

MEMORANDUM

July 19, 2017

TO: Bill Ridenour
Chairman, Arizona Board of Regents

FROM: Michael M. Crow
President, Arizona State University



CC: Arizona Board of Regents
Eileen Klein
Nancy Tribbensee

RE: FY2017 At-Risk Compensation

Enclosed is my FY2017 Performance Assessment as it relates to the Arizona Board of Regents At-Risk Compensation program. This performance and incentive-based compensation model has been in place for several years following the chairmanship of Regent Rick Myers. This represents a report on the metrics established for both FY2017 and for the period between FY2015 and FY2018, with multiple year objectives. Separate reporting is occurring relative to Enterprise Executive Committee metrics.

ASU continues to accelerate its transformation into the prototype for a model that we refer to as the “New American University.” This prototype is best described by our charter which is detailed below.

ASU is a comprehensive public research university, measured not by whom it excludes, but by whom it includes and how they succeed; advancing research and discovery of public value; and assuming fundamental responsibility for the economic, social, cultural and overall health of the communities it serves.

Overall, our energy as an executive team and my energy as the president and chief executive officer of the university is targeted on implementing this charter and attaining the specific overall metrics outlined by the Board for Arizona State University. In this role, I serve as the leader and chief executive for a team of extremely talented individuals who are implementing one of the most significant redesign and reconceptualization efforts ever associated with any institution of higher education.

OFFICE OF THE PRESIDENT

FULTON CENTER 410, 300 E. UNIVERSITY DRIVE
PO BOX 877705 TEMPE, AZ 85287-7705
(480) 965-5253 FAX: (480) 965-0865
[HTTP://PRESIDENT.ASU.EDU](http://president.asu.edu)

In addition, there are specific, visible, complicated and important objectives that we have agreed to as being a part of this performance assessment. These objectives are all consistent with the overall ABOR objectives and are also consistent with the charter and vision for Arizona State University. This report highlights performance on these objectives alone and not on the overall attainment of the university's overall objectives.

Specific to these objectives, there are the FY2017 at-risk compensation goals. These goals are detailed as follows:

- 1) Lead the design and launch of a "math transformation" - a fundamentally altered curricular design and course pedagogy to eliminate math as the "rate limiter" for student success in both STEM related fields and in all other areas of academic advancement. To be specific, we outline that achievement of this goal include the design and launch of a learning approach and format that when applied to an array of courses will provide the adaptive learning platform capable of changing ASU course success rates to more than 80% mastery from around 50% mastery, with mastery being defined as an A or B in the class. Our data indicates that a C or below is insufficient to ensure the student's success over their life as an ASU student. Achievement of this performance metric will also require proving the viability of the approach with at least three large-scale deployed courses.

As detailed in the attached materials, we have put a tremendous amount of focus on this and this goal has been attained. I think most interestingly in this category is the fact that through both advanced systems development at ASU, through learning by doing at ASU and through selective partnerships, we have been able to develop mechanisms for us to advance these courses and actually deploy, at scale and ultimately at any scale, a math curriculum that will allow us to remove math as the rate limiter for success for so many students not only attending ASU but also students working their way through high school and other college activities. This effort is the result of a tremendous team and partnership activity and it is one of the most significant accomplishments that our team has been involved in throughout my tenure at ASU.

- 2) Lead the design and launch of a full-scale ASU brand tracking system and brand enhancement strategy. In addition, ASU will focus on the deep education of its students regarding the emergence of ASU as a unique world class research university. This is particularly important because of the fact that ASU has morphed very quickly from its reputation as a large regional public college and sometimes its reputation as a "party school" to a first rate, high quality research university. This goal has been accomplished through the fantastic effort of the new ASU Marketing Hub and its very significant efforts to develop, track and alter our branding activities both here in Arizona and around the country. Through the leadership of our team and our new hires in this space, we believe that we now understand our brand and we understand now how to advance and protect our brand. This goal has been attained.

Secondly, I am reporting on the FY2017 progress to date on the larger 3-year goals set for the period FY2015-FY2018. The final report for these goals will be at the end of the next fiscal year. These goals include:

Goal #1: Achievement of the projected FY2018 Strategic Plan metric goal of a freshmen retention rate of 85.2%; additional incentive to exceed goal by attaining a freshmen retention rate of 86%. On this very complicated goal, we are continuing to make very significant progress and believe that we are on track to goal attainment. All of our methods and techniques that we have been working towards have been identified in the report and we are increasingly positive about the progress that is being made toward our overall goal of a freshmen retention rate above 90%. Freshmen retention above 90% is only attainable typically at institutions that limit admission to students from high schools with A averages.

Goal #2: University attaining the projected FY2018 Strategic Plan metric goal for total research expenditures of \$562.5M with an additional incentive for exceeding the goal by attaining total research expenditures of \$607.4M for FY2018. We remain on track with research expenditures for 2017 at \$521M. This represents a \$400M per year increase since FY2003. Our progress to date has allowed us for the last 10 years to be the fastest growing research university in the United States. Having said that, the attainment of the goal of \$562.5M or the stretch goal of \$607.4M will be very challenging in the complicated, competitive arena in which we operate. Nonetheless, I am personally very excited by this progress and can say that ASU has emerged as one of the leading research universities in 10 years.

Goal #3: Achievement of the projected FY2018 Strategic Plan metric goal in bachelor degrees awarded of 16,246. In FY2017, we produced 16,050 bachelor degrees and we believe that we are on track to hit the 2018 goal. That is up from 8,566 bachelor degrees, roughly a 100% increase by the 2018 timeframe.

Goal #4: Achievement of the projected FY2018 Strategic Plan metric goal of 100,184 total students enrolled at the university. Our performance as of FY2017 is 98,177 students and we believe that we are on track to the 2018 goal of slightly more than 100,000 students enrolled.

Goal #5: Achievement of the projected FY2018 Strategic Plan metric goal number of degrees in high demand fields (Engineering, Mathematics and Statistics, Health Professions, etc.) of 9,450. This is a very challenging goal but we have been able to attain the number of 8,297 degrees in these high demand fields thus far. This is up from 5,100 degrees in these high demand fields since FY09 and I believe that we are on track but may be moving a little bit below goal. We will continue to shift and evolve our strategies in these areas but, nonetheless, I think we are making good progress.

We also have three University Initiatives performance incentives:

- 1) Attain top 3 ranking of the Pac-12 for academic performance of ASU student athletes. Thus far, we are exceeding that goal by generally being ranked second in the Pac-12 for academic performance as you can see in the enclosed materials. This is coming from a tradition of not being a high performing academic/athletic enterprise. I can now say unequivocally that we are.
- 2) Increase fundraising to more than \$165M per year over the three-year average FY16, FY17, FY18. We are exceeding this projected goal dramatically with fundraising the last 2 years being above \$200M. In fact, this year we are coming in at above \$220M. I believe that we will continue on this track.
- 3) Launch and operate America's largest engineering school successfully with 90% student retention. This is a stretch goal of unbelievable scale but nonetheless we have reached the first part of the goal becoming the largest engineering school in the country. And, we believe that we will attain this goal overall and are certainly on track to be able to do that.

Overall, I am very happy with the performance of our team, very happy with the kinds of progress that we are making on the goals and believe that we are making excellent progress toward our broader FY18 goals.

I look forward to reviewing these materials with the Board Executive Committee at our upcoming meeting in August.

2016-2017 At-Risk Compensation Proposed Goals

FY2016-2017 Goal 1

Lead the design and launch of a “Math Transformation” – a fundamentally altered curricular design and course pedagogy to eliminate math as the “rate limiter” for student success in both STEM related fields and in all other areas of academic advancement.

Achievement of this goal will include the design and launch of a learning approach and format that when applied to an array of courses will provide the adaptive learning platform capable of changing ASU course success rates to more than 80% mastery from around 50% mastery. Achievement of this performance metric will also require proving the viability of the approach with at least 3 large scale deployed courses.

FY 2017 Goal 1

At-Risk Compensation Proposed Goal:

Lead the design and launch of a “Math Transformation” as identified in Goal 1

Goal Accomplished

Report Follows

MATH TRANSFORMATION PLANS

The Arizona Board of Regents has set an ASU goal to lead “Math Transformation”. The instructions include:

- ASU will lead the design and launch of “Math Transformation” to eliminate math as a “rate limiter” for student success in both STEM and all other areas of study.
- Achievement of this goal will include the design and launch of a learning approach using adaptive learning platforms capable of changing ASU course success rates to more than 80% mastery.
- At least 3 large scale deployed courses must be transformed.

As this report shows, these goals are being achieved.

1. EVOLUTION OF ASU’S ADAPTIVE LEARNING PLATFORMS

Phase 1

In terms of innovative approaches to math instruction, ASU is well ahead of other universities. At a recent “Pathways” meeting hosted by the Association of Public & Land-Grant Universities (APLU), ASU had already advanced beyond the plans being proposed at Pathways. In terms of math pedagogy, ASU has been the leader in adaptive learning technology from the beginning, 2011. At a different APLU meeting of institutions that each had been awarded a \$550,000 grant for purposes of adopting adaptive learning courseware, including ASU, no one was at ASU’s stage. Moreover, ASU is well positioned to maintain international leadership with a new broad based project involving calculus and the expansion of the innovative Global Freshman Academy (GFA) math courses, both to be discussed later in this report. ASU is well positioned to implement with success the type of courseware imagined in ABOR’s directive for math performance and transformational leadership in math education.

Starting in 2011, ASU was the first to introduce courseware that was truly adaptive, spurred by a critical need to improve student proficiency in foundational math skills. Too many students were failing to advance towards a degree because they were unable to pass a college level math course; and various attempts to solve the problem ended in failure. Adaptive learning means courseware that can progress students through learning objectives on a personalized path by measuring each student’s proficiency on each learning objective. If the student attains the required proficiency (normally 90%) on a learning objective they progress to the next lesson. If not, they review. If they again fail to get the required proficiency score, they are remediated lesson by lesson. Three courses were launched in 2011: MAT110 (foundational math for non-credit); MAT117 (College Algebra); and MAT142 (College Mathematics, with less algebraic content than MAT117). Developmental Math and College Algebra long have been recognized as the problem courses with which universities struggle nationwide. Great effort has been spent on trying to improve student performance in these two courses across most of higher education.

Grade performance is displayed below and it is important to understand the nature of the data. The “success rate” that is reported is the percent of students initially enrolled in the course receiving an A, B or C grade. To keep comparisons consistent over time periods, only grades for on-campus sections are reported as the overwhelmingly dominant option available to students when the transition to adaptive learning took place. Finally, before reviewing the data, it is important to recognize that there were four notable changes that occurred in these three courses that could affect reported grades.

- First, class size doubled to 100 students on average because the courseware provided efficiencies that instructors did not have previously.

- Second, course content was standardized so that every student in each section confronted exactly the same material; material could not be trimmed at the discretion of the instructor.
- Third, grading was standardized so that faculty could not curve the grades as they chose.
- Fourth, it is important to recognize that performance in these courses required students to pass from lesson-to-lesson by attaining high levels of mastery on all lessons, usually 90%, in addition to grades on exams. Mastery of each lesson was never part of the grading scheme prior to adaptive learning as it could not be measured without the courseware. In the past, students could get a passing grade while having large gaps in their mastery of some content.

Generally speaking, these new changes made grading more stringent.

Grades are reported below for Fall 2009 and Spring 2010 (Academic Year 09-10) prior to the adoption of adaptive learning systems. Grades also are reported for Fall 2012 and Spring 2013 (AY12-13), one year after the adaptive learning systems were adopted. In this early phase of development of adaptive learning courseware, student success varied across the three courses and across semesters.

- Usually, grade performance is better in the Fall than Spring in all three courses in this early time period because more highly qualified first-time freshmen take the courses in the Fall.
- In MAT110, grades definitely improved in the early transition to adaptive learning. Indeed, by AY15-16 (not reported in this table) student success reached enviable levels by national standards, **86% across both semesters**.
- The success rate in MAT142 fluctuated year-to-year, but was relatively unchanged on balance over the academic years (combining the Fall and Spring semesters). Although unchanged, it must be emphasized the success rate remained quite high even with standardized grading and a doubling of class size.
- In contrast, performance in MAT117 (College Algebra), the most difficult of the three classes, declined in most years, although allowance for standardized content, standardized grading and the 80% mastery requirement probably accounts for some of the decline.

SUCCESS RATE

	Pre-adaptive		Post-adaptive	
	F09	Sp10	F12	Sp13
MAT110	69%	52%	83%	69%
MAT117	69%	57%	63%	51%
MAT142	82%	71%	83%	79%

A few problems became apparent in this time period. First, both instructor training and their experience in teaching in this manner were paramount to success. Turnover in instructors plagued the earliest years. Some instructors performed considerably above average, and some considerably below. Eventually, this was rectified as successful and experienced course coordinators took responsibility for monitoring, mentoring and training less experienced instructors. Overtime, a core of more permanent instructors were retained from year-to-year. There also were other changes that influence year-to-year student performance such as the change in the math placement exam. As a consequence, student success rates can and did fluctuate between years as these external factors changed. A more persistent problem was endemic. This was the dawn of the technological development in adaptive learning courseware, led by ASU. The technology was still catching up to the instruction throughout these early years; and MAT117 was especially plagued by this problem.

Phase 2

Starting AY2015-16, planning for substantial changes to our courseware, began with the transition to ALEKS (McGraw Hill) in MAT117. MAT142 will begin a transition to ALEKS in Fall17. ALEKS makes possible some very important enhancements.

- The courseware for MAT117 had not been updated significantly by the original vendor since it was launched. In contrast, the new ALEKS courseware is much more precise in terms of recommending content to students. This same courseware provides personalized learning paths to the many thousands of students in the GFA College Algebra course, to be discussed below. The previous courseware could not have managed a task of the complexity of GFA.
- Our own instructional videos have been integrated into the ALEKS platform. Students also have access to a tremendous amount of learning assistance inside the classroom and tutors outside of it. Additionally, new short videos produced “by students for students” are used to provide real-time tutoring on specific topics around the clock.

The advantage of ALEKS is its superior capability to remediate not only within the course content, but also remediate with content that is pre-requisite knowledge below the starting level for the course. This led to a radical departure from the national practice. MAT110, the non-credit foundational math course, was eliminated in spite of the success in this course that started with an A-B-C rate at 66% prior to adaptive learning and finished above the 85th percentile. Now, students who would have placed into foundational math in the past enroll directly into the appropriate credit bearing courses, MAT142 or MAT117. ALEKS possesses the capability of assessing a student’s mastery of content, topic-by-topic. If a student needs foundational remediation in any particular topic, ALEKS can deliver it as needed and when needed. Some students may need an entire semester of remediation. They earn continuing credit (a Z grade) in their class and can finish the course the following semester. Many students may need much less remediation and they can complete in one semester what would have taken two semesters in prior years. Additionally, students will be no longer placed into a remedial math class. Studies find that remedial classes create a self-fulfilling feeling of failure; and for students insufficiently resilient, often lead to higher withdraw rates from the university.

Student success in terms of grades for AY15-16 (pre-ALEKS) and AY16-17 (post-ALEKS) are presented below for the three classes. Recall that by AY 16-17, foundational math had been eliminated and MAT117 and MAT142 now comprise what were three large-enrollment courses previously. Students who took MAT110 in the previous year because of low placement scores (there were more than 1,200 of them) are now main-streamed into MAT117 and 142. Once again, to keep comparisons consistent with the previous table, grades are reported for on-campus sections as the dominant option available to students when the transition to adaptive learning took place.

SUCCESS RATE

	Pre-ALEKS		Post-ALEKS	
	F15	Sp16	Fall16	Sp17
MAT110	85%	87%	X	X
MAT117	62%	64%	79%	77%*
MAT142	80%	64%	80%	70%
Total enrollment	4,150	1,945	4,400	1,217

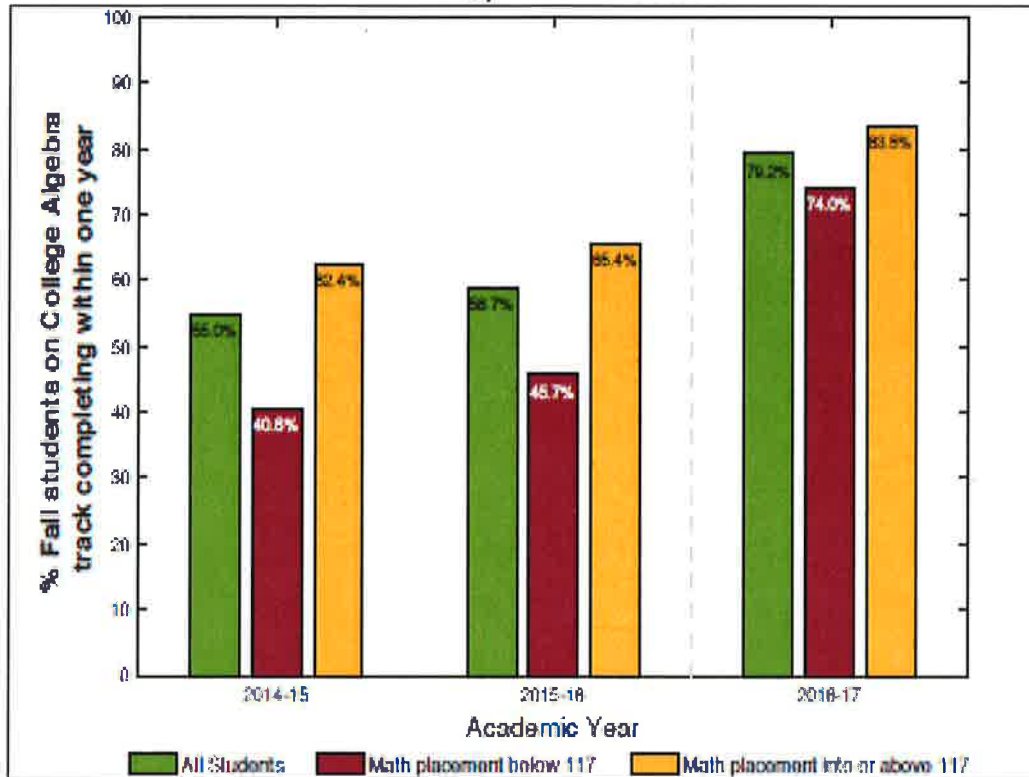
*Forecasted based on the expected conversion rate of Z to a passing grade

The results are transformational for MAT117.

