

Associate of Science Transfer and STEM Focused Direct Transfer Agreement – Associate of Arts

November 2014

Introduction and Purpose of Study

In 2007, the Joint Access Oversight Group (JAOG) asked for an evaluation to examine the impact of establishing the AS-T (Associate of Science Transfer) pathway in Washington Community and Technical Colleges on transfer to science and engineering baccalaureate degrees. The purpose of the following study is an evaluation of the magnitude of growth of the Associate of Science degree programs, the impact of these programs on the Direct Transfer Agreement (DTA) degree with science/technology/engineering/math focus, and the impact on transfer success. The data used in the study compares outcomes of two types of science-related completers to students who complete a General DTA. One group of science-related completers is the **AS-T**, which includes completions of both tracks of the AS-T degree as well as the various Engineering AS-T/MRP (Major Related Program) degrees. The second group of science-related completers is the **STEM Focused DTA**, which are students who completed a DTA Associate of Arts degree with at least 55 college-level quarter credits in math, science, or engineering.

Key Findings

Students who complete the STEM Focused DTA, one of two Associate of Science–Transfer degrees (Tracks 1 and 2), or the five MRPs under the Associate of Science–Transfer degree tracks are more likely than General DTA graduates to be male, under the age of 29, and Asian/Pacific Islander. Since the AS-T degrees were first awarded, the number of these degrees (both Track 1 and Track 2) has **grown substantially**:

- The Associate in Science Track 1 degree and Track 2 degrees grew 60 percent and 97 percent over the past ten years, respectively. This compares to an approximate 21 percent growth rate of academic degrees overall (14,728 versus 17,818). Science-related degrees make up 10 percent of all academic degrees.
- The number of STEM Focused DTA degrees started to decline as the number of AS-T degrees increased, although it remains a popular choice for science focused students, as there was a significant increase in the total awards in 2010-11.

Students complete the AS-T degrees and AS-T/MRPs with **fewer credits and with a higher transfer rate** than students with a STEM Focused DTA:

- AS-T Track 1 graduates complete their associate’s degree with a median of 115 credits, AS-T Track 2/MRP a median of 117, and STEM Focused DTA graduates with a substantially higher median of 125 credits.
- AS-T graduates have a higher transfer rate than both General DTA and STEM Focused DTA graduates – approximately 88 percent had transferred within three years of completing their

associate's degree, compared to 76% for STEM Focused DTA graduates and General DTA graduates.

AS-T graduates complete **bachelor's degrees at a higher rate than DTA graduates:**

- Fifty percent (50%) of AS-T graduates completed baccalaureate degrees (at a WA public university) within three years, while 30 percent of DTA graduates completed.
- The most common bachelor of science major for AS-T graduates was Mechanical Engineering, and for DTA graduates it was Business.
- Ninety percent (98%) of AS-T graduates who earn a bachelor's degree earn a STEM degree, compared to 12 percent of DTA graduates.

Background

The Associate of Science–Transfer (AS-T) degrees (Track 1 and Track 2; biology/chemistry/earth science and engineering/physics/computer science) were developed in the late 1990s to provide a better pathway to science and engineering baccalaureate degrees than was possible based on the statewide Direct Transfer Associate (DTA) degree agreement. Under the DTA a student carefully planning his or her course of study can complete a maximum of 50 quarter credits in math, science or engineering, assuming they take no other elective credits (15 credits in the science distribution area, 5 credits in quantitative reasoning and all 30 elective credits). Most students preparing for a science and engineering major need at least 55 math, science and engineering credits. To make room for at least one truly elective course and for the needed math and science, the AS-T degree is built on the assumption that students will complete about half the general education credits in humanities and social science after transfer. This delayed completion of general education courses parallels the approach of science and engineering majors who start directly at universities.

Community colleges first began awarding the Associate of Science–Transfer (AS–Transfer) degree in 2000-01. The degree is one of two major state-wide agreements designed to smooth transfer from community colleges to Washington public and private baccalaureate institutions:

- Direct Transfer Associate degree (DTA) is well suited for transfer students intending baccalaureate degrees in business, education, nursing and many liberal arts fields.
- AS-T serves as the best preparation for transfer to baccalaureate degrees in science and engineering.

