ARIZONA BOARD OF REGENTS' COST STUDY

DECEMBER 2017

BOARD OF Regents ARIZONA'S PUBLIC UNIVERSITIES

EDUCATE · DISCOVER · IMPACT

ASU Arizona State University | NORTHERN ARIZONA UNIVERSITY | THE UNIVERSITY OF ARIZONA

Introduction

Arizona Revised Statutes §15-1650.03(A) requires the Arizona Board of Regents (ABOR) to complete a cost study by December 15, 2017[1]. The cost study's purpose is to determine the cost of educating a full-time resident undergraduate student at each university. The legislation outlines the following elements to be included in the report:

1. The use of instructional fees at each university, including differentiating between mandatory fees, program fees and course fees.
2. Differentiated costs between programs of study, including differential tuition and program and course fees.
3. The costs of faculty and administration differentiated between the amount of time needed to instruct students and to conduct research.
4. A breakdown of where tuition dollars are allocated, including the amount that is not directly attributable to instructional costs.
5. An analysis of the marginal cost and the average cost of a student depending on the type of program in which the student is enrolled, including online programs.

Findings

- During fiscal year 2016, on average, Arizona's public universities spent $16,813 per student.
- This per FTE[2] cost is based on nationally established financial reporting standards and audited financial information.
- ABOR engaged Grant Thornton, a national accounting firm, to independently verify the presented information and provide comparisons with peer universities.
- Grant Thornton found Arizona public universities' use of the data is correct.
- Grant Thornton also determined Arizona's public universities cost per student is lower than their peers, the aggregated national average of four-year public research institutions and the aggregated national average of all four-year public institutions.
    - ASU is 38% below its peer institutions
    - NAU is 27% below its peer institutions
    - UA is 24% below its per institutions
    - ASU, NAU and UA are 21% below all four-year public research universities
    - ASU, NAU and UA are 5% below all four-year public universities
- After adjustments for inflation, fiscal year 2016 per student expenditures were $838 less than per student expenditures in fiscal year 2008.

[1] See Appendix A

[2] Student counts are measured in terms of head count or Full-Time Equivalent (FTE). The student head count measure counts full and part-time students equally. The FTE calculation is based on total enrollment divided by credit hours as defined in A.R.S. §15-1661. This study uses 21st day FTE counts.

Approach

Arizona's public universities produce and publish substantial amounts of cost information. To establish a cost per resident student, ABOR determined the number should be grounded in cost data that is:

- Based on audited data;
- Consistent across Arizona's public universities;
- Based on clear cost definitions;
- Comparable across time; and
- Comparable with other peer universities.

The Educational and General Expense report (E&G) meets these standards. The E&G report was established by the National Association of College and University Business Officers (NACUBO), which also dictates the guidelines for completing the report. The report is widely used in higher education and collected and published in the Federal Government higher education database, which allows for comparisons across time and with peer universities. Data in the report is based on university audited financial statements and ties to each university's Comprehensive Annual Financial Report (CAFR).

The E&G report focuses on academic costs and excludes auxiliary (self-supporting enterprises, e.g., residence and dining halls, bookstore, parking, etc.), research and new construction capital costs. The report divides expenditures into the following defined functional categories:

> **Instruction:** Instruction includes all activities that are part of an institution's instructional program. Expenditures include all general academic instruction activities for both credit and noncredit courses. Includes remedial and tutorial instruction and vocational instruction (if offered).
>
> **Public Service:** Public service expenditures primarily include all activities providing non-instructional services for individuals and groups external to the institution. These activities include conferences, institutes, clinic services, consultation, advisory services and community-focused service programs. Many public service activities serve an ancillary role to the instructional mission of the institution, as they provide an opportunity for students to observe and participate in activities related to their field of study. *(The non-instructional component of this category is excluded in this study).*
>
> **Academic Support:** Academic support services are costs that directly support the academic functions of the institution. Expenditures include general academic administration such as Dean's Offices, as well as support directly available to students such as academic technology and support, academic advising and libraries and museums.
>
> **Student Services:** Student services expenditures are all student-related activities that support students' emotional and physical well-being and intellectual, cultural and social development outside the context of the formal instruction program, including the Dean of Students, disability resources services, peer mentoring programs, campus health, student recreation, and counseling services. This category also includes admissions, registrar and career advising and placement services expenditures.

Institutional Support: Institutional support costs include support for general administrative costs. Administrative functions such as executive management, chief academic officer, general counsel, human resources, research administration, accounting and finance, police, procurement, marketing and media relations, information technology, and risk and liability costs.

Operation and Maintenance of Plant: Operations and maintenance of plant are costs related to the administration, supervision, operation, maintenance, preservation and protection of the institution's physical plant. Included are janitorial and utility services, repairs and non-capital alterations of building, furniture and equipment, care of grounds, maintenance and operation of buildings and other plant facilities, space and capital leasing, and facility and capital management. Heavy construction costs and capitalized renovations and upgrades are not included in this category.

Independent Verification

To validate the use of the E&G, ABOR engaged Grant Thornton, a national accounting firm, to review the allocation of expenditures to the E&G and the use of the E&G as the correct base for determining per student academic costs. The independent review consisted of a direct and indirect validation of the process applied and data reported by each university. The study analyzed each university's transaction level expense data, and how each type of transaction was mapped to a cost category defined by NACUBO. The analysis focused on how appropriate the assignments were – reviewing the descriptive detail for the applicable accounts, funds, and object and expense codes. Grant Thornton concluded:

- Using the E&G as the primary basis for assessing cost per student is consistent across higher education – a majority of institutions utilize E&G as the primary measure for assessing cost.
- Costs were assigned appropriately and no significant changes were found that would indicate an inconsistency in coding of costs.

Cost per FTE

While the E&G is an excellent tool for determining academic costs per student, the specific nature of the questions for this study call for some adjustments to the E&G. These adjustments are detailed in the "Average Cost per Student" section of this report, and include adding a capital investment measure and some scholarship expense as well as excluding non-instructional public service expenditures and overhead and administrative costs associated with research and auxiliaries. These adjustments directly align the expense definition with the "cost of education."

The statute asks the universities to develop the average costs for a resident undergraduate student. In general university expenditures are shared between graduate and undergraduate programs. While the cost study does exclude the most expensive graduate programs (University of Arizona's Colleges of Medicine and Arizona State University's Thunderbird School of Global Management), the rest of graduate education is included in the presented average cost. Additional allocation of costs would be arbitrary.

To ensure accuracy, the cost study uses fiscal year 2016 data, which was the most recently available audited data. Based on this methodology, the average cost per student for fiscal year 2016 was $16,813.

FY 2016 Average Expenditures per Arizona Resident Student $16,813

Other Measures

In addition to the E&G review, ABOR also asked Grant Thornton to benchmark Arizona university costs with peer universities using the E&G and other measures. The Grant Thornton report concluded:

- Arizona public universities cost per student is lower than the aggregated national average of four-year public institutions – an average that includes both research and non-research universities.
- Arizona institutions' E&G cost per FTE student are below the peer averages.[3]

Other measures selected by Grant Thornton included:

- Full-time faculty per 100 FTE: When compared to peers, ASU, NAU, and UA's collective average of full-time faculty per 100 FTE students remained below the overall peer group average for every year from 2000 to 2013. This measure is an example of cost efficiency when compared to peer institutions.
- Total number of completions (degrees plus other formal awards)**:** ASU, NAU, and UA's collective trend of total number of completions exceeds all collective peer totals beginning in 2011 and continuing through 2013.
- Completions per 100 FTE students: The overall trend of completions per 100 FTE students, shows slight increases from 2000 through 2013. Arizona institutions collectively have slightly higher trends of completions per 100 FTE students than their peers and the national average.
- Total number of degrees**:** ASU, NAU, and UA's collective trend of total number of degrees granted begins to exceed totals for all other collective peers between 2011 through 2013.
- Degrees per 100 FTE students: Arizona institutions have slightly higher trends of degrees per 100 FTE students than their peers. This measure is an example of performance efficiency.

Compared to Arizona public university peers, Arizona's universities graduate a higher percentage of students with fewer resources.

The Grant Thornton study is found in its entirety in Appendix B.

[3] For each Arizona public university, ABOR has selected a group of similar universities to serve as a peer group. Peer universities are used for benchmarking. A complete list of each university's peers can be found in Appendix B on page 47.

Part One: Average Cost per Student

As noted above, the methodology for calculating operating costs uses functional expense categories as defined by NACUBO and as found on the E&G report. The methodology and cost definitions mirror those in the universities' CAFRs.

Expenses are reported by functional category including instruction, public service, academic support, student services, institutional support, operation and maintenance of plant and scholarship/fellowship expenses. Excluded from the E&G are costs associated with research, auxiliaries, plant funds, agency funds and endowments.

However, the E&G does not align perfectly with the purposes of this cost study, which is to determine the cost of education for a resident undergraduate student. To align the cost model with that purpose, the model begins with the E&G and then makes a number of correcting entries. These adjusting entries include:

- Exclusion of certain programs. The Colleges of Medicine and agricultural programs at the UA and ASU's Thunderbird School of Global Management are excluded from the study. The cost structure of the Colleges of Medicine, driven primarily by the unique costs of instructing medical students, dramatically impacts costs per student. The agricultural programs at UA are largely non-academic and Thunderbird is strictly a graduate program. Excluding these costs from the calculation dropped the cost per student by approximately $2,831.
- Exclusion of non-instructional public service activities. Costs associated with programs that include limited instruction, such as public radio/television and the Arizona State Museum were excluded. These exclusions reduced the cost per FTE by $258.
- Exclusion of overhead and administration related to research, auxiliaries and excluded public service. These exclusions reduced the cost per FTE by $1,022.
- Inclusion of capital costs. Each year the universities spend millions of dollars developing and maintaining academic space. Because these expenditures vary year to year, the model uses depreciation associated with academic space as a proxy for the academic costs. Comparisons between depreciation amounts and actual capital expenditures proved that over a period time annual depreciation approximated average expenditures on academic capital. The added capital factor increased the cost per FTE by $1,017.

Scholarship Expenditures

University financial accounting divides scholarship expenses into two broad categories: Scholarship Allowance and Scholarships and Fellowships. Scholarship Allowances are generally associated with scholarship awards applied to tuition and fees and tuition waivers. In these cases, universities reduce the amount of tuition a student must pay. For financial reporting, since universities never see these dollars, they are accounted for as a reduction to gross tuition revenues.

Scholarships and Fellowships expenses are cash payments to students. These are generally payments for expenses over and above tuition costs. Since these payments reflect a transfer of university resources to a student, they are included as expenses for financial reporting purposes.

The E&G report combines both categories into a Scholarship and Fellowships expense line item. The resident student cost model used by ABOR since fiscal year 2016 is based on the E&G cost per student *net of scholarship expense*. All scholarship related costs were removed. For this report, to calculate the actual cost of education as requested by the Legislature, the model only removes the scholarship allowance portion of the scholarship award. The portion of scholarships that represent actual university expenditures is included in the average cost per student.

Calculation Summary

To reach an academic cost per student ABOR made the following calculation:

E&G cost per FTE net of scholarship expenses:	$18,437
Add depreciation:	$1,017
Add scholarship and fellowship expenditures:	$1,470
Exclude non-academic public service:	($258)
Exclude overhead related to research, auxiliary, and excluded public service:	($1,022)
Exclude certain programs:	($2,831)
Average academic cost per student:	$16,813

Each university's individual calculation can be found in Appendix C.

As noted above, the E&G report breaks down the per student costs into functional categories. System wide, the fiscal year 2016 per student functional cost breakdown is shown in Table 1. A detailed explanation of the function categories is provided in Table 2.

Table 1: Cost per FTE by Function

Function	Amount
Instruction	$8,047
Academic Public Service	$349
Academic Support	$2,451
Student Services	$1,339
Institutional Support	$1,276
Operating and Maintenance	$857
Depreciation	$1,020
Scholarship/Fellowship	$1,474
Total	$16,813

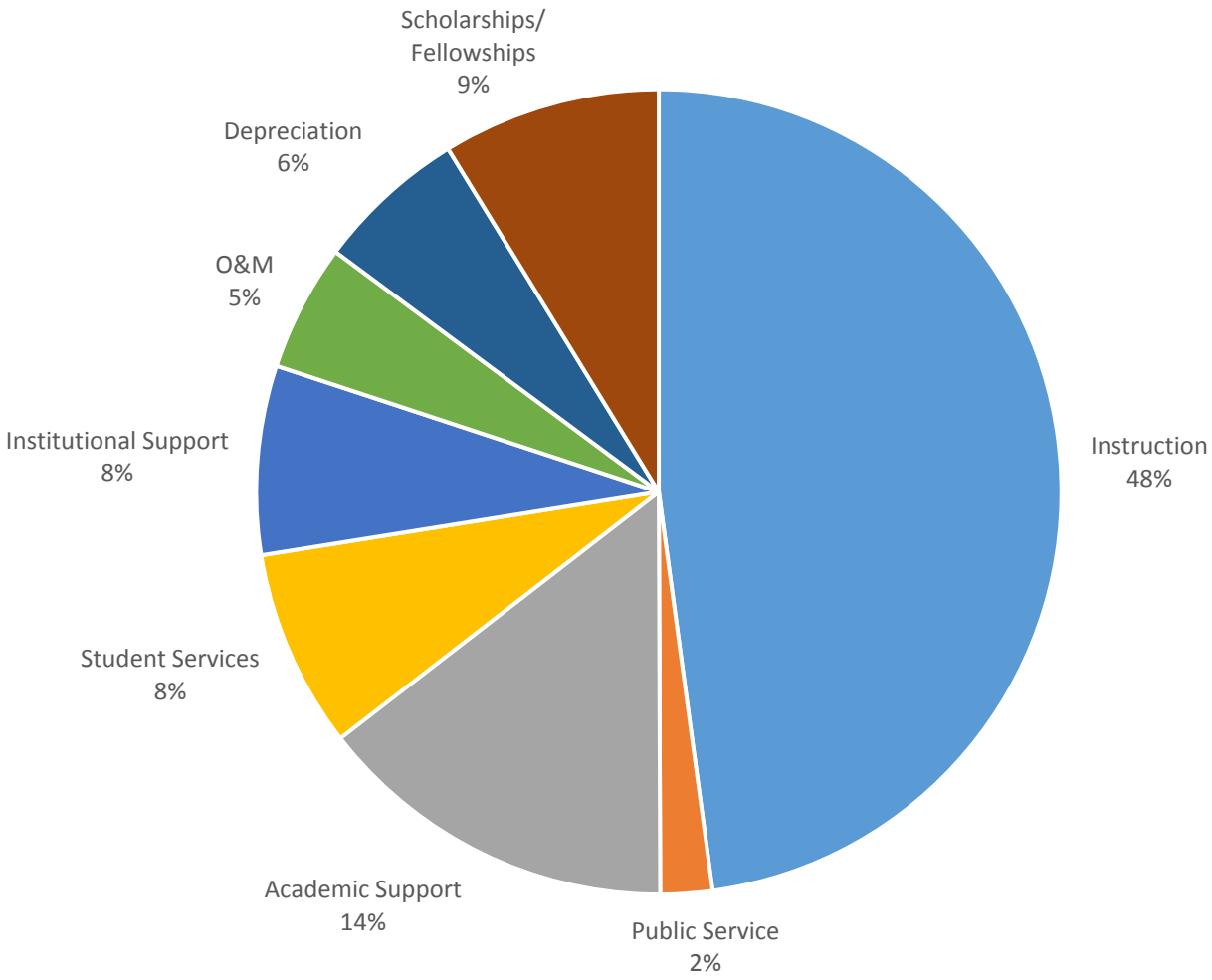


Table 2: Cost Function Detail

	ASU	NAU	UA
Instruction	The instructional reporting category includes expenditures for all general academic instruction activities for both credit and noncredit courses. Includes remedial and tutorial instruction. The instructional expenditures occur mainly within the colleges, 89 percent in colleges and ASU Online. The College of Liberal Arts and Sciences, the Fulton Schools of Engineering, and W.P. Carey School of Business account for 50 percent of all instructional expenditures.	These expenditures include departments or activities related to instruction in NAU's College of Arts and Letters, W.A. Franke College of Business, College of Engineering, Forestry and Natural Sciences, College of Education, College of Social and Behavioral Sciences, and the College of Health and Human Services. The expenditures in the College of Engineering, Forestry and Natural Sciences account for the largest proportion of the total.	These expenditures are for general academic instruction for both credit and non-credit activities. Of this total 93 percent of the expenditures occur within the colleges. The Colleges of Science, Social & Behavioral Sciences and Eller College of Management account for more than 50 percent of the total instruction expenditures occurring within all colleges. Other units with Instruction expenditures include: Global Initiatives, Student Affairs, Graduate College and the Honors College.
Public Service	Expenditures primarily include all activities providing non-instructional services for individuals and groups external to the institution. These activities include conferences, institutes, clinic services, consultation, advisory services and community-focused service programs. Many public service activities serve an ancillary role to the instructional mission of the institution, as they provide an opportunity for students to observe and participate in activities related to their field of study. Similar to instruction, the majority of public service expenditures occur within the colleges and schools, the largest is in the Teacher's College supporting an in-classroom mentorship program for new teachers. Non-academic activities are excluded from this study.	These expenditures include departments or activities such as NAU's teacher development, Gear Up, community focused and sponsored initiatives and Native American Initiatives. Community-focused experiential learning (Rhodes Scholar Program)/Gear Up account for over half the expenditures in this program. Non-academic activities are excluded from this study.	Expenditures are primarily for activities or services provided to individuals and groups outside the institution. Of the total Public Service expenditures, 57 percent occurred within the colleges and were primarily conference, seminar and clinic services provided to the community. Other activities in this category include services provided to the public by the Biosphere 2, museums and libraries. Non-academic activities are excluded from this study.

	ASU	NAU	UA
Academic Support	Expenditures that directly support the academic functions of the institution. Expenditures include general academic administration such as Dean's Offices, as well as support directly available to students, including academic technology and support, academic advising, libraries and museums. Nearly half of the expenditures occur within colleges, with academic technology and libraries comprising another 20 percent.	Expenditures include departments or activities such as the NAU library, support provided from the Provost's and Deans' Offices and IT support provided directly to academic programs. These three areas comprise over half the expenditures in this program.	Expenditures are for activities and services that support instruction. Of this total, 48 percent is attributable to expenditures within the colleges and are primarily for administrative support activities of the college, for example, the dean's office and support staff. Other activities within this category are: libraries (13 percent) and university technology services (11 percent).
Student Services	Expenditures include all student-related activities that support students' emotional and physical well-being and intellectual, cultural and social development outside the context of the formal instruction program, including the Dean of Students, disability resources services, peer mentoring programs, campus health, student recreation and counseling services. This category also includes admissions, registrar and career advising and placement services expenditures. Educational Outreach and Student Services accounts for 30 percent of these costs, with another 20 percent resulting from services provided to students in the colleges.	Expenditures include departments or activities such as the operations in the Admissions Office, the Registrar's Office and the Office of Financial Aid as well as the student programming and services that covers areas from disability resources to peer mentoring programs. Student programming and services in the Student Affairs Department comprise the largest expenditure area in this program accounting for approximately 25 percent of total expenditures.	Expenditures are for activities outside formal instructional programs that support student emotional and physical well-being and promote student cultural and social development. The majority of these expenditures are incurred by units outside of the colleges such as the Student Affairs Office which accounts for 71 percent of the total. Student Affairs comprises: Dean of Students, Admissions, Curriculum, Disability Resource Center, Registrar and New Student Services offices. Other expenditures within this category are attributable to units such as: Campus Health Services (11 percent), Campus Recreation (8 percent), and other student support functions within Global Initiatives and the Graduate College.
Institutional Support	Expenditures include support for general administrative costs. Administrative functions include executive management, chief	Expenditures include departments or activities such as information technology services and administrative offices including among others the Office of the President, General Counsel,	Expenditures are for the day-to-day operational support of the institution. Included in this category are expenditures for general administrative services, such as: University Information

	ASU	NAU	UA
	academic officer, general counsel, human resources, research administration, accounting and finance, police, procurement, marketing and media relations, information technology, and risk and liability costs. These costs occur largely within administrative units.	Comptroller, Audit, Budget, Police and Parking. IT services is the single largest expenditure area in this program accounting for approximately 25 percent of total expenditures.	Technology Services which represents 30 percent of this total. Other institutional administrative support functions include Academic Affairs; Executive Office of the President; Legal/General Counsel; Human Resources; Financial Services—Accounting, Payroll, Procurement; Budget Office; Research Administration; and Health Sciences Administration. Examples of the types of institutional expenditures include risk and liability insurance, police and safety, regulatory compliance, facilities leases, banking services and information technology contracts and services.

Resident Student Funding Model

For this study, the full-cost of educating a student includes both operating and capital costs. The Resident Student Funding model also addresses state support for both operating and capital costs. Recognizing that a university degree is both a public and a private good, the model calls for the state to fund 50 percent of the operating cost of educating a student on an annual basis. For capital expenditures, the model assumes occasional state investments, such as the Research Infrastructure investment (2003) and the Capital Investment Fund (2017).

To calculate the 50 percent state funding request related to operating funding, the capital component (depreciation) must be removed from the per student amount.

Total cost:	$16,813
Depreciation:	$ 1,017
Operating costs:	$15,796

Therefore, requested per resident student state support level would be $7,898. ABOR anticipates basing its future budget requests on this amount until the next cost study is completed five-years from now. For fiscal year 2018, including one-time funds, per resident student state support is $5,630.

Current state support:	$5,630
50 percent funding model:	$7,898

The calculation of state support is included in Appendix D.

Cost per Student Over Time

In addition to calculating the fiscal year 2016 costs, ABOR and the universities also calculated the cost per resident student in fiscal years 2008 and 2012. For comparison purposes, fiscal years 2008 and 2012 numbers are shown in 2016 dollars.

Table 3: Cost per Student Over Time

University	FY 2008	FY 2012	FY 2016
ASU	$18,232	$16,509	$17,706
NAU	$16,027	$13,878	$14,637
UA	$17,491	$17,201	$16,349
System Wide	$17,651	$16,253	$16,813

System wide, in real dollars Arizona public universities are spending over $800 per student less today than they spent in fiscal year 2008.

Part Two: Use of Fees

Arizona Revised Statutes §15-1626 authorizes ABOR to set tuition and fees. Board policy allows for the establishment of mandatory, program and class fees as well as differentiated tuition in an effort to allocate the higher costs associated with various programs, classes and services to specific users. Some fees are the result of student government proposals to provide funding for specific projects initiated by students.

ABOR policy divides fees into two broad categories - mandatory fees and differentiated tuition and fees.

Mandatory Fees

Mandatory fees are charged to all students and must be approved by ABOR regardless of the amount. These fees are designed to link certain expenditures to a specific increase in student funded revenues. This process creates additional transparency for users and ensures specific requests for revenue increases are used for the purposes given to justify the increase. University use of mandatory fees is limited – there are a total of 16 mandatory fees across all three universities. Examples of mandatory fees include technology fees, health services fees, facilities fees and recreation fees.

Differential Tuition and Fees

Tuition and fees in this category include differentiated tuition, program fees and class or course fees.

Differential tuition: Universities are able to charge a higher or lower tuition rate when costs are substantially different at the college level. Undergraduate examples include the Herberger Institute for Design and the Arts at ASU and the UA College of Nursing. In fiscal year 2016, 12 colleges were charged a differential tuition rate. NAU does not use differential tuition.

Program fees: If only certain programs within a college have differentiated costs, the university may seek a program fee. The vast majority of program fees are applied to graduate level programs; however, some undergraduate examples include the geology program at NAU and the computer science program at UA. In total, 171 programs charged a differentiating fee.

Class/course fees: Class or course fees are charged at the individual class level. Fees charged must be used for expenses directly related to the class. Course fees allow the universities to cover expenses that are necessary for successful completion of the class objectives. They cannot be used for general expenditures.

In fiscal year 2016, the three universities had 30,182 approved courses in their course bank with 7,930 carrying an approved fee. However, in any given semester, a university will only offer a subset of their approved courses. For example, in the fall 2015 semester, Arizona public universities offered 14,167 of 30,182 courses. Of the 14,167 courses, 3,577 had a course fee or just over 25 percent.

Of the course fees charged in FY 2016, 96 percent were $100 or less.

Table 4: Number of Fees

Fee Type	Total Number
Mandatory Fees	16
Differential Tuition	12
Program Fees	171
Course Fees	7,930

As a percentage of total revenues, mandatory fees, differentiated tuition, course and program fees and remain a minor component. Table 5 shows the percent of tuition and fee revenue generated by differential tuition and fees.