- Student success in MAT117 jumped to 79% in Fall16 and is projected to achieve 77% in Spring17 if students successfully convert Z (continuing credit) grades to passing grades at the same rate as they did for Fall16. This success was achieved in spite of having students who previously placed into foundational math mainstreamed into the course.
- Student success in MAT142 also improved over the combined Fall-Spring semesters, although MAT142 still employs older adaptive courseware and has yet to be converted to ALEKS courseware. Likewise, this success was achieved in spite of having students who previously placed into foundational math main-streamed into the course.
- Enrollment in what were three classes in Fall15 went from 4,150 to 4,400 as the three classes were collapsed into two in Fall16. Spring enrollment fell from 1,945 in Spring16 to 1,217 in Spring17 meaning significantly more students completed in one semester what many did over two semesters in previous years, saving students time and money. ***This is an important step in achieving the goal to eliminate math as a “rate limiter” for student success in both STEM and all other areas of study.***

Another consideration in achieving the goal to eliminate math as a “rate limiter” is to examine how students perform in the context of their initial preparation. The chart below shows the rate at which students passed the course based on preparation. Several results are noteworthy. Students previous to the migration to ALEKS completed the course at significantly lower rates, and this is especially true for students with low placement scores. In previous years, students with initial low placement scores eventually passed this course only 43% of the time, about a 21 point gap compared to students with satisfactory placement scores. In AY16-17, students with low placement scores passed the course at a rate of 74% while 83.5% of the students with satisfactory placement scores passed the course, substantially closing the achievement gap. ***This is another important step in achieving the goal to eliminate math as a “rate limiter”.***

Pass Rates by Placement Status



Alternative measures of student success

The conventional metrics reported above understate the success of the courses. Notably, students can choose a W or Z grade in MAT117 and not complete the course for reasons unrelated to class performance. The large majority choose a W or Z grade with the intent of completing the same course the next semester; and a significant number achieved this goal. But others drop the course because they change their major to one that requires MAT142 instead of MAT117. Still another segment of students start at ASU in the Fall semester but do not re-enroll at ASU for the Spring semester for any number of reasons. They will not be able to convert to a passing grade in Spring. **The success rate in MAT117 goes to 87% once adjustment is made for those who choose a Z or W with the intent of enrolling in MAT142 in a new major or the intent to withdraw from ASU entirely.** When Online students are included, the success rate is 83% in Fall16 after these adjustments. A final perspective on grade performance is to calculate the percent of students who enrolled in MAT117 and received a D or E grade. That figure is only 3.2% for Fall16.

Still another metric of student success relates to a direct measure of “mastery”. As already indicated, the ALEKS adaptive learning system can measure proficiency for each learning objective in the course. Often, a rule of 90% proficient is used. Proficiency only can be measured for students who complete the course because those who withdraw early, by definition completed/mastered only a few of the almost 400 detailed learning objectives associated with this course. In Fall16, students who completed the course achieved 95.6% mastery, far exceeding the goal set by ABOR of 80%. The technology to measure mastery at such a granular level did not exist prior to using ALEKS.

2. THE FUTURE TRANSFORMATION OF ASU'S ADAPTIVE LEARNING PLATFORMS

Phase 3

Immediate steps

The first stage of course development using adaptive learning courseware at ASU involved three large enrollment courses, MAT110, 117 and 142. As the Board's instructions were being designed to transform three courses, ASU eliminated MAT110 and collapsed the original three courses into two, either MAT117 or MAT142, depending on the student's major. At the current time, success in the three courses, now collapsed to two, provide all of our data. However, further extensions and enhancements are being planned as next steps in the transformation of math education. First, MAT142 is being converted onto the ALEKS platform in Fall17 as a pilot; and converted entirely to ALEKS in Fall18 when the courseware is de-bugged. As it did for MAT117, ALEKS will provide a superior adaptive learning experience for students in MAT142; and it will provide superior measurements of proficiency on every learning objective for every student. Additionally, a pilot project teaching pre-calculus is slated for Fall17 also using ALEKS. This will become another large enrollment class transformed to an adaptive learning platform. Pre-calculus is an important pre-requisite course for many STEM students not yet prepared for Calculus. At the same time, pre-calculus is being readied for GFA using ALEKS, greatly accelerating course development across the ASU curriculum.

The next transformations

It will take much less time for other universities to catch-up to our existing stage of development in adaptive learning courseware than it took ASU to develop, launch & advance it. Our development was fostered by millions of dollars of grants from the Gates Foundation and the courseware was co-developed with technology companies or the technology units of publishers. The intent of the Gates Foundation, and certainly the goal of the publishers, is to disseminate the usage widely. It also is an ASU goal. To this end, ASU is participating in a very large project managed by APLU to accelerate adaptive learning courseware among a set of large public universities. Additionally, adaptive learning courseware is a prominent discussion item among the large public universities in the University Innovation Alliance. Many of them are adopting the technique. Finally, some of our co-development partnerships with vendors normally return a revenue share back to ASU for co-developed courseware sold outside of ASU, enhancing our own incentive for widespread adoption.

Other plans are in place that will maintain ASU's leadership in the transformation of math education, a task assigned to ASU by the Board. The first development is the build-out of additional math courses in the Global Freshmen Academy (GFA) including pre-calculus and calculus courses. The GFA provides a sandbox unavailable to any other university.

- Extraordinary resources and talent from ASU's EdPlus are used to build GFA courses. This will maintain ASU course design efforts at the frontier.
- The resources also provide opportunities for EdPlus to experiment with different designs that extend what can be accomplished in digital learning environments.
- These courses make available massive amounts of detailed data on an equally massive number of learners. The data analytics that can be performed for learning science are almost unlimited.

In its first year, the ALEKS based GFA College Algebra course attracted more than 50,000 learners. Of these, about 10,000 proved to be engaged students and more than 500 completed the entire course, mastering more than 90% of the curriculum. The amount of data coming from this course that can become available to learning scientists and course designers is beyond any scale previously

encountered. Cumulatively, the 50,000 learners were tested on more than 1.5 million math skills and GFA students mastered more than 500,000 skills, more than 1,500 new math skills learned each day. The lessons learned by course designers in the GFA class from this data are migrated to other learning platforms, both on-campus and on-line.

The course is led by a single instructor, supported by a team of undergraduate coaches supervised by the Undergraduate Academic Success Programs office. The coaching team provides scalable support and advice, creating instructional video content “on the fly” to answer student questions and providing targeted advice to students through ASU’S Compass learning support system. Compass allows the instructional team to target the “just-in-time” delivery of learning content to specific groups of students identified through combinations of demographic and performance based characteristics. The innovations in learning support that are tested in GFA can be (and have been) migrated to classes delivered both on-campus and online.

In May 2017, GFA added a pre-calculus course, also based on ALEKS, a precursor to installing adaptive learning in this course on-campus. Supported by the same instructional team, GFA pre-calculus is off to a solid start, attracting about 1,000 new learners every week. First-year calculus courses directed at Engineers (MAT 265) and Business majors (MAT 210) are currently under development, and are expected to launch in 2018. The development of these classes for GFA also will accelerate the development for delivery on-campus and on-line.

The adaptive learning courses in GFA and elsewhere play other important roles in ASU’s global leadership for access to higher education. The math innovation (and other courses) will tackle some of the greatest barriers to success in higher education and or STEM majors. This is true globally as well as locally. The GFA courses provide access to college level courses for students around the world who have no other access; or students who need alternative access. An example of the latter is the “Earned Pathway” for admission to ASU. A substantial number of potential students do not meet admissions requirement, including Starbucks employees. They can earn admission into ASU by passing GFA courses. Additionally, ASU Prep Digital embeds personalized, adaptive technology in all of their mathematics courses for all of their students, expected to be in the tens of thousands. . The pipeline to higher education improves dramatically when more students arrive at the university already proficient in college algebra and/or pre-calculus.

Another “next step” in the evolution of adaptive learning in math will be “connected courses”. A RFP has been completed seeking developmental partners to build courses that “talk” to each other. Success in many courses depends on pre-requisite knowledge brought forward from previous courses. This is most apparent in math classes and classes that depend on mathematical knowledge. For instance, the first calculus course for engineers depends on knowledge of pre-calculus. The engineering calculus classes that follow depend sequentially on the prior calculus classes. Often students stumble because they lack adequate recall of knowledge from prior classes. Connected courses solve this by remediating/refreshing content knowledge wherever and whenever the courseware detects the student needs refresher content from previous courses – courses will “talk” to each other. It does not stop there. Physics beyond general education requires proficiency in calculus. Thus Physics must also “connect to” calculus. An Engineering course must connect to the physics course which must connect to a calculus course; and so forth. The RFP contains the possibility of connecting the courses in the lower division engineering core, including math classes; and the lower division core for business including business calculus. Discussions have begun to select co-developers to build adaptive and connected courses in calculus for both Engineering and Business.

3. PROGRESS ON GOALS

ASU will lead the design and launch of “Math Transformation”. At least 3 large scale deployed courses must be transformed.

- ASU was the first to apply adaptive learning in the transformation of three large math courses. The three were subsequently collapsed into two courses last academic year.
- Following the success with the ALEKS courseware last year, the transformation of a substantial number of additional courses begins this academic year, adding pre-calculus, calculus for business and calculus for engineering over the next few years.
- These courses will be available on-campus, online and in the Global Freshmen Academy, reaching tens of thousands of students.

Achievement of this goal will include the design and launch of a learning approach using adaptive learning platforms capable of changing ASU course success rates to more than 80% mastery.

- Before being eliminated, the success rate in MAT110 went from 69% in Fall09 to 85% in Fall15.
- The success rate in MAT142 remained in the low 80 percentile range. However the success was achieved with class size doubling to sections of 100; standardized content; standardized grading; and the inclusion of students who did not achieve the minimal placement score for the course.
- The success rate in MAT117 went from 69% in Fall09 to 79% in in Fall16. The success rate was achieved with class size doubling to sections of 100; standardized content; standardized grading; and the inclusion of students who did not achieve the minimal placement score for the course (starting in Fall16).
 - ✓ The success rate of 79% in MAT117 goes to 87% once adjustment is made for those students who choose not to complete the course with the intent of enrolling in MAT142 required for a new major, or the intent of withdrawing from ASU entirely after their first semester.
 - ✓ In terms of mastery, the students who completed the course achieved 95.6% mastery in Fall16, far exceeding the goal set by ABOR of 80% mastery. (Mastery only can be measured for students who complete the course because those who withdraw early, by definition completed/mastered a limited number of the almost 400 detailed learning objectives associated with this course.)

The transformation will eliminate math as a “rate limiter” for student success in both STEM and all other areas of study.

- In Fall16, significantly more students completed in one semester what many did over two semesters in previous years as students with low placement scores were mainstreamed into the two college credit courses, MAT117 and MAT 1142 instead of first taking developmental math. This saved students time and money.
- In previous years, students with initially low placement scores eventually passed MAT117 only 43% of the time, about a 21 point gap compared to students with satisfactory placement scores. In AY16-17, students with low placement scores passed the course at a rate of 74% while 83.5% of the students with satisfactory placement scores passed the course. The success rates of these two groups, respectively, was much higher than previous years. Moreover, the achievement gap between the two groups was narrowed significantly. As a consequence, students progress into their major map at a significantly faster rate than previously regardless of prior preparation.
- Math as a “rate limiter” does not end at college algebra. A substantial number of students do not succeed in the calculus classes for their respective majors. It is expected that the expansion

of adaptive learning into calculus classes for business and engineering over the next few years will meet with similar success, opening the path to higher rates of graduation of students in their chosen major who previously had failed to progress beyond the required calculus courses in their major maps.

ASU
MATH TRANSFORMATION:
ACHIEVEMENTS AND PLANS

ASU GOALS

The Arizona Board of Regents' instructions include:

- Lead the design and launch of “Math Transformation” to eliminate math as a “rate limiter” for student success in both STEM and all other areas of study.
- Include the design and launch of a learning approach using adaptive learning platforms capable of changing ASU course success rates to more than 80% mastery from around 50%.
- At least 3 large scale deployed courses must be transformed.

EVOLUTION OF ASU'S ADAPTIVE LEARNING PLATFORMS

ASU was the first university to introduce courseware that was truly adaptive in 2011, spurred by a critical need to improve proficiency in foundational math skills.

- Too many students failed to advance to a degree because they were unable to pass a college level math course.
- All attempts to solve the problem failed until installation of adaptive learning.
- As we usually use the term in math:
 - ✓ adaptive learning means courseware that progress students through learning objectives on a personalized path, measuring each student's proficiency on each learning objective.
 - ✓ If the student attains the required proficiency (normally 90%) on a learning objective they progress to the next lesson. If not, they review. If they again fail to get the required proficiency score, they can be remediated lesson by lesson.

Adaptive Learning vs Lecture

	Lecture		ADAPTIVE
- Lesson Plan	Fixed	→	Variable
- Presentation	Group	→	Individual
- Content	Common	→	Personalized

Evolution: Phase 1

Three Intro Math Courses Transformed to Adaptive Learning in 2011

The three courses transformed to adaptive learning were:

- **MAT110, Foundational Math**
 - ✓ A non-credit course to prepare students for college level math.
 - ✓ One of the two greatest math course challenges nationwide.
- **MAT117, College Algebra**
 - ✓ The other greatest challenge nationwide in math.
 - ✓ A required course for students unprepared for Calculus.
- **MAT142, College Mathematics**
 - ✓ The required course for certain majors such as the arts, humanities, some social sciences and others.
 - ✓ Less algebraic content than MAT117.

Characteristics of the Transformation

- The three classes were transformed to adaptive learning with a personalized path, measuring each student's proficiency on each learning objective.
- Problem solving skills emphasized
- Each class doubled in size to as many as 100 students per section because of the instructional efficiencies provided by the courseware.
- Content was standardized so that every student in each course section confronted exactly the same material; material could not be trimmed at the discretion of the instructor.
- Grading was standardized so that individual faculty could not curve the grades as they chose.
- Students required to pass from lesson-to-lesson by attaining mastery on all lessons, usually 90%, in addition to grades on exams. Previously, students could get a passing grade while having large gaps in their mastery of some content.
- ***Generally speaking, these changes made grading more stringent.***

Student is led through the course in a personalized manner.

- Know what they have accomplished
- Know what is next
- Know where they are supposed to be



Welcome, Knewton

HOW THIS COURSE WORKS

Next activity

Workshop: Inside a lesson

From: [Getting started](#) > [Using this course](#) > [How this course works](#)

Let's go >

STATUS ?

Incomplete

This course has ended. You did not complete the course requirements in time.

BADGES ?

0 of 7

SUBJECTS COMPLETED



Getting started



The number system



Equations & expressions



Ratios & proportions



Statistics & probability



Geometry



Functions

ASU Math Redesign Adaptive Learning The Classroom



Students are engaged.



An instructor and 4 assistants answer individual questions.



Student attendance is strong.

Faculty Efficiencies

Instructor knows:

- How the class is doing
- Drilling deeper in the dashboard, how each student is doing
 - ✓ Who is doing fine
 - ✓ And who needs assistance
 - ✓ And the lesson in which the student is struggling

ASU
- ASU MAT 104 (117) - Track 1 **BETA**
MAT 110: Enhanced Freshman Mathematics | 2012 Fall - BI - 0... | 26 STUDENTS | DATES: 10/17/2012 - 12/1

Group progress

Showing 26 of 26 students [EXPORT CLASS DATA \(CSV\)](#)

OFF TRACK (6) **COMPLETE (1)**

NO WORK (2) **ON TRACK (19)**

Students to watch

- 1 student has lessons in Focus Mode
- 1 student has failed Test your skills after completing a focus lesson
- 1 student is consistently in Focus Mode (avg. of more than 2 tests per lesson)
- 19 students are inactive (have not completed any tests in 7 days)

Student Success

Usually, grade performance is better in the Fall in all three courses because more highly qualified first-time freshmen take the courses in the Fall.

Recall, post-adaptive, content and grading are standardized and grading is more demanding, usually requiring 90% proficiency on all lessons.

MAT110: Grades substantially improved post-adaptive.

MAT117: Post-adaptive, performance fluctuated year-to-year in MAT117, the most difficult of the three classes; but on balance declined, albeit with a doubling of class size and more stringent grading standards.

MAT142: Grades fluctuated year-to-year, but was relatively unchanged on balance over the academic years, albeit with a doubling of class size and more stringent grading standards.

The % of students earning an A,B or C

- Pre-adaptive learning AY 2009-10
- One year after the transition, AY2012-13*

	Pre-adaptive		Post-adaptive	
	F09	Sp10	F12	Sp13
MAT 110	69%	52%	83%	69%
MAT 117	69%	57%	63%	51%
MAT 142	82%	71%	83%	79%

* To keep comparisons consistent, grades are reported for on-campus sections as the dominant option available to students when the transition to adaptive learning took place.

Lessons Learned

Problems became apparent in this time period, requiring some changes.

1. Instructor training and their experience in teaching in this manner were paramount to success.
 - Turnover in instructors plagued the earliest years.
 - Eventually, this was rectified as experienced course coordinators took responsibility for monitoring, mentoring and training less experienced instructors.
 - Overtime, a core of more permanent instructors were retained from year-to-year.
2. There also were external changes that influence year-to-year student performance such as the change in the math placement exam. As a consequence, student success rates can and did fluctuate between years as these external factors changed.
3. This was the dawn of the technological development in adaptive learning courseware, led by ASU. The technology was still catching up to the instruction throughout these early years; and MAT117 was especially plagued by this challenge.

EVOLUTION: Phase 2 2016

The courseware for MAT117 had not been updated significantly by the original vendor since it launched in 2011. New ALEKS (McGraw Hill) courseware had just been modified at “instruction quality”; and planning began in AY15-16 for the transition to ALEKS in MAT117.

- The advantage of ALEKS is its superior capability to remediate not only within the course content, but also remediate with content that is pre-requisite knowledge below the starting level for the course.
- During this time, our own instructional videos were integrated into the ALEKS platform. Additionally, new short videos produced “by students for students” were installed to provide real-time tutoring on specific topics around the clock.

Three Courses Collapse to TWO

The precision at which ALEKS can remediate with pre-requisite content as well as regular course content led to a radical departure from the national practice.