In addition, since around 2006-07, colleges had the option of awarding some specific programs of study in specialized fields under the Direct Transfer Agreement or the Associate of Science degrees. These specific programs of study in specialized fields are called Major Related Programs (MRPs). Major related programs help transfer students better prepare for the junior year in a “major” upon transfer.

The data in this report is based on the SBCTC data warehouse, the National Clearinghouse, and the MRTE+ database.

Analyses

1. What are the characteristics of students who complete Associate of Science degrees, STEM Focused DTA's, and General DTA's?

The following table (**Table 1**) compares the percent distribution of gender, age, race/ethnicity, and economically disadvantaged graduates for each of the four categories of degrees. The General DTA graduates align with the typical student composition of 60% female, while the STEM Focused DTA and AS-T Track 1 degrees are both 50% female. Graduates in AS-T Track 2 (Engineering) are overwhelmingly male. Students in the AS-T degrees are on average younger than students in both STEM Focused and General DTA with about 90% being 29 or younger. Asian and Pacific Islander students are represented within the STEM Focused DTA and AS-T degrees at a higher rate than the General DTA, especially in the AS-T Track 1 degree. Finally, the majority of all types of graduates are not considered economically disadvantaged, with the AS-T and STEM Focused DTA graduates showing a slightly lower percentage than General DTA.

Table 1
Demographics of Associate of Science and STEM Focused DTA Graduates

Demographics	General DTA	STEM Focused DTA	AS-T Track 1	AS-T Track 2*
Gender				
Male	40%	50%	50%	82%
Female	60%	50%	50%	18%
Age				
Under 20	28%	17%	30%	28%
20-29	57%	66%	62%	61%
30-39	10%	13%	8%	10%
40 or above	5%	5%	1%	2%
Race/Ethnicity				
Asian/Pacific Islander	10%	20%	28%	21%
African American	5%	3%	5%	3%
Native American	2%	2%	2%	2%
Hispanic	11%	12%	6%	9%
Other, Multiracial	1%	2%	2%	2%
White	70%	62%	57%	63%
Economically Disadvantaged				
Yes	31%	28%	29%	28%
No	69%	72%	71%	72%
Total	14,937	586	342	842

*Includes exit codes H,O,P,Q,S and W for specialized engineering

2. *What has been the trend of degree completions of the AS-T versus the STEM Focused DTA as a pathway to science and engineering majors? What proportion of all academic associate degrees are both of these types of science-related degrees?*

AS-T Track 2 (engineering and physics) degrees are awarded more than AS-T Track 1 (biology, chemistry and earth science) degrees, and their respective rate of growth over time has been higher. STEM Focused DTA degrees began to decline as the AS-T degrees became awarded more frequently, although there has been a 43 percent increase since 2009-10, which corresponds with a substantial increase in the number of degrees awarded in that year. In 2013-14 the total number of academic degrees awarded decreased slightly, and went down for each degree type with the exception of the AS-T 2. The proportion of all academic degrees that are science-related has remained consistent at 10 percent for the last three years (**Table 2**).