Table 5: Fee Revenue

University	FY 2016 Total Revenues (in millions)	FY 2016 Fee Revenue (in millions)	Percent of Total Revenue
ASU	$2,289.0	$170.2	7.4%
NAU	$531.7	$36.0	6.8%
UA	$2,040.9	$84.3	4.1%
System Wide	$4,861.6	$290.5	6.0%

Fee Reform

In 2014, ABOR announced a series of initiatives to simplify tuition and fees. In response to these proposals, discussion of multi-year tuition strategies were incorporated into the university Operational and Financial Reviews (OFR) to enhance alignment of business planning and oversight with the tuition and fee setting calendar, and to provide students and families more insight into future tuition and fee levels. This implementation has evolved into ASU outlining a pledge for a small, incremental increase in

tuition rates and an ongoing tuition promise program at NAU and a new tuition guarantee program at UA.

In November 2017, ABOR President Klein presented a review and update on the tuition and fee reform efforts, including efforts to increase student involvement in the tuition and fee-development process. In addition, President Klein outlined possible fee reforms including:

- Establishing a fee subcommittee;
- Establishing a fee sunset review process;
- Increasing transparency of the universities' fee development process, and;
- Developing a summary/guide for students detailing the fee setting process and identifying key contact personnel.

ABOR approved a process to review and incorporate these recommendations into board policy and practice.

Part Three: Faculty and Administration Costs

Faculty affect the quality of education and are instrumental in achieving the outcomes of the board's and universities' strategic plans. Work expectations for faculty include a variety of activities. They establish curriculum content, set student performance standards, and provide classroom and personal instruction. Faculty members also perform research and through their public service activities make valuable contributions to the community. Costs related to faculty public service and research are generally excluded from this study.

Universities traditionally divide university faculty teaching activities into three distinct areas – organized class sections, thesis/dissertation classes and individual studies. For organized class sections, class credit hours are typically used as a reasonable proxy for hours of classroom instruction; therefore, a three-credit-hour course is assumed to be three hours of teaching per week. However, a faculty member's time in the classroom represents only a portion of the responsibilities for effectively teaching a course. In addition to direct contact hours there are a variety of other instructional activities directly related to classroom instruction such as curriculum development, class preparation, grading papers, tests or other assignments, academic advising, answering students' questions outside class and developing/updating class instructional objectives.

According to the most recent report from the National Center for Education Statistics (Digest of Education Statistics 2015), full-time faculty and instructional staff spent 58 percent of their time teaching; research and scholarship accounted for 20 percent of their time; and 22 percent is spent on other activities such as administrative duties, personal growth, and service.[4] While ABOR did not

[4] *Digest of Education Statistics 2015* (p. 439). (n.d.). National Center for Education Statistics https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2016014

complete a recent independent survey, it is likely the Arizona public university faculty time allocation is consistent with national patterns.

Board policy identifies six broad categories of faculty rankings. Faculty are employees whose Notice of Appointment is Professor (Tenured/Tenure Track), Associate Professor (T/TT), Assistant Professor (T/TT), Lecturer (senior and principal), Instructor, or faculty without a rank. A breakdown of each university's faculty by rank is included in Table 6.

Table 6: Faculty by Rank

Faculty Type	ASU	NAU	UA	Total
Professor	985	285	982	2,252
Associate Professor	789	213	656	1,658
Assistant Professor	666	223	822	1,711
Lecturers	459	262	294	1,015
Instructors	437	85	350	872
Faculty-No Rank	73	553	53	679
Total	**3,409**	**1,621**	**3,157**	**8,187**

Depending on the role assigned, faculty may also include the president, provost, vice provosts, deans, directors, associate deans, assistant deans and executive officers of academic departments (chairpersons, heads or the equivalent) if their principal activity is instruction combined with research and/or public service. Below is a general definition and explanation of work expectations for different faculty types.

Professor (Full, Associate and Assistant): Professors are categorized by three ranks: full, associate and assistant. All levels of professors serve in one or more of the three principal university functions - instruction, research and public service. Further, professors will be appointed into a tenured or tenure-eligible position; or on a fixed-term basis, to a practicing, research or clinical position. Specific duties and work expectations may vary between instruction, research and public service depending on the type of appointment and the specific expertise of the professor and the needs of the university.

Lecturers: Lecturers are appointed on a fixed-term basis, primarily to provide student instruction. They may also hold teaching service responsibilities, including supervision of supplemental student learning, professional development and/or administrative duties related to teaching.

Instructors: Instructors are appointed on an annual, fixed-term basis and generally focus on student instruction. They may have limited service and/or professional development responsibilities.

No-rank: Faculty without a rank include faculty appointed on a fixed term basis who do not carry one of the five ranks noted above. Generally, they are appointed to provide student instruction or research support.

Administrative Costs

The cost per resident student calculation allocates overhead costs between academic units, research and auxiliary. Additionally, ASU and UA allocated overhead costs to the excluded programs: ASU's Thunderbird School of Global Management and UA Colleges of Medicine and Agricultural programs. Table 7 shows the allocation of overhead by unit and by university. For this study, overhead is defined as actual Operation and Maintenance and Institutional Support expenditures. Overhead costs were allocated between the three categories based on total expenditures in that category.

Table 7: Allocation of Overhead

	ASU	NAU	UA
Academic	74%	81%	63%
Research	17%	8%	26%
Auxiliary	9%	11%	11%
Total	100%	100%	100%

While allocation by expenditure is a valid method and is used consistently across all three universities, the method may in some instances over allocate overhead costs. For example, for the UA Colleges of Medicine per FTE expenditures are so high that this method potentially over allocates overhead costs, which would in turn lower UA's academic cost per student. ABOR considered other allocation methods such as a per FTE allocation or a per credit hour allocation, but these methods would likely under allocate overhead costs leaving the cost per student too high, therefore the more conservative approach was chosen. Further, per FTE or credit hour allocations do not work for allocating costs to research, auxiliaries, or agricultural programs.

For this cost study, only academic overhead costs were included in the cost per FTE. All other overhead costs were excluded. Overhead allocations for each university are shown in Appendix E.

Part Four: Breakdown of Tuition Expenditures

As part of the state budget submittal, the universities track and report expenditures for the following funds:

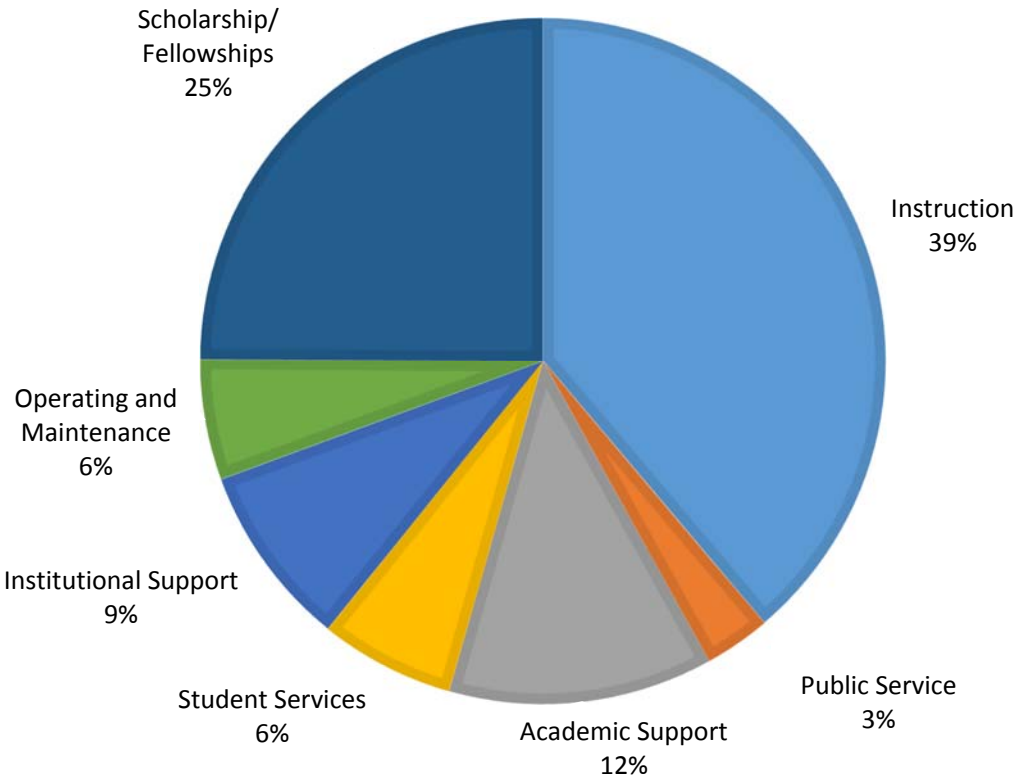
- Appropriated fund;
- Indirect Cost Recovery fund;
- Loan fund;
- Federal Indirect Cost Recovery fund;
- Federal Grants fund;
- Designated fund;
- Auxiliary fund, and;
- Restricted fund.

State budget standards require the universities to divide tuition and fee revenues into the Appropriated fund and the Designated fund. Approximately 59 percent of tuition and fee revenue is combined with state general fund dollars in the Appropriated fund. Since these tuition dollars are comingled with general fund dollars, a comprehensive and isolated review of tuition expenditures is not available at this time. Starting in fiscal year 2019, university budget procedures will change to allow universities to track tuition expenditures separately.

For fiscal year 2016, total operating expenditures is likely the best proxy.

Table 8: University Expenditures by Function (In Millions)

	ASU	NAU	UA (w/o COM)	System Wide
Instruction	$749.7	$169.4	$372.9	$1,292.0
Public Service	$36.8	$28.2	$39.3	$104.3
Academic Support	$265.5	$40.5	$109.3	$415.3
Student Services	$111.0	$53.8	$48.0	$212.8
Institutional Support	$155.2	$52.4	$78.8	$286.4
Operating and Maintenance	$108.5	$29.8	$51.3	$189.6
Scholarship/Fellowships	$449.1	$140.1	$239.7	$828.9
Total	$1,875.8	$514.2	$939.3	$3,329.3



Part Five: Average Cost by Program

Academic structures at Arizona's public universities are complex. Major categories are colleges, institutes, departments and degrees. However, the majority of budgeting and cost allocations are organized at the college level. Therefore, for purposes of this cost study, the term "program" is defined at the college level.

The cost study applies the same cost per FTE methodology to determine the cost per program that was used for university average costs. Statewide there are 32 defined colleges with 15 at ASU, six at NAU, and 15 at UA (excluding Colleges of Medicine). When comparing per FTE costs at the college level, the size of the student body associated with a particular college has a skewing effect on the outcomes. The top four cost per FTE colleges each has fewer than 700 students. The program with the single highest cost per FTE, the School for the Future of Innovation in Society at ASU, started in academic year 2016 and at that time only had 71 students. Additionally, costs for this college included start-up costs. As the college grows and start-up costs phase out, ASU anticipates the cost of the college will normalize to about the university average.

The universities allocate costs between the colleges and central administration. For this exercise, each college's actual costs were included. Overhead expenditures were allocated by student credit hour. Tables 9-11 list each college with its corresponding enrollment and cost per FTE. A complete breakdown of fiscal year 2016 costs by college is shown in Appendix F.

Table 9: Cost per Program ASU

College	FTE	Cost per FTE
Business	10,075	$18,949
CISA / University College	6,530	$14,531
Design and the Arts	6,003	$16,406
Engineering	12,220	$18,881
Future of Innovation in Society	71	$69,141
Health Solutions	3,292	$17,464
Journalism	1,256	$19,487
Law	1,147	$32,293
Liberal Arts and Sciences	31,770	$16,597
New College	3,983	$14,994
Nursing and Health Innovation	1,405	$24,604
Public Service & Community Solutions	5,491	$16,897
Sustainability	538	$33,775
Teachers College	4,554	$20,332

Table 10: Cost per Program NAU

College	FTE	Cost per FTE
Arts and Letters	4,037	$15,445
Business	3,900	$13,828
Forestry, Engineering, and Natural Sciences	7,145	$14,101
Education	2,675	$15,874
Social and Behavioral Sciences	6,741	$13,829
Health and Human Services	2,877	$16,677

Table 11: Cost per Program UA

College	FTE	Cost per FTE
Agriculture and Life Sciences	2,881	$13,153
Architecture & Landscape Architecture	601	$17,723
Education	1,669	$16,601
Engineering	2,351	$18,161
Fine Arts	2,090	$16,073
Humanities	4,392	$13,548
Nursing	1,013	$25,953
Optical Sciences	286	$15,732
Pharmacy	803	$26,692
Science	9,492	$15,210
Social & Behavioral Sciences	8,856	$14,746
Management	5,123	$17,376
Law	671	$33,024
Public Health	1,032	$21,529
University of Arizona South	560	$19,769

Online and Marginal Costs

The legislation requiring the cost study asks the universities to calculate online and marginal costs. At this time the universities are unable to provide separate cost data for these two items. Online education is not an isolated activity at the university, but an integrated educational delivery system embedded in each college. Often the same professors who are teaching on-campus classes are developing and delivering the online content. Further, the majority of on campus students take at least some of their programing in an online format. With this integrated approach to online content delivery, any cost allocations between online programs and on-campus programs would be arbitrary.

For fiscal year 2016, 17,991 of 158,681 FTE students or about 11 percent were strictly online students. For resident students, that percentage is much smaller; about 6,500 or 6.7 percent of all resident students were online students.

Last February, the WICHE Cooperative for Education Technologies (WCET) published a study comparing online costs with traditional educational costs.[5] The study surveyed 197 colleges across the United States and asked administrators to compare online to face-to-face courses on 21 unique cost factors. For 18 of the 21 factors, fewer than 5 percent of respondents scored online classes as less expensive than face-to-face classes. For 9 of the factors, more than 50 percent of respondents reported higher costs for online classes. Nearly every administrator surveyed scored each factor as the same as or more expensive than face-to-face education. The report cites cost factors such as:

- Software;
- Communication technologies;
- Faculty development regarding how to teach at a distance;
- Faculty support in converting their classes from lecture to distance format;
- Periodic course updating/redesign;
- Instructional designers;
- Technicians;
- 24/7 technical and academic support (registration, advising, counseling, online bookstores, online libraries, online tutoring, accessibility support, etc.).

The detailed survey responses are found in Appendix G.

Marginal costs are also difficult to calculate. The costs of adding a single student are likely close to zero; however, as additional students are added, the marginal costs increase until eventually, marginal cost equals the average per FTE cost. Attempting to determine the point at which marginal costs equal average costs would require defining costs as variable or fixed. Certain costs such as plant, utility and administrative costs are assumed to be fixed for a number of new students, while other costs such as counseling or instruction would be variable. As students are added, more and more costs move from fixed to variable until ultimately all costs become variable.

Two complicating factors in the Arizona public university system compromise efforts to develop a marginal cost scale. The first is the relative instability of university finance over the last decade. As shown in section one, since fiscal year 2008, reductions in available revenues have driven dramatic changes in per FTE costs due to budget reductions and programmatic restructures. These changes preclude any attempt to compare year over year cost versus enrollment changes. To isolate the marginal costs of adding additional students would require a near static programmatic environment. The second complicating factor is the rapid growth of Arizona's universities. Between fiscal years 2011 and 2016, student counts grew at a rate of nearly 6,000 students per year. This rapid growth converts nearly every university cost into a variable cost and makes marginal cost calculations not only difficult, but for practical purposes equal to average cost.

[5] Poulin, R. & Straut, T. (2017). WCET Distance Education Price and Cost Report. http://wcet.wiche.edu/sites/default/files/Price-and-Cost-Report-2017_0.pdf

Arizona Board of Regents

Cost Study

Appendix

Appendix

A: Statute
B: Grant Thornton Study
C: Reconciliation to E&G
D: State Support per Resident Student
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F: Expenditures by College
G: WICHE Online Cost Survey

Appendix A

Cost Study Statutory Requirement

15-1650.03. Arizona board of regents; resident undergraduate students; cost study; annual cost containment report

A. On or before December 15, 2017 and every five years thereafter, the Arizona board of regents shall conduct and complete a comprehensive cost study to determine the actual cost of educating a full-time resident undergraduate student at each university under the jurisdiction of the board. The board shall submit the cost study to the governor, the president of the senate, the speaker of the house of representatives and the joint legislative budget committee and shall provide a copy to the secretary of state. The cost study shall include a detailed breakdown of the costs associated with educating a full-time resident undergraduate student and shall include at least the following:

1. The use of instructional fees at each university, including differentiating between mandatory fees, program fees and course fees.

2. Differentiated costs between programs of study, including differential tuition and program and course fees.

3. The costs of faculty and administration differentiated between the amount of time needed to instruct students and to conduct research.

4. A breakdown of where tuition dollars are allocated, including the amount that is not directly attributable to instructional costs.

5. An analysis of the marginal cost and the average cost of a student depending on the type of program in which the student is enrolled, including online programs.

Appendix B

Arizona Board of Regents

Cost Estimation Methodology Review

June 2017

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Executive Summary

In December 2016, the Arizona Board of Regents (ABOR) engaged Grant Thornton to:

- Provide an independent review of the methodology and process applied by ABOR (and the Arizona state higher education institutions it supports – University of Arizona, Arizona State University, and Northern Arizona University) to calculate Education & General (E&G) costs per student full-time equivalent (FTE),
- Identify other metrics to assess cost per student, and
- Conduct benchmarking of those metrics with identified peer institutions.

Findings from each of these evaluation areas are identified for further consideration by ABOR and Arizona State Legislature decision makers.

The independent review consisted of a direct and indirect validation of the process applied and data reported by each Arizona school to the Integrated Postsecondary Education Data System (IPEDS). The direct validation analyzed each schools' transaction level expense data, and how each type of transaction was mapped to a cost category defined by the National Association of College and University Business Officers (NACUBO) to report to IPEDS. The analysis focused on how appropriate the assignments were – reviewing the descriptive detail for the applicable accounts, funds, object and expense codes. Grant Thornton was able to validate that the majority of the expenses were assigned appropriately to NACUBO category, and any anomalies would not have a material impact on the information reported to IPEDS.

The indirect validation evaluated changes in E&G figures reported to IPEDS between Arizona state schools and identified peer institutions. The evaluation focused on:

I. **E&G cost components over time**: How have the E&G cost components changed across each institution between FY2007-2008 and FY2013-2014? Are the nominal and proportional changes in E&G cost components consistent for each institution?
II. **Across institutions**: How have E&G costs shifted across institutions in the peer group? Data evaluated includes the nominal, proportional and per-unit E&G related figures.

No significant changes were found in this analysis that would indicate an inconsistency in coding of costs across Arizona schools.

Also as part of the engagement, Grant Thornton reviewed industry thought leadership literature, and leveraged its experience and expertise in higher education, to identify metrics to help assess the cost of higher education. Key metrics are identified and described –those related to E&G, as well as other cost and performance metrics to help augment the E&G cost per student FTE analysis currently utilized in Arizona. To understand and evaluate the metrics discussed in this document, visualization dashboards were developed to assess Arizona state institutions, and also to benchmark against peer institutions. These dashboards are available in Tableau format.

Key findings from the metric and benchmark review include:

- **E&G Measures –** The Arizona Board of Regents approach of reporting E&G cost per student FTE data to IPEDS, and using the metric as the primary basis for assessing cost per student FTE in the state, is consistent across higher education - a majority of institutions and supporting entities utilize E&G as a primary measure for assessing cost.
    - Grant Thornton was able to validate that the majority of the expenses were assigned appropriately to NACUBO category, and any anomalies would not have a material impact on the information reported to IPEDS. Additionally, there were no significant changes found in the indirect validation that would indicate an inconsistency in coding of costs across Arizona schools.
    - Arizona public universities cost per student is lower than the aggregated national average (academic years 2000 – 2013) of four-year public institutions – an average that includes both research and non-research universities.
    - Arizona institutions' E&G cost per FTE student are below the peer averages and overall average (33% below in 2013). Institution-specific findings include:
        - ASU E&G cost per student FTE is below the overall FY2006-2015 average ($30,931) – as well as the median line and average line for all its peer institutions – for all fiscal years present. ASU has the lowest E&G per FTE for FY2006 – 2011.
        - NAU is consistent with many of its peer institutions in terms of E&G per student costs. For all fiscal years present, NAU's trend of E&G cost per student FTE remained below both the overall FY2006-2015 average ($19,074) and the NAU Peer Average line and NAU Peer Median Line.
        - U of A E&G costs per student FTE is below the overall FY2006-2015 average ($35,517). U of A's trend is also below the average line for all its peer institutions for all fiscal years present, and below its peer median line from fiscal years 2006-2007 and 2009-2015.
    - Arizona institution's E&G cost trends (both total and per student FTE) are consistent with its peers – there is an overall trend of increased total E&G costs over time.
- **Net Tuition Revenue Measures** – Arizona institutions' net tuition revenue trends are consistent with peer institutions – there is a significant increase in the cost of education borne by students over time. When assessing net tuition revenue – or the cost of education borne by students – over time, it is important to understand the interplay between this metric and state appropriations. Higher education experts and thought leaders have reported in recent years on the relationship between net tuition revenue and state appropriations.
- **Full-Time Faculty per 100 FTE –** ASU, NAU, and U of A's collective average of full-time faculty per 100 FTE students remained below the overall group average for every year from 2000 to 2013.
- **Total Number of Completions -** ASU, NAU, and U of A's collective trend of total number of completions exceeds all collective peer totals beginning in 2011, continuing through 2013.
- **Completions per 100 FTE Students -** The trend of completions per 100 FTE students, overall, shows slight increases from 2000 through 2013. Arizona institutions, overall, have slightly higher trends of completions per 100 FTE students than their peers and national averages.
- **Total Number of Degrees -** ASU, NAU, and U of A's collective trend of total number of degrees granted begins to exceed totals for all other collective peers beginning in 2011, continuing through 2013.
- **Degrees per 100 FTE Students -** Arizona institutions, overall, have slightly higher trends of degrees per 100 FTE students than their peers.
- **Retention Rates**: ASU and UA, while increasing overall from 2000 compared to 2013, have lower retention rate numbers than a majority of their respective peers. NAU's retention rates are in-line with its peer institutions.

Engagement Overview

In December 2016, the Arizona Board of Regents (ABOR) engaged Grant Thornton to provide an independent review of the methodology and process applied by ABOR (and the Arizona state higher education institutions it supports – University of Arizona (U of A), Arizona State University (ASU), and Northern Arizona University (NAU)) to calculate Education & General (E&G) costs per student full-time equivalent (FTE), identify other metrics to assess cost per student, and conduct benchmarking of those metrics with identified peer institutions. The Board of Regents requested this support because it is working with the Arizona State Legislature to increase the percentage of each resident student's cost of education funded by the state to 50%. In order to appropriate dollars, it is fundamental to understand the cost to educate an Arizona resident student. Calculating the cost of an education is a challenging endeavor – there are numerous methodologies and metrics that can be used in a number of ways. As such, it is necessary to accurately and effectively employ a methodology to calculate cost. Applying a consistent methodology allows ABOR to conduct year-over-year comparisons, as well as benchmark against peer institutions.

Like many higher education institutions, ABOR has employed the E&G cost per student FTE metric to assess the costs of education (the metric is defined in section I). An independent, external validation of the application of the E&G methodology will increase confidence that ABOR and the Arizona Legislature have an accurate understanding of the cost to educate an Arizona resident student. Benchmarking against peer institutions will help ABOR and the AZ Legislature to understand how the Arizona schools are performing compared to other similar institutions.

The scope of this project included an assessment of ABOR's methodology for calculating each category pertaining to the E&G cost per student FTE metric, conducting a review and analysis of other cost per student metrics, and developing benchmarks of those metrics against peer institutions. Key findings are identified for further consideration. The review, analysis, and benchmarking were conducted at the individual institution level using the most recently available Integrated Postsecondary Education Data System (IPEDS) survey information (FY2014 – 2015, provisional) and the IPEDS Analytics: Delta Cost Project dataset (Academic Year 2013).

In order to achieve the scope of this project, Grant Thornton undertook the following approach:

- Reviewed and documented information from IPEDS related to calculating and reporting E&G cost per student FTE
- Conducted interviews with key Board of Regents and Arizona university stakeholders
- Analyzed documentation and tools leveraged by Arizona university stakeholders to calculate E&G cost per student FTE
- Assessed and validated Arizona E&G cost per student FTE calculations
- Identified and assessed other metrics used to understand costs of education
- Developed benchmarks against peer institutions

This document serves as the final report of the engagement. Section I documents the review of the calculation of E&G cost per student FTE and provides findings and recommendations. Section II discusses the findings of the review of metrics and benchmarks to understand the cost of education – defining key metrics, discussing the value each can add in evaluating education cost and performance, and illustrating each metric – comparing Arizona state schools with peer institutions. Key findings from this analysis are also offered. Each identified metric is supported by a Tableau dashboard to visually communicate information. All metric benchmark visualization data discussed in this report will be made available in a format suitable to ABOR.