- MAT110, foundational math, was eliminated in spite of the success in this course which started with a A-B-C rate of 66% prior to adaptive learning and finished above 85%.
- Now, students who would have placed into foundational math in the past enroll directly into the appropriate credit bearing courses, MAT142 or MAT117.
 - ✓ ALEKS possesses the capability of assessing a student's mastery of content, topic-by-topic. If an individual student needs foundational remediation in any particular topic, ALEKS can deliver it in a personalized manner as needed and when needed.
 - ✓ Some students may need most of a semester of remediation. They earn continuing credit (a Z grade) in their class and finish the course the following semester.
 - ✓ Many students need much less remediation and they can complete in one semester what would have taken two semesters in prior years.
 - ✓ Additionally, students will not be placed into a remedial class. Studies find that remedial classes create a self-fulfilling feeling of failure; and for students insufficiently resilient, often lead to higher withdraw rates from the university.

Student Success: Phase 2

MAT117: Student success in MAT 117 jumped to 79% in Fall16 and is projected at 77% in Spring17; *this in spite of having students who previously placed into foundational math main-streamed into the challenging MAT 117 class.*

MAT142: Student success in MAT 142 improved over the combined Fall-Spring semesters, although MAT142 has yet to be converted to ALEKS; *this in spite of having students who previously placed into foundational math main-streamed into the course.*

Enrollment in what were three classes in Fall 15 went from 4,150 to 4,400 as the three classes were collapsed into two in Fall16. But Spring enrollment fell from 1,945 in Spring16 to 1,217 in Spring17. This means significantly more students completed in one semester what many did over two semesters in previous years; *an important step in achieving the goal to eliminate math as a “rate limiter” for student success in both STEM and all other areas of study.*

	Pre-ALEKS		Post-ALEKS	
	F15	Sp16	F16	Sp17
MAT 110	85%	87%	X	X
MAT 117	62%	64%	79%	77%*
MAT 142	80%	64%	80%	70%
Total Enrollment	4,150	1,945	4,400	1,217

*Forecasted based on the expected conversion rate of Z to a passing grade

Alternative Measures of Success

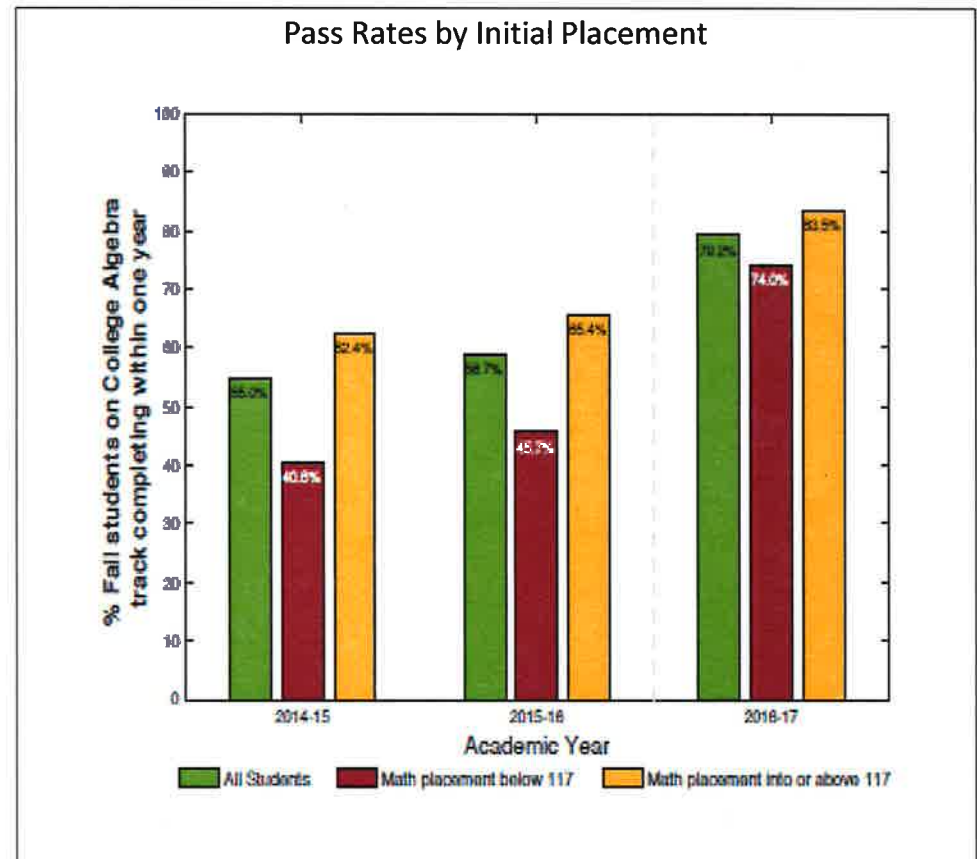
The success rate as calculated in the previous tables is the most common measure of course success used nationally. But these results understate the success of the courses in some important ways.

- For instance, students can choose a W or Z grade in MAT 117 and not complete the course for reasons unrelated to class performance.
 - ✓ The large majority choose a W or Z grade with the intent of completing the same course the next semester; and a significant number achieved this goal.
 - ✓ Others drop the course because they change their major to one that requires MAT142 instead of MAT 117.
 - ✓ Another segment of students start at ASU in the Fall semester but do not re-enroll at ASU for the Spring semester for a number of reasons. Clearly, they will not be able to convert to a passing grade by Spring.
 - ✓ The success rate in MAT 117 goes to 87% once adjustment is made for those who choose a Z or W with the intent of enrolling in MAT 142 in a new major or the intent of withdrawing from ASU entirely. When Online students are included, the success rate is 83% in Fall16 after these adjustments.
- Another perspective on grade performance is to calculate the percent of students who enrolled in MAT 117 and received a D or E grade. That figure is only 3.2% for Fall16.

Alternative Measures of Success (cont)

Closing the Achievement Gap

- Another consideration per the goal to eliminate math as a “rate limiter” is to examine how students perform by initial preparation.
- Previous to the migration to ALEKS, students completed the course at significantly lower rates, as already mentioned. But this is especially true for those with low placement scores.
 - ✓ In previous years, students with low placement scores passed MAT117 only 43% of the time, about a 21 point gap compared to those with satisfactory placement scores.
 - ✓ In AY16-17, 83.5% of the students with satisfactory placement scores passed while students with low placement scores eventually passed at a rate of 74%.
 - ✓ This represents substantial improvement for both groups while also substantially closing the achievement gap for the two groups, *is another important step in achieving the goal to eliminate math as a “rate limiter”.*



Alternative Measures of Success (cont) Mastery

As already indicated, the adaptive learning system can measure proficiency for each learning objective in the course. Often, a rule of 90% proficient is used.

- Proficiency only can be measured for students who complete the course because those who withdraw early, by definition completed/mastered only a few of the almost 400 detailed learning objectives associated with this course.
- In Fall16, students who completed the course achieved 95.6% mastery, far exceeding the goal set by ABOR of 80%. The technology to measure mastery at such a granular level did not exist prior to using ALEKS.

Phase 3 2017-18 and Beyond

ASU's innovation leadership will remain intact even though it will be much easier for other universities to obtain courseware than it was for us to develop it. Four areas of frontier development are either in-progress or soon to begin.

- Development of adaptive learning courses in pre-calculus, calculus for engineers and calculus for business
- Massive open math courses for credit: Global Freshmen Academy (GFA) courses
- Connected Courses
- Transfer to grades 9-12

Transformed and New Courses

- MAT142, already an adaptive learning course, is being migrated to the ALEKS platform in Fall17 as a pilot; and converted entirely to ALEKS in Fall18 once the courseware is de-bugged. As it did for MAT117, ALEKS will provide a superior adaptive learning experience for students in MAT142; and it will provide superior measurements of proficiency on every learning objective for every student.
- Also using ALEKS, MAT170, pre-calculus, currently is being readied for the GFA using ALEKS while the course is also being readied to be taught on-campus in this format in Fall17. This will become the fourth large enrollment class transformed to an adaptive learning platform, although it will be the third surviving course. MAT170 is an important pre-requisite course for many STEM students not yet prepared for Calculus.
- The business calculus course, MAT210, and the multi-course sequence in engineering calculus are slated for development in GFA in 2018; and soon after, introduced for on-campus and online use.

The Role of Global Freshman Academy (GFA)

Course development in the GFA plays an important role in ASU's math innovation. The GFA provides a sandbox unavailable to any other university; what is learned in the GFA is migrated to on-campus and online courses. While MOOC's have been around for years, they have never been offered for credit globally. To do so requires:

- Extraordinary resources and talent from ASU's EdPlus to build the massive and open GFA courses for credit, maintaining our course design efforts at the frontier.
- The resources also provide opportunities for EdPlus to experiment with designs that extend what can be accomplished in digital learning environments, such as "just-in-time tutoring".
- These courses make available massive amounts of data in real time on an equally massive number of learners. The data analytics that can be performed for learning science seem almost unlimited.
 - ✓ In its first year, the GFA College Algebra course attracted more than 50,000 learners, of which about 10,000 proved to be engaged students and more than 500 completed the entire course, mastering more than 90% of the curriculum.
 - ✓ Cumulatively, the 50,000 learners were tested on more than 1.5 million math skills and GFA students mastered more than 500,000 skills; more than 1,500 new skills per day.

The Role of Adaptive Learning for Access

Adaptive courseware also plays an important role in ASU's mission for access. The math innovation (and other courses) ongoing in the GFA will tackle some of the greatest barriers to success in higher education and or STEM majors. This is true globally as well as locally.

- GFA courses provide access to college level courses for students around the world who have no other access.
- Students who need alternative access can utilize GFA courses through the “Earned Pathway” for admission to ASU. A number of potential students do not meet admissions requirement, including Starbucks employees. They can earn admission into ASU by passing specified GFA courses.
- Additionally, ASU Prep Digital embeds personalized, adaptive technology in all of their mathematics courses for all of their students, expected to be in the tens of thousands. This non-linear, adaptive approach gives students agency in their math education. The pipeline to higher education improves dramatically when more students arrive at the university already proficient in college algebra and/or pre-calculus.

Connected Courses

Another “next step” in the evolution of math education is “connected courses”. Discussions have begun to select developmental partners to build connected courses. The idea is simple; the technology complex.

- Success in many courses depends on pre-requisite knowledge brought forward from previous courses. This is most apparent in math classes and classes that depend on mathematical knowledge. The first calculus course for engineers depends on knowledge of pre-calculus. The engineering calculus classes that follow depend sequentially on the prior calculus classes.
- It does not stop there. Physics beyond general education requires proficiency in calculus. Thus Physics must also “connect to” calculus; and so forth.
- Often students stumble because they lack adequate recall of knowledge from prior classes. Connected courses solve this by remediating/refreshing content knowledge wherever and whenever the courseware detects the student needs refresher content from previous courses in various subjects – courses will “talk” to each other.
- The calculus courses for lower division business and engineering will be among the first for development.

RECAP: PROGRESS ON GOALS

ASU will lead the design and launch of “Math Transformation”. At least 3 large scale deployed courses must be transformed.

- ASU was the first to apply adaptive learning in the transformation of three large math courses. The three were subsequently collapsed into two courses last academic year.
- Following the success with the ALEKS courseware last year, the transformation of a substantial number of additional courses begins this academic year, adding pre-calculus, calculus for business and a sequence of calculus courses for engineering over the next few years.
- These courses will be available on-campus, online and in the Global Freshmen Academy, reaching tens of thousands of students.

RECAP: PROGRESS ON GOALS (CONT)

Achievement of this goal will include the design and launch of a learning approach using adaptive learning platforms capable of changing success rates to more than 80% mastery.

- Before being eliminated, the A-B-C rate in MAT110 went from 69% in Fall09 to 85% in Fall15.
- The success rate in MAT142 remained in the low 80 percentile range. However the success was achieved with class size doubling to sections of 100; standardized content; standardized grading; and the inclusion of students who did not achieve the minimal placement score for the course.
- The success rate in MAT117 went from 69% in Fall09 to 79% in in Fall16. The success rate was achieved with class size doubling to sections of 100; standardized content; standardized grading; and the inclusion of students who did not achieve the minimal placement score for the course (starting in Fall16).
 - ✓ The success rate of 79% in MAT117 goes to 87% once adjustment is made for students who choose not to complete the course with the intent of enrolling in MAT142 required for a new major, or the intent of withdrawing from ASU entirely after their first semester.
 - ✓ In terms of mastery, the students who completed the course achieved 95.6% mastery in Fall16, far exceeding the goal set by ABOR of 80% mastery. (Mastery only can be measured for students who complete the course because those who withdraw early, by definition completed/mastered a limited number of the almost 400 detailed learning objectives associated with this course.)

RECAP: PROGRESS ON GOALS (CONT)

The transformation will eliminate math as a “rate limiter” for student success in both STEM and all other areas of study.

- In Fall16, significantly more students completed in one semester what many did over two semesters in previous years as students with low placement scores were mainstreamed into the two college credit courses, MAT117 and MAT 1142 instead of first taking developmental math. This saved students time and money.
- In previous years, students with initially low placement scores eventually passed MAT117 only 43% of the time, about a 21 point gap compared to students with satisfactory placement scores. In AY16-17, students with low placement scores passed the course at a rate of 74% while 83.5% of the students with satisfactory placement scores passed the course. The success rates of these two groups, respectively, was much higher than previous years. Moreover, the achievement gap between the two groups was narrowed significantly. As a consequence, students progress into their major map at a significantly faster rate than previously regardless of prior preparation.
- Math as a “rate limiter” does not end at college algebra. A substantial number of students do not succeed in the calculus classes for their respective majors. It is expected that the expansion of adaptive learning into calculus classes for business and engineering over the next few years will meet with similar success, opening the path to higher rates of graduation of students in their chosen major who previously had failed to progress beyond the required calculus courses in their major maps.

2016-2017 At-Risk Compensation Proposed Goals

FY2016-2017 Goal 2

Lead the design and launch of a full scale ASU brand tracking system and brand enhancement strategy. In addition, ASU will focus on the deep education of its students regarding the emergence of ASU as a unique world class research university.

ASU has emerged as a highly innovative world class research university that has maintained egalitarian admission standards. This new ASU, ASU as the New American University, now merits its own unique brand and this effort will assess, outline and advance the newly achieved status for ASU as a brand tracking and enhancement project. These efforts will be carried out internally and externally.

Success will be measured in the market by positive enhancement of ASU perception through brand tracking and analysis. Internally success will be measured through changes in understanding by ASU students of the university's type and performance.

FY 2017 Goal 2

At-Risk Compensation Proposed Goal:

Lead the design and launch of a full scale ASU brand tracking system and brand enhancement strategy as identified in Goal 2

Goal Accomplished

Report Follows



Design and Launch ASU Brand Tracking System

Methods for understanding and monitoring the brand



brand tracker

The Hub has been measuring brand perceptions since June 2014 across a wide range of constituents totalling over 16,000 to date.

Constituents:

- Prospective students
- Prospective parents
- Online prospects
- Current ASU and competitive students
- ASU and competitive alumni



structural equation models

With the tracker data, we are able to perform complex analyses that help us understand the causal factors and their relative importance in influencing perceptions and behaviors.

A structural equation model (SEM) exists for all key constituents to help guide marketing strategies and plans.



message testing

The SEM helps determine where to focus to achieve desired outcomes while message testing helps determine the optimum communication, by constituent, to deploy.

To date we have tested over 600 messages to determine their potential impact on brand perceptions.



marketing effects analysis

The Hub conducts post-program analyses on all marketing efforts to measure the effects.

ASU Brand Tracking

The Hub conducts annual brand tracking among each key constituent audience in order to measure brand perceptions for ASU and other “competitive” brands of interest. Results are tracked over time to measure progress and identify marketing priorities for each constituent group.

Method: quantitative online survey through panel sample provider, paid social media campaigns or email invitations

Sample size: 400 to 2000 evaluations per group

Constituents include:

- Prospective students and parents
- Online prospective students
- Current ASU and competitive students
- ASU and competitive alumni

Measures:

- Brand awareness (unaided and aided)
- Ad recall
- Likelihood to recommend/apply
- Perceptions of brand (excellence, teaching quality)
- Experiences with the brand (e.g., current or past involvement in activities)
- Self-reported impact behaviors
- Satisfaction with brand
- Participation interest



Advanced analytics

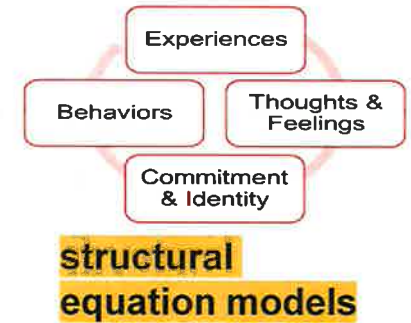
Several types of advanced analytics are enabled by the tracking data:

Factor analysis - perception questions/attributes are all factor-analyzed to identify the latent constructs being measured

Structural equation modeling - provides validation for the conceptualized causal path of influence among the factors and provides estimates of path strength along with percent of total effects on the dependent variable (i.e., importance weights)

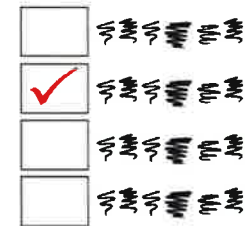
Brand strength indices - calculated to compare ASU's performance to that of other aspirational institutions. Brand strength is a sum of relative (percentile) factor scores for each brand multiplied by the importance weights for each factor. Each brand is scored relative to a derived "best in class" brand that is comprised of the highest score on each factor.

Segmentation - meaningful differences within a given constituent group can be found through clustering techniques to create sub-groups with shared traits, such as the alumni affinity segments



Pre-testing

Pre-testing research protocols have been established for identifying the strength of marketing communications materials in advance of market execution
To date, over 600 messages and 100 images have been evaluated for impact on perceptions
Other uses of this protocol include TV ads/video stimuli, radio scripts, taglines, ad concepts and brand positioning statements
Significance testing is conducted to assess which stimuli are among our top performers given the constituent group and communication objective



message testing

Marketing effects

The primary objective of marketing effects analysis is to identify the causal impact of a marketing “treatment” on the desired perceptual or behavioral objective

A truly experimental design with randomized assignment to the treatment is rarely possible in marketing

However, we have been able to use test and control markets, longitudinal tracking (pre-post analysis) and variation in ad recognition at the individual level to isolate and measure the magnitude of the effects of specific marketing elements



Overall, current students' perceptions of Arizona State University's excellence increased significantly between 2016 and 2017.

The average net excellence score for each year was as follows.

2016	2017
5.71	5.87*

Table: Scale is on a range of 1 to 7 with a score of 1 indicating lowest possible perceptions and a 7 indicating the highest possible perceptions.

*Increase significant at the 95% confidence level ($p=0.014$), as evaluated by a Weighted Welch two sample t-test

Additionally, a density plot to the right shows that responses in 2017 skew much higher on the scale.