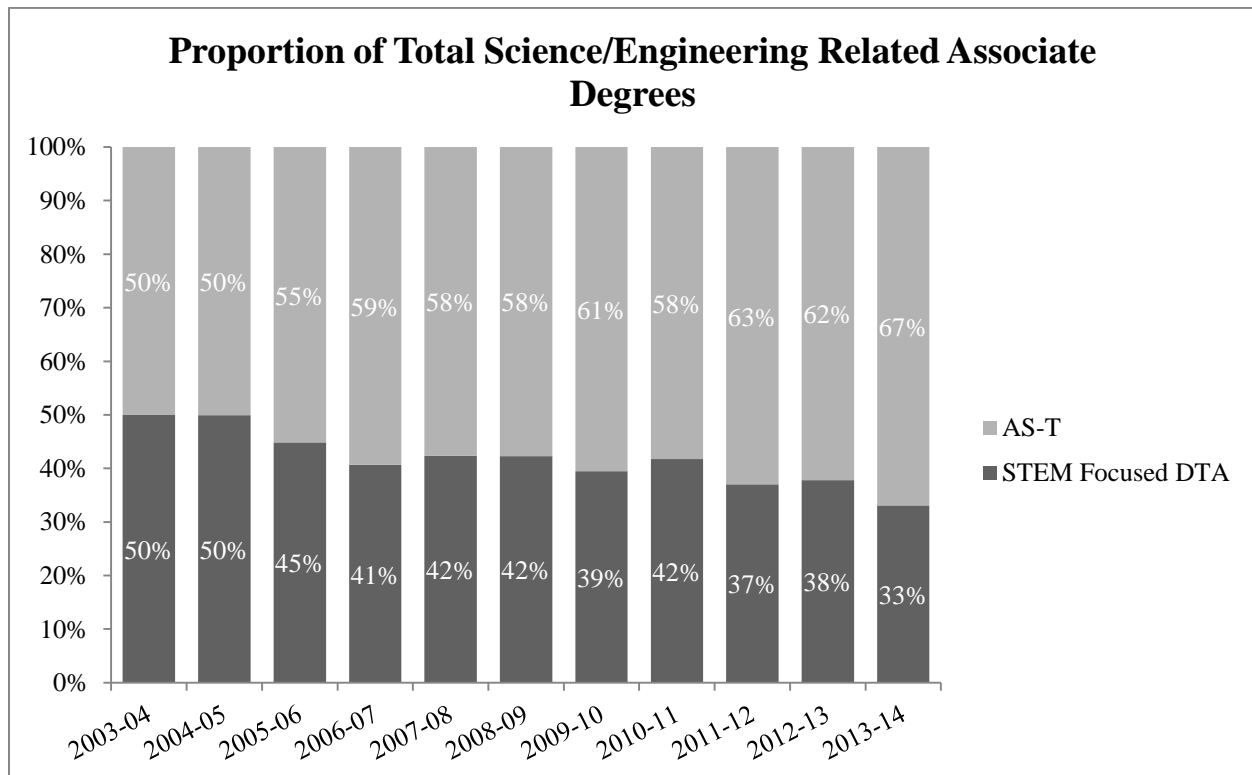
Table 2
General DTA and Science-Related Associate Degrees

Year	General DTA	STEM Focused DTA	AS-T Track 1	AS-T Track 2*	STEM Focused DTA & AS-T	Total Academic Degrees	% Academic Degrees that are STEM-DTA & AS-T
2003-04	13,037	641	214	426	1,281	14,728	9%
2004-05	12,338	555	204	352	1,111	13,906	8%
2005-06	12,577	475	212	372	1,059	14,074	8%
2006-07	12,062	412	235	366	1,013	13,425	8%
2007-08	12,137	385	227	399	1,011	13,542	7%
2008-09	12,517	378	216	377	971	13,865	7%
2009-10	12,777	410	252	479	1,141	14,304	8%
2010-11	14,550	591	267	558	1,416	16,559	9%
2011-12	14,839	608	348	687	1,643	17,174	10%
2012-13	15,277	707	394	770	1,871	17,893	10%
2013-14	14,937	586	342	842	1,770	17,818	10%

*includes exit codes H, O, P, Q, S, and W for specialized engineering

Figure 1 (below) shows the respective proportion of the total science related degrees represented by each type over the past ten years. The AS-T degrees were awarded at a higher proportion than STEM Focused DTA degrees starting in 2005-06, and that trend continued to grow each year up until 2010-11. In that year, the number of STEM Focused DTA's awarded increased 25% above the prior year as compared to an 11% increase in AS-T degrees. In 2013-14, the rapid growth in the AS-T Track 2 degrees (along with Engineering-related MRP's) pushed the proportion of the AS-T degrees to represent two-thirds of all science-related degrees.