Section I. Review of ABOR Cost per Student FTE Calculations

Definition of Education and General (E&G) Cost per Student FTE Metric

The Arizona Board of Regents reports E&G cost per student FTE data to IPEDS, and uses the metric as the primary basis for assessing cost per student FTE in the state. This approach is consistent across higher education - a majority of institutions and supporting entities utilize E&G as a primary measure for assessing cost.

The E&G cost metric is defined as the sum of costs for all activities that fall under the defined categories for education and general expenditures (all activities other than research, auxiliary enterprises and hospitals). These categories are defined by IPEDS and NACUBO. NACUBO provides a methodology for colleges and universities to follow to properly categorize relevant expenses. Each Arizona institution aggregates each category using audited financial data, and submits the value of each category to IPEDS on an annual basis. As defined by IPEDS and NACUBO, the categories for E&G expenditures are:

- Instruction
- Public Service
- Academic Support
- Student Services
- Institutional Support
- Operations and Maintenance
- Scholarships and Fellowships

For full definitions of these categories – including explanations of where administrative costs fit into E&G categories (e.g., Academic Support and Institutional Support), and what types of administrative costs are included – please see Appendix 1. The costs within these categories are summed, then divided by the total 12-month FTE enrollment to calculate the cost per student. This report utilizes the 12-month FTE enrollment metric[1] because it captures crucial student populations often left out of the fall term enrollment measure. As IPEDS explains, 12-month enrollment is a cumulative unduplicated headcount of enrollment over the full 12-month period beginning July 1 and ending June 30. 12-month enrollment is comprehensive; fall enrollment is more of a "snapshot" of an institution's enrollment on a particular date in the fall.[2] (For example, fall term enrollment may misrepresent the number of students at nontraditional schools, and undercounts the actual total enrollment that is eligible for federal aid.[3] These are important factors when assessing and comparing cost across institutions.)

[1] The 12-month full-time-equivalent (FTE) enrollments are derived from the 12-month instructional activity portion of the Enrollment component (IPEDS data for this variable are only available for 2004+). FTE enrollment is the sum of the institutions' FTE undergraduate and graduate enrollment, plus the estimated FTE of first-professional students. Undergraduate and graduate FTE are calculated using the 12-month instructional activity reported for credit and/or contact hours, with calculation factors. First-professional FTE is estimated by calculating the ratio of full-time to part-time first-professional students from the fall enrollment counts and applying this ratio to the 12-month unduplicated headcount of first-professional students. The estimated number of full-time first professional students is added to one-third of the estimated number of part-time first professional students.

[2] IPEDS. (2016). *2016-17 Survey Materials FAQ: What is the difference between 12-month enrollment and fall enrollment?* Retrieved from https://surveys.nces.ed.gov/ipeds/VisFaqView.aspx?mode=reg&id=11&show=all#383

[3] College Insight. (2015). *Tips for Using the Data: Enrollment Measures.* Retrieved from

The E&G cost per student FTE calculation is:

> **E&G cost per 12-month FTE student = (instruction + public service + academic support + student services + institutional support + operations and maintenance + scholarships/fellowships) / 12-month FTE Student Enrollment**

As a note regarding definition of E&G, while the IPEDS standard is the most widely applied methodology for calculating E&G, other organizations define E&G categories differently. Most notably, the IPEDS Analytics: Delta Cost Project database includes research spending in its cost measures and metrics. As shown in the definition above, research (i.e., sponsored or outside research) is not included as a component of the E&G standard for directly reported IPEDS survey information. Either is an acceptable definition, the important criteria is to ensure that any peer-to-peer comparison uses the same definition.

Direct Validation

A critical component of validating an institution's cost categorization methodology is studying the approach by which the organization's low level accounts are mapped to the higher level categories reported to internal and external stakeholders. This is studied to confirm that the value reported for each category are proportionally consistent with institutional operations. For Arizona institutions, the relationships to evaluate include how account names are mapped to the E&G categories as defined by NACUBO. While these mappings and categorizations do not impact the revenue or expense figures for an institution, they impact the components of the IPEDS metrics and impact data related to performance and benchmarking.

The direct validation process consisted of meetings with financial administrators at ASU, U of A, and NAU. Each university provided insight into the methodology and process leveraged to aggregate account level transaction information to NACUBO cost categories. Each university also provided a breakdown of all FY14 expenses incurred by account, and how those expenses were mapped to NACUBO cost categories. The review focused on FY14 data, and it was assumed that mappings in this year are indicative of the current and ongoing process being followed.

Direct Validation Key Findings

Upon review of each dataset, it was found that the vast majority of transaction mappings could be validated, with ~7% requiring follow up discussion. When these transactions were discussed with Arizona institutions to better understand the logic in mapping particular transactions to defined NACUBO categories, the financial managers provided additional clarifying detail not found in the transaction data to indicate why the assignment to NACUBO category was correct. Grant Thornton was able to validate that the majority of the expenses (over 95%) were assigned appropriately to NACUBO category, and any anomalies would not have a material impact on the information reported to IPEDS.

Indirect Validation

In addition to the direct validation of the application of E&G costs per student FTE methodology, an indirect validation of how expenses are aggregated to defined IPEDS E&G categories was conducted. This validation focused on evaluating changes in E&G figures reported to IPEDS. The evaluation focused on two primary data trends:

I. **E&G cost components over time**: How have the E&G cost components changed across each institution between FY2007-2008 and FY2013-2014? Are the nominal and proportional changes in E&G cost components consistent for each institution?
II. **Across institutions**: How have E&G costs shifted across institutions in the peer group? Data evaluated includes the nominal, proportional and per-unit E&G related figures.

Indirect Validation Key Findings

There are no significant changes that would indicate an inconsistency in coding of costs across Arizona schools.

A full explanation of both the direct and indirect validation process and findings can be found in Appendix 4.

Section II. Review of Metrics and Benchmarks

In order to provide a full understanding of how higher education institutions analyze cost metrics, key thought leadership literature in higher education cost analysis was reviewed (most notably, IPEDS, IPEDS Analytics: Delta Cost Project, and the Institute for Higher Education Policy (IHEP) – a full listing of sources reviewed appears at the end of this document). In addition, Grant Thornton utilized prior client experience in higher education and subject matter expertise in costing and performance management to further guide the identification of additional metrics. This analysis focused on identifying metrics that help to understand the cost of education, while also providing additional insight into performance measures that can help understand the implications in changes to the cost of education.

In this section, key metrics are identified, described and analyzed. Key findings are also offered for each metric. The first subsection identifies and defines key higher education cost and performance metrics, focusing on E&G metrics (because E&G cost per student FTE is the primary metric used in Arizona to assess cost per student), as well as other metrics to help augment the E&G cost per student FTE analysis. To understand, evaluate, and analyze the metrics discussed in this document, visualization dashboards were developed. These dashboards are designed to understand key cost per student FTE metrics in Arizona, as well as benchmark against peer institutions. Each metric in the tables below is mapped to a supporting Tableau dashboard:

1. E&G Dashboard: Part I
2. E&G Dashboard: Part II (Peer Comparison)
3. Net Tuition Revenue Dashboard: Part I
4. Net Tuition Revenue Dashboard: Part II (Peer Comparison)
5. Institutional Characteristics Dashboard: Part I
6. Institutional Characteristics Dashboard: Part II (Peer Comparison)

Analysis of these dashboards – focused on identifying trends and key findings, are offered in the second subsection. The Tableau dashboards will be made available in a format suitable to ABOR.

Identified Higher Education Metrics

E&G Cost Metrics

As discussed in Section I., E&G cost per student FTE is the primary metric used by the Arizona Board of Regents and State Legislature to assess cost of education at state institutions. Thus, key metrics using E&G were identified - Table 1 below describes E&G measures used to provide benchmarks against peer institutions. In a supporting Tableau dashboard (E&G Dashboard: Part I and Part II), metrics were developed for the following: (1) U.S. trends from 2000 to 2013; and, (2) ASU, NAU, and U of A comparisons to peer institutions over time (2006 – 2015). Incorporation of these measures and analysis allows institutions and stakeholders to identify trends and understand the implications of trends in higher education spending.

Source data for E&G Dashboard: Part I comes from the IPEDS Analytics: Delta Cost Project 2000 – 2013 dataset. Source data for E&G Dashboard: Part II, comes directly from IPEDS survey data for fiscal years 2005-2006 through 2014-2015. E&G Dashboard: Part II was developed to leverage the most recent data possible (IPEDS). This data was not readily available in a format to support the reports in Dashboard I, thus the IPEDS Analytics data was used.

It is important to note that in E&G Dashboard: Part II, FY2014-2015 data is "provisional," meaning that, while the data has been checked, IPEDS has not yet finalized it and institutions may submit changes in the next reporting period. In addition, unlike the IPEDS Analytics: Delta Cost Project data which has been translated into analytical format to allow for longitudinal analyses of trends in postsecondary education and account for data anomalies, the IPEDS data is the "raw" data submitted by each institution.

Total E&G Expenditures (E&G Dashboard: Part I and Part II)	
Definition	Total E&G expenditures per year (current year total)
Information Provided	• Allows stakeholders—both institutions and policymakers—to gain a better understanding of how much colleges and universities are spending for their total education and general expenses.
E&G Cost per 12-month Student FTE (E&G Dashboard: Part I and Part II)	
Definition	Total E&G expenditures (current year total) divided by total 12-month FTE student enrollment
Information Provided	• Illustrates trend of E&G cost per student FTE for institutions and peers.

Table 1. E&G Measures

Other IPEDS Cost Metrics

While E&G and its corresponding reported components serve as the commonly accepted standard for calculating and assessing higher education costs, IPEDS survey data include additional cost and financial metrics which can add value and additional comparisons to traditional E&G measures.

The following table provides examples of frequently used and derived variables related to cost that are directly available within IPEDS Survey Data:

Percent (%) Distribution of Core Revenues, by Source	
Source	IPEDS Survey Data
Information Provided	• Core revenues, total dollars (GASB or FASB) • Tuition and fees as a percent of core revenues (GASB or FASB) • State appropriations as percent of core revenues (GASB or FASB) • Local appropriations as percent of core revenues (GASB or FASB) • Government grants and contracts as a percent of core revenues (GASB or FASB) • Private gifts, grants, and contracts as a percent of core revenues (GASB or FASB) • Investment return as a percent of core revenues (GASB or FASB) • Other revenues as a percent of core revenues (GASB or FASB)
Core Revenues per FTE Enrollment, by Source	
Source	IPEDS Survey Data
Information Provided	• Revenues from tuition and fees per FTE (GASB or FASB) • Revenues from state appropriations per FTE (GASB or FASB) • Revenues from local appropriations per FTE (GASB or FASB) • Revenues from government grants and contracts per FTE (GASB or FASB) • Revenues from private gifts, grants, and contracts per FTE (GASB or FASB) • Revenues from investment return per FTE (GASB or FASB) • Other core revenues per FTE (GASB or FASB)
Percent (%) Distribution of Core Expenses, by Function	
Source	IPEDS Survey Data
Information Provided	• Core expenses, total dollars (GASB or FASB) • Instruction expenses as a percent of total core expenses (GASB or FASB) • Research expenses as a percent of total core expenses (GASB or FASB) • Public service expenses as a percent of total core expenses (GASB or FASB) • Academic support expenses as a percent of total core expenses (GASB or FASB) • Student service expenses as a percent of total core expenses (GASB or FASB) • Institutional support expenses as a percent of total core expenses (GASB or FASB) • Other core expenses as a percent of total core expenses (GASB or FASB)

Core Expenses per FTE Enrollment, by Function	
Source	IPEDS Survey Data
Information Provided	• Instruction expenses per FTE (GASB or FASB) • Research expenses per FTE (GASB or FASB) • Public service expenses per FTE (GASB or FASB) • Academic support expenses per FTE (GASB or FASB) • Student service expenses per FTE (GASB or FASB) • Institutional support expenses per FTE (GASB or FASB) • All other core expenses per FTE (GASB or FASB)

Table 2. Other Cost Measures

In addition to IPEDS survey data, which includes cost and finance measures beyond E&G, IHEP provides examples of additional cost metrics which can be directly extracted or calculated from IPEDS Analytics: Delta Cost Project data – which is derived from foundational IPEDS survey information.

Education and Related (E&R) Expenditures per Student	
Definition	E&R expenditures per FTE student based on 12-month enrollment.
Population	12-month FTE enrollment calculated using 12-month instructional activity credit hours in IPEDS Survey Data.
Data elements needed to calculate proposed metric	1. Expenditures for instruction and student services 2. Expenditures for instruction, student services, research, and public service 3. Expenditures for academic support, institutional support, and operations and maintenance
Cost for Credits Not Completed*	
Definition	The per-student expenditures by the institution for credits attempted but not completed by first-year students
Population	12-month cohorts of first-year students (e.g., first-time full-time [FTFT], transfer full-time [TFT], first-time part-time [FTPT], transfer part-time [TPT]).
Data elements needed to calculate proposed metric	1. Number of credits not completed by cohort in the first year 2. Number of students attempting credit-bearing courses in the cohort in the first year
Cost for Completing Gateway Courses	
Definition	For all gateway course completers in a given year, the per-student expenditures associated with all developmental and gateway courses attempted before gateway course completion, tracking English and math courses separately.
Population	Gateway course completers in a given year.
Data elements needed to calculate proposed metric	1. Number of development and gateway course credits attempted before completion 2. Number of gateway completers in a given year
Change in Revenue from Change in Retention	
Definition	The impact of changes in first-year retention rates from one cohort to another on tuition revenue available to the institution.
Population	12-month cohorts of students (e.g., FTFT, FTPT, TFT, TPT).
Data elements needed to calculate proposed metric	1. Net tuition revenue 2. Change in retention rate 3. Number of students in cohort
Cost of Excess Credits to Credential*	
Definition	The per-student expenditures for excess credits to credential for all completers with excess credits in a given year.
Population	All completers in a given year by credential level.
Data elements needed to calculate proposed metric	1. Total earned credits for each completer with excess credits 2. Average credits across all completers 3. Total number of completers with excess credits

Expenditures per Completion*	
Definition	E&R divided by the number of completions in a fiscal year.
Population	All credentials conferred in a given year.
Data elements needed to calculate proposed metric	1. Expenditures per completion

*Uses education and related expenditures (per credit) as part of calculation, itemized in Expenditures per Student variable.

Table 3. IHEP Metrics Mapped with IPEDS Analytics: Delta Cost Project Variables[4]

Other Higher Education Cost and Performance Metrics

In addition to the traditional E&G measures discussed, thought leaders such as the Delta Cost Project (IPEDS Analytics) and IHEP have developed cost and performance metrics derived from foundational IPEDS survey data. IHEP has developed specific measures based mostly (but not exclusively) on the metrics and methodology created by the Delta Cost Project—which produced its datasets by expanding upon IPEDS foundational information.[5]

The metrics captured in Table 4 below from Delta Cost Project and IHEP can help enhance current IPEDS reported metrics. These metrics are designed to help understand the implications of changes to cost per student FTE – i.e., what key performance metrics are impacted when cost per student FTE increases or decreases? Table 4 defines each metric, and describes the additional information and value it can provide to enhance institutional decision making. Inclusion of these measures can help higher education institutions evaluate how effectively they use funds to educate students.

As a note, several of the metrics listed below use Education & Related (E&R) as a base. E&R is closely related to the E&G metric, and is defined by the Delta Cost Project. E&R spending per student includes expenditures related to the following: instruction, student services, and a **prorated** share of administration and operations and maintenance. IPEDS definition of E&G (because it excludes research) is nearly synonymous with E&R (except for the prorated share of administration and operations and maintenance noted above). However, several E&G expense categories—such as Academic Support and Institutional Support – include various administrative costs and components (see Appendix 1 for full definitions and explanations).

Use of existing institutional and IPEDS data, such as E&G measures, is an effective means of tracking and understanding higher education spending trends—and should continue to be a priority for ABOR. Inclusion of additional metrics, such as E&R, provided by IHEP and Delta Cost Project will add value to existing data and allow for enhanced, insightful analyses.

Most data for these metrics can be directly extracted from the Delta Cost Project Database.[6] If data elements are not available through Delta Cost Project, or if anything differs from those metrics, the details are noted in the table.

[4] Institute for Higher Education Policy. (2016). *Toward Convergence: A Technical Guide for the Postsecondary Metrics Framework*. 4.1: Efficiency Metrics. 41-51. Web: www.ihep.org/sites/default/files/uploads/docs/pubs/ihep_toward_convergence.pdf

[5] Institute for Higher Education Policy. (2016). *Putting the "integrated" back into IPEDS: improving the integrated postsecondary education data system to meet contemporary data needs*. Retrieved from http://www.ihep.org/research/publications/putting-integrated-back-ipeds-improving-integrated-postsecondary-education

[6] Delta Cost Project. (2016). *Delta Cost Project Database 1987 – 2013*. Retrieved from http://www.deltacostproject.org/delta-cost-project-database; National Center for Education Statistics. (2012). *IPEDS Analytics: Delta Cost Project Database*. Retrieved from https://nces.ed.gov/ipeds/deltacostproject/

Net Tuition Revenue[7] (Net Tuition Revenue Dashboard: Part I and Part II)	
Definition	The percentage of E&R covered by net student tuition revenue versus institutional subsidies in a fiscal year.
Information Provided	• Quantifies proportion of E&R expenditures paid for by net tuition revenue relative to other institutional resources—like state and local appropriations. • Relevant to policymakers because it quantifies the impact of increased or decreased state support for higher education and its direct impact on students and families.
Net Tuition Revenue per 12-month FTE Student (Net Tuition Revenue Dashboard: Part I and Part II)	
Definition	Net Tuition Revenue—i.e., percentage of E&R covered by net student tuition revenue versus institutional subsidies in a fiscal year—divided by total 12-month FTE student enrollment. In other words, the dollar amount of net tuition revenue contributed per student.
Information Provided	• Quantifies proportion of E&R expenditures paid for by net tuition revenue relative to other institutional resources—like state and local appropriations. • Quantifies the impact of increased or decreased state support for higher education and its direct impact on students and families. • Normalizes the Net Tuition Revenue metric by removing the impact of variation in institution size – thereby facilitating benchmarking and comparisons.
Full Time Faculty per 100 FTE Students (Institutional Characteristics Dashboard: Part I and Part II)	
Definition	• The number of full-time faculty members per 100 FTE students.
Information Provided	• Normalizes faculty to student ratios to allow for improved trend analysis and peer comparisons.
Total Number of Completions (Institutional Characteristics Dashboard: Part I and Part II)	
Definition	• This annual component of IPEDS collects number of degrees and other formal awards (certificates) conferred. These data are reported by level (associate's, bachelor's, master's, doctor's, and first-professional), as well as by length of program (for some by not all).
Information Provided	• Allows stakeholders—both institutions and policymakers—to gain a better understanding of how their trend of completions granted compares to peer institutions. • Higher completion rates may indicate better educational experiences for students.
Completions per 100 FTE Students (Institutional Characteristics Dashboard: Part I and Part II)	
Definition	• The number of completions divided by the number of FTE students (based on 12-month enrollment) in a given year expressed as completions per 100 FTE.
Information Provided	• Normalizing E&R spending by outputs – number of completions – allows for comparisons of institutional efficiency. • Illustrates how effectively institutions turn credential-seeking students into graduates.
Total Number of Degrees Granted (Institutional Characteristics Dashboard: Part I and Part II)	
Definition	• The total number of degrees conferred by a college, university, or other postsecondary education institution as official recognition for the successful completion of a program of studies.
Information Provided	• Illustrates how effectively institutions turns degree-seekers into degree-holders or graduates. • Isolating degrees (without awards or certificates) may provide additional insight into institutional efficiency when examining trends over time.
Degrees per 100 FTE Students (Institutional Characteristics Dashboard: Part I and Part II)	
Definition	• The number of degrees divided by the number of FTE students (based on 12-month enrollment) in a given year expressed as completions per 100 FTE.
Information Provided	• Illustrates how effectively institutions turns degree-seekers into degree-holders or graduates. • Isolating degrees (without awards or certificates) may provide additional insight into institutional efficiency when examining trends over time.
Full Time Retention Rate (Institutional Characteristics Dashboard: Part I and Part II)	
Definition	• The percent of the previous year's fall first-time full-time cohort (minus exclusions) that re-enrolled at the institution as either full-time or part-time the following fall.
Information Provided	• Retention rates are commonly used measures to examine institutional success and outcomes.

Table 4. IHEP Metrics Mapped with IPEDS Analytics: Delta Cost Variables[8]

[7] To calculate Net Tuition Revenue (or Student Share of Cost; another term commonly used) IHEP includes the entire student population, rather than only undergraduates, because graduates and undergraduate expenditures cannot currently be separated in IPEDS/Delta Cost Project data.

[8] Institute for Higher Education Policy. (2016). *Toward Convergence: A Technical Guide for the Postsecondary Metrics Framework*. 4.1: Efficiency Metrics. 41-51. Retrieved from: www.ihep.org/sites/default/files/uploads/docs/pubs/ihep_toward_convergence.pdf

Analysis of Metrics and Benchmarks: Key Findings

Data Sources & Methodology

For purposes of this report, Grant Thornton sought to balance using the most recent data available from IPEDS with using the data that best supported the analytics requested by the Arizona Board of Regents. Thus, the E&G Dashboard: Part II (comparing Arizona institutions to their peers on E&G cost per student metrics) was developed with the IPEDS 2006 – 2015 (provisional) dataset. For other dashboards, the IPEDS Analytics: Delta Cost Project[9] 2000 – 2013 dataset.

Tableau Dashboards	Corresponding Data Source
E&G Dashboard: Part I	IPEDS Analytics: Delta Cost Project, AY1999-00 – 2012-13
E&G Dashboard: Part II (Peer Comparison)	IPEDS Survey Data, Provisional, FY2005-06 – FY2014-15 (provisional)
Net Tuition Revenue Dashboard: Part I	IPEDS Analytics: Delta Cost Project, AY1999-00 – 2012-13
Net Tuition Revenue Dashboard: Part II (Peer Comparison)	IPEDS Analytics: Delta Cost Project, AY1999-00 – 2012-13
Institutional Characteristics Dashboard: Part I	IPEDS Analytics: Delta Cost Project, AY1999-00 – 2012-13
Institutional Characteristics Dashboard: Part II (Peer Comparison)	IPEDS Analytics: Delta Cost Project, AY1999-00 – 2012-13

Table 5. Tableau Dashboards with Corresponding Data Sources

IPEDS Analytics: Delta Cost Project data is a longitudinal database derived from IPEDS finance, enrollment, staffing, completions and student aid survey data for academic years 1986-87 through 2012-13. Delta Cost Project IPEDS Analytics data has been translated into analytical format to allow for longitudinal analyses of trends in postsecondary education. Unlike direct IPEDS survey data, IPEDS Analytics: Delta Cost Project information accounts for common data anomalies which pose difficulties when analyzing cost trends over time, across multiple institutions – variation in accounting standards, reporting changes, inflation, missing data, etc.

Source data for E&G Dashboard: Part II was taken directly from IPEDS survey data for fiscal years 2005-2006 through 2014-2015. This dashboard uses direct IPEDS survey data – instead of IPEDS Analytics: Delta Cost Project information – to present additional cost data recently available in IPEDS, in addition to the dashboard's focus on E&G cost only, compared to a sample of peers.

It is important to note that in E&G Dashboard: Part II, FY2014-2015 data is "provisional", meaning that, while the data has been checked, IPEDS has not yet finalized it and institutions may submit changes in the next reporting period.

[9] IPEDS Analytics: Delta Cost Project is managed by the American Institutes for Research, a longstanding partner of the National Center for Education Statistics which oversees and manages IPEDS.