Figure: The above chart displays the relative density of respondents at each perception level by year. The higher the density line, the more respondents who expressed that level of perception. Thus the higher blue peak at the rightmost end of the chart shows an increase in the proportion of respondents with these very high perceptions.

Quality Perceptions - Across Constituents

Overall perceptions of excellence for every constituent group have directionally increased from 2016 to 2017, with the increase for alumni, current and prospective students being statistically significant.

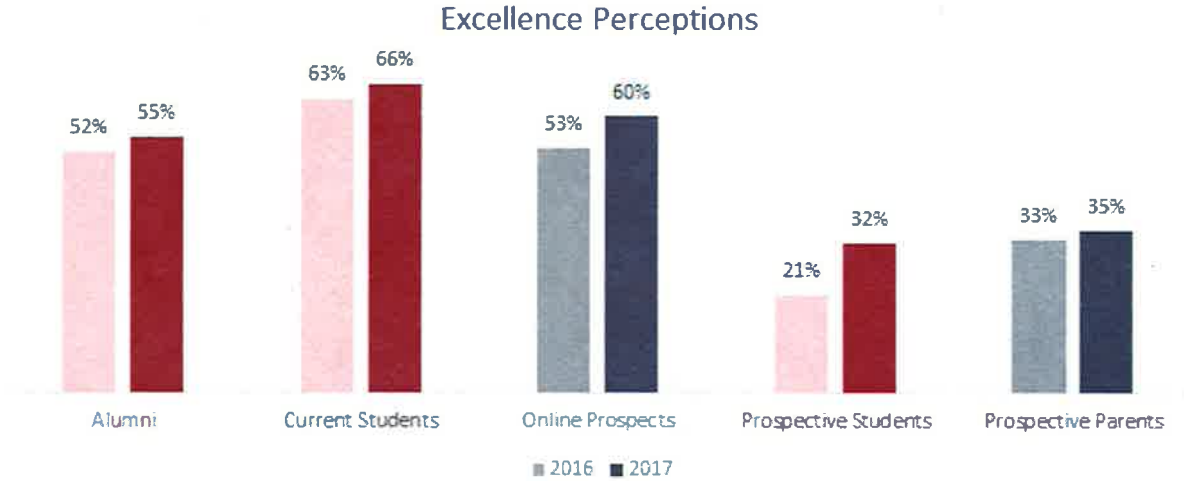


Figure: Scores are an average of the top 2 box % for alumni and online prospects (7 point scale) and top box % for prospective students and prospective parents. Alumni score change and current student score changes were significant at the 90% confidence level, while prospective students at the 95% confidence level. All YOY changes were evaluated using a bootstrap confidence interval.

Enterprise Performance Incentives

FY2015-2018 Goal 1

Achievement of the 2018 fiscal year strategic plan metric goal in the Freshman Retention Rate of 85.2%; additional incentive to exceed goal by attaining a Freshman Retention Rate of 86%.

FY 2017 Goal 1

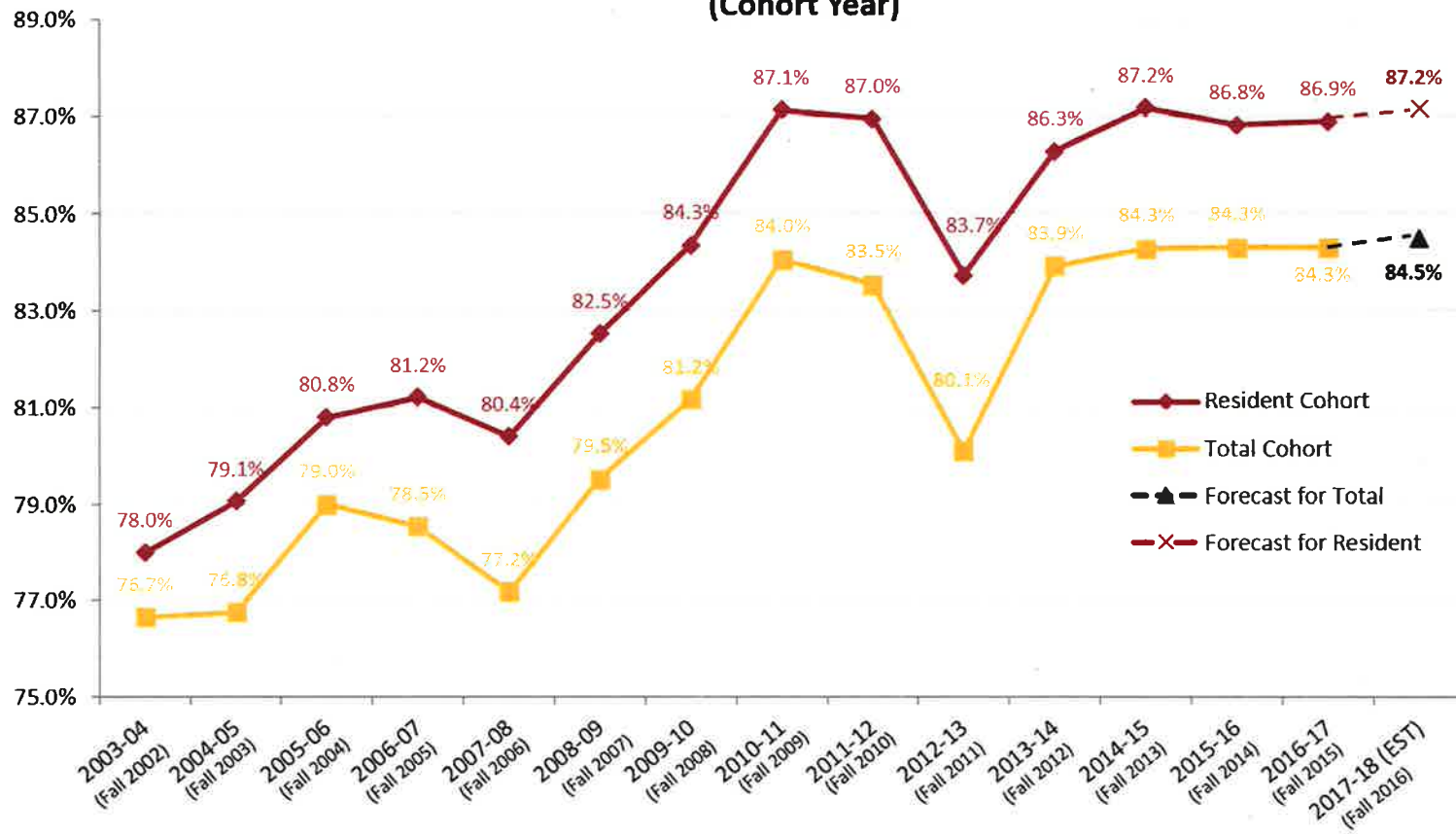
Enterprise Metrics Performance Incentives:

Freshman retention rate: 84.5%

Progress Report Follows

Achieving Freshman Retention Goal

**First-Time Full-Time Freshman Retention Rate by ABOR Reporting Year
(Cohort Year)**



Beneath the Aggregate Numbers

- The aggregate trends and forecasts shown in the chart are a composite of retention rates of subgroups. The forecasts are based on point-in-time comparisons to last year. Changes still can occur, even at this late date. At this time, the retention rate for the 2016 cohort is expected to be 84.5%
- Significant adverse shifts in the composition of the entering class among subgroups can reduce the average rate even if almost all the subgroups are improving. Thus, the most accurate perspective on policy success is the retention rates for each subgroup:
 - ✓ The retention of the entire entering class of 2017 is tracking 0.7 points above last year.
 - ✓ The rate for the freshmen with high risk profiles is 1.2 points ahead due to the impact of many programs.
 - ✓ The rate for all other students is 0.7 points ahead.
 - ✓ Resident freshmen retention is up 0.3 points at this time and is expected to exceed 87%.
 - ✓ Non-resident student retention from California is up 1.3 points.
 - ✓ Non-resident student retention from other U.S. markets is up 2.1 points.
 - ✓ Only international students are behind last year's rates, -3.1 points below. External factors made the recruitment and retention of international students a national problem during 2016-17 across almost all institutions of higher education. *If the same number of international students had enrolled at ASU in Fall 2016 as 2015 and were retained at the same rate as 2015, ASU's overall retention rate would be on track towards 85.3% this year.*

Achieving 2018 Metric: 85.2% Freshman Retention

Context:

- ASU underperformed historically, but has worked to improve the freshman retention rate to the level of other universities that admit only “A” students coming out of high school, while ASU still admits “B” students as well.
- The ultimate goal is above 90% retention, the current retention rate for UT Austin, which admits only “A” students.
- “A” students coming to ASU from Arizona high schools already retain at 95% and the average of all Arizona students is likely to exceed 87% this year.
- New and continuing efforts to boost overall retention have focused particularly on improving outcomes for “B” students and those from lower income families.
- Retaining higher numbers of out-of-state students remains a challenge for ASU, as even those who perform well often return to universities in their home states after their first, successful year at ASU. Indicative of this pattern, it is possible to track students who transfer elsewhere. The six-year graduation rate for students who started at ASU is above 74%, whether they stayed at ASU or transferred. It is as high or higher for non-residents as resident students.

Review of AY 2016-17

New student success tools were implemented throughout AY 2016-17

- A financial literacy platform, iGrad, became available to students and their families in summer of 2016. It provides access to personalized student financial learning and planning, emphasizing college and life/career financial planning.
- GetSet was implemented in the freshmen ASU 101 course. Nearly 6,500 students used it. It is an online growth mindset platform that matches students to peer mentors who had similar circumstances and successfully navigated the same challenges and obstacles. It can improve a sense of belonging, motivation, resiliency, and determination in a highly personalized way. There is evidence that freshmen who used it had higher GPA's, leading to higher retention. As expected, students with at-risk profiles enjoyed the largest gains in GPA from GetSet; and the retention to-date of at-risk students has improved by 1.2 points.
- The Learn Explore Advance Design (LEAD) program for students with at-risk profiles tripled in size. Both GPA and Spring retention of LEAD students were substantially higher than comparable non-LEAD students.
- Civitas predictive analytics platform was built in the Fall and became operational in mid-Spring, providing real-time risk assessment of each individual student, not only freshmen.
- In mid-Spring, Salesforce was integrated with Civitas and other data sources, becoming the communication network for academic advisors and other student support staff. It enabled systematic case management and personalized student centric assistance, shifting interaction with students from a transactional mode to a proactive mode. Systematic interventions were implemented based on real-time data that had been unavailable previously.
- The ePortfolio platform grew exponentially, enabling students to store, share, and showcase their in and out-of-class work & achievements, building the ingredients for a top-notch resume and portfolio (Digication). In a very short period of time, this voluntary program has grown to 63,700 unique student users with 88,500 portfolios.

Achieving Higher Freshman Retention

Next Strategies to Realize Goals

The new student success tools were completed later than expected for AY16-17. They will be more fully developed and in-use from the beginning of AY 17-18, although that does not imply they will be finished. Continuous improvement in the technology, and possibly more importantly, continuous improvement through a process of “learning-by-doing” of service providers is expected.

For AY17-18, there will be:

- Continued existing broad-reaching programs and actions to reach as many students as possible (e.g., tutoring, financial aid).
- New initiatives that provide students access to applications that personalize their experiences and give them meaningful control.
- New instruments that give service providers information for focused intervention as soon as a predicted failure has developed instead of reacting to failure once it occurs.
- New analytics of the efficacy of focused interventions for student groups and for specific challenges encountered by students.
- Further expansion of LEAD to 900 students.

Highlighted initiatives (cont.)

Strategies to Realize Goals (Cont.)

- Improvements in communication technologies. This includes a search for new technology that will permit messaging and chatting with students. Students increasingly ignore email. Additionally, GetSet will introduce a new App that sends “influence messaging” to students. As one example, students who receive an early alert about grades at the first mid-term might receive a message from a peer student: “I got an alert last year, went to tutoring and turned my grade around”.
- Begin to co-develop an interactive and personalized student-facing application so students can map-out an integrated plan to achieve their academic and career aspirations
 - using Degree Search, Major Maps, iGrad, Schedule Planner, career planner, graduation planner, etc.
 - students control their course planning (within the degree map), visualize progress towards their goals, understand the implications of changing plans (e.g., cost), layout their own milestones to achieve (e.g., internship), and integrate achievements in ePortfolio
 - students own their plans and define their aspirations at the beginning, rather than at the end, of their college experiences.

Highlighted initiatives (cont.)

Strategies to Realize Goals (Cont.)

- Curricular Innovations. Major expansion of new approaches will continue to drive improved learning, and by so-doing, improve student success, leading to improved retention and graduation. These innovations require active/engaged learning and a level of personalization not normally found in traditional pedagogies. The LEAD program is an example. Additionally, adaptive learning-based pedagogy is blended with interactive learning that cause students to apply their knowledge; extend it to unfamiliar situations; and formulate solutions to complex problems.
 - Additional courses will be added next year in pre-calculus, economics (two courses) and history bringing the total to ten courses in general education courses.
 - Calculus courses will follow soon.
 - The next project will develop over time, adding courses that connect to each other in the entire biology major, business and engineering. For instance, physics for engineers will “talk” to the calculus class if a student is encountering a problem remembering the calculus that is prerequisite for solving the physics problem.

Enterprise Performance Incentives

FY2015-2018 Goal 2

University attaining the projected 2018 fiscal year strategic plan metric goal for the total research expenditures of \$562.5 million; with an additional incentive for exceeding the goal by attaining total research expenditures of \$607.4 million for the 2018 fiscal year.

FY 2017 Goal 2

Enterprise Metrics Performance Incentives:

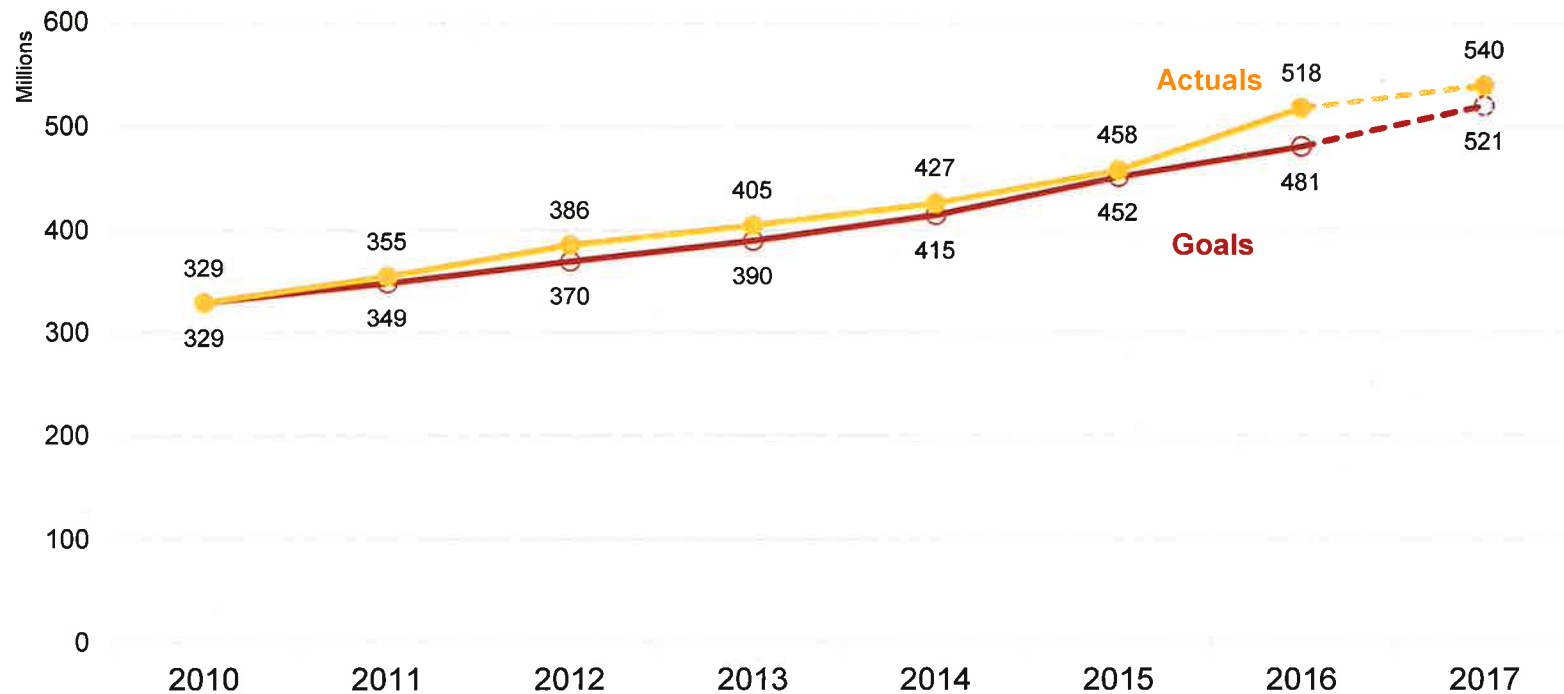
Research Expenditures: \$521 million

Estimate as of July 2017

Progress Report Follows

Total Research Expenditures

Research Expenditures vs. Goals

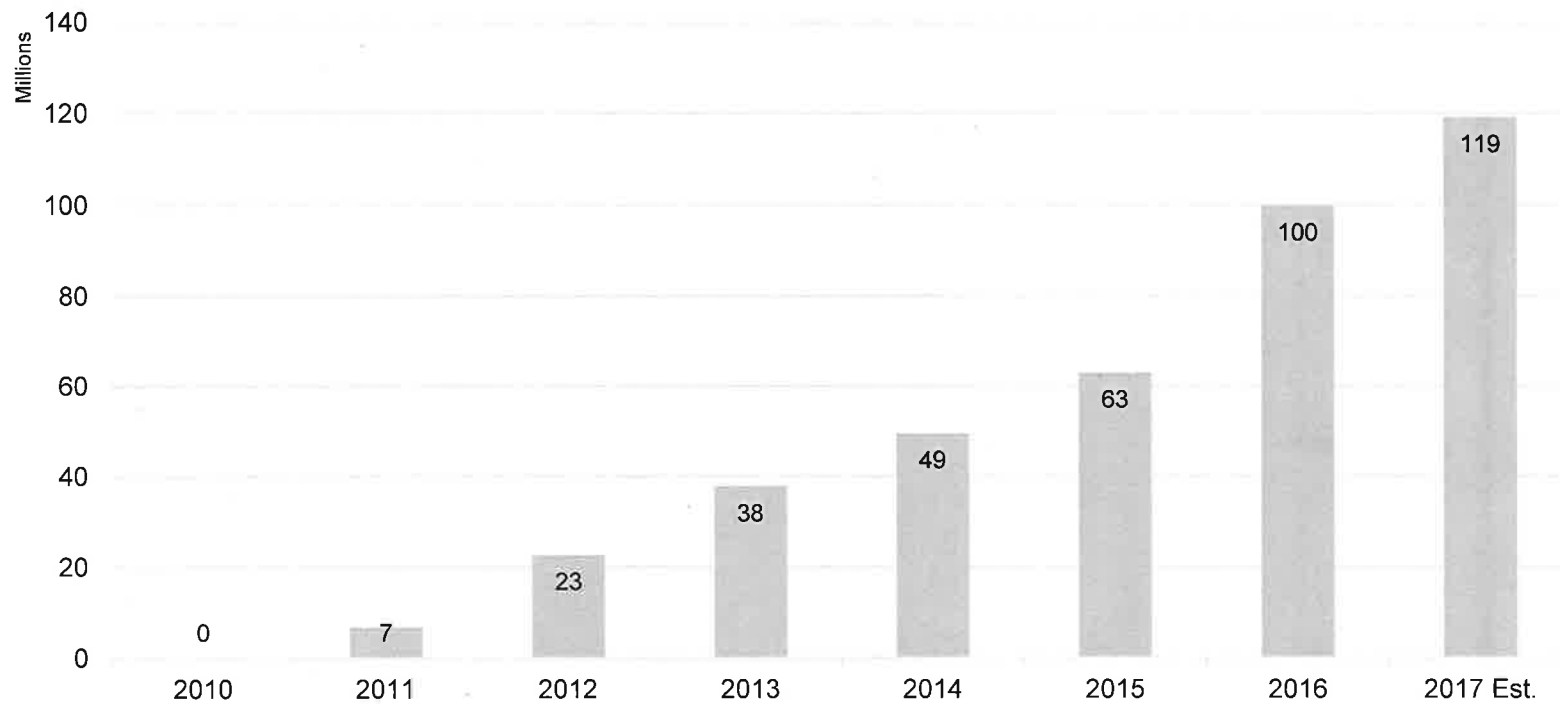


ASU has met or exceeded its goal in each year of the Enterprise Plan.