Figure 1



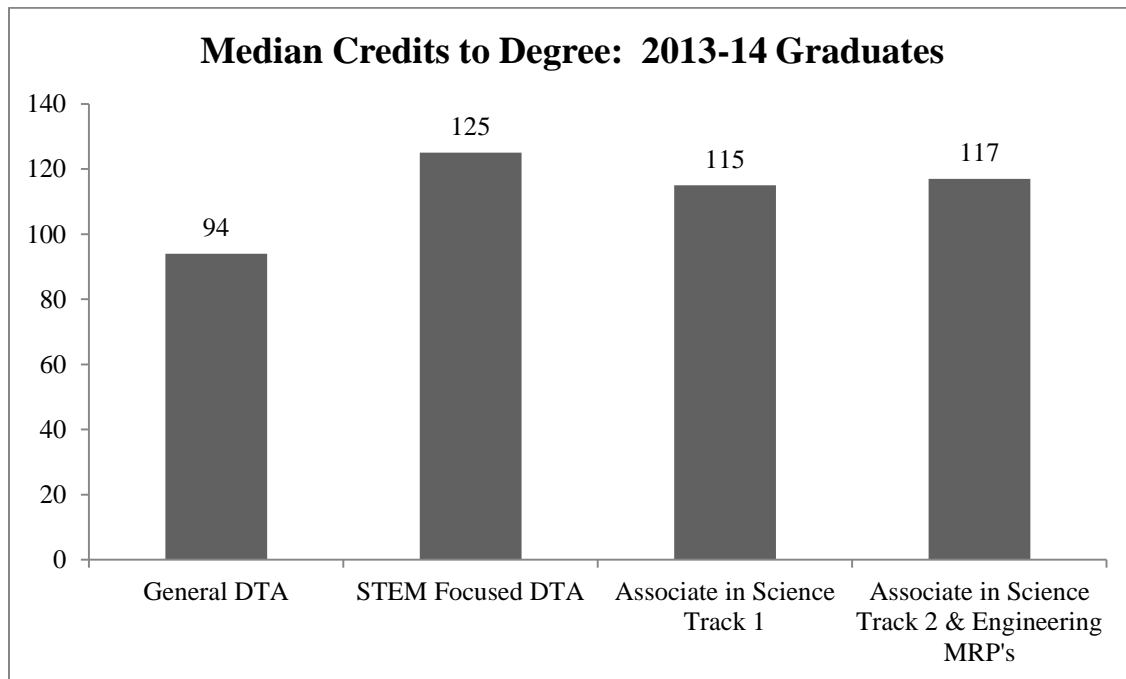
3. Do AS-T students complete their associate degree with fewer credits than STEM Focused DTA students?

As mentioned in the background section, the purpose of creating the AS-T degree was to provide a better transition to baccalaureate programs than afforded by the distribution requirements in the DTA. The requirements allow for students to take the necessary 55 credits in the science course areas while leaving more room for electives. Historically, science/math/engineering transfer students have had to take two to three quarters above the minimum of 90 credits required in an associate degree. Many such students complete the college-level pre-calculus course or courses, in addition to the two or more calculus courses required for their field of study. The engineering MRP's reflected in this analysis require more than 90 credits even for students who are calculus ready upon entry to their community college.

The following table (**Table 3**) demonstrates the median number of credits to degree of the 2013-14 graduates by degree type. The General DTA shows the fewest credits to completion, while

the STEM Focused DTA shows the greatest number. Students completing both types of AS-T degrees finish with comparable credits, which are on average about 10 credits less than students in the STEM Focused DTA. This pattern indicates that the AS-T degree serves as a more efficient pathway for students wishing to focus on the sciences.