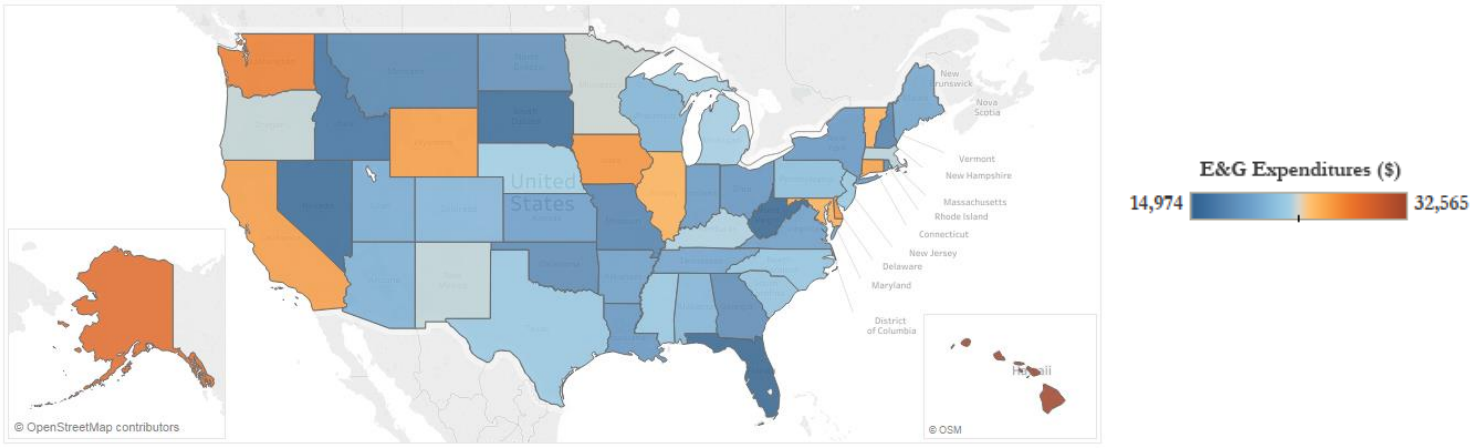
E&G Cost Measures

The corresponding Tableau dashboards for this section—E&G Dashboard: Part I and Part II—allow users to filter between the E&G cost and E&G cost per student FTE metrics. E&G cost per student FTE is calculated by taking the E&G cost metric and dividing by total 12-month FTE student enrollment—both obtained through IPEDS and provided in the IPEDS Analytics: Delta Cost Project dataset. Due to changes in IPEDS reporting standards, information for E&G cost per student FTE is not available for academic years 2000 – 2003 in the IPEDS Analytics: Delta Cost Project dataset. Thus, the following analysis in E&G Dashboard: Part I covers academic years 2004 – 2013.[10] Analyses in E&G Dashboard: Part II covers fiscal years 2006 – 2015.

E&G Findings Summary: Arizona's institutional E&G cost trends (both total and per-student) are consistent with its peers – there is an overall trend of increased total E&G costs over time. NAU and U of A's E&G cost per student FTE trend line is lower compared to its peer sample average. ASU's trend remains below its peer sample average until FY 2014.

E&G – National Trends, Public 4-Year Institutions (E&G Dashboard: Part I)

Figure 1.1 below illustrates a geographic heat map of the United States depicting average E&G costs or expenditures per student FTE for public 4-year institutions (or above) by state, aggregated for all academic years from 2000 to 2013 (individual years can be isolated in Tableau). Users also have the ability to view data for public 2-year institutions, as well as drilling down to institutions that conduct research within the dashboard. The following analysis examines all public 4-year institutions (research and non-research). An orange-blue diverging color scale is used—blue signifying lower average E&G costs, while orange signifies higher average E&G costs.



Data Source: IPEDS Analytics: Delta Cost Project Database, Academic Year 2000 - 2013.

Figure 1.1: Average E&G Cost per 12-month Student FTE in the U.S. (2004 – 2013): Public 4-Year Institutions

Findings:

- Arizona's aggregated average E&G cost per student FTE ($20,674) is lower than the national aggregated average for public 4-year (or above) institutions – $21,475.[11]
- Arizona's E&G per FTE student costs remain at or below the national average for all present years.[12]

[10] Academic year is the period of time generally extending from September to June; usually equated to 2 semesters or trimesters, 3 quarters, or the period covered by a 4-1-4 calendar system. Academic year is displayed as the end year (i.e. academic year 2010 includes data for 2009-2010).

[11] The national average can be viewed in the Summary Card within worksheet 5.1, E&G: U.S. Trend.

[12] This can be viewed by filtering for individual years in E&G Dashboard: Part I.

E&G – Arizona & Peer Group Trends (E&G Dashboard: Part I)

Figure 1.2 below illustrates trend analysis comparing average E&G expenditures for all three Arizona institutions against averages for all peer institutions collectively. The average line represents the average E&G cost per student FTE for ASU, NAU, U of A, and all peers (versus just sample peers). For a complete list of all peer institutions used, please see Appendix 3.

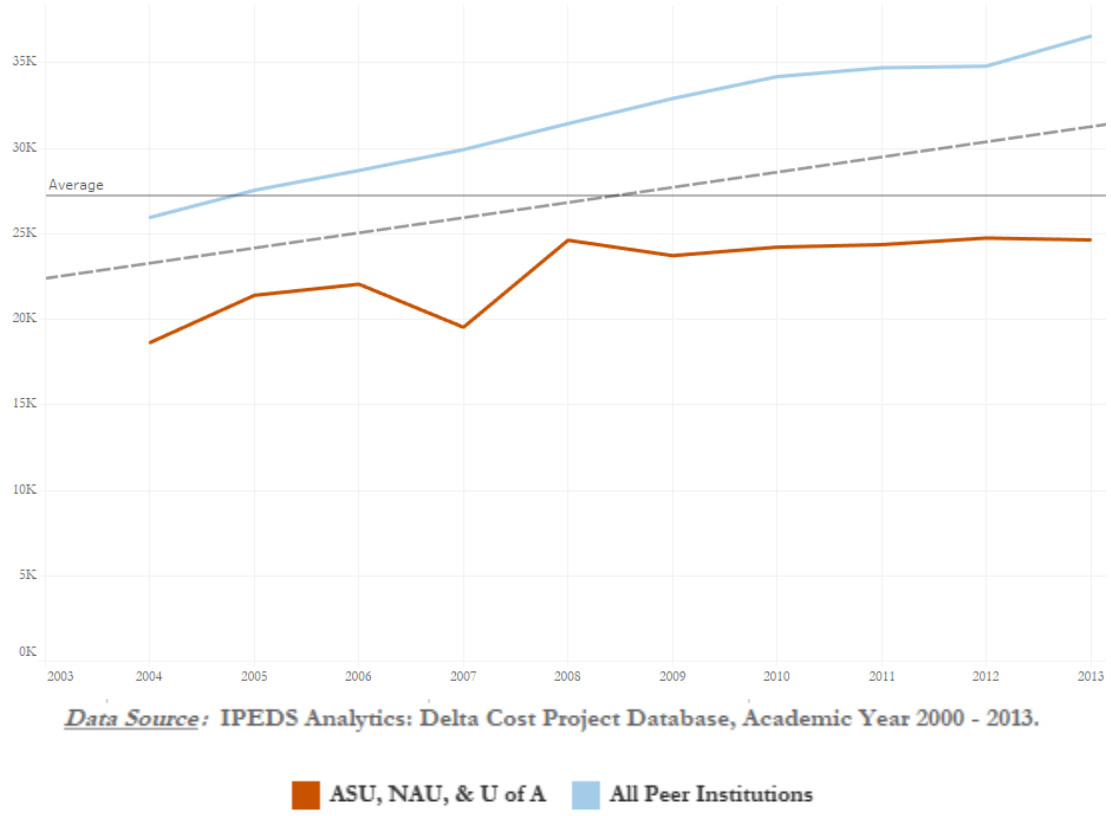


Figure 1.2 – Average E&G Cost per 12-month Student FTE: How have expenditures varied over time?

Findings

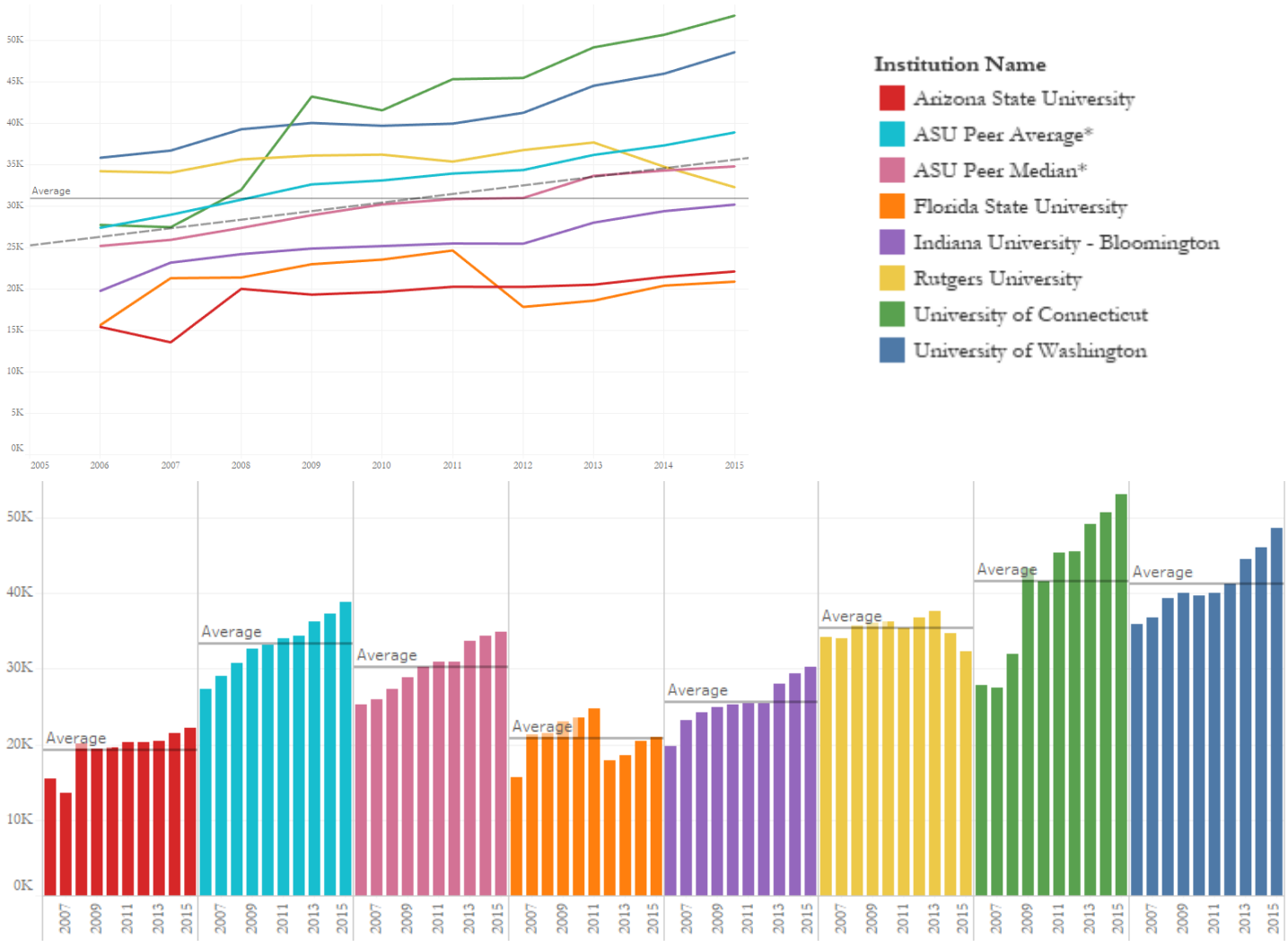
- Arizona institutions' E&G cost per FTE student are below the peer averages and overall average (33% in 2013).
- The significant drop in E&G cost per student FTE from 2006 to 2007, then drastic increase from 2007 to 2008, is worth further exploration, particularly since no similar patterns exist in the peer institution group.

E&G – Arizona & Peer Institution Trends (E&G Dashboard: Part II)

The figures below illustrate trend analysis comparing E&G expenditures per total 12-month FTE student for ASU, NAU, and U of A against a sample of their respective peer institutions for fiscal years 2006 to 2015. The 1.3x line graphs illustrate the overall trends for each school over time, while the 1.4x graphs emphasize trends at a particular institution.

The grey, horizontal Average line in the 1.3x line graphs represent the overall average E&G for all fiscal years. The Peer Average and Peer Median data—available in both 1.3x and 1.4x graphs—capture *all* identified peer institutions for each ABOR school (see Appendix 3 for complete list).

E&G – Arizona State University & Peer Sample



Data Source: IPEDS Survey Data: 12-month FTE Enrollment, Finance/Public Institutions - GASB 34/35 Expenses and other deductions, FY 2005-06 - 2014-15 (Provisional).
***Note: Peer Averages and Peer Medians calculated using *all* AOBR identified peer institutions. See Appendix A for complete list of corresponding peer institutions used.**

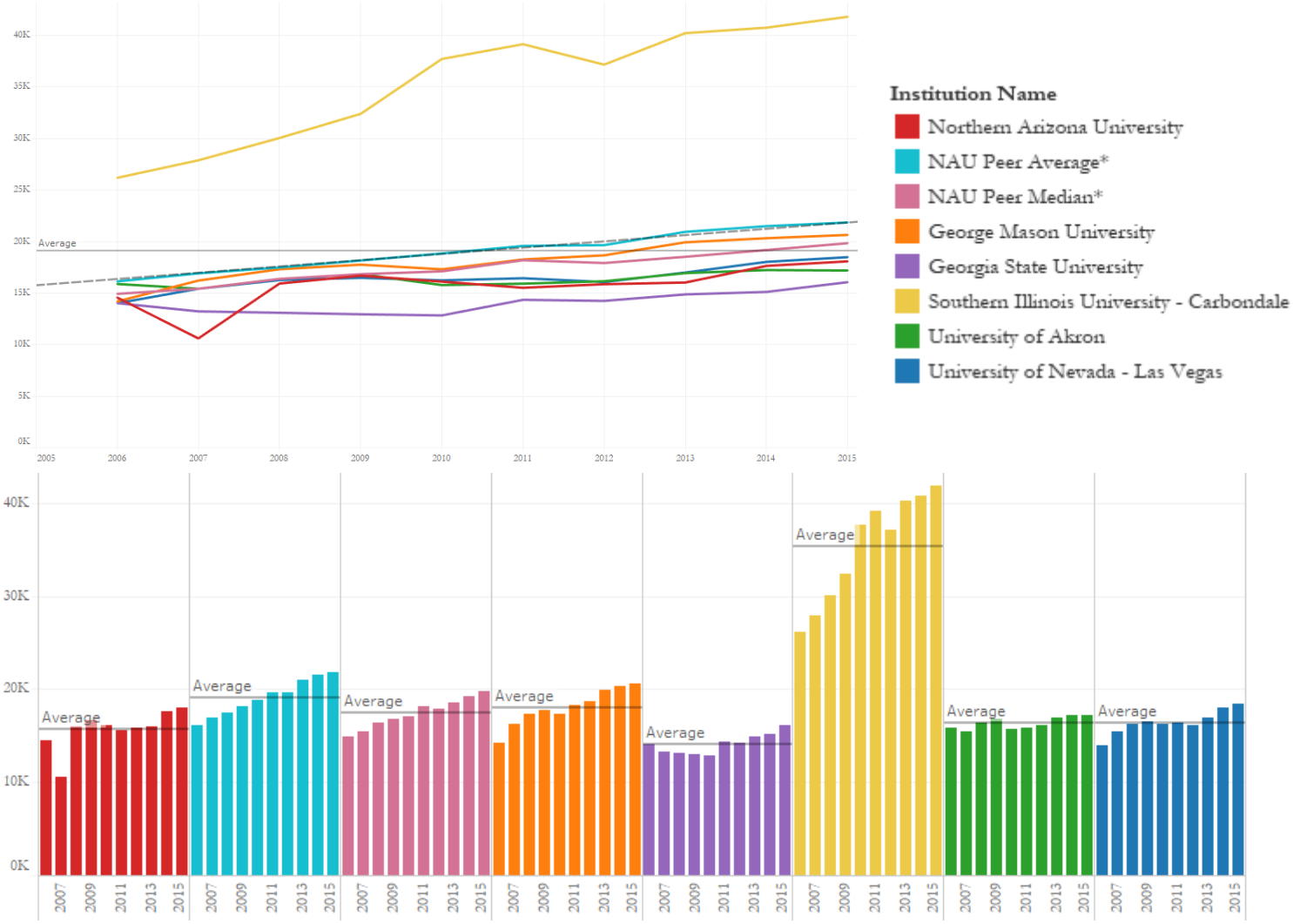
Figures 1.3a & 1.4a – Trend of E&G Cost per 12-month Student FTE

Findings

- ASU's trend of E&G costs per student FTE is below the peer sample average – as well as the median line and average line for all its peer institutions – for all fiscal years present. ASU has the lowest E&G per FTE for FY2006 – 2011.
- ASU remains below the overall FY2006-2015 average ($30,931) for all years present.

- ASU's E&G per FTE cost spikes from FY2007 ($13,579) to FY2008 ($20,039), then stabilizes through FY 2015 ($22,139). A similar trend of increased E&G per student FTE from FY2007 to 2008 is present in NAU, U of A, and other peers. This may be indicative of the financial recession that occurred in 2007 and 2008 in the United States.

E&G – Northern Arizona University & Peer Sample



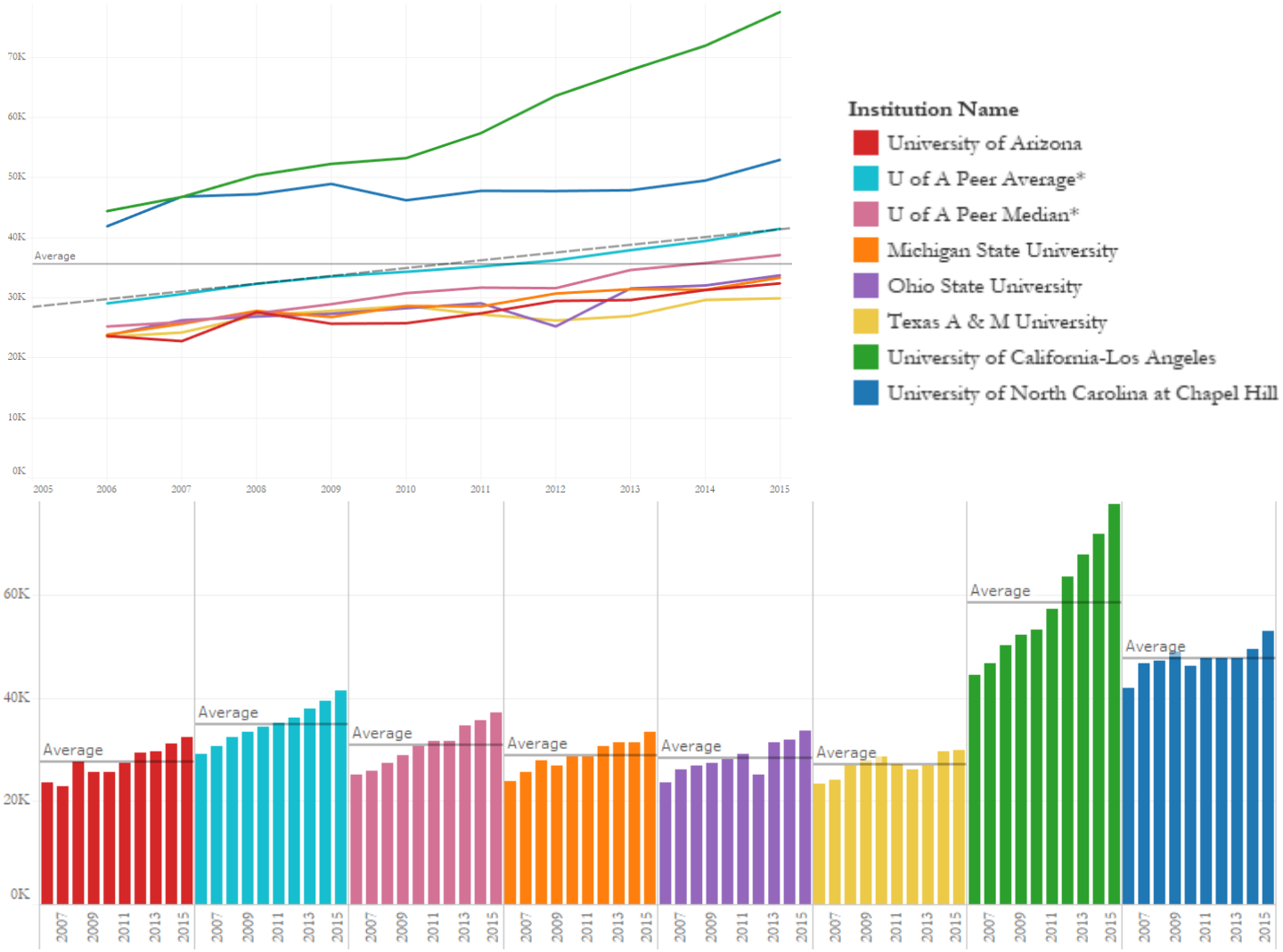
Data Source: IPEDS Survey Data: 12-month FTE Enrollment, Finance/Public Institutions - GASB 34/35 Expenses and other deductions, FY 2005-06 - 2014-15 (Provisional).
***Note: Peer Averages and Peer Medians calculated using *all* AOBR identified peer institutions. See Appendix A for complete list of corresponding peer institutions used.**

Figures 1.3b & 1.4b – Trend of E&G Cost per 12-month Student FTE

Findings

- NAU is consistent with many of its peer institutions in terms of E&G per student costs. For all fiscal years present, NAU's trend of E&G per student FTE remained below both the overall FY2006-2015 average ($19,074) and the NAU Peer Average line and NAU Peer Median Line.
- NAU had the second lowest E&G per student FTE trend consistently, only above Georgia State University; NAU had the lowest E&G per student FTE among sample peers in FY 2007.
- Southern Illinois – Carbondale's E&G costs per student FTE were significantly higher, and the rate of change increased substantially faster, than NAU and the other sample peer institutions for all fiscal years from 2006 through 2015; for future analysis, NAU may consider removing Southern Illinois as a peer institution to avoid skewing of data (particularly calculation of peer median and peer averages).

E&G – University of Arizona & Peer Sample



Data Source: IPEDS Survey Data: 12-month FTE Enrollment, Finance/Public Institutions - GASB 34/35 Expenses and other deductions, FY 2005-06 - 2014-15 (Provisional).
***Note: Peer Averages and Peer Medians calculated using *all* AOBR identified peer institutions. See Appendix A for complete list of corresponding peer institutions used.**

Figures 1.3c & 1.4c – Trend of E&G Cost per 12-month Student FTE

Findings

- U of A is in-line with its peer institutions in terms of E&G costs per student FTE, and remains below the overall FY2006-2015 average—$35,517—for all fiscal years 2006 to 2015.
- U of A E&G costs per student FTE is below the overall peer sample average for all fiscal years 2006 to 2015. U of A is below the Peer Median trend line for all fiscal years except FY2008, when it's E&G per student FTE was $27,613 while the U of A Peer Median was $27,420.
- Collectively, U of A, Texas A&M, Michigan State University, and Ohio State University have E&G per student FTE costs below the overall FY2006-2015 average. UCLA and UNC Chapel Hill both have higher trends of E&G cost per student FTE, remaining well above the overall average for all present fiscal years.
- Due to UNC Chapel Hill and UCLA being far above the overall average and trends of peers, ABOR may consider removing these institutions from future peer analysis and comparisons.

Net Tuition Revenue Measures

The corresponding Tableau dashboards for this section—Net Tuition Revenue Dashboard: Part I and Part II—allow users to filter between the Net Tuition Revenue or Dollar Amount Contributed from Students and Net Tuition Revenue per Student metrics.

Net Tuition Revenue per Student is calculated by taking the Net Tuition Revenue metric and dividing by total 12-month FTE student enrollment—both obtained through IPEDS and provided in the IPEDS Analytics: Delta Cost Project dataset. Analysis in this section covers academic years 2004 to 2013.[13]

Net Tuition Revenue & State Appropriations: When assessing net tuition revenue – or the cost of education borne by students – over time, it is important to understand the interplay between this metric and state appropriations. Higher education experts and thought leaders have reported in recent years on the relationship between net tuition revenue and state appropriations. For example, studies using IPEDS survey data have shown that net tuition revenues per FTE students at public 4-year institutions grew over the past decade (i.e., 2003-04 to 2013-14); at the same time, revenues per FTE student from state and local appropriations at public 4-year institutions declined.[14]

While the focus of this report and analysis is on net tuition revenue, similar relationships between net tuition revenue and state appropriations are present in the IPEDS Analytics: Delta Cost Project database (the source data used for Net Tuition Revenue Dashboard: Part I and Part II analysis). For example, when isolating public 4-year institutions, net tuition revenue steadily increases from academic year 2000 to 2013, while state appropriations steadily decrease beginning in academic year 2008 through 2013. From 2000 to 2005, state appropriations remained stable, with little variation. From 2005 to 2008, state appropriations increase slightly from academic year 2005 to 2008. These trends are present both within the state of Arizona and the U.S. as a whole.[15]

Net Tuition Revenue Findings Summary: Arizona institutions' net tuition revenue trends are consistent with peer institutions – there is a significant increase in the cost of education borne by students over time. ASU shares similar trends with its peer sample group over the entire data range; however, for academic years 2011 and 2012, ASU's increases were among the highest in its peer group. When normalizing net tuition revenue per student, ASU is in line with, and in some cases lower, in its net tuition revenue trends over time compared to peers. NAU and U of A have similar trends with its peer sample group, and are lower in net tuition revenue compared to a few peers. Similarly, when normalizing net tuition revenue per student, NAU and U of A remain in line with peer institutions, sharing similar overall increases in the trend of net tuition revenue per student.

