for the total annual growth in this area, while awards at the other 12 institutions grew and shrank annually. In healthcare, RU became the major contributor to award growth after its 2020 merger with the Jefferson College of Health Science. In science and engineering, GMU was the only institution that achieved continuous annual award growth. Compared to 2017, the awards at NSU and VSU decreased annually in all four areas/fields. This decline coincided with a change in the federal Parental Loans for Undergraduate Students

(PLUS) program, which disproportionately impacted families of students attending HBCU institutions, and which contributed greatly to HBCUs' enrollments declining from fall 2014 to fall 2018 (and completions through spring 2023).

The following narrative, tables and charts provide an overview and summaries of total annual awards by award area/field and institution and are accompanied by comparison data to the goals outlined in the budget language.

Overall Awards

Total awards in the areas/fields/programs identified in the budget language grew by 3,719 between 2017 and 2023. Table 1 depicts the annual awards by area and year numerically and in total; Chart 1 depicts the annual by-area awards graphically.

Table 1. Total Degrees Awarded between 2017 and 2023

Area (2 Digit CIP Code)	2017	2018	2019	2020	2021	2022	2023
Data Science and Tech (11,14,27,52)	5,067	5,382	6,036	6,590	7,106	7,165	8,021
Education (13)	3,993	4,047	4,092	4,221	4,060	4,073	4,231
Healthcare (51)	4,852	4,820	4,891	5,197	5,329	5,466	5,417
Science and Engineering (14*)	8,099	7,847	8,043	8,114	8,365	8,027	8,061
Grand Total	**22,011**	**22,096**	**23,062**	**24,122**	**24,860**	**24,731**	**25,730**

*Excludes CIP 14.0901, 14.0903, and 14.1001 as they are reported as data science and technology degrees.

Chart 1: Annual degrees awarded by area
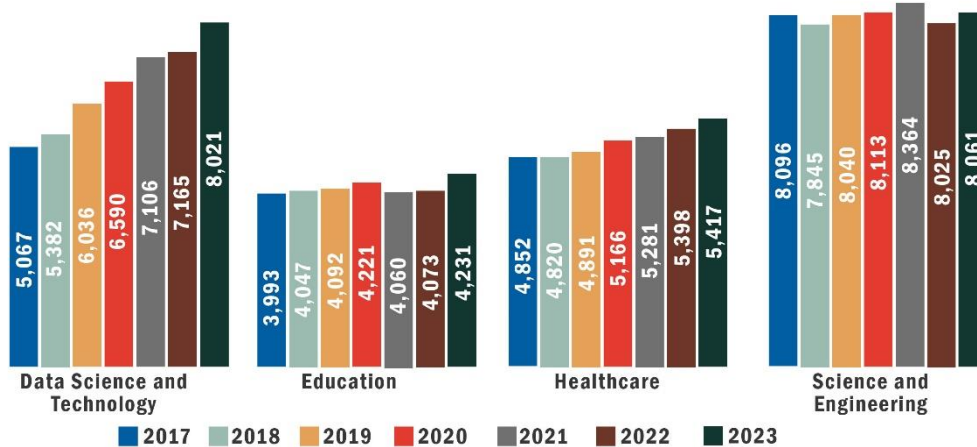
*Excludes CIP 14.0901, 14.0903, and 14.1001 as they are reported as data science and technology degrees.

Table 2 provides the expected increase and the actual annual growth and percent change over the 2017 baseline year. In 2023, the primary growth was in the data science and technology area, which grew by 58% over the 2017 awards. The next largest growth was in healthcare (12%) and education (6%). Science and engineering declined by 0.5% compared to the 2017 level.