Table 3



4. How does the baccalaureate transfer rate of the different types of graduates compare?

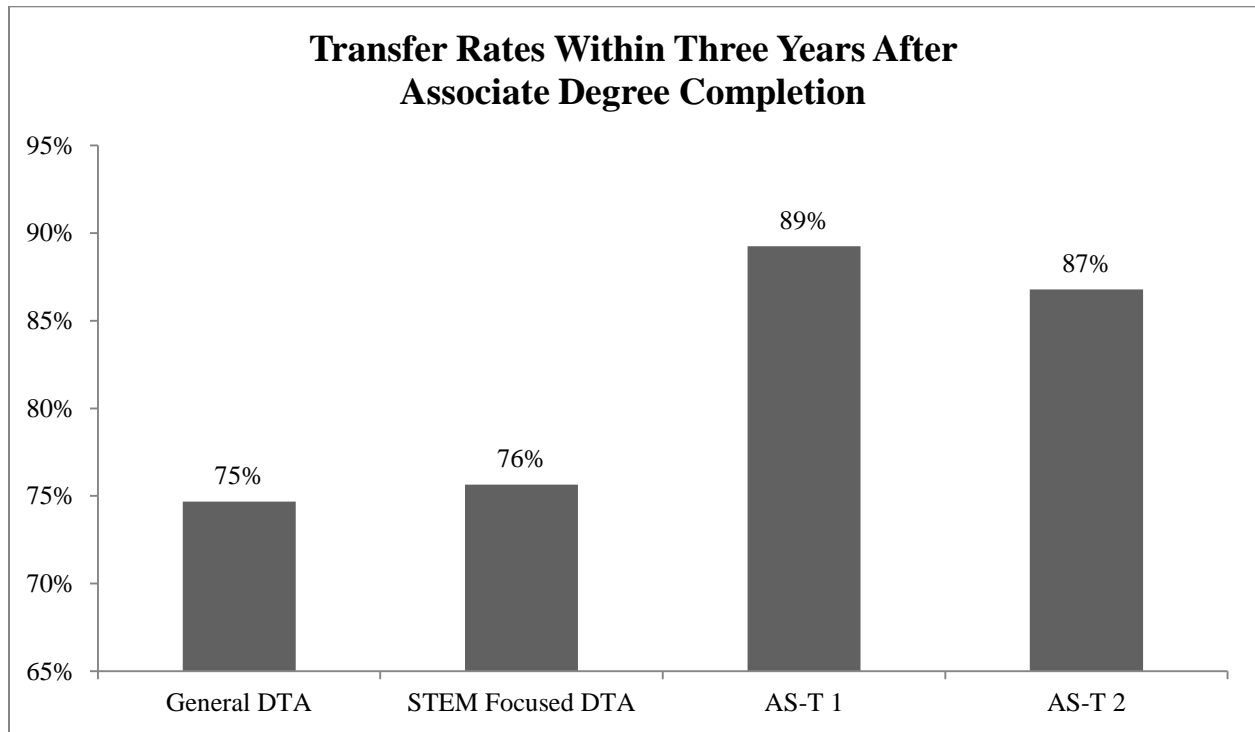
This data was compiled by matching graduates to enrollment records through the National Clearinghouse for all 2009-10 graduates. All four types of graduates that have been described in this report thus far are compared for transfer to a 4-year college or university. Of the 13,918 graduates that year, 12,714 (91 percent) were able to be matched for a transfer evaluation.¹ **Figure 2** shows the transfer rates² by award type and by how many years following completion at the CTC level.

Transfer rates are approximately 10 percent higher for AS-T graduates than either type of DTA graduate. Nearly 90 percent of AS-T 1 and 87 percent of AS-T 2 graduates transfer within three or more years. Graduates with a STEM Focused DTA show a 76 percent transfer rate, which is comparable to the transfer rate of the General DTA graduates (75 percent). The higher transfer rate for AS-T graduates is additional evidence that the AS-T degree creates efficiencies for students wishing to transfer to pursue the sciences.

¹ Students with no social security number in the system are unable to be matched

² Rate is based on the unduplicated number of *matched* students, not the total number of completers