For the following section of this report, the Net Tuition Revenue per FTE Student metric is used for analysis. Unlike Net Tuition Revenue, Net Tuition Revenue per FTE Student accounts for differences in institution size and student populations. This allows for greater comparability and accurate analysis across institutions, over time.

[13] Academic year is the period of time generally extending from September to June; usually equated to 2 semesters or trimesters, 3 quarters, or the period covered by a 4-1-4 calendar system. Academic year is displayed as the end year (i.e. academic year 2010 includes data for 2009-2010).

[14] The College Board. (2017). *Institutional Revenues per Student at Public Institutions over Time*. Trends in Higher Education. Retrieved from: https://trends.collegeboard.org/college-pricing/figures-tables/institutional-revenues-student-public-institutions-over-time

[15] This information is gathered from examining net tuition revenue and state appropriations variables over time. While this relationship is not visualized in the Tableau dashboards, the variables are available within the source data and Tableau variable list for future use.

Net Tuition Revenue – National Trends, Public 4-Year Institutions (Net Tuition Revenue Dashboard: Part I)

Figure 2.1 below illustrates a geographic heat map of the United States depicting average net tuition revenue per student FTE for public 4-year institutions (or above) by state, aggregated for all academic years from 2004 to 2013 (individual years can be isolated in Tableau). Users also have the ability to view data for public 2-year institutions, as well as drilling down to institutions that conduct research within the dashboard. The following analysis examines all public 4-year institutions (research and non-research).

An orange-blue diverging color scale is used—blue signifying lower average net tuition revenue per student, while orange signifies higher average net tuition revenue per student.

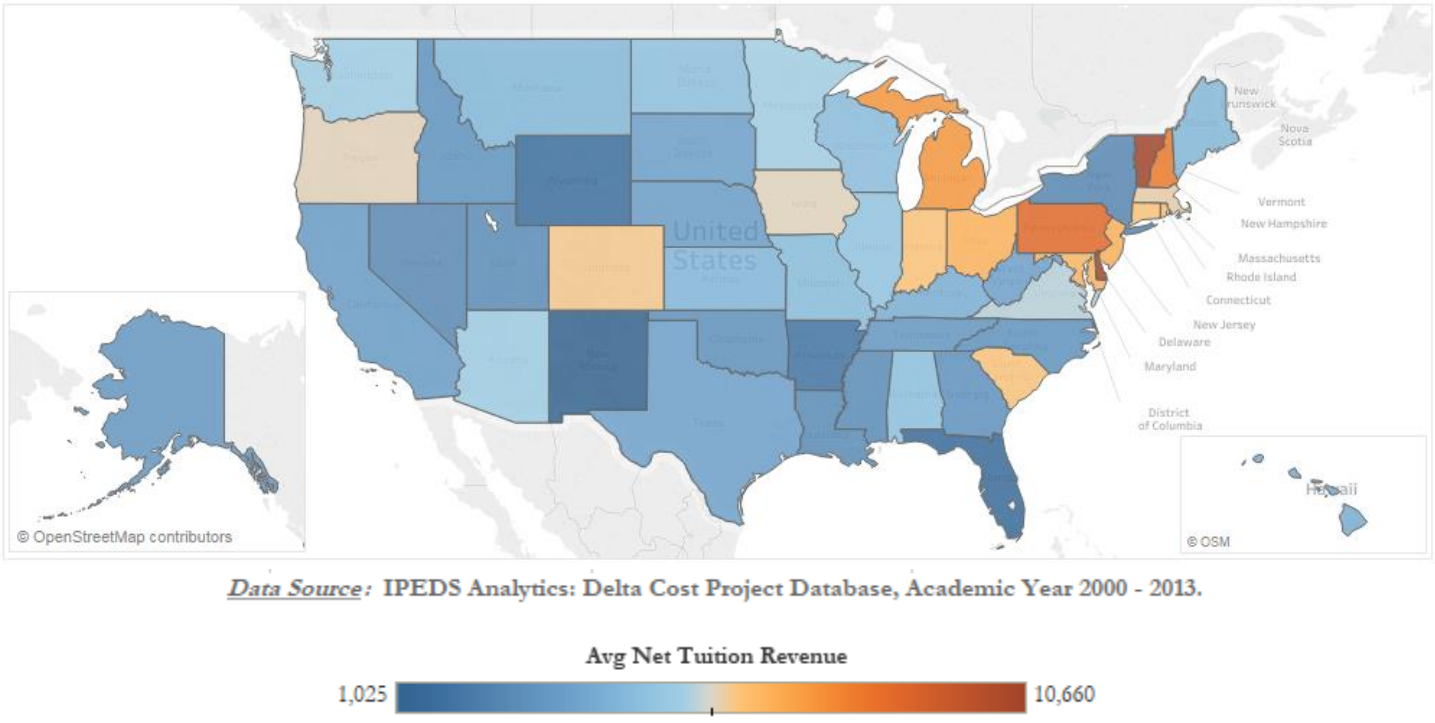


Figure 2.1 – Average Net Tuition Revenue per 12-month FTE Student in the U.S. (2004 – 2013): Public 4-Year Institutions (or above)

Findings

- For the overall average from 2004 to 2013, Arizona's average net tuition revenue or dollar amount contributed per FTE student ($5,306) is higher than the national average—$4,781.[16]
- Arizona had a higher average net tuition revenue per FTE student than the national average for all years from 2005 – 2006 and 2008 – 2013.[17]

[16] The national average can be viewed in the Summary Card within worksheet 7.1, Net Tuition Revenue: U.S. Trend.
[17] This can be viewed by filtering for individual years in Net Tuition Revenue Dashboard: Part I.

Net Tuition Revenue – Arizona & Peer Group Trends (Net Tuition Revenue Dashboard: Part I)

Figure 2.2 below illustrates trend analysis comparing average Net Tuition Revenue per 12-month FTE Student trends for all three Arizona institutions against averages for all peer institutions collectively. The average line represents the average net tuition revenue per student for ASU, NAU, U of A, and all peers (versus just sample peers). For a complete list of all peer institutions used, please see Appendix 3.

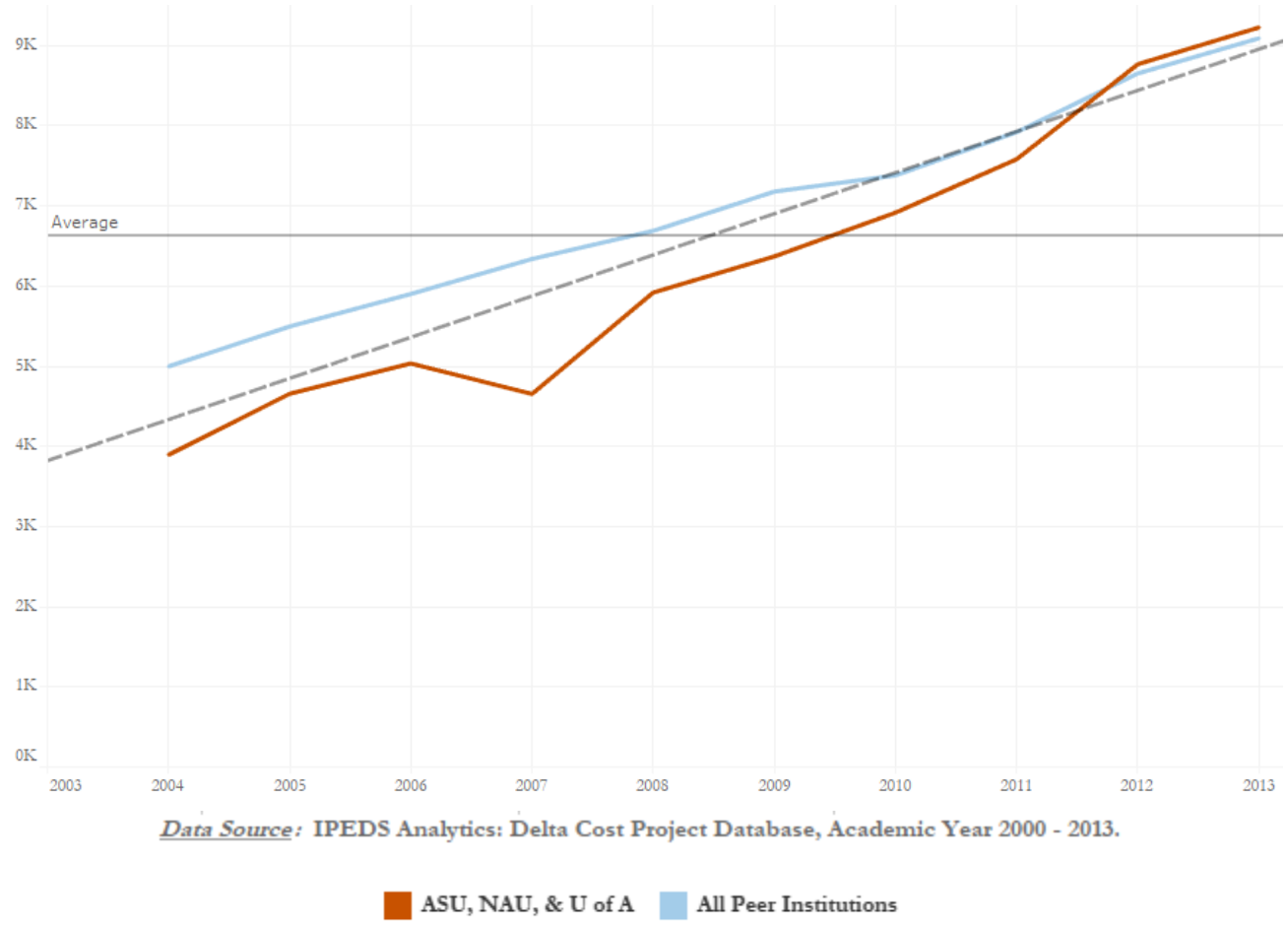


Figure 2.2 – Average Net Tuition Revenue per 12-month FTE Student

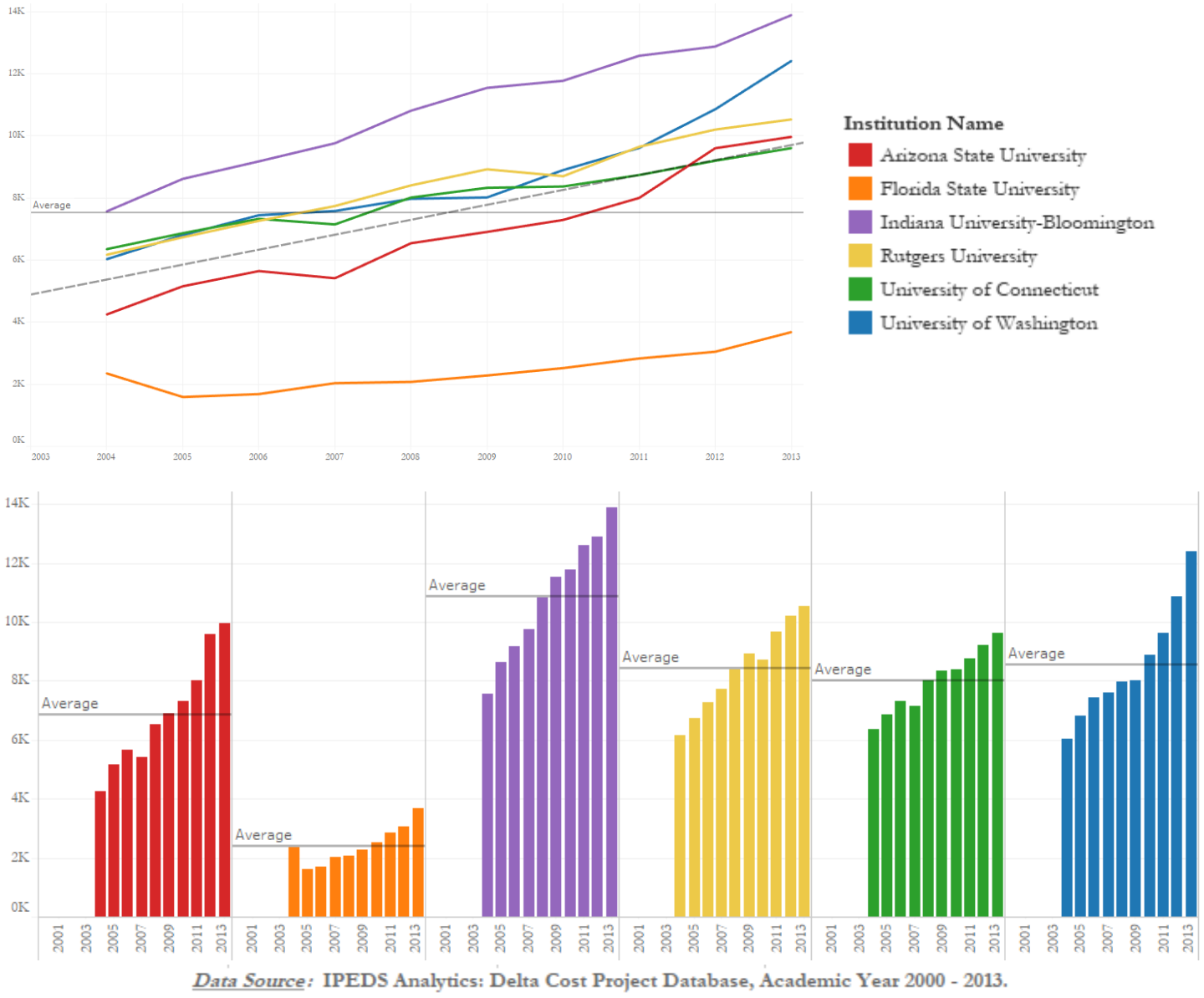
Findings

- ASU, NAU, and U of A collective peer average net tuition revenue per student remained below the average—$6,633—until 2010.
- Arizona institutions and peer institutions have similar trends - steady increases of average net tuition revenue per student from 2004 to 2013.

Net Tuition Revenue – Arizona & Peer Institution Trends (Net Tuition Revenue Dashboard: Part II)

The figures below illustrate trend analysis comparing Net Tuition Revenue per 12-month FTE student for ASU, NAU, and U of A against a sample of their respective peer institutions for academic years 2004 to 2013. The 2.3x line graphs illustrate the overall trends for each school over time, while the 2.4x graphs emphasize trends at a particular institution.

Net Tuition Revenue – Arizona State University & Peer Sample

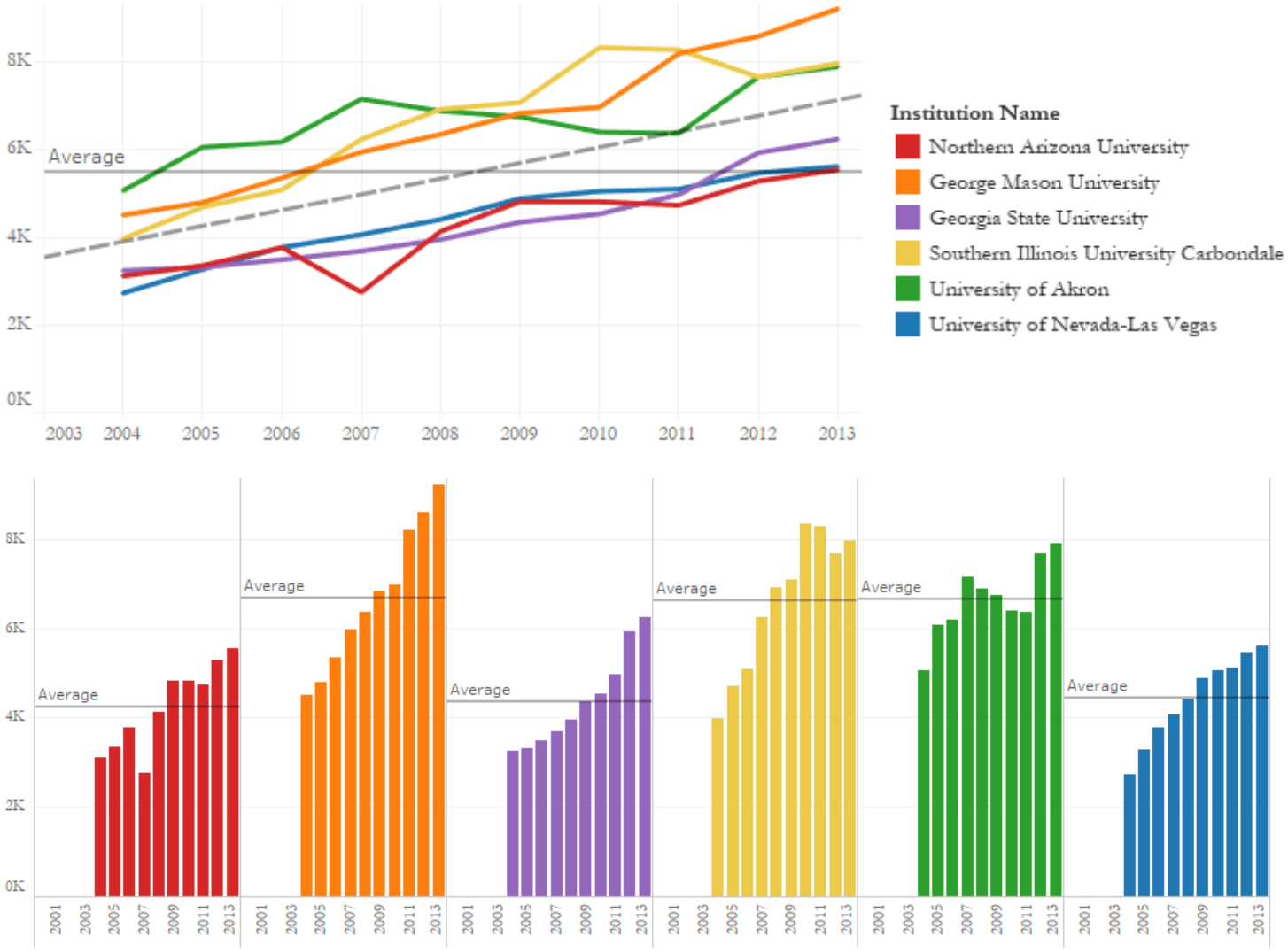


Figures 2.3a & 2.4a – Net Tuition Revenue per Student

Findings

- ASU's trend of net tuition revenue per student is consistent with its peer sample. Florida State University is significantly lower than ASU and the other institutions for every year from 2004 to 2013.
- From 2007 – 2008 and 2011 – 2012 ASU's trend increases significantly. Other institutions with notable increases in net tuition revenue per student are Florida State University and University of Washington from 2010 – 2013.

Net Tuition Revenue – Northern Arizona University & Peer Sample



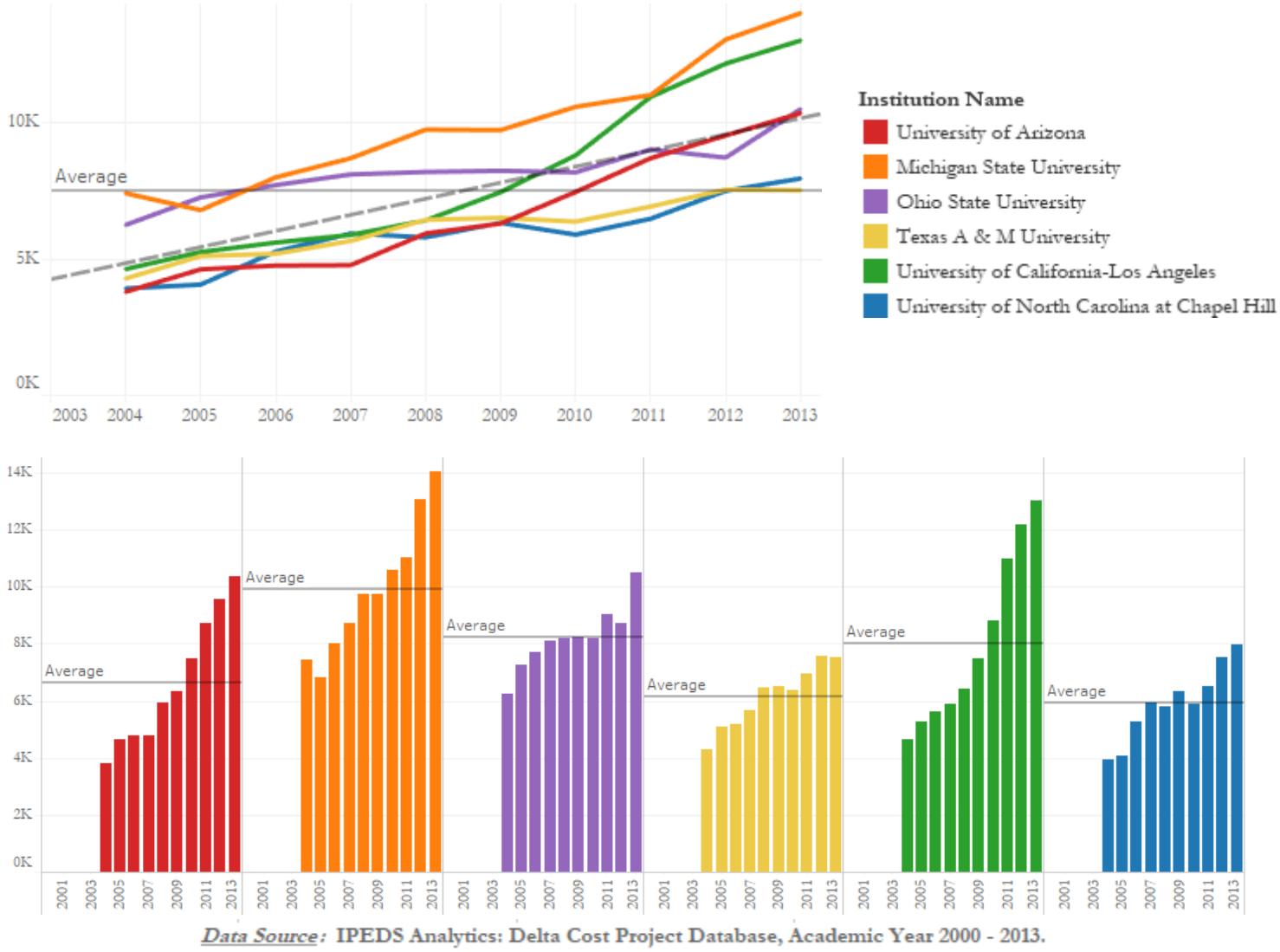
Data Source: IPEDS Analytics: Delta Cost Project Database, Academic Year 2000 - 2013.

Figures 2.3b & 2.4b – Net Tuition Revenue per Student

Findings

- NAU's trend of net tuition revenue per student is consistent with its sample peer institutions. NAU has the second lowest net tuition revenue, only above Georgia State University.
- NAU's net tuition revenue remained below the peer average—$5,503—for all years 2004 – 2013.
- While NAU's overall trend is consistent with its peer sample group, the institution experienced a significant increase in net tuition revenue per FTE student from 2007 to 2008, from $2,752 to $4,142.

Net Tuition Revenue – University of Arizona & Peer Sample



Figures 2.3c & 2.4c – Net Tuition Revenue per Student

Findings

- U of A's trend of net tuition revenue per FTE student is consistent with its sample peer institutions. U of A has lower net tuition revenue than Ohio State University, UCLA, and Michigan State University. However, U of A's net tuition revenue are higher, only slightly in some cases, than UNC Chapel Hill and Texas A&M starting in 2010.
- It is important to note that University of Arizona's higher net tuition revenue may be attributed to its medical school.
- U of A's net tuition revenue remained below the peer average—$7,489—until 2010.

Institutional Characteristics Measures

The corresponding Tableau dashboards for this section—Institutional Characteristics Dashboard: Part I and Part II—allow users to filter between the various institutional characteristics metrics identified in Table 2 and their corresponding per student measure via drop down menus. Analysis in this section covers academic years 2000 through 2013, unless noted otherwise.[18]

The following measures are provided in the IPEDS Analytics: Delta Cost Project dataset based on reported information in IPEDS.