Table 2: Annual award change over base year (2016-17) compared to expected annual growth

Area (2 Digit CIP Code)	Expected Annual Increase	2018 Annual Change over 2017		2019 Annual Change over 2017		2020 Annual Change over 2017		2021 Annual Change over 2017		2022 Annual Change over 2017		2023 Annual Change over 2017	
		#Awards	%Chng	#Awards	%Chng	#Awards	%Chng	#Awards	%Chng	#Awards	%Chng	#Awards	%Chng
Data Science & Tech (11,14,27,52)	220	315	6.2%	969	19.1%	1,523	30.1%	2,039	40.2%	2,098	41.4%	2,954	58.3%
Education (13)	150	54	1.4%	99	2.5%	228	5.7%	67	1.7%	80	2.0%	238	6.0%
Healthcare (51)	200	(32)	-0.7%	39	0.8%	345	7.1%	477	9.8%	614	12.7%	565	11.6%
Science & Engineering (14*)	310	(252)	-3.1%	(56)	-0.7%	15	0.2%	266	3.3%	(72)	-0.9%	(38)	-0.5%
Grand Total	**880**	**85**	**0.4%**	**1,051**	**4.8%**	**2,111**	**9.6%**	**2,849**	**12.9%**	**2,720**	**12.4%**	**3,719**	**16.9%**

*Excludes CIP 14.0901, 14.0903, and 14.1001 as they are reported as data science and technology degrees.

Chart 2 illustrates comparisons of the four areas' annual changes against their targets. For science and engineering, the overall target was not met in all years. Education awards met the target in 2020 and 2023. Healthcare met the growth goal between 2020 and 2023. The growth of data science and technology awards far surpassed its annual goal in each year since 2017.

Chart 2: Expected Annual Change over Base Year 2017 by Area Compared to Expected Annual Growth
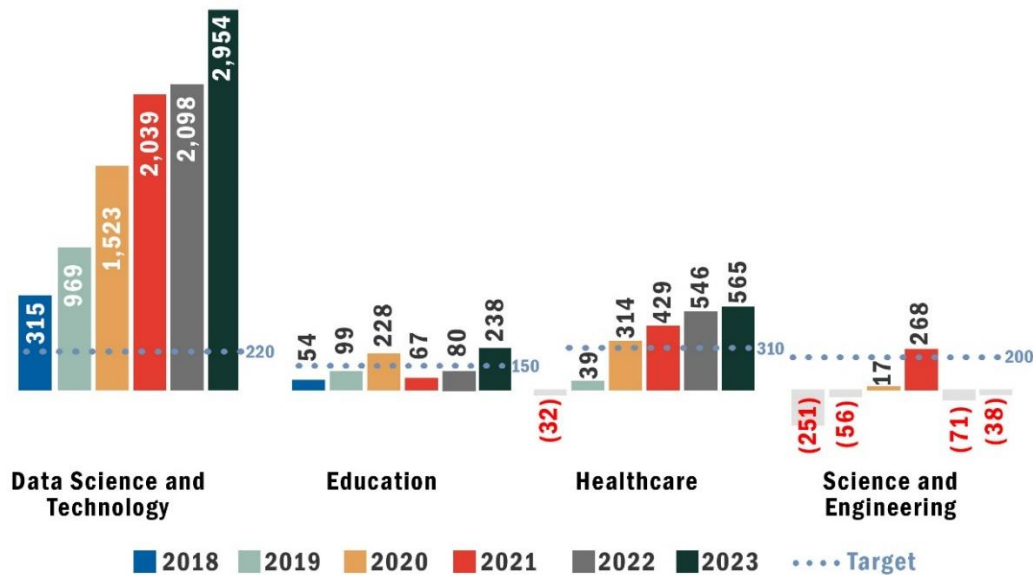
Awards by Institution

Most institutions increased the total degrees produced in these areas/fields between 2017 and 2023. Three institutions – ODU, NSU and VSU – saw a continuous decline in enrollment from fall 2014 to fall 2018. Given the traditional four-year path to a bachelor's degree, this smaller cohort likely contributed to the decreased degree production at these institutions through spring 2023.

A 2015 report on the impact of changes in the federal Parental Loans for Undergraduate Students (PLUS) program indicated that HBCUs were disproportionately impacted and experienced larger enrollment declines compared to other institutions. Given that ODU also has a high percentage of low-income students, the changes to the PLUS program also may have impacted ODU and contributed to its lower awards in these areas.