ASU's Research Expenditures have increased by 57% in the first 6 years of the Enterprise Plan.

Total Research Expenditures

Cumulative Outperformance vs. Goals

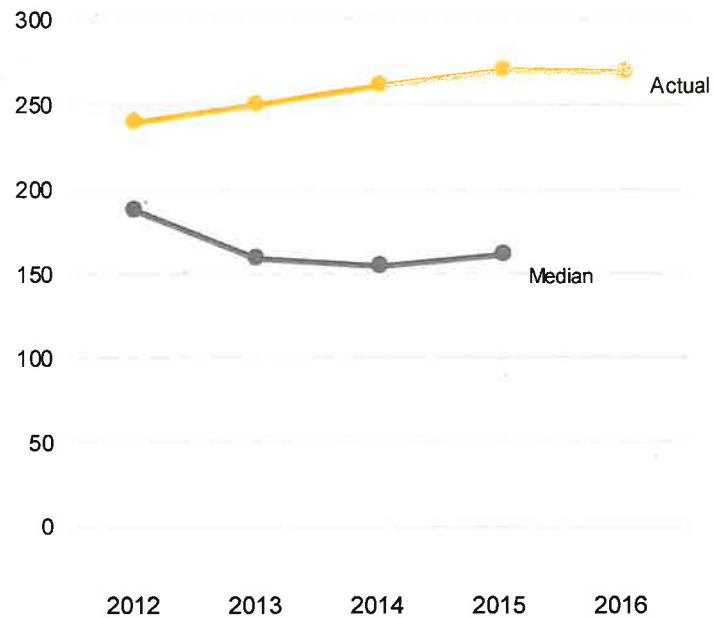


ASU has outperformed its research expenditure goals by nearly \$100M.

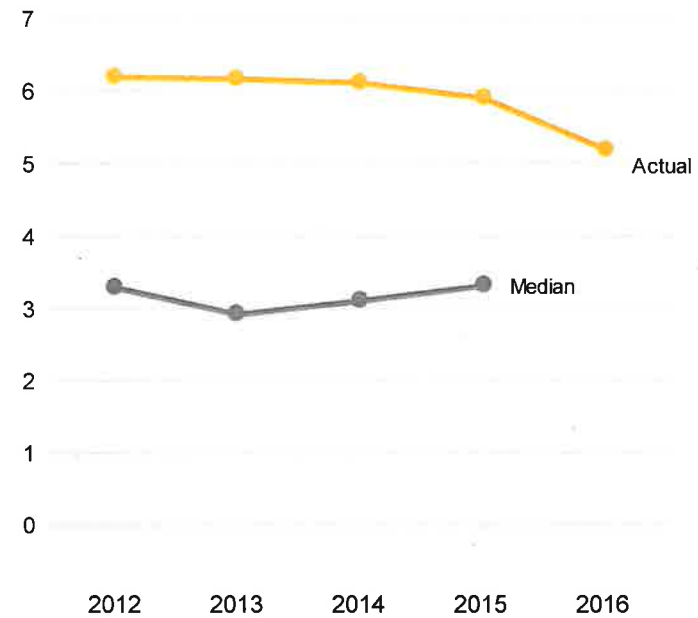
Research Metrics

Invention Disclosures

Invention Disclosures Transacted



per \$10M in Total Research Expenditures

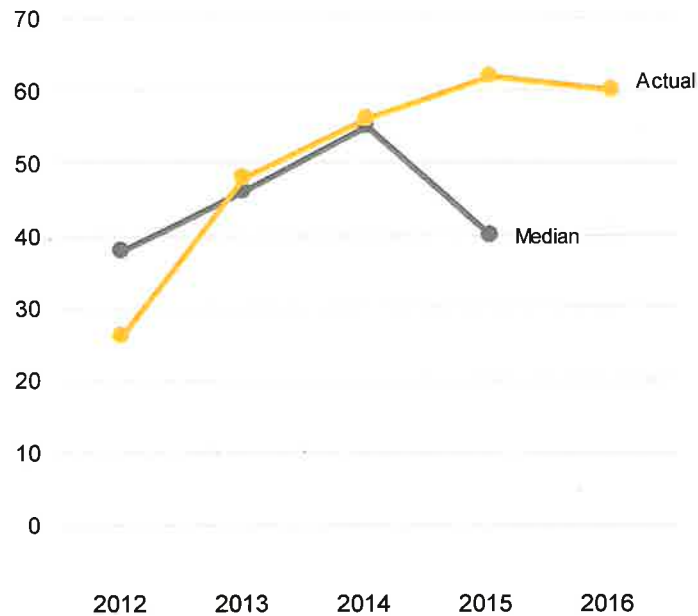


ASU significantly outperforms the median of its peer institutions in invention disclosures transacted.

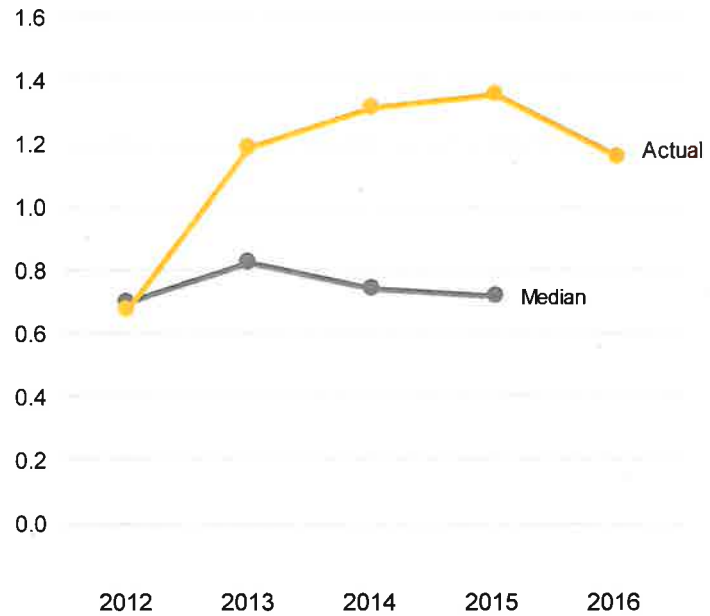
Research Metrics

U.S. Patents

U.S. Patents Issued



per \$10M in Total Research Expenditures

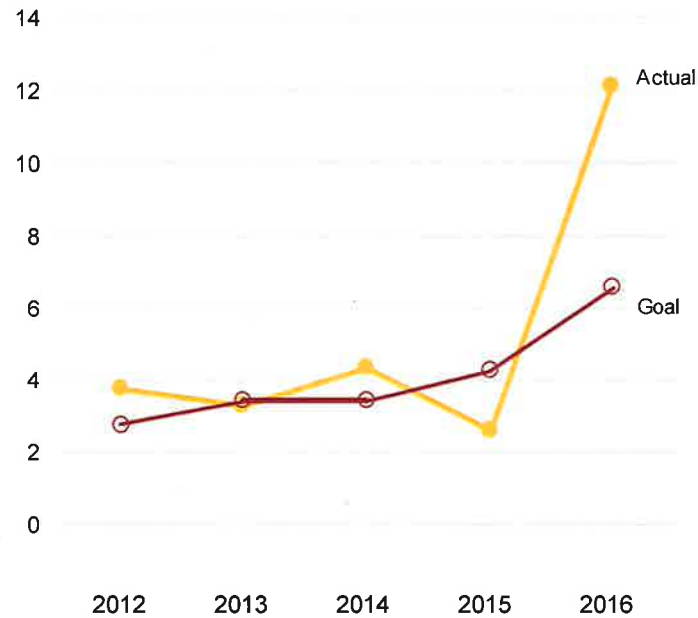


ASU significantly outperforms the median of its peer institutions in U.S. patents issued per \$10M in research expenditures.

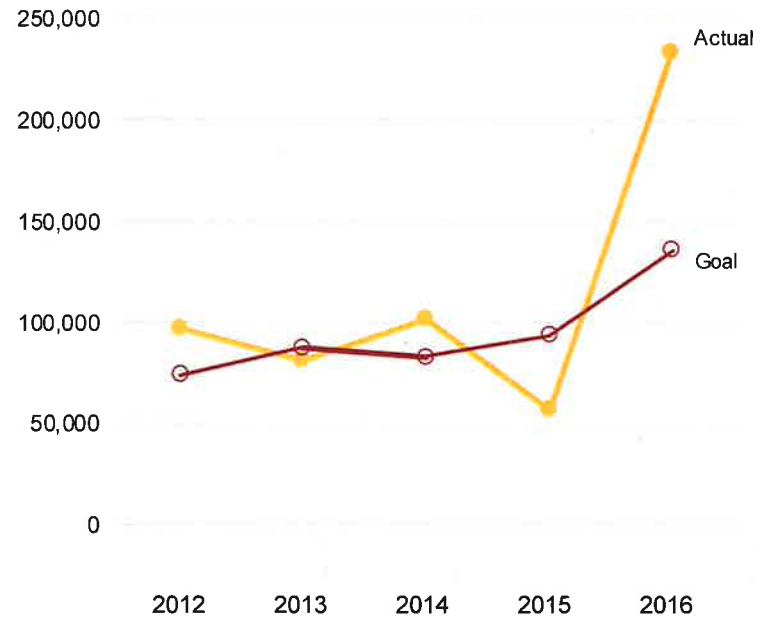
Research Metrics

Intellectual Property Income

Intellectual Property Income



per \$10 Million in Total Research Expenditures

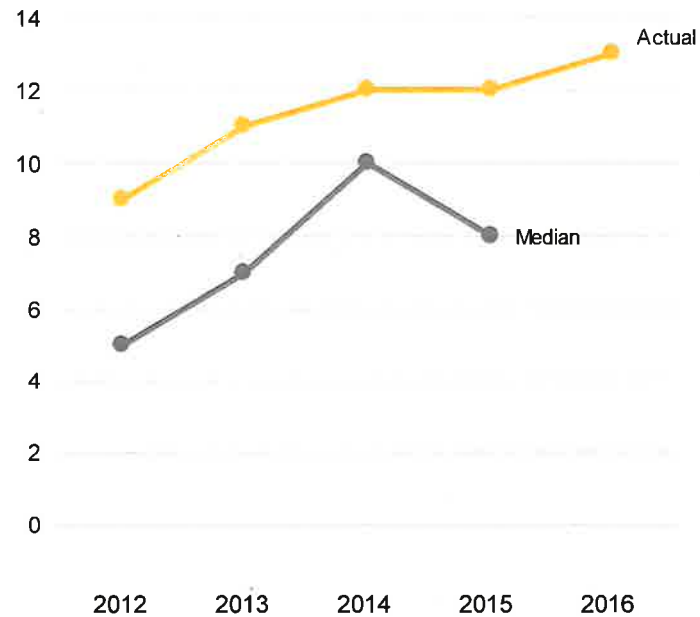


ASU outperforms the median of its peer institutions in research expenditures per square foot of research space.

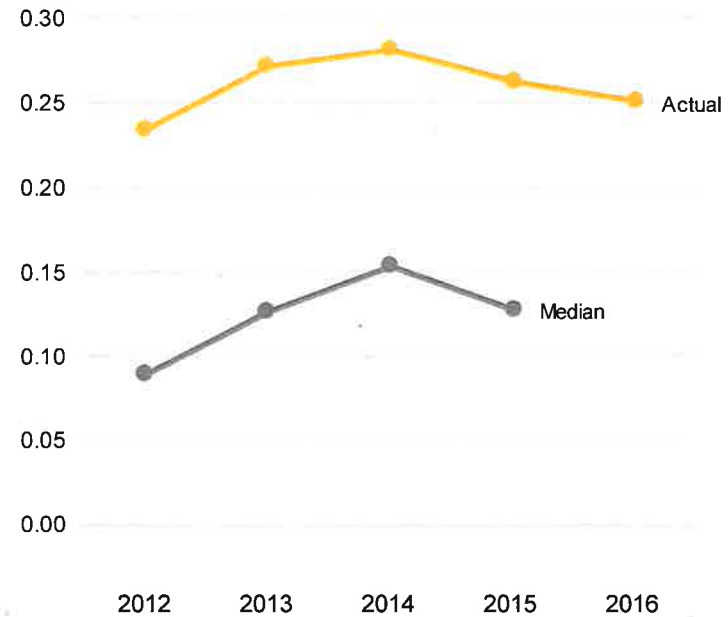
Research Metrics

Startup Companies

Startup Companies



per \$10 Million in Total Research Expenditures

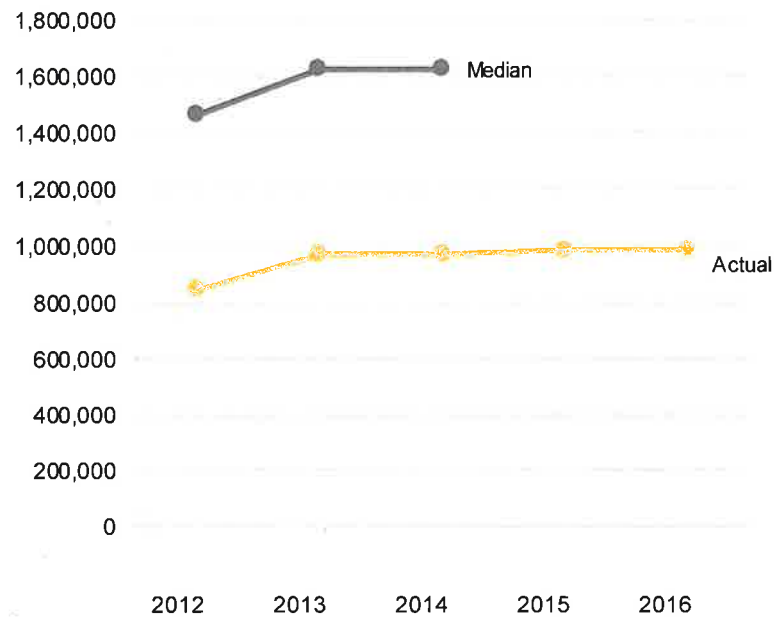


ASU significantly outperforms the median of its peer institutions in startup companies launched.