Institutional Characteristics Findings Summary:

- **Full-Time Faculty per 100 FTE Students –** Compared to its peer sample group, ASU has lower faculty per 100 FTE student numbers for each academic year, indicating that class sizes are larger at ASU versus some of the institutions in the peer sample. NAU's trend of faculty per 100 FTE students is consistent with its peer institution sample—with a steady decline in recent years. U of A's faculty per 100 FTE student numbers are consistent in respect to the peer sample group—lower than UCLA and UNC Chapel Hill, but higher than Michigan State University, Ohio State University, and Texas A&M. While Arizona institutions experienced little variation in the overall trend of full-time faculty per 100 FTE students, in 2011, the peer institution average of full-time faculty per 100 FTE began increasing.
- **Total Number of Completions -** Overall, the trend of number of completions (degrees, awards, and certificates granted) has steadily increased over time between 2000 and 2013 for all institutions. Collectively, Arizona institutions match this increase. ASU, NAU, and U of A's collective trend of total number of completions exceeds all collective peer totals (see Appendix 3 for full list) beginning in 2011, continuing through 2013.
- **Completions per 100 FTE Students -** The trend of completions per 100 FTE students, overall, shows slight increases from 2000 through 2013. Arizona institutions, overall, have slightly higher trends of completions per 100 FTE students than their peers and national averages.
- **Total Number of Degrees -** Across all Arizona institutions and peers, trends for number of degrees granted are increasing. ASU, NAU, and U of A's collective trend of total number of degrees granted begins to exceed totals for all other collective peers (see Appendix 3 for full list) beginning in 2011, continuing through 2013.
- **Degrees per 100 FTE Students -** The trends for degrees per 100 FTE students increase from 2000 to 2013 overall. Arizona institutions, overall, have slightly higher trends of degrees per 100 FTE students than their peers. When isolating public 4-year institutions only, Arizona public 4-year institutions have a higher aggregated average degrees per 100 FTE students than the aggregated national average for public 4-year institutions.
- **Retention Rates -** The overall trend in retention rates for Arizona school and peer institutions increases from 2000 to 2013. NAU's retention numbers are in-line with its peer institutions. ASU and U of A, while increasing overall from 2000 compared to 2013, have lower retention rate numbers than a majority of their respective peer institutions (although, it should be noted, Arizona schools are above the overall national average).

For the following section of this report, analysis is focused on Full-Time Faculty per 100 FTE Students, Retention Rates, and Completions per 100 FTE Students. Unlike Total Number of Completions and Total Number of Degrees, Completions and Degrees per 100 FTE Students account for differences in institution size and student populations. This allows for greater comparability and accurate analysis across institutions, over time.

It is important to note that results for completions and degrees were very similar; thus, only completions will be highlighted in the report due to degrees granted being a part of completions (which also includes awards and certificates). While degrees

[18] Academic year is the period of time generally extending from September to June; usually equated to 2 semesters or trimesters, 3 quarters, or the period covered by a 4-1-4 calendar system. Academic year is displayed as the end year (i.e. academic year 2010 includes data for 2009-2010).

granted is a common way to examine institutional and student success, awards and certificates can be just as valuable—particularly for commuter institutions which provide education for non-traditional students.

While not highlighted in this report, all success metrics referenced above present added value and insight to ABOR and are provided in the corresponding Tableau dashboards.

Note: Missing values for specific academic years indicates the necessary information needed from IPEDS to calculate this measure for Delta Cost Project was not provided or available.

Full-Time Faculty per 100 FTE Students

Institutional Characteristics (Faculty) – National Trends, Public 4-Year Institutions (Institutional Characteristics Dashboard: Part I)

Figure 3.1 below illustrates a geographic heat map of the United States depicting average full-time faculty per student FTE for public 4-year institutions (or above) by state, aggregated for all academic years from 2000 to 2013 (individual years can be isolated in Tableau). Users also have the ability to view data for public 2-year institutions, as well as drilling down to institutions that conduct research within the dashboard. The following analysis examines all public 4-year institutions (research and non-research).

A blue color scale is used—light blue signifying lower average faculty ratios, while dark blue signifies higher average faculty ratios.

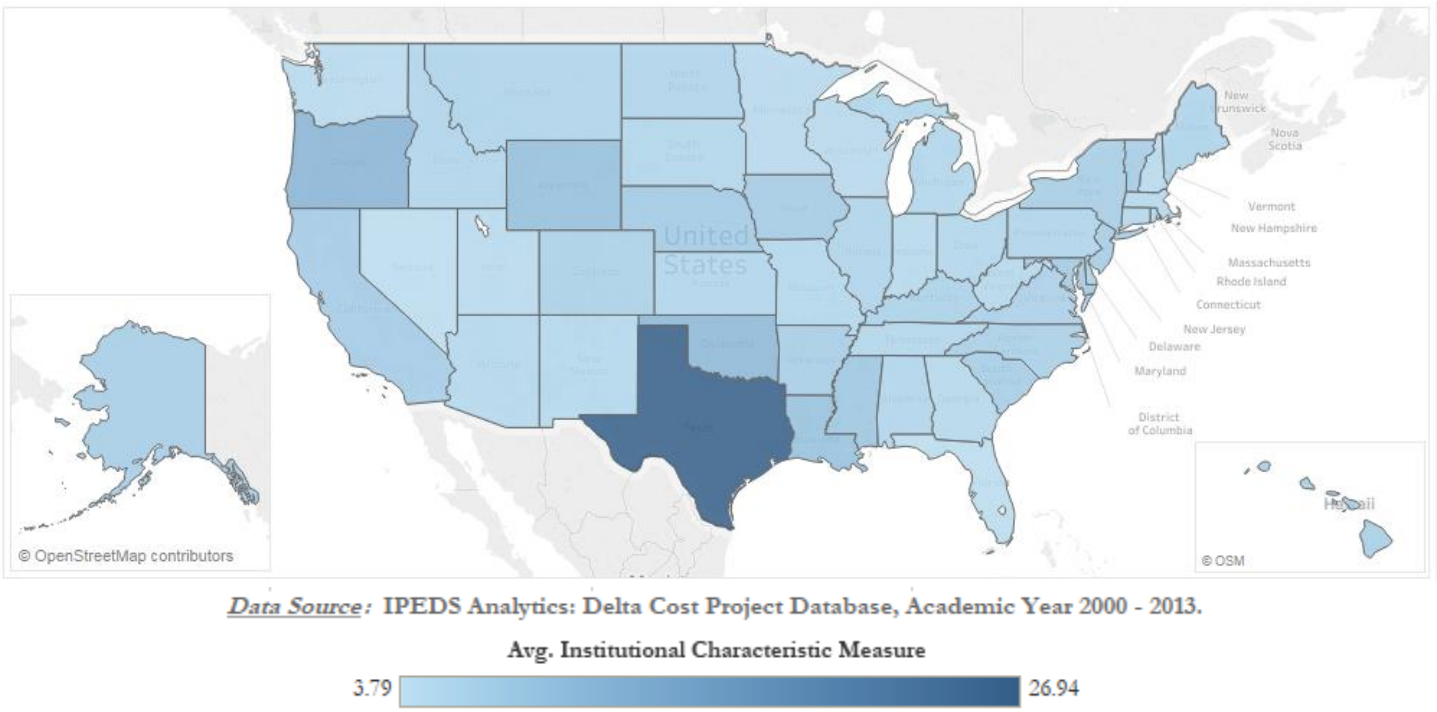


Figure 3.1 – Average Full-Time Faculty per 100 FTE Students in the U.S. (2000 – 2013): Public 4-Year Institutions (or above)

Findings

- For its overall average from 2000 to 2013, Arizona's average full-time faculty per 100 FTE student ratio (5.08) is below the national aggregated average of 6.46 for other public 4-year institutions. It is important to note that, when excluding Texas, Arizona's average faculty per FTE student ratio is consistent nationally.
- For each available year, Arizona has less full-time faculty per 100 FTE students than the national average.[19][20]

[19] The national average can be viewed in the Summary Card within worksheet 9.1, Institutional Characteristics: U.S. Trend.
[20] This can be viewed by filtering for individual years in Institutional Characteristics Dashboard: Part I.

Institutional Characteristics (Faculty) – Arizona & Peer Group Trends (Institutional Characteristics Dashboard: Part I)

Figure 3.2 below illustrates trend analysis comparing average Full-Time Faculty per 100 FTE Student trends for all three Arizona institutions against averages for all peer institutions collectively. The average line represents average full-time faculty per 100 FTE students for ASU, NAU, U of A, and all listed peers (versus just sample peers). For a complete list of all peer institutions used, please see Appendix 3.

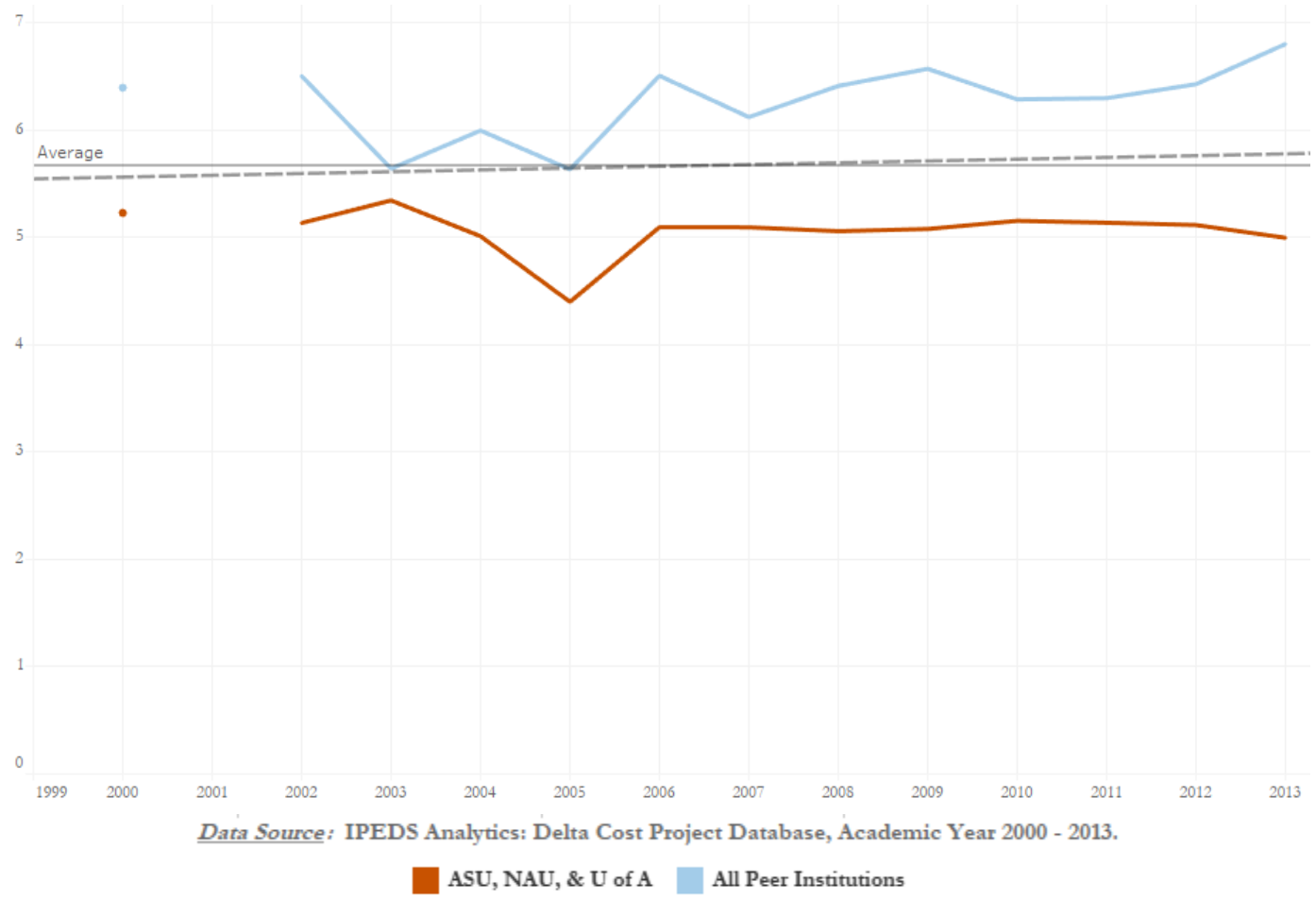


Figure 3.2 – Average Full-Time Faculty per 100 FTE Students

Note: Missing values for specific academic years indicates the necessary information needed from IPEDS to calculate this measure for Delta Cost Project was not provided or available.

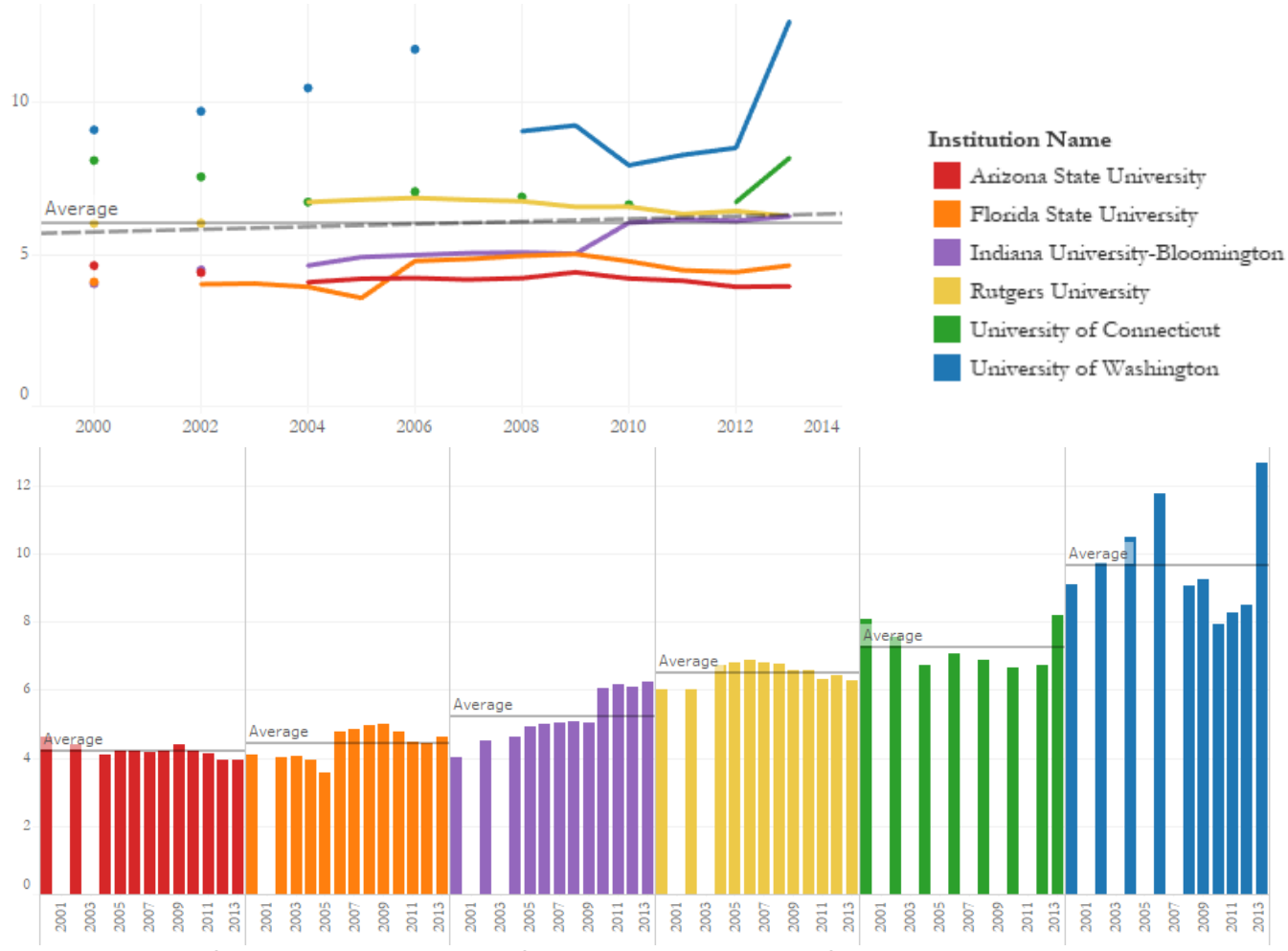
Findings

- ASU, NAU, and U of A's collective average of full-time faculty per 100 FTE students remained below the overall group average—5.671—for every year from 2000 to 2013.
- Both Arizona institutions and their peers had similar trends from 2004 to 2005—drops in full-time faculty per 100 FTE student—and in 2005 to 2006 when rates similarly increased.
- From 2006 through 2013, there is little variation in Arizona institutions' trend of faculty per 100 FTE students; however, in 2011, peer institution numbers begin steadily increasing.

Institutional Characteristics – Arizona & Peer Institution Trends (Institutional Characteristics Dashboard: Part II)

The figures below illustrate trend analysis comparing the number of Full-Time Faculty per 100 FTE Students for ASU, NAU, and U of A against a sample of their respective peer institutions for academic years 2000 to 2013. The 3.3x line graphs illustrate the overall trends for each school over time, while the 3.4x graphs emphasize trends at a particular institution.

Institutional Characteristics (Faculty) – Arizona State University & Peer Sample



Data Source: IPEDS Analytics: Delta Cost Project Database, Academic Year 2000 - 2013.

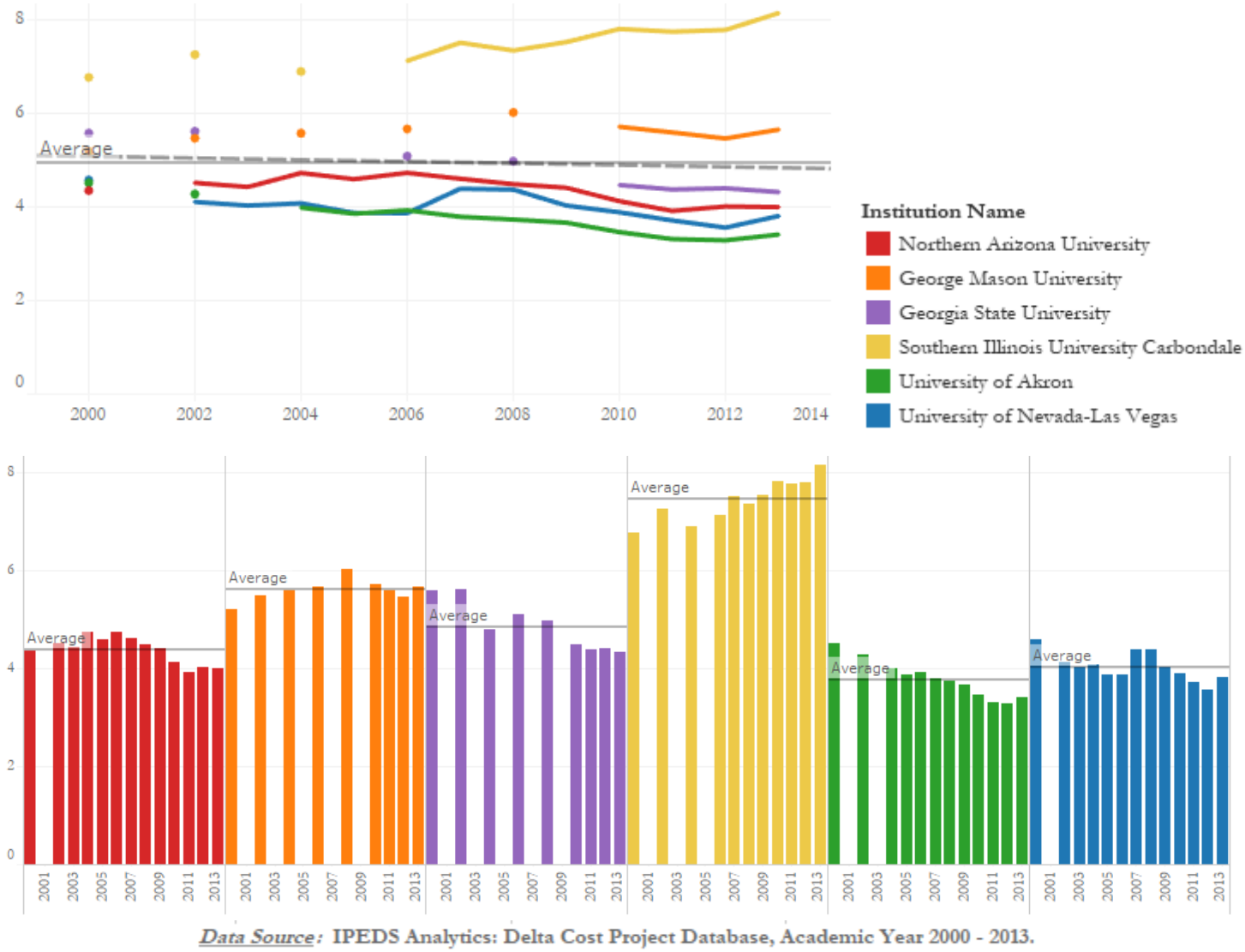
Figures 3.3a & 3.4a – Full-Time Faculty per 100 FTE Students

Note: Missing values for specific academic years indicates the necessary information needed from IPEDS to calculate this measure for Delta Cost Project was not provided or available.

Findings

- ASU shares similar trends of full-time faculty per 100 FTE students. ASU, Florida State University, Rutgers, and University of Connecticut have trends of decreasing faculty ratios for most academic years shown.
- ASU, overall, has the lowest full-time faculty per 100 students out of this peer sample.
- IU Bloomington and University of Washington have overall increases in full-time faculty per 100 FTE students from 2000 to 2013. In particular, University of Washington has a drastic spike from 2012 to 2013.

Institutional Characteristics (Faculty) – Northern Arizona University & Peer Sample



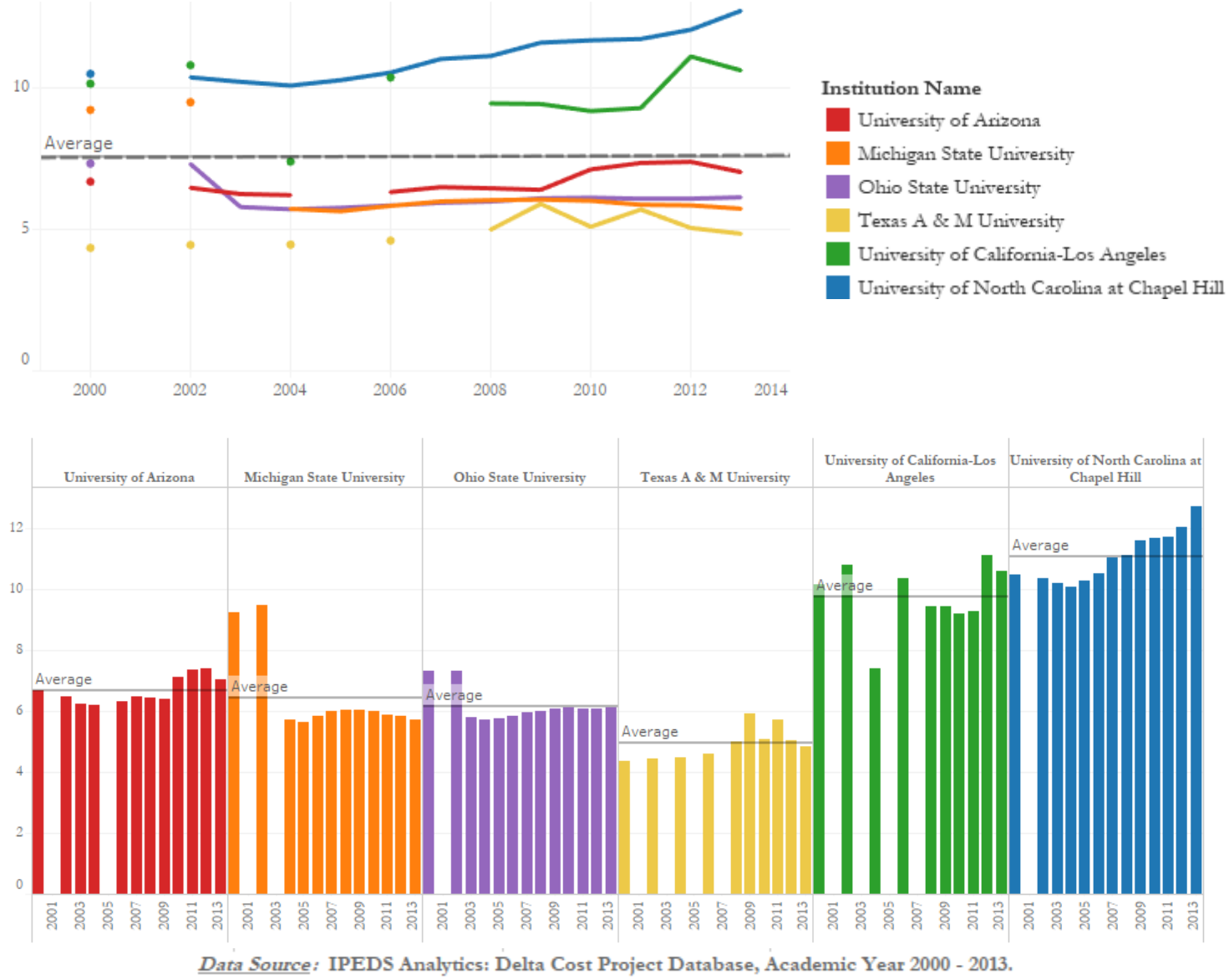
Figures 3.3b & 3.4b – Full-Time Faculty per 100 FTE Students

Note: Missing values for specific academic years indicates the necessary information needed from IPEDS to calculate this measure for Delta Cost Project was not provided or available.