Conversely, some institutions saw continuous enrollment growth that may have led to the increased degree production. For example, GMU's undergraduate enrollment increased by about 4,000 between fall 2014 and fall 2018.

Table 3: Total awards of data science and technology, education, healthcare, and science and engineering by institution, 2017 to 2023

Inst.	2017	2018	2019	2020	2021	2022	2023
CNU	396	379	405	385	427	369	414
GMU	3,698	3,913	4,148	4,369	4,628	4,254	4,481
JMU	1,973	2,018	2,019	2,170	2,247	2,125	2,160
LU	322	342	326	323	334	413	346
NSU	388	348	260	278	257	300	301
ODU	3,060	2,983	2,900	2,879	2,892	2,847	2,843
RU	700	678	745	1,059	1,035	1,016	1,059
UMW	357	327	356	424	390	410	349
UVA	2,589	2,690	3,042	3,212	3,438	3,647	3,817
VCU	3,110	3,043	3,215	3,190	3,220	3,179	3,014
VMI	183	226	183	180	203	191	141
VSU	308	287	266	264	246	230	261
VT	4,158	4,064	4,443	4,585	4,757	4,737	5,585
WM	769	798	754	804	786	1,013	959
Total	**22,011**	**22,096**	**23,062**	**24,122**	**24,860**	**24,731**	**25,730**

Table 4 depicts the annual increase in STEM-H degree awards over the 2017 base year for each of the 14 targeted public institutions. Since 2019, the annual total STEM-H degree awards exceeded the expected annual total goal. For the three institutions cited above as experiencing multi-year enrollment declines, those declines impacted their degree production. For Radford, its primary growth was in healthcare, due largely to its merger with the Jefferson College of Health Sciences in FY 2020.

Table 4: Annual Award Change Over Base Year 2017 Compared to Expected Annual Growth by Institution

	Expected Total Annual Increase	2017 Base Year	2018 Annual Change over 2017	2019 Annual Change over 2017	2020 Annual Change over 2017	2021 Annual Change over 2017	2022 Annual Change over 2017
CNU	20	396	(17)	9	(11)	31	(27)
GMU	160	3,698	215	450	671	930	556
JMU	85	1,973	45	46	197	274	152
LU	15	322	20	4	1	12	91
NSU	20	388	(40)	(128)	(110)	(131)	(88)
ODU	125	3,060	(77)	(160)	(181)	(168)	(213)
RU	30	700	(22)	45	359	335	316
UMW	10	357	(30)	(1)	67	33	53
UVA	80	2,589	101	453	623	849	1,058
VCU	110	3,110	(67)	105	80	110	69
VMI	10	183	43	0	(3)	20	8
VSU	15	308	(21)	(42)	(44)	(62)	(78)
VT	160	4,158	(94)	285	427	599	579
WM	40	769	29	(15)	35	17	244
Total	**880**	**22,011**	**85**	**1,051**	**2,111**	**2,849**	**2,720**

The following tables provide awards by area and annual changes in awards from 2017 to 2023. Tables 5.1 through 5.4 show the annual degree awards by area and institution. Tables 6.1 to 6.4 show the expected annual degree increases and the actual annual degree changes over the 2017 base year. For the degree production in science and technology, Table 6.4 indicates that only GMU produced more than its expected annual award increase consistently between 2018 and 2023. VT met its annual growth goal in 2020, 2021 and 2023. UVA met its annual growth goals in 2021 and 2022. JMU and VCU met their annual growth goals in 2021. The remainder of the institutions did not produce their expected annual award increases over the 2017 base year from 2018 to 2023.