Figure 2

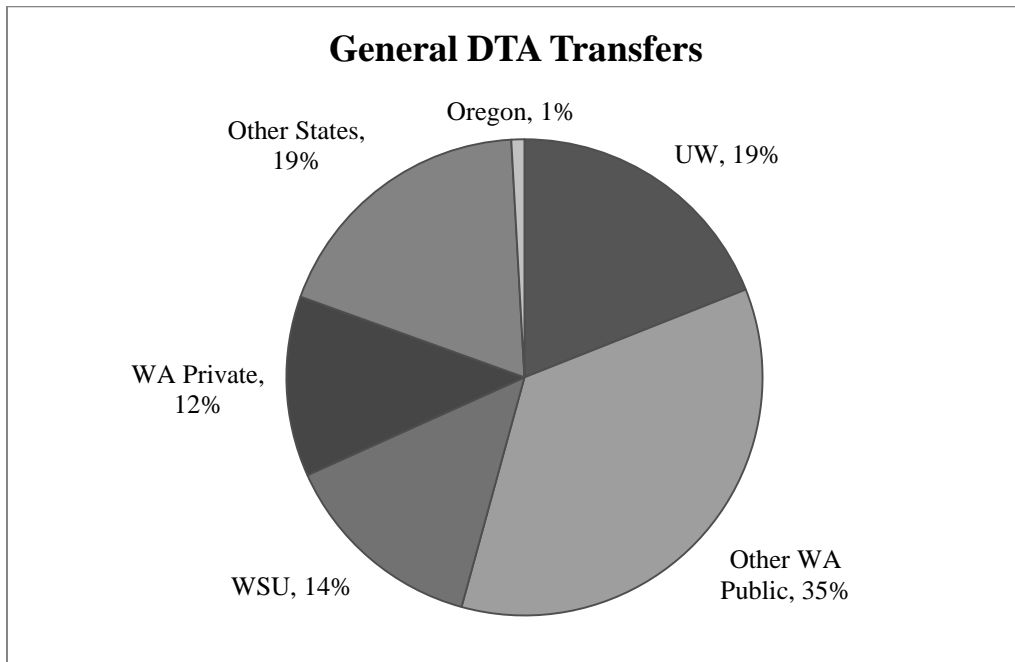


5. Where do these students transfer?

Some students attend more than one university in the years following graduation from a CTC. Since the vast majority of students transfer within one year of completing their associate's degree, this data includes just the first transfer school attended (see **Figures 3 through 6**).

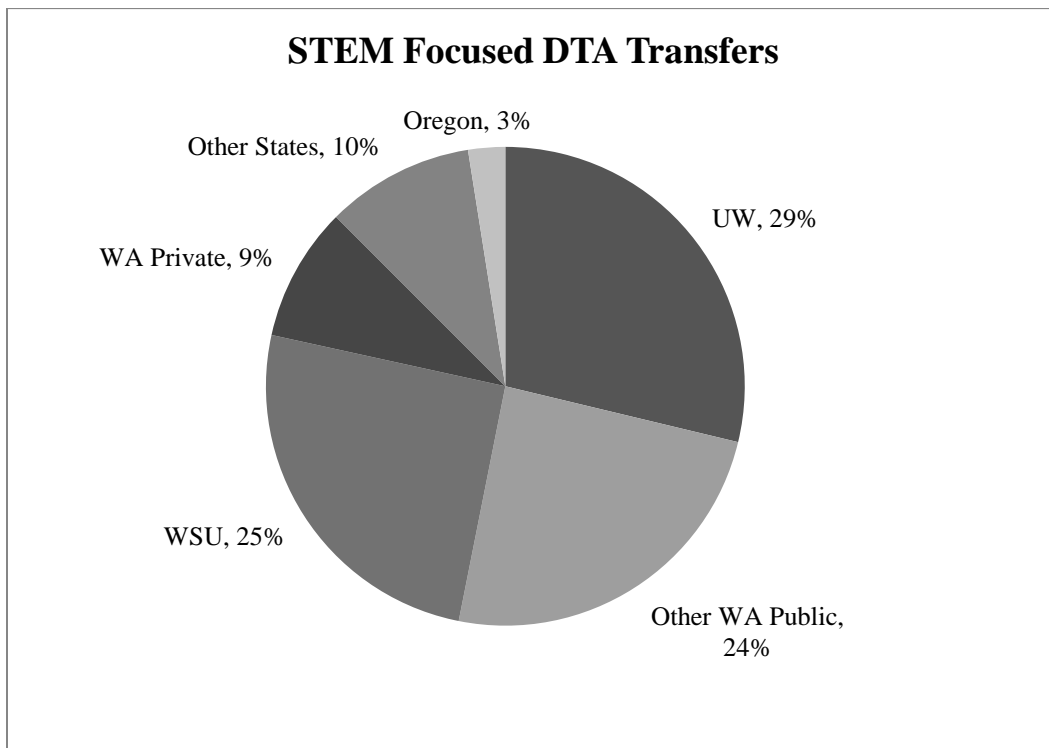
Students who earned a General DTA degree (**Figure 3**) are most likely to transfer to the regional public institutions in Washington. Nineteen percent (19%) transfer to the University of Washington (UW) and 14 percent to Washington State University (WSU). Nearly one-fifth of graduates with a General DTA degree transferred out of state.