Findings

- NAU's trend of full-time faculty per 100 FTE student is consistent with many of its sample peer institutions—George Mason University, Georgia State University, University of Akron, and University of Nevada – Las Vegas. All of these institutions experienced overall steady decreases in full-time faculty per 100 FTE students.
- NAU has the second lowest trend of full-time faculty per 100 FTE student, only above University of Nevada – Las Vegas.
- NAU, University of Akron, and University of Nevada's trend remained below the sample average (4.933) from 2000 through 2013.

Institutional Characteristics (Faculty) – University of Arizona Peer Sample



Figures 3.3c & 3.4c – Full-Time Faculty per 100 FTE Students

Note: Missing values for specific academic years indicates the necessary information needed from IPEDS to calculate this measure for Delta Cost Project was not provided or available.

Findings

- U of A's full-time faculty per 100 FTE students is in-line with many of its peer institutions. Overall, U of A has higher full-time faculty per 100 FTE students than Michigan State University, Ohio State University, and Texas A&M University.
- U of A remained below the sample average—7.566—from 2000 through 2013. However, this sample average may be skewed due to the high numbers from UCLA and UNC Chapel Hill, both of which have consistently higher numbers for all years represented.

Completions per 100 FTE Students

Institutional Characteristics (Completions) – National Trends, Public 4-Year Institutions (Institutional Characteristics Dashboard: Part I)

Figure 4.1 below illustrates a geographic heat map of the United States depicting average completions (awards, certificates, and degrees) per student FTE for public 4-year institutions (or above) by state, aggregated for all academic years from 2000 to 2013 (individual years can be isolated in Tableau). Users also have the ability to view data for public 2-year institutions, as well as drilling down to institutions that conduct research within the dashboard. The following analysis examines all public 4-year institutions (research and non-research).

A blue color scale is used—light blue signifying lower average completion rates, while dark blue signifies higher average completion rates.

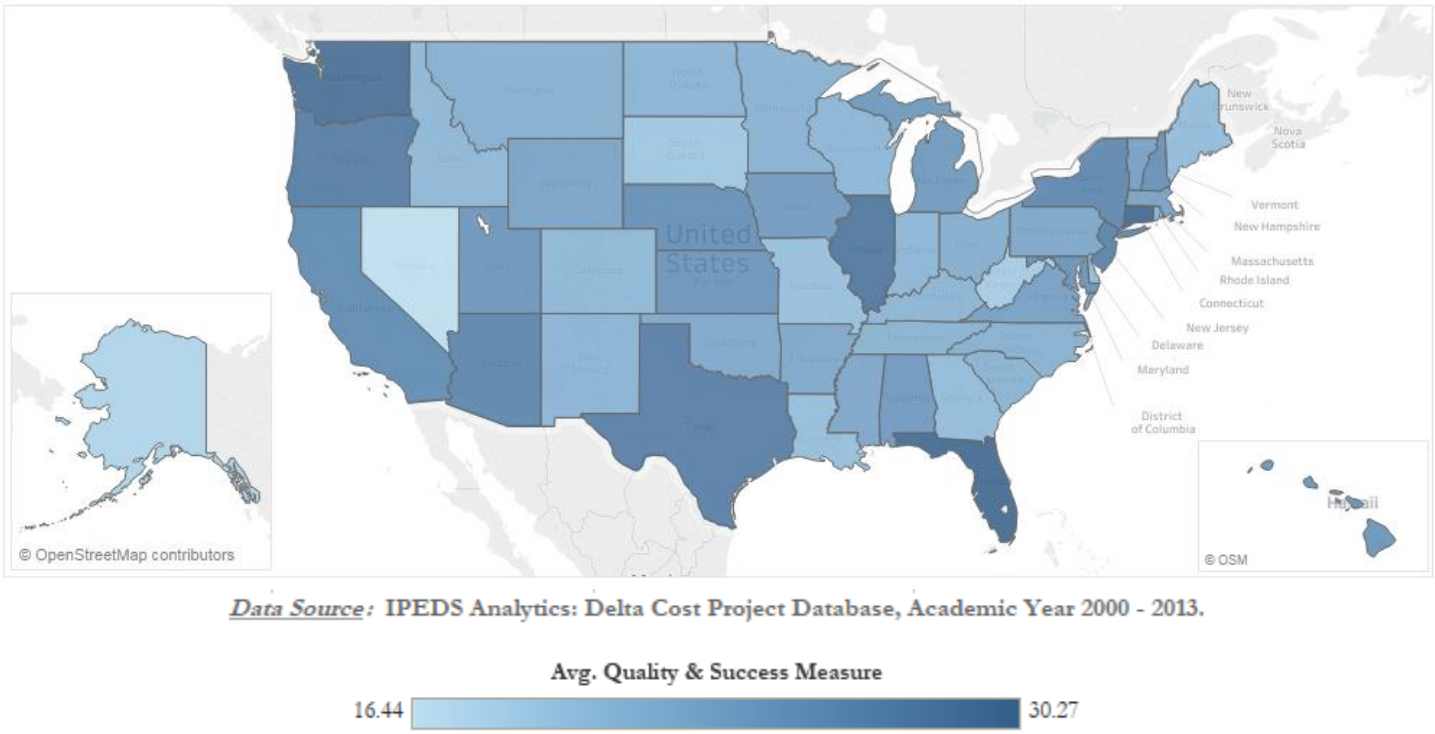


Figure 4.1 – Avg. Completions per 100 FTE Students in the U.S. (2000 – 2013): Public 4-Year Institutions (or above)

Findings

- For its overall average from 2000 to 2013, Arizona's average completion ratio (27.01) is higher than the aggregated national average of 23.38 for public 4-year institutions.[21]
- From 2000 to 2013, Arizona's averages of completions per 100 FTE student were higher than national aggregated averages.[22]

[21] The national average can be viewed in the Summary Card within worksheet 9.1, Institutional Characteristics: U.S. Trend.
[22] This can be viewed by filtering for individual years in Institutional Characteristics Dashboard: Part I.

Institutional Characteristics (Completions) – Arizona & Peer Group Trend (Institutional Characteristics Dashboard: Part I)

Figures 4.2 below illustrates trend analysis comparing average Completions per 100 FTE Students trends for all three Arizona institutions against averages for all peer institutions collectively. The average line represents average completions per 100 FTE students for ASU, NAU, U of A, and all their respective peers (versus just sample peers). For a complete list of all peer institutions used, please see Appendix 3.

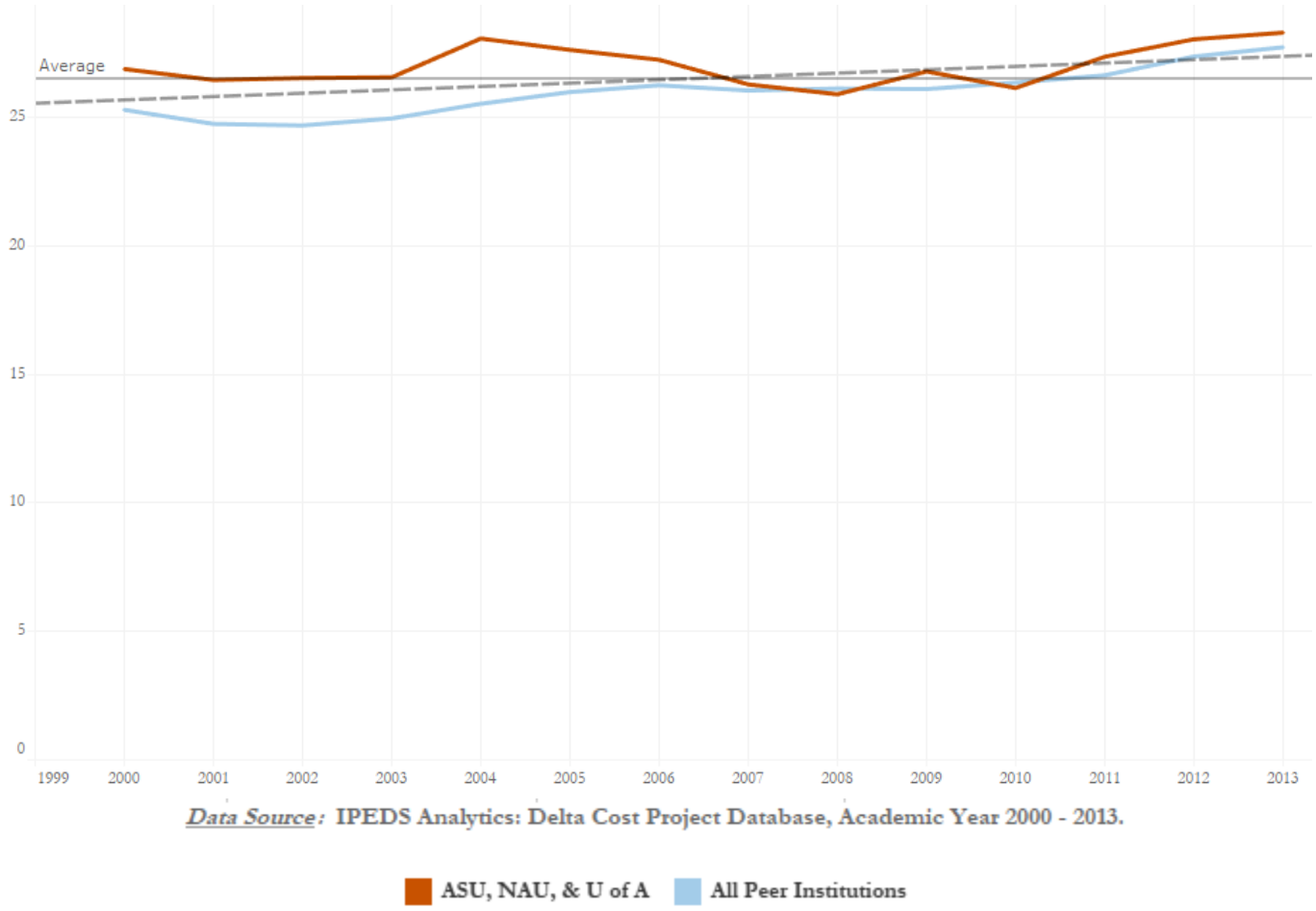


Figure 4.2 – Average Completions per 100 FTE Students

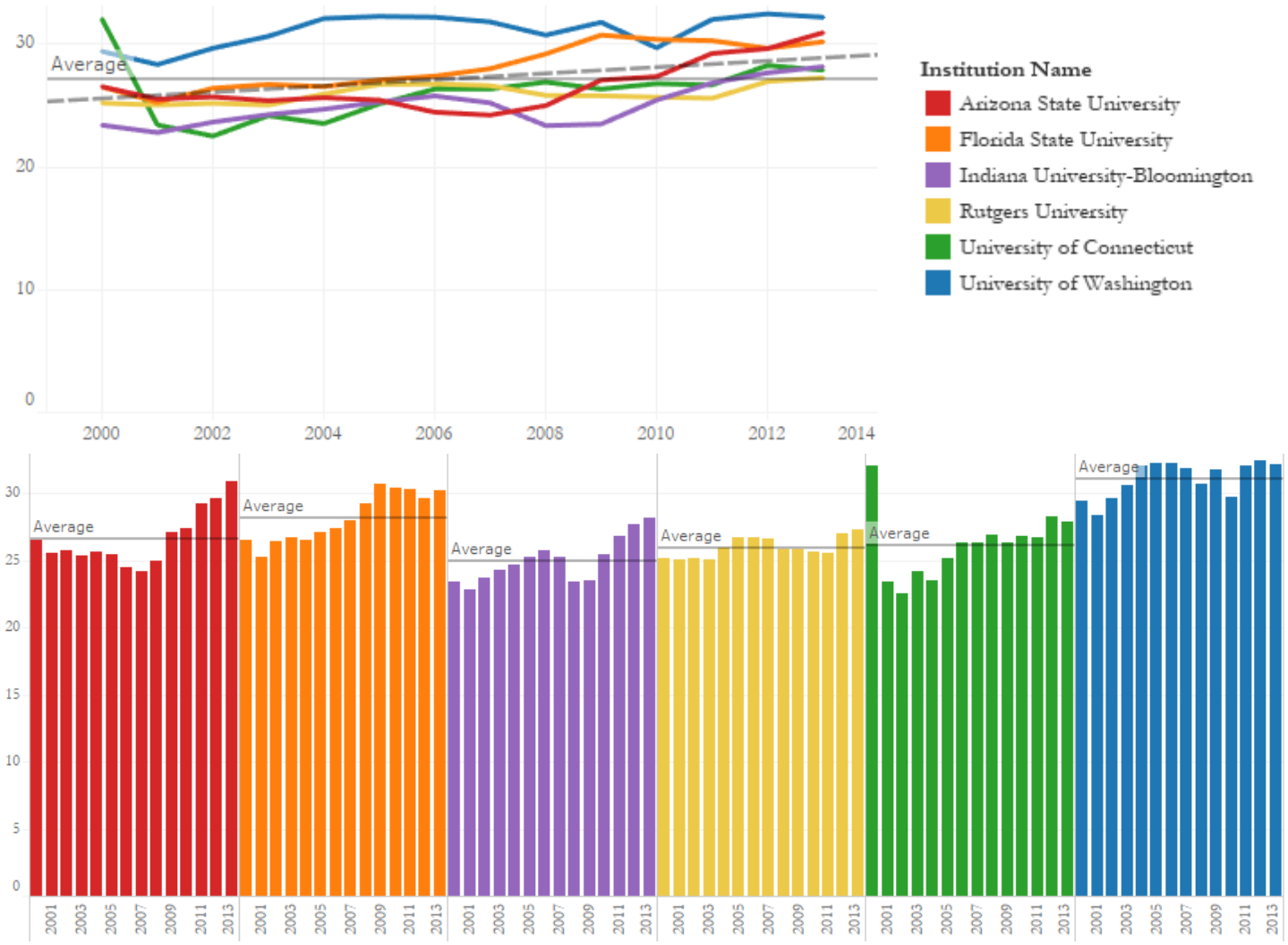
Findings

- ASU, NAU, and U of A collectively perform better in terms of average completions per 100 FTE students compared to their peer institution averages.
- Arizona institutions and peer institutions experience little variation in the overall trend of average completions per 100 FTE students from 2000 – 2013.
- Overall, both Arizona institutions and peer institution average completion rates steadily increased from 2010 to 2013.

Institutional Characteristics – Arizona & Peer Institution Trends (Institutional Characteristics Dashboard: Part II)

The figures below illustrate trend analysis comparing Completions per 100 FTE Students (12-month enrollment) for ASU, NAU, and U of A against a sample of their respective peer institutions for academic years 2000 to 2013. The 4.3x line graphs illustrate the overall trends for each school over time, while the 4.4x graphs emphasize trends at a particular institution.

Institutional Characteristics (Completions) – Arizona State University & Peer Sample

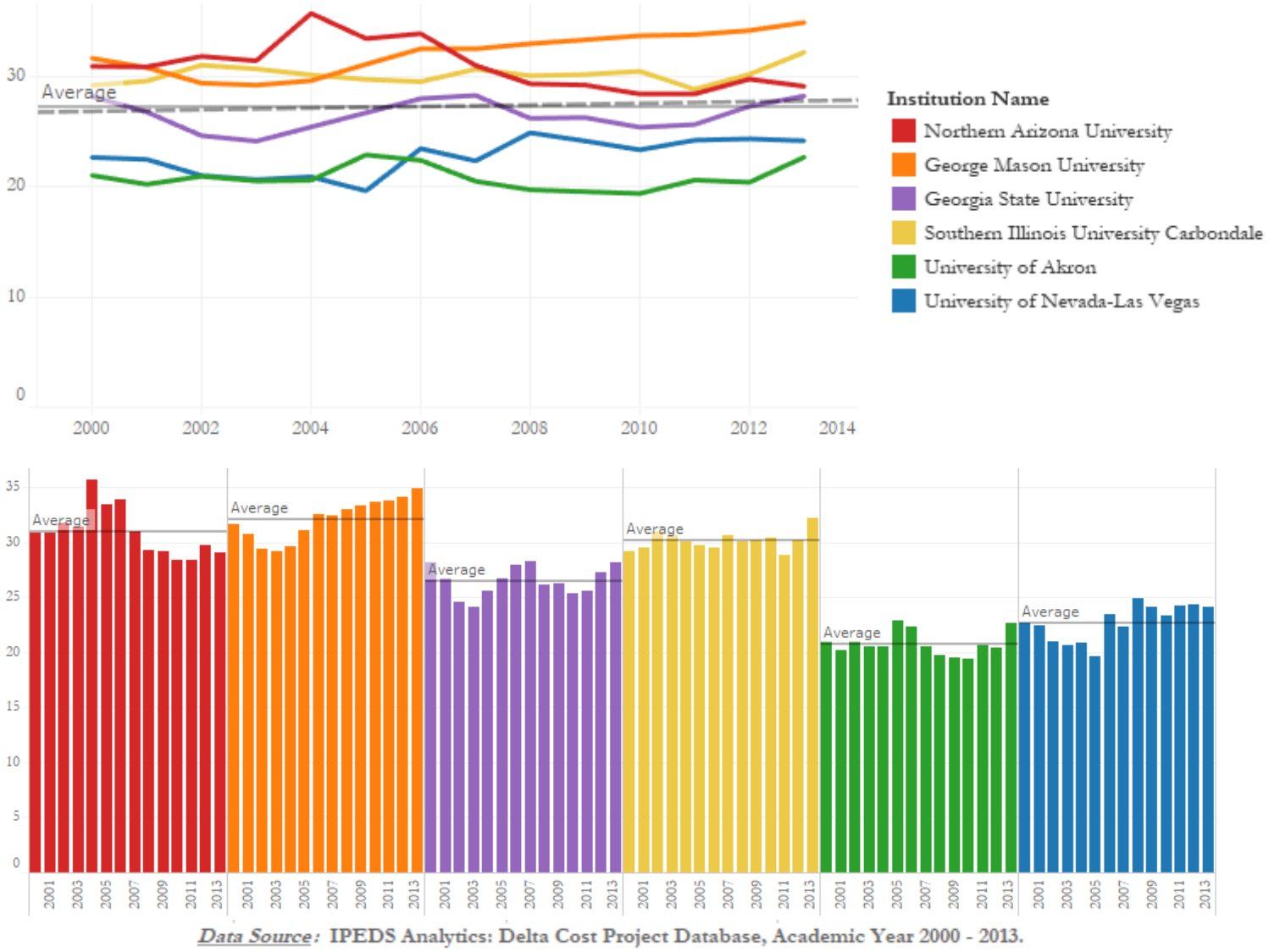


Figures 4.3a & 4.4a – Trend of Completions per 100 FTE Students

Findings

- ASU's trend of completions per 100 FTE students is overall higher than a majority of its sample peer institutions—Indiana University – Bloomington, Rutgers University and University of Connecticut.
- In 2010, ASU's completions per 100 FTE students (29.36) exceeds the sample peer average of 27.18.
- ASU's trend of completions per 100 FTE student steadily increases from 2007 – 2014.

Institutional Characteristics (Completions) – Northern Arizona University & Peer Sample



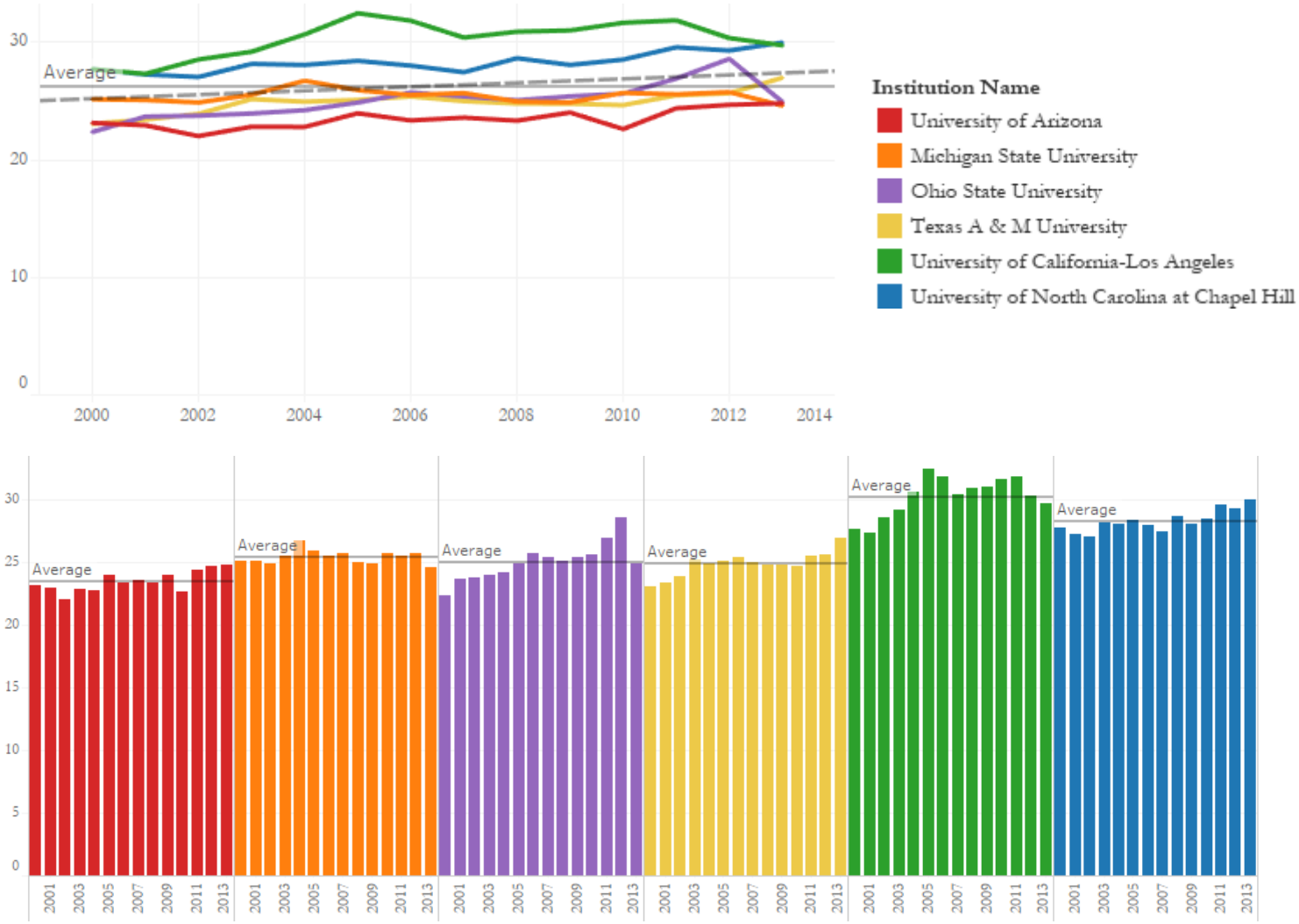
Data Source: IPEDS Analytics: Delta Cost Project Database, Academic Year 2000 - 2013.

Figures 4.3b & 4.4b – Trend of Completions per 100 FTE Students

Findings

- NAU's overall trend of completions per 100 FTE students is highest than all peers from 2002 – 2006. In all other years, it remains close behind George Mason University and Southern Illinois University – Carbondale.
- From academic years 2000 – 2013, NAU has higher rates of completions per 100 FTE students than the sample peer average (27.24).
- NAU's trend of completions per 100 FTE students steadily declined from 2004 – 2010, and then stabilized.

Institutional Characteristics (Completions) – University of Arizona & Peer Sample



Figures 4.3c & 4.4c – Trend of Completions per 100 FTE Students

Findings

- From 2000 – 2013, U of A consistently had one of the lowest trends of completions per 100 FTE students compared to its peer sample group.
- In addition, U of A's overall trend remained below the sample peer average of 26.24 for all academic years. Michigan State University, Ohio State University, and Texas A&M University all remained below the sample peer average as well and shared similar patterns as U of A.