Table 5.1: Annual Awards in Data Science and Technology

Inst.	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
CNU	107	109	129	130	147	126	163
GMU	1,313	1,434	1,527	1,683	1,876	1,723	1,863
JMU	297	312	317	365	359	318	333
LU	26	29	29	30	19	21	24
NSU	85	82	59	77	65	95	81
ODU	382	420	442	477	514	521	641
RU	93	92	108	69	82	75	65
UMW	74	69	90	92	75	84	72
UVA	572	590	956	1,203	1,306	1,326	1,598
VCU	454	456	441	464	476	517	399
VMI	38	64	55	50	58	57	35
VSU	79	76	60	70	75	59	76
VT	1,320	1,400	1,592	1,608	1,774	1,854	2,321
WM	227	249	231	272	280	389	350
Total	**5,067**	**5,382**	**6,036**	**6,590**	**7,106**	**7,165**	**8,021**

Table 5.2: Annual Awards in Education

Inst.	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
CNU	70	77	60	52	49	47	56
GMU	907	954	1,026	1,115	1,053	834	869
JMU	325	362	334	386	372	396	488
LU	111	137	86	116	167	217	188
NSU	71	70	69	43	36	37	37
ODU	708	663	615	602	608	586	611
RU	286	264	285	294	276	239	296
UMW	120	106	106	133	113	119	108
UVA	314	358	404	388	349	482	483
VCU	559	552	655	652	659	627	585
VMI							
VSU	116	115	85	76	56	93	107
VT	261	214	206	190	182	171	160
WM	145	175	161	174	140	225	243
Total	**3,993**	**4,047**	**4,092**	**4,221**	**4,060**	**4,073**	**4,231**

Table 5.3: Annual Awards in Healthcare

Inst.	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
CNU							
GMU	700	701	726	744	831	798	872
JMU	976	979	1,011	1,042	1,087	1,034	983
LU	112	115	143	112	106	135	99
NSU	103	92	71	73	59	76	87
ODU	1,004	964	890	853	855	904	795
RU	188	210	218	553	563	610	603
UMW	22	30	40	52	48	55	39
UVA	508	534	524	532	552	589	563
VCU	1,197	1,159	1,203	1,153	1,145	1,115	1,148
VMI							
VSU						1	5
VT	42	36	65	83	83	149	223
WM							
Total	**4,852**	**4,820**	**4,891**	**5,197**	**5,329**	**5,466**	**5,417**

Table 5.4: Annual Awards in Science and Engineering*

Inst.	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
CNU	219	193	216	203	231	196	195
GMU	778	824	869	827	868	899	877
JMU	375	365	357	377	429	377	356
LU	73	61	68	65	42	40	35
NSU	129	104	61	85	97	92	96
ODU	966	936	953	947	915	836	796
RU	133	112	134	143	114	92	95
UMW	141	122	120	147	154	152	130
UVA	1,195	1,208	1,158	1,089	1,231	1,250	1,173
VCU	900	876	916	921	940	920	882
VMI	145	162	128	130	145	134	106
VSU	113	96	121	118	115	77	73
VT	2,535	2,414	2,580	2,704	2,718	2,563	2,881
WM	397	374	362	358	366	399	366
Total	**8,099**	**7,847**	**8,043**	**8,114**	**8,365**	**8,027**	**8,061**

Note: *excludes CIP 14.0901, 14.0903, and 14.1001 as they are reported as Data Science and Technology degree awards.

Table 6.1: Annual Award Change over 2017 Base Year in Data Science and Technology

Inst.	Expected Annual Increase	2018 Annual Change over 2017	2019 Annual Change over 2017	2020 Annual Change over 2017	2021 Annual Change over 2017	2022 Annual Change over 2017	2023 Annual Change over 2017
CNU	5	2	22	23	40	19	56
GMU	50	121	214	370	563	410	550
JMU	10	15	20	68	62	21	36
LU		3	3	4	(7)	(5)	(2)
NSU	5	(3)	(26)	(8)	(20)	10	(4)
ODU	15	38	60	95	132	139	259
RU	5	(1)	15	(24)	(11)	(18)	(28)
UMW		(5)	16	18	1	10	(2)
UVA	20	18	384	631	734	754	1,026
VCU	20	2	(13)	10	22	63	(55)
VMI	5	26	17	12	20	19	(3)
VSU	5	(3)	(19)	(9)	(4)	(20)	(3)
VT	60	80	272	288	454	534	1,001
WM	20	22	4	45	53	162	123
Total	**220**	**315**	**969**	**1,523**	**2,039**	**2,098**	**2,954**