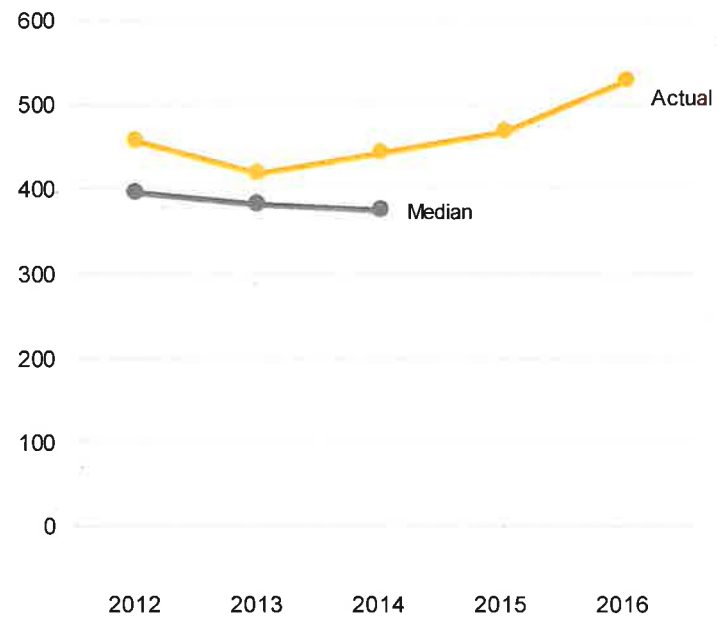
Research Metrics

Net Assignable Research Square Feet

Net Assignable Square Feet (NASF)



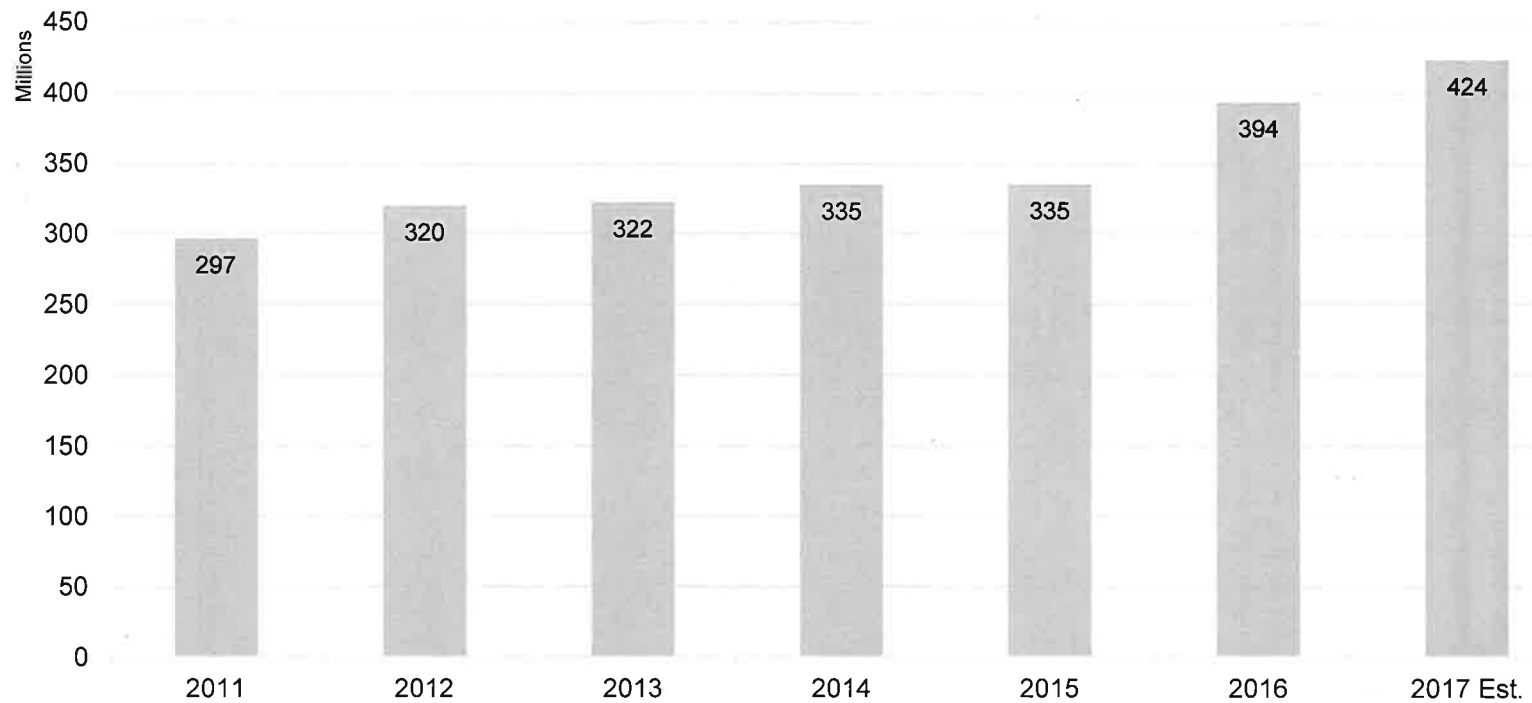
Total Research Expenditures per NASF



ASU outperforms the median of its peer institutions in research expenditures per square foot of research space.

Looking Forward

Award Obligations Received

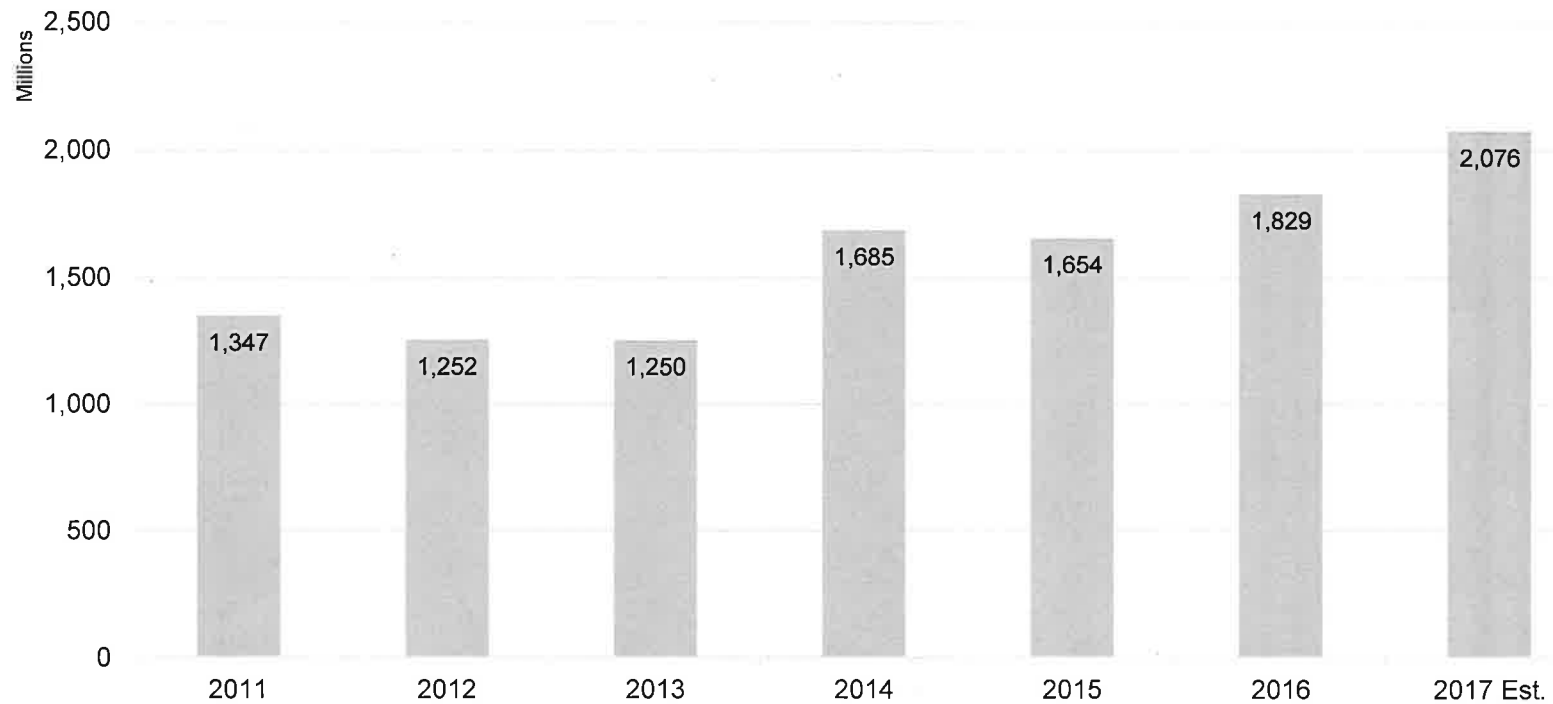


ASU's award obligations are at an all time high.

ASU's award obligations increased by nearly 43% since 2011.

Looking Forward

Proposals Submitted



ASU's proposal volume nearing institutional records set during ARRA period.
ASU's proposal volume has increased more than 65% since 2012-2013 levels.

Enterprise Performance Incentives

FY2015-2018 Goal 3

Achievement of the projected 2018 fiscal year strategic plan metric goal in Bachelor's Degrees awarded of 16,246.

FY 2017 Goal 3

Enterprise Metrics Performance Incentives:

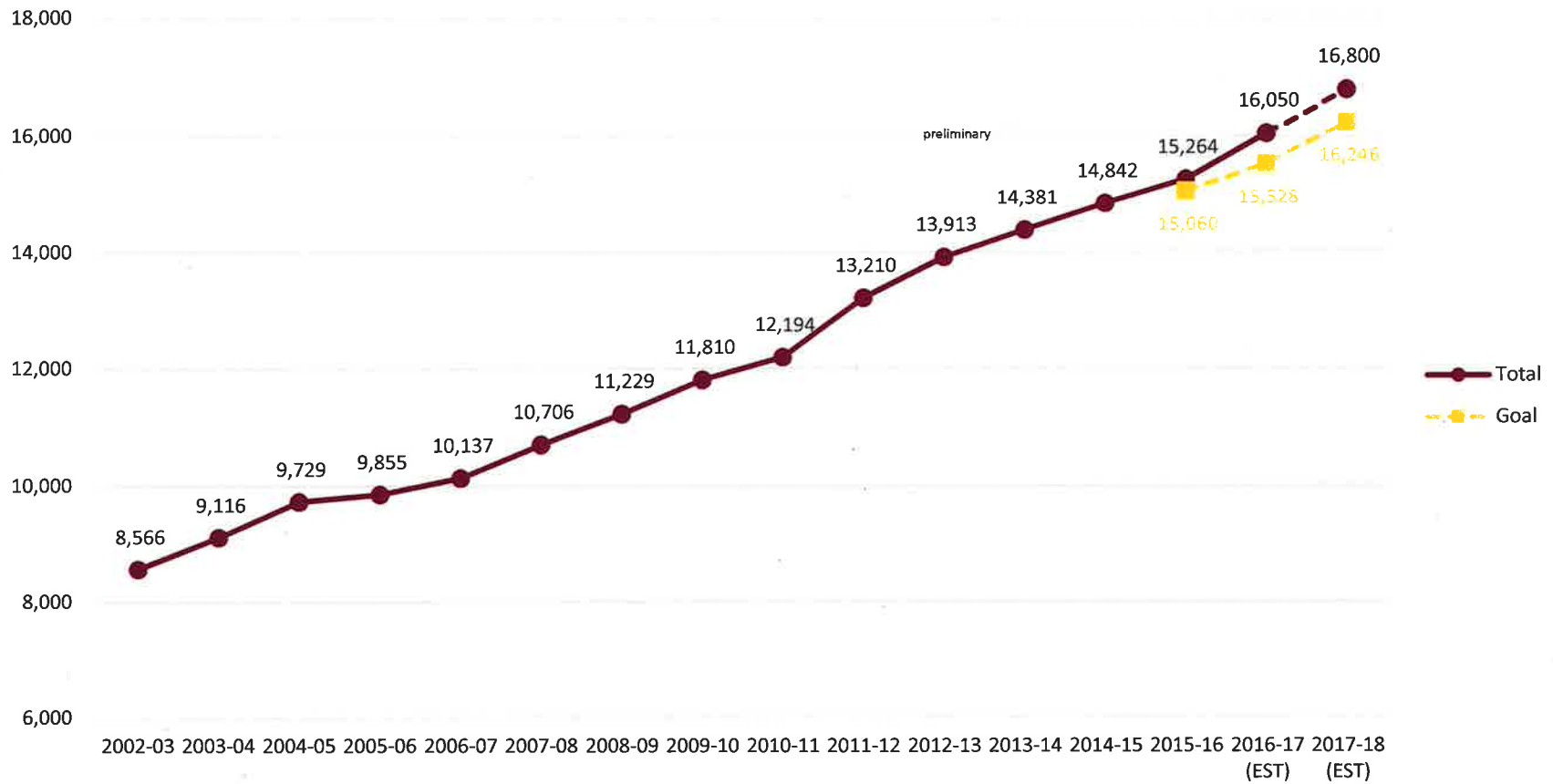
Bachelor's Degrees Awarded: 16,050

Estimate as of July 2017

Progress Report Follows

Achieving Degree Goal:

Number of Bachelor's Degrees Awarded by Reporting Year



Achieving 2018 Metric: 16,246 Bachelor's Degrees

Importance of Increasing Bachelor's Recipients in Arizona

- Obtaining a college degree remains the single greatest determining factor in social mobility – ability to improve one's socio-economic position.
- University graduates produce cutting edge ideas, products, and processes that move creativity and discovery into the marketplace, boosting personal as well as societal success.
- Increasing the number of college graduates will improve outcomes for children, for our health and social systems, and for civic participation in Arizona.

Achieving 2018 Metric: 16,246 Bachelor's Degrees

Strategies to Realize Goals

- Continued growth in the freshman class (78% increase since 2002)
- Continued growth in transfer pathway programs with community college partners. Fall new transfers increased by 98% since 2002.
- Continue to add about 10 new degree program offerings each year.
- Continue to increase Online program offerings. More than 65 undergraduate degree programs and concentrations are offered online.

Achieving 2018 Metric: 16,246 Bachelor's Degrees

Strategies to Realize Goals (cont.)

- Long-term upward trajectory in graduation rates.
 - Since 2006, the overall 4 year rate has increased from 33.6% to a forecast of 51.1% for the 2013 cohort. The rate for the 2013 cohort represents a slight .5 percentage point decline over the prior cohort.
 - The decline is entirely due to the increasing share of the class that were non-residents, who retain and graduate at lower rates than Arizona residents, rather than to the rate at which students graduate. The 4 year rate for Arizona students continues its trend of improvement, from 34.5% for the 2006 cohort to 53.5% forecasted for the 2013 cohort. At the same time, the rate for non-resident students improved from 31.8% in 2006 to an expected rate of 48.6% for the 2013 cohort.
 - Similarly, the overall 6 year rate has increased from 57% (2006 cohort) to a forecasted 67.8% for the 2012 cohort. The rate for Arizona students has increased from 61.1% to a forecasted 70.5%, for the same time period.
 - It is important to note that retention and graduation rates for the 2011 cohort have shown or will show a slight decline from the 2010 cohort rates, but exhibit subsequent recovery to the same or higher rates for the 2012 cohort. The drop off for the 2011 cohort is attributable to a sharp decline in their first year retention due to an increase in the unmet cost of attendance, stricter renewal criteria for a scholar program, the cumulative effect of the recession, and an increased number of students with math deficiencies . ASU ameliorated as many of these issues as possible, hence the subsequent recovery.

Enterprise Performance Incentives

FY2015-2018 Goal 4

Achievement of the projected 2018 fiscal year strategic plan metric goal of 100,184 total students enrolling in the University.

FY 2017 Goal 4

Enterprise Metrics Performance Incentives:

Total Enrollment: 98,177

FY2017 Result

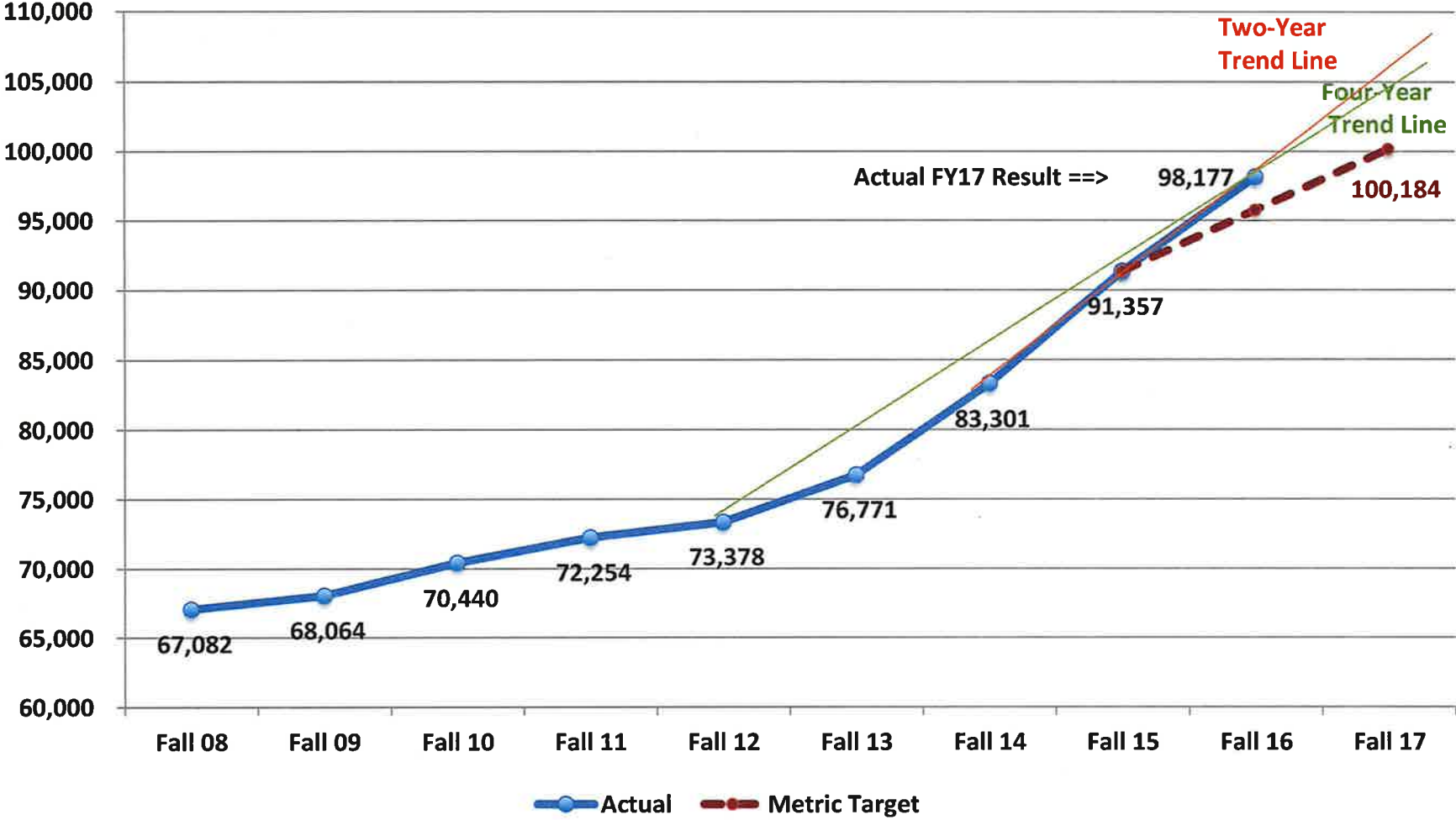
Progress Report Follows

Arizona State University ABOR Metrics Progress Report

Total Enrollment in FY18 (Fall 2017)
As of July 2017

Total Enrollment

Actual Fall 2008 to Fall 2016 & Metric Targets to Fall 2017



Enrollment Growth Philosophy

ASU seeks enrollment growth in order to be of greater service to:

- Rising high school seniors to have access to a world class research university
- Transfer students from community colleges
- College completers through online programs
- Areas outside the urban centers through programs in Lake Havasu, Safford, and Yuma
- Industry programs such as the Starbucks partnership

Enrollment Growth Strategies

ASU will seek to expand the pipelines from AZ high schools and community colleges through efforts with:

- Expanded reach of programs in more high schools
- ASU Preparatory Academy
- ASU Digital Academy
- Better penetration of eAdvisor access for community college students.
- Earned admission programs (GFA)

ASU will ramp up on-ground activity in domestic and overseas recruiting in conjunction with the improving ASU brand reputation that is driven by:

- #1 school for innovation designation
- National visibility for the New American University model
- Current and new international educational and research partnerships that extend the awareness of ASU globally.