Figure 3



For STEM Focused DTA graduates (**Figure 4**), approximately one quarter of graduates attend UW, WSU, and all other WA public universities combined. The remaining quarter of STEM Focused DTA graduates attend WA private universities and out-of-state schools.

Figure 4



The most popular transfer destination for AS-T graduates, both tracks (Figures 5 and 6), is the UW, followed by WSU.

Figure 5

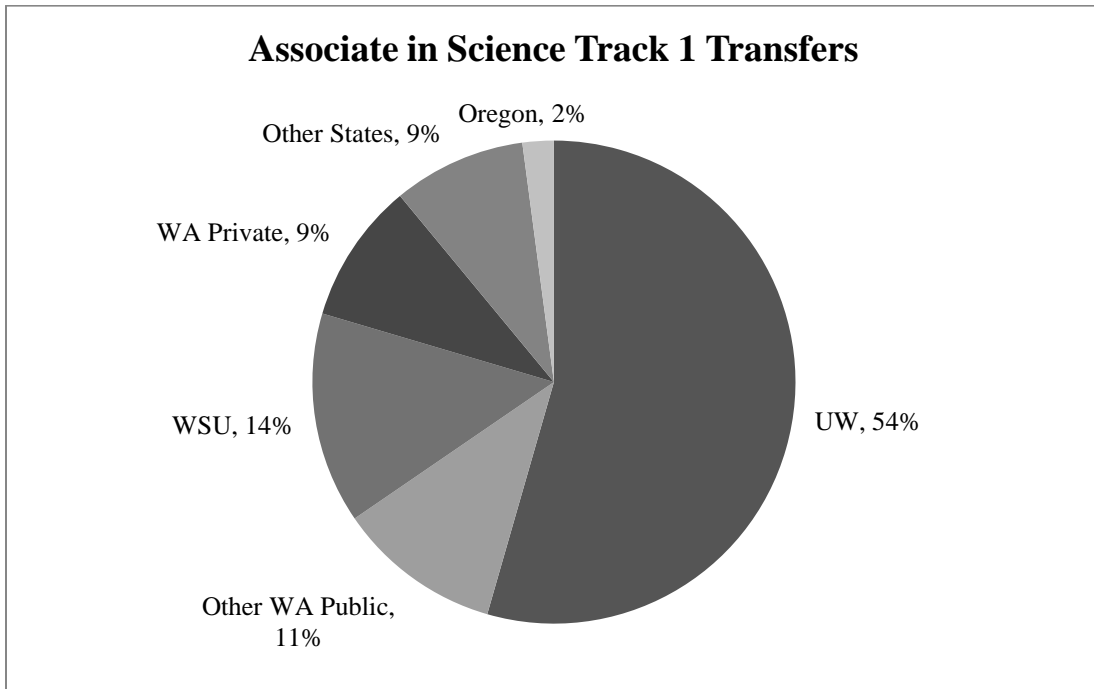
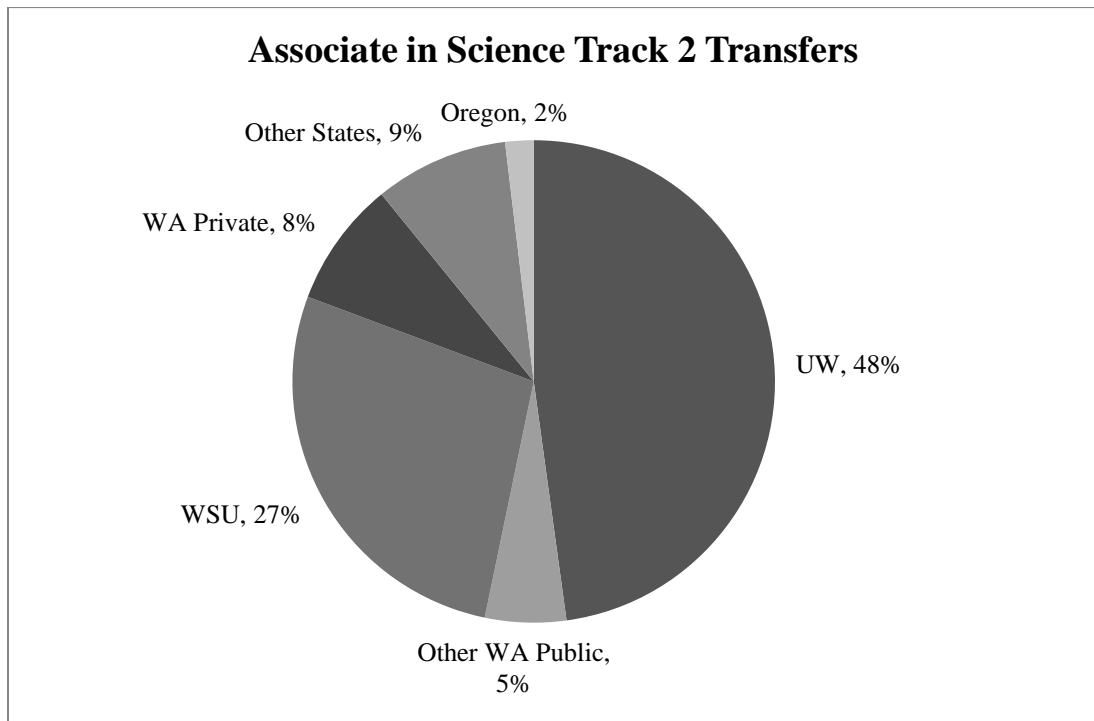