Table 6.2: Annual Award Change over 2017 Base Year in Education

Inst.	Expected Annual Increase	2018 Annual Change over 2017	2019 Annual Change over 2017	2020 Annual Change over 2017	2021 Annual Change over 2017	2022 Annual Change over 2017	2023 Annual Change over 2017
CNU		7	(10)	(18)	(21)		(14)
GMU	40	47	119	208	146	(73)	(38)
JMU	15	37	9	61	47	71	163
LU	5	26	(25)	5	56	106	77
NSU	5	(1)	(2)	(28)	(35)	(34)	(34)
ODU	30	(45)	(93)	(106)	(100)	(122)	(97)
RU	10	(22)	(1)	8	(10)	(47)	10
UMW	5	(14)	(14)	13	(7)	(1)	(12)
UVA	10	44	90	74	35	168	169
VCU	20	(7)	96	93	100	68	26
VMI							
VSU	5	(1)	(31)	(40)	(60)	(23)	(9)
VT		(47)	(55)	(71)	(79)	(90)	(101)
WM	5	30	16	29	(5)	80	98
Total	**150**	**54**	**99**	**228**	**67**	**103**	**238**

Table 6.3: Annual Award Change over 2017 Base Year in Healthcare

Inst.	Expected Annual Increase	2018 Annual Change over 2017	2019 Annual Change over 2017	2020 Annual Change over 2017	2021 Annual Change over 2017	2022 Annual Change over 2017	2023 Annual Change over 2017
CNU							
GMU	35	1	26	44	131	98	172
JMU	45	3	35	66	111	58	7
LU	5	3	31	0	(6)	23	(13)
NSU	5	(11)	(32)	(30)	(44)	(27)	(16)
ODU	40	(40)	(114)	(151)	(149)	(100)	(209)
RU	10	22	30	365	375	422	415
UMW		8	18	30	26	33	17
UVA	20	26	16	24	44	81	55
VCU	40	(38)	6	(44)	(52)	(82)	(49)
VMI							
VSU						1	5
VT		(6)	23	41	41	107	181
WM							
Total	**200**	**(32)**	**39**	**345**	**477**	**614**	**565**

Table 6.4: Annual Award Change over 2017 Base Year in Science and Engineering*

Inst.	Expected Annual Increase	2018 Annual Change over 2017	2019 Annual Change over 2017	2020 Annual Change over 2017	2021 Annual Change over 2017	2022 Annual Change over 2017	2023 Annual Change over 2017
CNU	15	(26)	(3)	(16)	12	(23)	(24)
GMU	35	46	91	49	90	121	99
JMU	15	(10)	(18)	2	54	2	(19)
LU	5	(12)	(5)	(8)	(31)	(33)	(38)
NSU	5	(25)	(68)	(44)	(32)	(37)	(33)
ODU	40	(30)	(13)	(19)	(51)	(130)	(170)
RU	5	(21)	1	10	(19)	(41)	(38)
UMW	5	(19)	(21)	6	13	11	(11)
UVA	30	13	(37)	(106)	36	55	(22)
VCU	30	(24)	16	21	40	20	(18)
VMI	5	17	(17)	(15)	0	(11)	(39)
VSU	5	(17)	8	5	2	(36)	(40)
VT	100	(121)	45	169	183	28	346
WM	15	(23)	(35)	(39)	(31)	2	(31)
Total	**310**	**(252)**	**(56)**	**15**	**266**	**(72)**	**(38)**

Note: *excludes CIP 14.0901, 14.0903, and 14.1001 as they are reported as Data Science and Technology Degree Awards.