Enrollment Growth Strategies

Maintaining responsive financial aid policies to offer affordable access is critical to recruitment and retention success

The growth trajectory of ASU Online can be maintained by:

- Continuing to expand the number of undergraduate and graduate degree programs available online, with particular emphasis on engineering and business
- Refining digital marketing strategies in conjunction with marketing partner
- Continuing to innovate with state-of-the-art instructional technologies and tools to assure highest quality courses in the market.
- Offering alternate pathways such as Global Freshman Academy

Enterprise Performance Incentives

FY2015-2018 Goal 5

Achievement of the projected 2018 fiscal year strategic plan metric goal number of degrees in high demand fields of 9,450.

FY 2017 Goal 5

Enterprise Metrics Performance Incentives:

Degrees Awarded in High Demand Fields: 8,297

FY16 Result

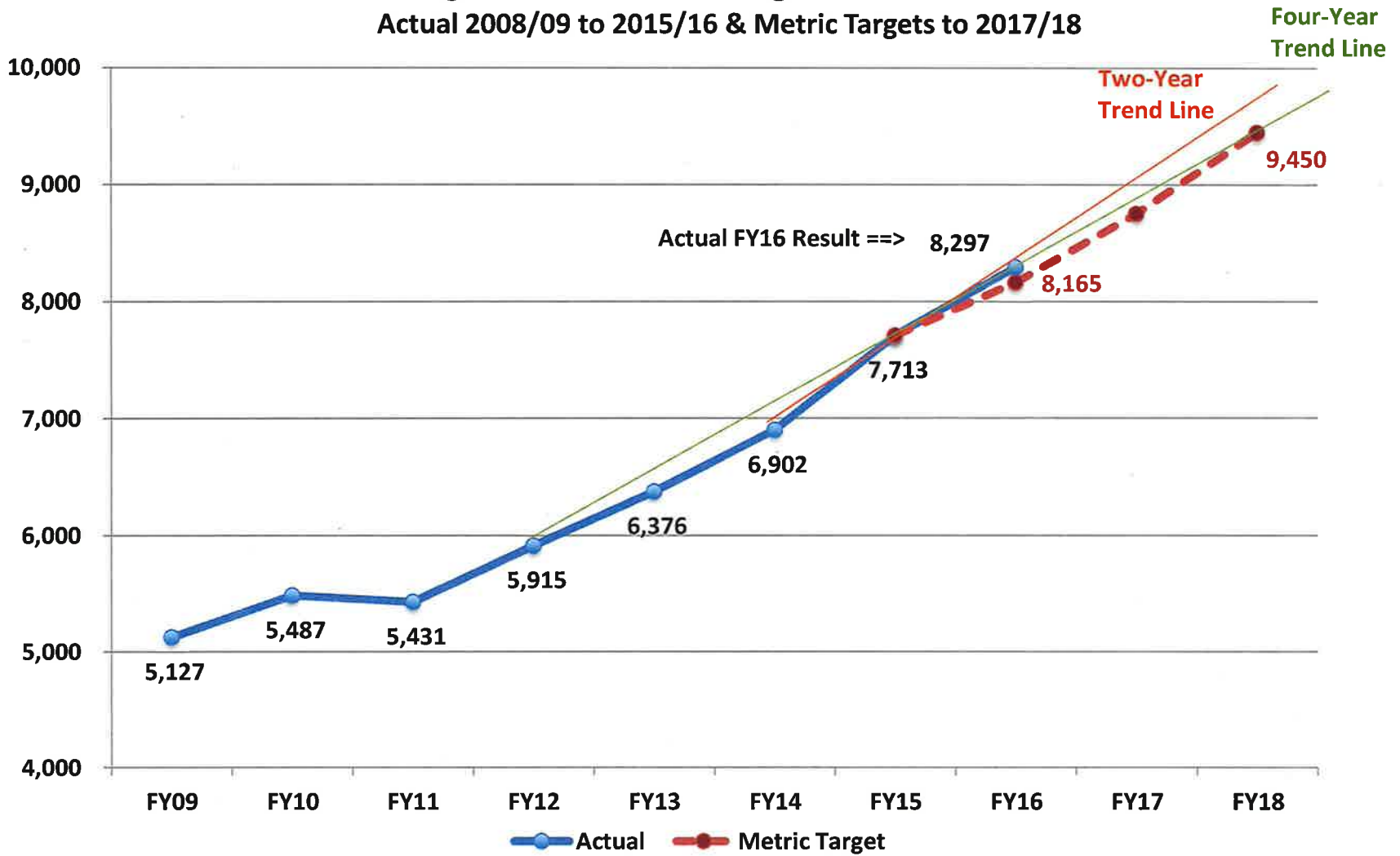
Progress Report Follows

Arizona State University ABOR Metrics Progress Report

Total Degrees Awarded in High Demand Fields in FY17
As of June 2017

Degrees Awarded in High Demand Fields

Actual 2008/09 to 2015/16 & Metric Targets to 2017/18



High-Demand Degree Strategies

- High demand degrees have been defined as those from the STEM fields (natural sciences, engineering and technology, and mathematics), the health professions, and education.
- Student demand has shifted towards all of these fields (except education) as concerns about career prospects have become more of a focus in the choice of majors.
- ASU believes that this shift will continue, and current enrollment patterns confirm that. Achieving the targets require the ability and willingness to provide sufficient capacity to meet demand.

High-Demand Degree Strategies

- On-campus investments in the sciences and engineering in faculty and in student housing are underway.
- New online programs, particularly in engineering and in bio-medical sciences, will further enlarge capacity for enrollment.
- New options for healthcare programs have been introduced to provide more opportunities beyond nursing. Examples include: Science of Healthcare Delivery, Health Policy, Health Management, Healthy Lifestyle Coaching, and Biomedical Informatics.
- Education degree demand growth will require better market signals. ASU has efforts to provide teaching credentials to students in a wide range of non-education majors

University Initiatives Performance Incentives

FY2015-2018 Goal 1

Attain top three ranking in the PAC 12 for academic performance of ASU student athletes.

FY 2017 Goal 1

University Initiatives Performance Incentives:

PAC 12 Academic Performance for Student Athletes

Exceeding projected goals

Progress Report Follows

Attain top-three ranking in the Pac-12 for academic performance of ASU student-athletes

The strategic importance of the incentive to the university or enterprise strategic plan;

Collegiate athletics is generally recognized as the “front porch” to its respective university. Given its visibility, as well as the high level of local and national interest in intercollegiate athletics, student-athlete achievement is under constant scrutiny. While wins bring the most exposure, the overarching goal of Sun Devil Athletics is to ensure the academic success, graduation, overall well-being and successful career transition of ASU student-athletes.

Achievement of the incentive as assigned, progress toward achievement, or challenges that prevented achievement and a strategy for overcoming those challenges;

The primary metrics of academic performance for Sun Devil Athletics are 1) graduation success – measured by the NCAA Graduation Success Rate; 2) contemporary academic progress – measured by the Academic Progress Rate; and 3) overall and team grade point averages.

Additionally, academic achievement is demonstrated through the number of conference and national academic awards that SDA student-athletes receive, including:

- Pac-12 Conference Scholar-Athletes of the Year (annual since 2007)
- Academic All-Americans
- Post-Graduate Scholarships awarded

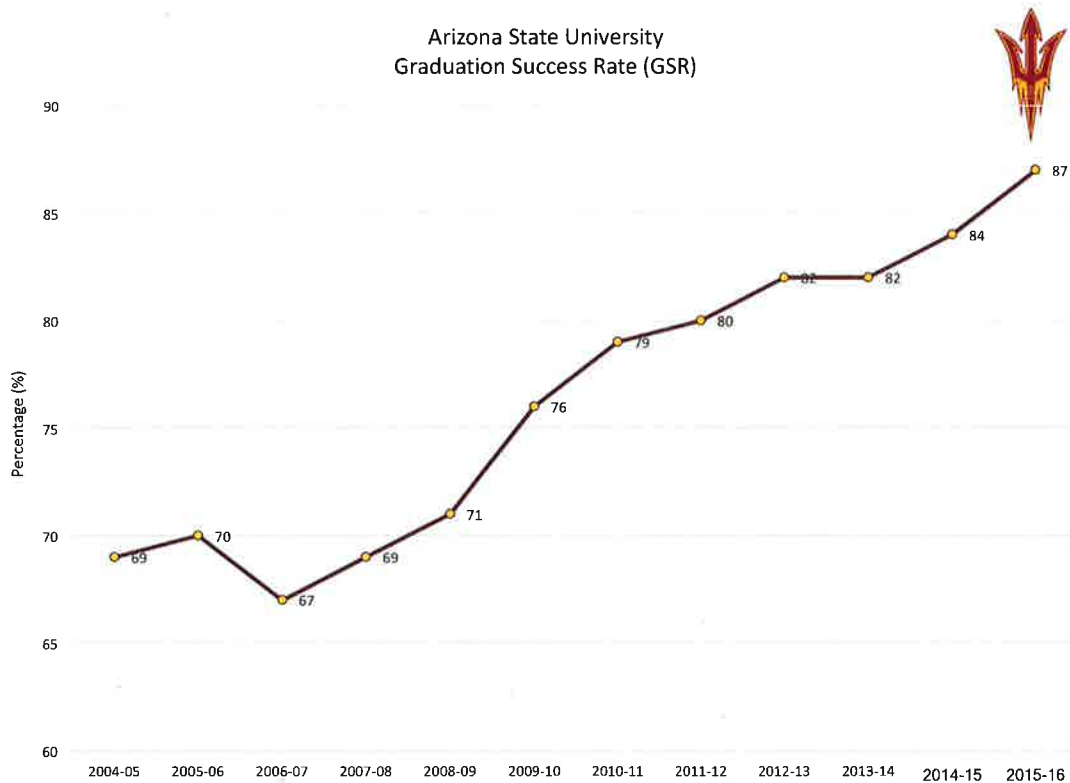
Graduation Success Rate	87%	2nd Place in Pac-12 (tied)
African American Student Athlete	85%	2nd Place in Pac-12
Academic Progress Rate	991*	2nd Place in Pac-12 (tied)
*Average APR score across all sports		
Seven teams gained NCAA national recognition for being ranked in top 10 percentile		2nd Place in Pac-12
Grade Point Average	3.15*	Highest all-time/no comparison data for Pac-12
*Average GPA for all student-athletes for 2016-17 academic year		
Pac-12 Scholar Athletes of Year	32*	2nd in Pac-12 Conference
*This honor began in 2007		
Academic All-Americans	74	2nd in Pac-12 Conference*
*Since 2000 (http://www.thesundevils.com/sports/2013/4/17/208257057.aspx)		
NCAA Postgraduate Scholarships	30	2nd in Pac-12 Conference*
*Since 2000 (http://www.thesundevils.com/sports/2013/4/17/208257057.aspx)		

Data or other evidence demonstrating achievement;

Graduation Success Rate:

87% = ASU's all-time high; have tied or surpassed previous all-time high in each of the past nine years.

- Women's GSR is 91%
- Men's GSR is 83% and has improved from 56% in 2005.
- ASU has confirmed we will maintain 87% at the next report in October 2017

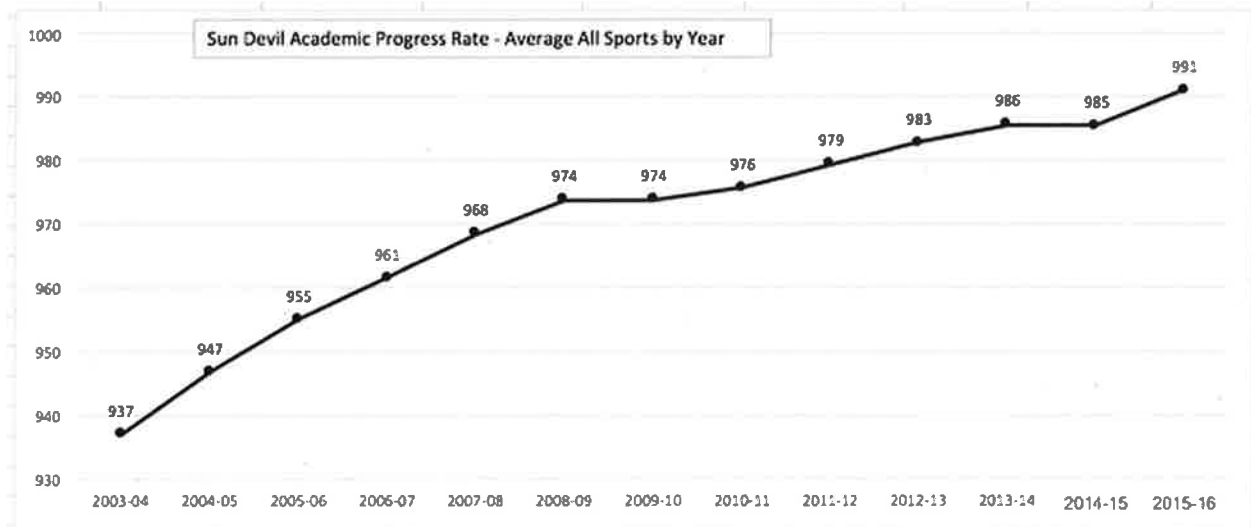


Academic Progress Rate

991 – continuous improvement since beginning of metric.

Teams ranked 1st in the Pac-12 (multi-year): Men's Golf, Women's Basketball, Women's Golf, Gymnastics, Women's Tennis, Women's Track, Beach Volleyball and Volleyball.

Ranked 2nd in Pac-12 for most teams recognized by the NCAA in the top 10%.



Any administrative, personnel, resource allocation or policy changes associated with achievement of the incentive;

- Created and enhanced systems to evaluate risk factors for all entering and continuing student-athletes
- Continued research on best practices for supporting academic performance
- Hired full-time learning specialist within past five years
- Incremental increases of staff size toward optimal ratio of academic support staff to student-athletes
- Evolved culture regarding academic excellence / achievement

2016-17:

- Hire an additional full-time learning specialist and Academic Coordinator – approved and completed FY17
- Continue to evolve comprehensive assessment tool for evaluating incoming and returning student-athletes by utilizing ME Screener
- Use technology to provide tools to enhance student-athlete academic performance and continue to collaborate with the University Technology Office to enhance performance-tracking software through DocuSign Grade Checks

The plan or proposed strategy for maintaining the achieved goal or the momentum put in place in support of the strategic initiative(s) described in the incentive; and

- Hire an additional full-time learning specialist.
- Move into larger Academic Center, which will provide a variety of benefits:
 - Offers productive and diverse learning spaces for student-athletes
 - Will separate social and academic spaces
 - Features increased technology and access for student-athletes
- Use technology to provide tools to enhance student-athlete academic performance and continue to collaborate with the University Technology Office to enhance performance-tracking software

- Increase compensation for Academic Coordinators
- Continue to evolve comprehensive assessment tool for evaluating incoming and returning student-athletes
- Customize educational tools and motivational methods better to meet the needs of current student-athletes

University Initiatives Performance Incentives

FY2015-2018 Goal 2

Increase fundraising to more than \$165 million per year over the 3-year average of FY16, FY17 and FY18.

FY 2017 Goal 2

University Initiatives Performance Incentives:

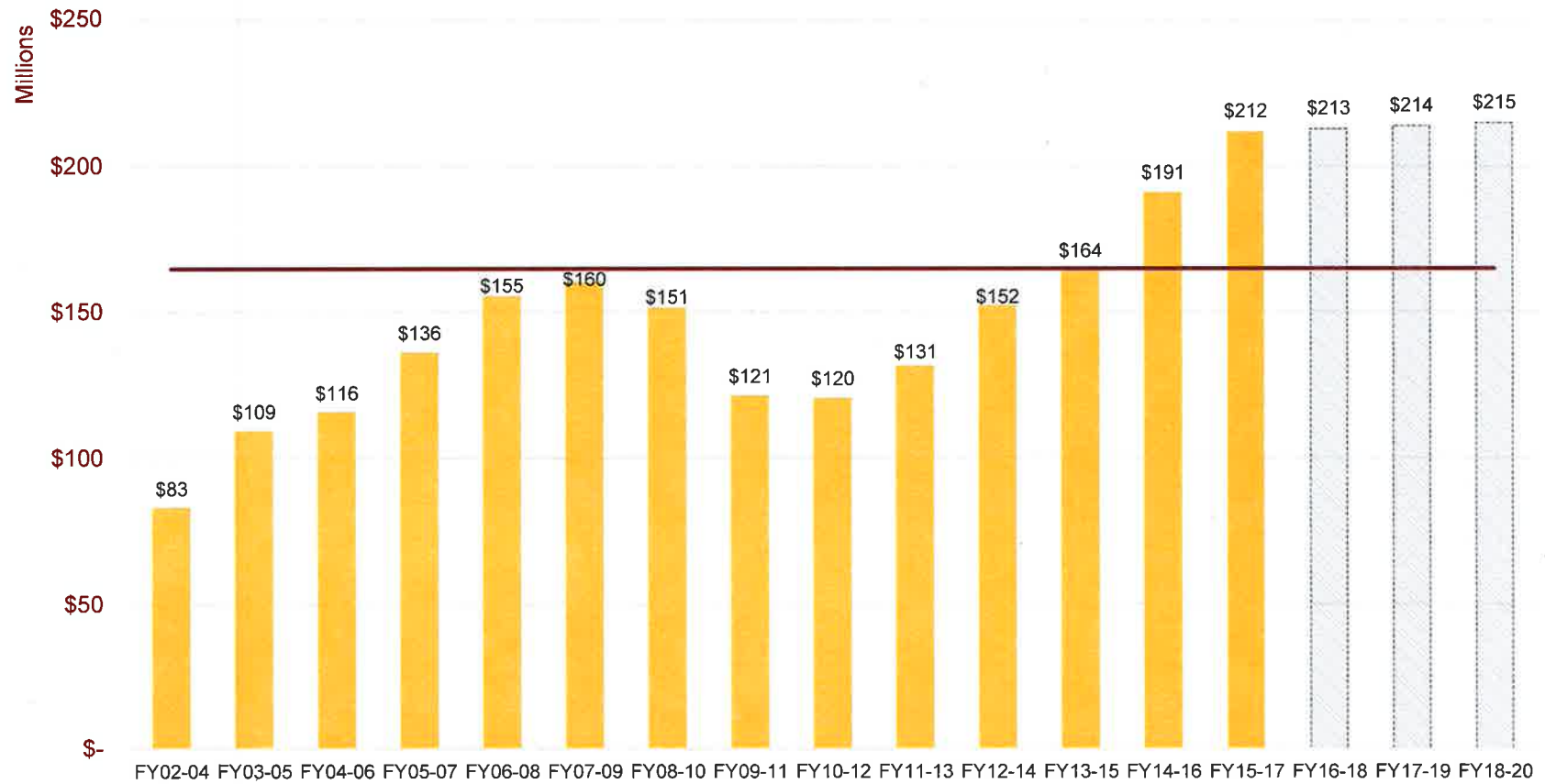
Fundraising to more than \$165 million per year over 3 year average

Exceeding projected goals

Progress Report Follows

- The strategic importance of the incentive to the university or enterprise strategic plan:
 - Resource raising is a key component to the University’s 2025 strategic outcomes as it advances Arizona State University as The New American University. The ASU Foundation has completed its 2025 strategic plan to support the University’s strategic outcomes for 2025, which will provide \$1B more to the University.
- Achievement of the incentive as assigned, progress toward achievement, or challenges that prevented achievement and a strategy for overcoming those challenges:
 - The ASU Foundation has a great team and strong leadership in place, and has established an innovative approach that complements President Crow and ASU.
- Data or other evidence demonstrating achievement:
 - For the third year in a row, the ASU Foundation has brought more than \$210M+ in new gifts & commitments from ASU investors, while launching the public phase of Campaign ASU 2020.
 - Since FY11, the ASU Foundation has seen steadily increasing new gifts and commitments which has improved our three year average from \$120M to \$190M+, exceeding the ABOR fundraising target.
 - See next slide on 3 year average for New Gifts & Commitments.