Figure 6



6. What bachelor degrees do these students receive?

Due to limitations in degree information through the National Clearinghouse, the data for this question was compiled by matching graduates to bachelor degree completion records through the MRTE+ database³. The analysis includes AS-T and all DTA graduates from 2007-08, tracked forward three years for bachelor degree completion (2011 is the most recent year for which degree information is available).

Of those graduates who transfer to a Washington public university, AS-T graduates are more likely (50 percent) to have completed a bachelor degree within three years than DTA graduates (30 percent). Nearly all AS-T graduates (98 percent) earned their bachelor's degree in a STEM field, compared to 12 percent of DTA graduates. DTA graduates were most likely to earn degrees in Business, Psychology, Accounting, and Social Sciences. **Tables 4a and 4b** show the number and type of bachelor degrees completed by each group of associate degree graduates.

Table 4a
AS-T Graduates Bachelor Degree Major

STEM Majors	AS-T 1	AS-T 2	Total	% of Total
MECHANICAL ENGINEERING	4	53	57	18%
ELECT/ELECTR & COMM, GENL	0	40	40	13%
CIVIL ENGINEERING, GENL	1	25	26	8%
BIOCHEMISTRY & BIOPHYSICS	22	1	23	7%
CELLULAR AND MOLECULAR BIOLOGY	21	2	23	7%
CHEMICAL ENGINEERING	3	13	16	5%
COMPUTER SCIENCES	0	26	26	8%
Other STEM Majors	54	40	94	30%
Other Majors	6	0	6	2%
Total	111	200	311	100%

³ MRTE+ includes all enrollments, transcripts, and degree completions for all public institutions in WA State.

Table 4b
DTA Graduates Bachelor Degree Major

Major	DTA	% of Total
BUSINESS ADMIN & MGMT	276	7%
GENERAL PSYCHOLOGY	230	6%
ACCOUNTING	184	5%
SOCIAL SCIENCES, GENERAL	171	5%
LIBERAL ARTS & SCIENCES	148	4%
SPEECH COMM & RHETORIC	132	4%
ENGLISH LANG & LIT, GENL	127	3%
FINANCE, GENL	121	3%
ECONOMICS	86	2%
POLITICAL SCIENCE & GOVT	85	2%
SOCIOLOGY	85	2%
MARKETING MGMT	80	2%
OPERATIONS MGMT & SUPV	62	2%
HISTORY, GENL	61	2%
ANTHROPOLOGY	57	2%
GENERAL EDUCATION	56	1%
HUMANITIES/HUMANISTIC STUD	54	1%
HUMAN SERVICES, GENERAL	52	1%
MULTI-/INTERDISCIPLINARY STUDIES, OTHER	52	1%
SOCIAL WORK	50	1%
Other Majors	1124	30%
STEM Majors	458	12%
Total	3751	100%