New Gifts and Commitments
Three-Year Average



FY18-FY20 totals are projected estimates

- Any administrative, personnel, resource allocation or policy changes associated with achievement of the incentive:
 - ASU Foundation is fully staffed for the public phase of Campaign ASU 2020.
- The plan or proposed strategy for maintaining the achieved goal or the momentum put in place in support of the strategic initiative(s) described in the incentive:
 - An annual, comprehensive Foundation operations plan outlines key objectives and metrics ensuring a well defined pathway to goal achievement.
 - The ASU Foundation re-structured several units to place a greater emphasis on principal-level giving (\$5M+) philanthropy, increasing overall donor count, and engaging the next generation of prospective donors.
- Any additional issues the president believes may be relevant to the evaluation of the incentive or to the continued success of the initiative described in the incentive:
 - Continued success of the impact of Campaign ASU 2020.

University Initiatives Performance Incentives

FY2015-2018 Goal 3

Launch and operate America's largest engineering school successfully with 90% student retention.

FY 2017 Goal 3

University Initiatives Performance Incentives:

Fulton Schools of Engineering Goal

Progress Report Follows



ASU Ira A. Fulton Schools of
Engineering
Arizona State University



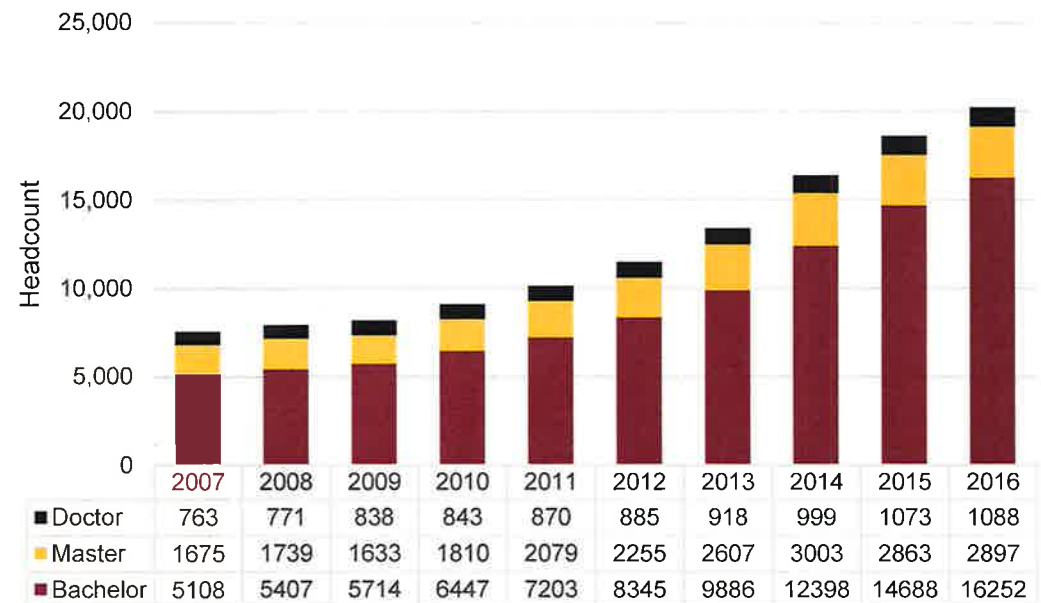
Building engineers at the nation's largest engineering school

Towards 90 percent retention

We are the largest engineering school in the U.S.

- Fall 2016 total enrollment surpassed 20,000. Fall 2017 enrollment expected to increase.
- Fulton Schools engineering enrollment #1 ahead of Texas A&M and Georgia Tech according to 2016 American Society of Engineering rankings

ASU Engineering Enrollment



Quality of student body – Fall 2016

Characteristics of the Freshmen class

- Nearly a quarter of Fulton Schools freshmen are in Barrett, the Honors College.
- SAT Avg 1,184; ACT Avg 26

Characteristics of our Undergraduates (increases relative to Fall 2015)

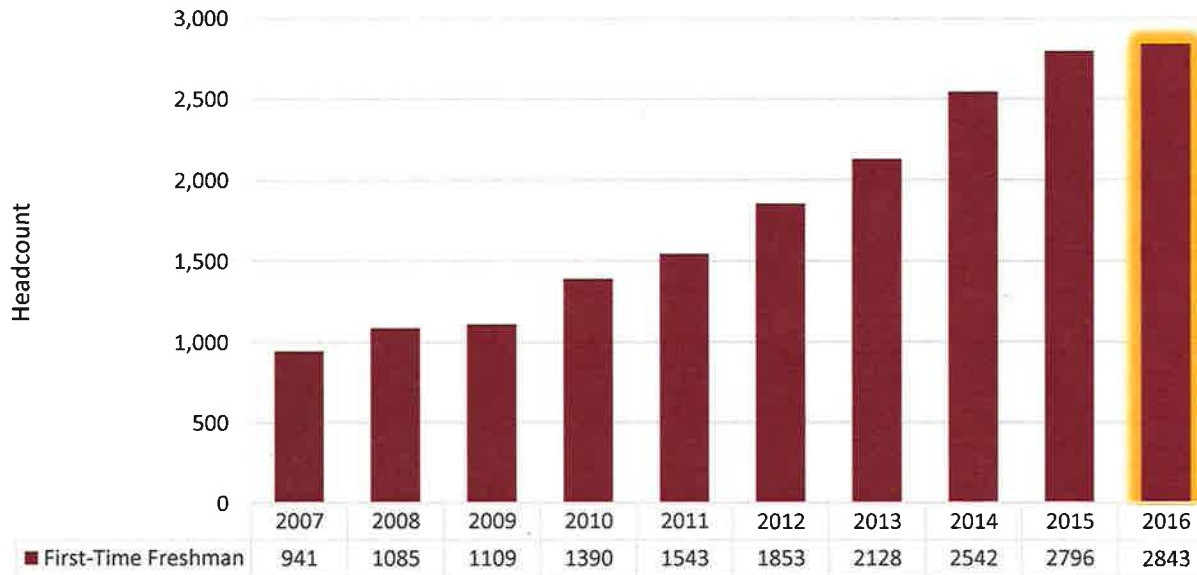
- 177 National Merit Scholars (*6% increase*)
- 125 National Hispanic Scholars (*14% increase*)
- 17 Gates Millennium Scholars (*6% increase*)
- 19 Flinn Scholars
- 3 Goldwater Scholars (9 since 2010), 1 Churchill Scholar, 1 Rhodes Scholar
- 4 National Achievement Scholars

Increasing access

Freshman enrollment

We welcomed 2,843 freshmen in Fall 2016, our largest class ever.

Fulton Schools of Engineering
Incoming Freshman Growth



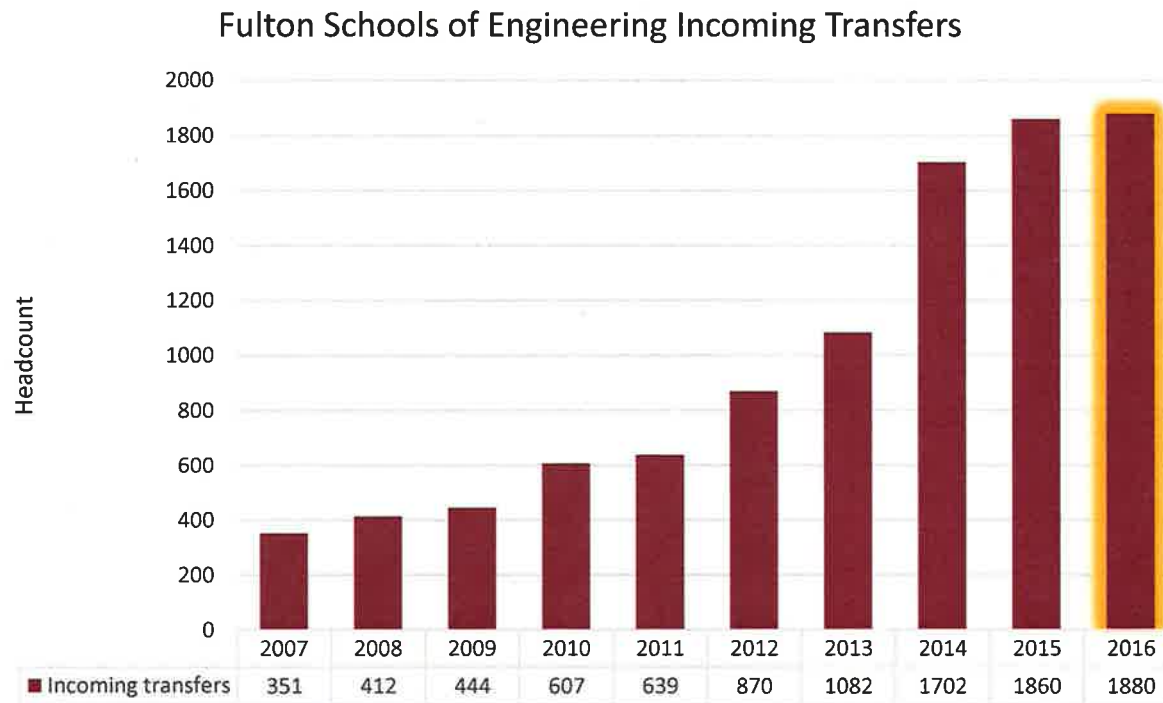
More than 600 women,
highest number in history

More than 700
underrepresented minorities,
highest number in history

Fall 2017 freshmen will
increase between 3-5%
percent

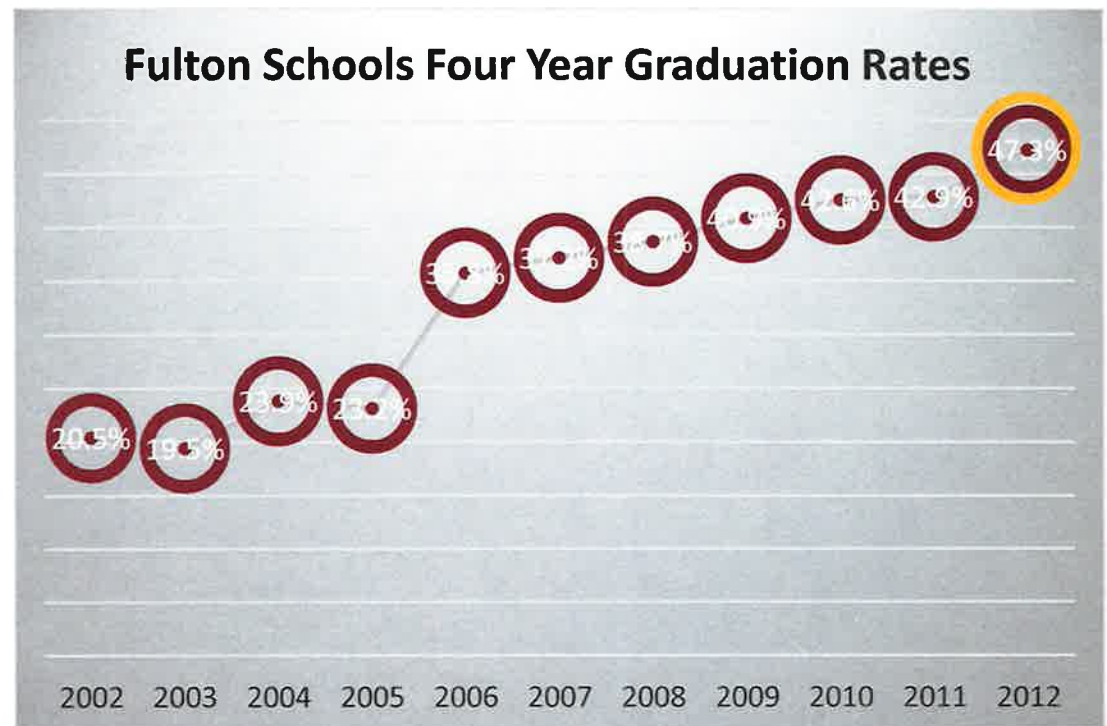
Transfer student enrollment

We welcomed 1,880 new transfer students in 2016.



Graduation rates rising

- Four-year graduation rate hits new high: 47.3 percent
- Five-year graduation rate is 61.0 percent
- Six-year graduation rate is 66.3 percent

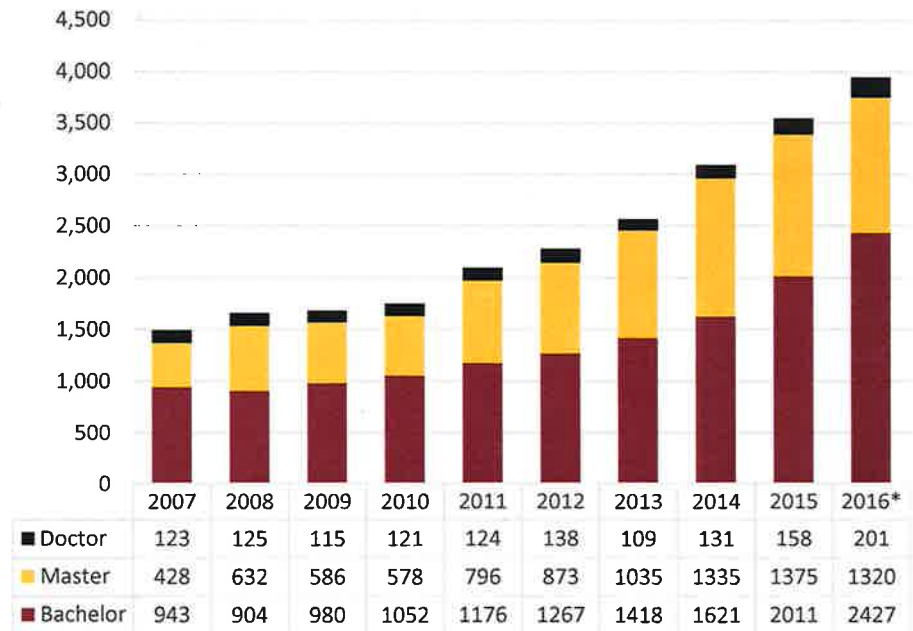


Most degrees granted ever

- Supply of graduates helps fuel Phoenix being named #3 city for tech jobs (TIME Money 6/16/17)
- #7 for bachelor's degrees granted in U.S., up from #16
- #6 for bachelor's degrees granted to Hispanics, up from #11
- #13 for bachelor's degrees granted to women, up from #24

Degrees granted continue to increase particularly at the bachelor's level.

Degrees Granted



* Estimated

Rankings from 2016 American Society for Engineering Education Profiles

**Update on strategies to foster success
in our degree programs**

Engineering Futures Update

Engineering Futures Update

Aim: Support persistence of first-generation students, women and those with socio-economic need in engineering

- 2016-2017 pilot of 100 students in first course included 54 percent first-generation students. Student feedback was overwhelmingly positive.

“I really enjoyed this course as it taught me so much about how to approach important life decisions and what it truly means to be an engineer.”

“Great class. I definitely learned a lot about engineering and more about myself and what I want to do in life and my career.”

Engineering Futures Update

Aim: Support persistence of first-generation students, women and those with socio-economic need in engineering

- Fall 2017 capacity for the program is 200, double that of last year
- Fall 2017 freshman students will enroll in the same classes as their peers, to facilitate engineering affinity building and peer support
- Master's students from our 4+1 accelerated programs will serve as peer mentors to enhance student retention

Young Engineers Shape the World Updates

Young Engineers Updates

Aim: Recruit and enroll women in Fulton Engineering by increasing awareness of engineering pathways among 11th and 12th grade students.

- 2016-2017 pilot launched with 100 students from seven area schools with 74 female, 26 male; 44 first-generation, 56 non-first-generation
- Offered 5 after school sessions of 90 minutes at high schools
- Offered 2 day-long Saturday design experiences at ASU
- 2017-2018 plan to continue programing at double capacity or more

New strategies 2017–2018

Strategies 2017–2018: Enhance ASU 101

- Integrate E2 camp with ASU 101 for all freshmen and strengthen affinity by expanding and reinforcing the “Engineers from day one” mindset.
- Integrate participating advisors, faculty, and peers into a refined and enhanced ASU 101 course
- Foster a stronger relationship between student and advisor by increasing presence and support provided by academic advisors in class

Strategies 2017–2018: Comprehensive Support

- Pilot Fulton Schools Study Groups in collaboration with the School of Mathematical and Statistical Sciences
- Use ASU's new analytics platform to track Fall 2017 freshmen from E2 through Fall 2018 enrollment
- Retention specialists reach out to students who are at-risk for attrition, i.e., early withdrawal, non-engaging and academic difficulty
- Improve tutoring delivery to support students in-person and online

ASU® Ira A. Fulton Schools of
Engineering
Arizona State University

engineering.asu.edu