Full-Time Retention Rate

Institutional Characteristics (Retention) – National Trends, Public 4-Year Institutions (Institutional Characteristics Dashboard: Part I)

Figure 5.1 below illustrates a geographic heat map of the United States depicting average full-time retention rate for public 4-year institutions (or above) by state, aggregated for all academic years from 2004 to 2013 (individual years can be isolated in Tableau). Users also have the ability to view data for public 2-year institutions, as well as drilling down to institutions that conduct research within the dashboard. The following analysis examines all public 4-year institutions (research and non-research).

A blue color scale is used—light blue signifying lower average full-time degree rates, while dark blue signifies higher average full-time retention rates.

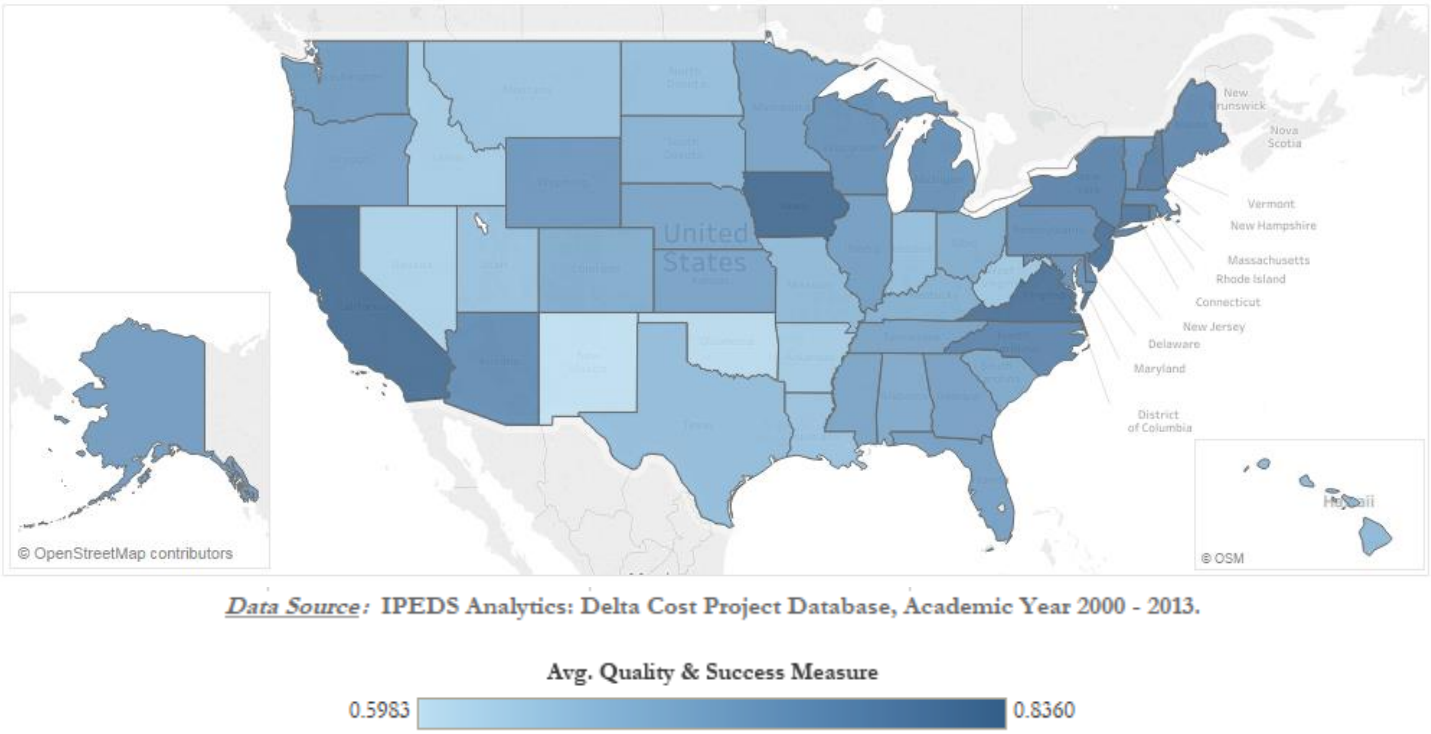


Figure 5.1 – Avg. Full-Time Retention Rate in the U.S. (2004 – 2013): Public 4-Year Institutions (or above)

Findings

- For its overall aggregated average from 2004 to 2013, Arizona's average full-time retention rate (76.5%) is higher than the national aggregated average of 72.44% for public 4-year institutions.[23]
- Arizona's average full-time retentions rates for all years, 2004 to 2013, were higher than the national averages.[24]

[23] The national average can be viewed in the Summary Card within worksheet 9.1, Institutional Characteristics: U.S. Trend.
[24] This can be viewed by filtering for individual years in Institutional Characteristics Dashboard: Part I.

Institutional Characteristics (Retention) – Arizona & Peer Group Trend (Institutional Characteristics Dashboard: Part I)

Figure 5.2 below illustrates trend analysis comparing average Full-Time Retention Rate trends for all three Arizona institutions against averages for all peer institutions collectively. The average line represents average retention rates for ASU, NAU, U of A, and all peers (versus just sample peers). For a complete list of all peer institutions used, please see Appendix 3.

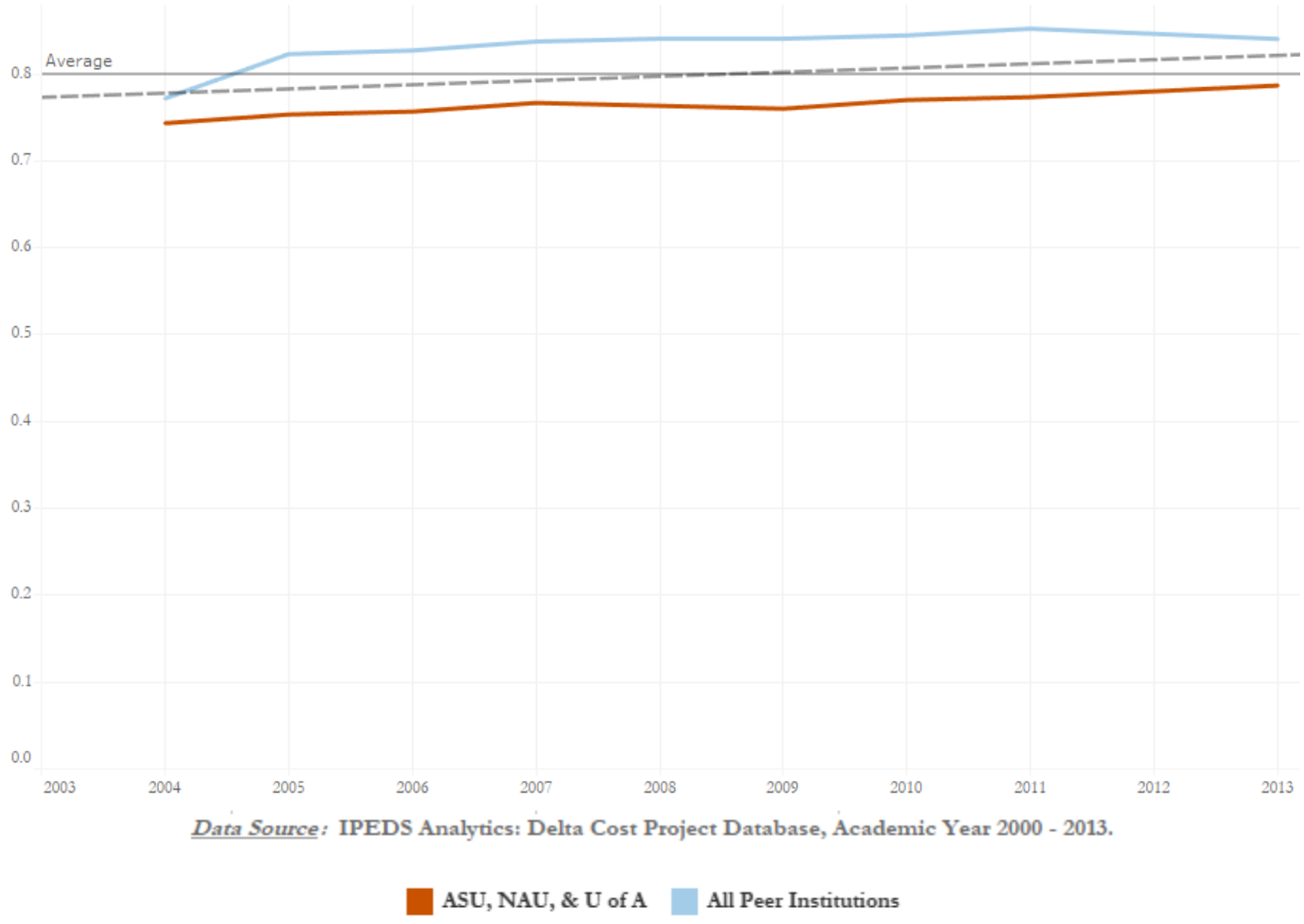


Figure 5.2 –Average Full-Time Retention Rate

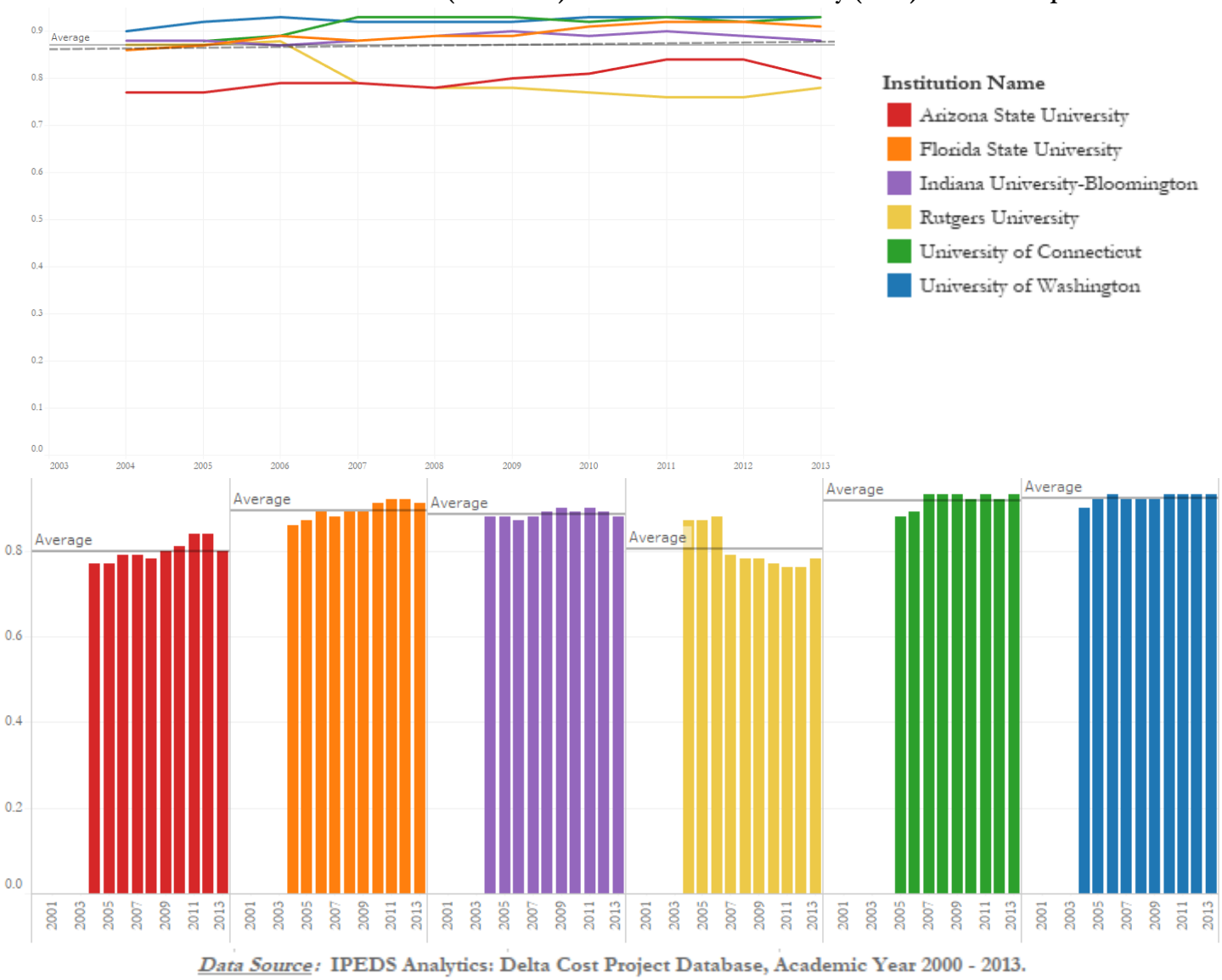
Findings

- ASU, NAU, and U of A average full-time retention rate is lower than peer institutions.
- Overall, both Arizona institutions' and peer institutions' trends of full-time retention rates remain relatively constant, with little variation.

Institutional Characteristics (Retention) – Arizona & Peer Institution Trends (Institutional Characteristics Dashboard: Part II)

The figures below illustrate trend analysis comparing Full-Time Retention Rates for ASU, NAU, and U of A against a sample of their respective peer institutions for academic years 2004 to 2013. The 5.3x line graphs illustrate the overall trends for each school over time, while the 5.4x graphs emphasize trends at a particular institution.

Institutional Characteristics (Retention) – Arizona State University (ASU) & Peer Sample

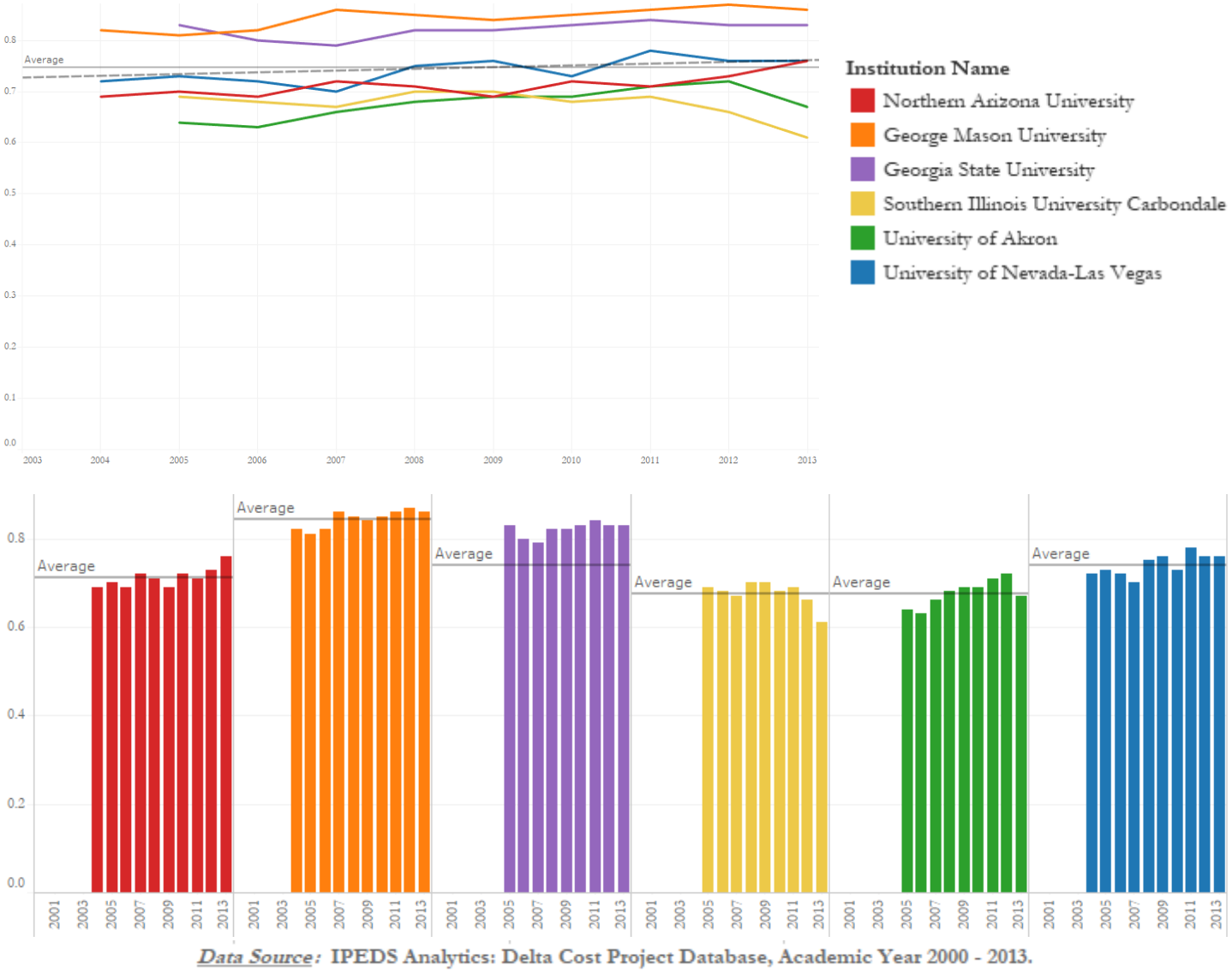


Figures 5.3a & 5.4a – Full-Time Retention Rate: ASU & Peer Comparison

Findings

- ASU had the lowest rates of full-time retention from 2004 through 2008 compared to its peers. Beginning in 2009, ASU surpassed Rutgers University in full-time retention.
- ASU had trends of full-time retention rates below the sample peer average—87%—for all academic years from 2004 to 2013.
- ASU—along with Florida State University and Indiana University – Bloomington—experienced drops in full-time retention rates from 2012 to 2013.

Institutional Characteristics (Retention) – Northern Arizona University & Peer Sample



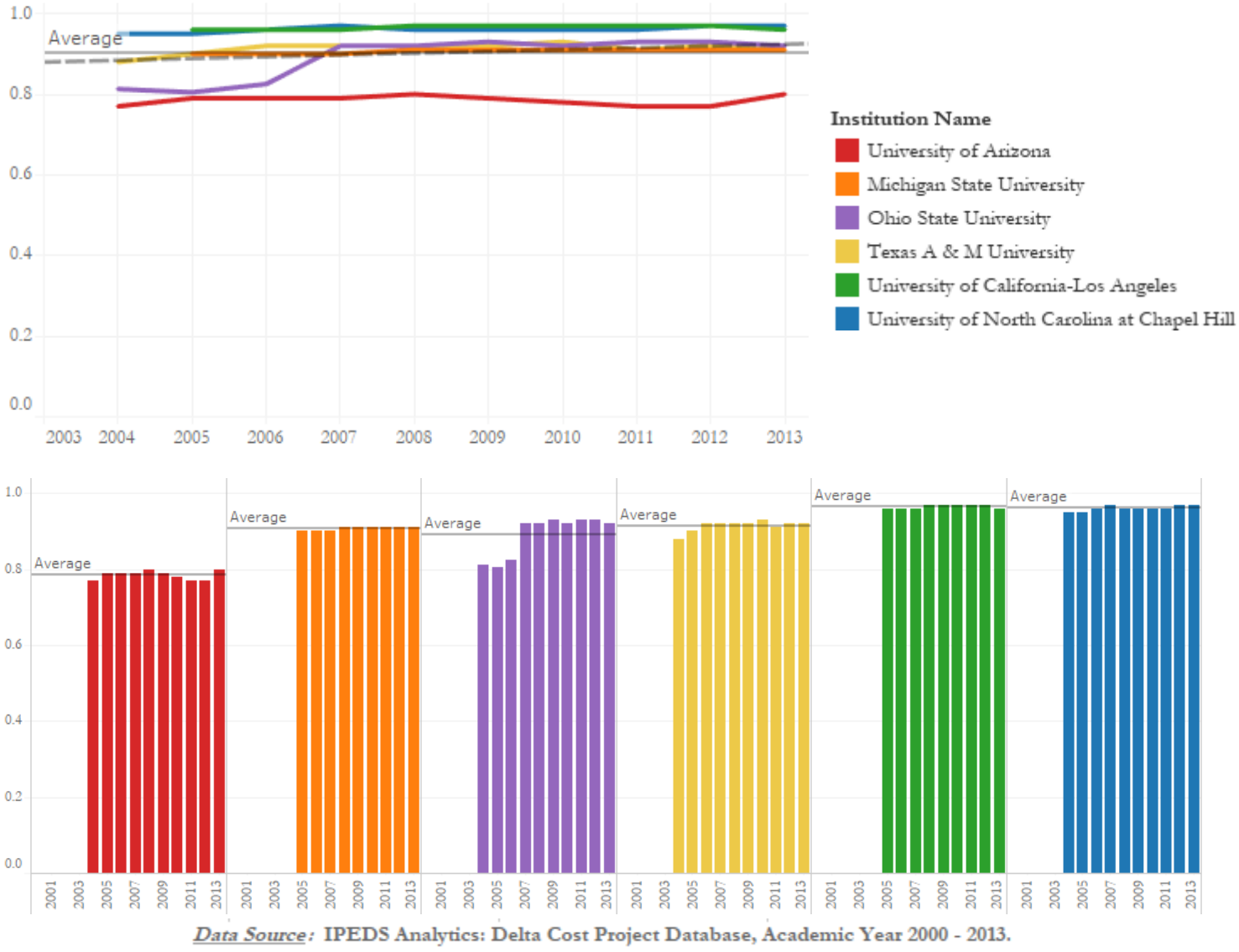
Figures 5.3b & 5.4b – Full-Time Retention Rate

Findings

- NAU had overall higher trends of full-time retention rates than both Southern Illinois University – Carbondale and University of Akron.
- NAU's full-time retention rate trends remained below the sample peer average (74.6%[25]) until 2013 when it reached 76%.

[25] Georgia State University's data point for 2000 was excluded due to an apparent data issue which caused a data point to be placed at 0.0000. This caused the original sample peer average to go from 0.7333 to 0.7461.

Institutional Characteristics (Retention) – University of Arizona & Peer Sample



Figures 5.3c & 5.4c – Full-Time Retention Rate

Findings

- U of A's trend of full-time retention rates from 2004 through 2013 is consistently lower than all sample peer institutions, including the sample peer average of 90.2%.
- U of A steadily decreased in full-time retention from 2008 through 2012, then increased from 2012 to 2013.Most other sample peer institutions experienced little variation in their full-time retention rates (except Ohio State University which stabilized in 2007).

Appendix 1: IPEDS Glossary – E&G Expense Categories

As defined by IPEDS and NACUBO, the categories for E&G expenditures are:

- Instruction
- Public Service
- Academic Support
- Student Services
- Institutional Support
- Operations and Maintenance
- Scholarships and Fellowships

Definitions for each category come from the most recent IPEDS 2016-2017 Data Collection System Survey Materials Glossary.[26]

Term	Definition
Instruction	A functional expense category that includes expenses of the colleges, schools, departments, and other instructional divisions of the institution and expenses for departmental research and public service that are not separately budgeted. Includes general academic instruction, occupational and vocational instruction, community education, preparatory and adult basic education, and regular, special, and extension sessions. Also includes expenses for both credit and non-credit activities. Excludes expenses for academic administration where the primary function is administration (e.g., academic deans). Information technology expenses related to instructional activities if the institution separately budgets and expenses information technology resources are included (otherwise these expenses are included in academic support). Institutions include actual or allocated costs for operation and maintenance of plant, interest, and depreciation.
Public Service	A functional expense category that includes expenses for activities established primarily to provide non-instructional services beneficial to individuals and groups external to the institution. Examples are conferences, institutes, general advisory service, reference bureaus, and similar services provided to particular sectors of the community. This function includes expenses for community services, cooperative extension services, and public broadcasting services. Also includes information technology expenses related to the public service activities if the institution separately budgets and expenses information technology resources (otherwise these expenses are included in academic support). Institutions include actual or allocated costs for operation and maintenance of plant, interest, and depreciation.
Academic Support	A functional expense category that includes expenses of activities and services that support the institution's primary missions of instruction, research, and public service. It includes the retention, preservation, and display of educational materials (for example, libraries, museums, and galleries); organized activities that provide support services to the academic functions of the institution (such as a demonstration school associated with a college of education or veterinary and dental clinics if their primary purpose is to support the instructional program); media such as audiovisual services; academic administration (including academic deans but not department chairpersons); and formally organized and separately budgeted academic personnel development and course and curriculum development expenses. Also included are information technology expenses related to academic support activities; if an institution does not separately budget and expense information technology resources, the costs associated with the three primary programs will be applied to this function and the remainder to institutional support. Institutions include actual or allocated costs for operation and maintenance of plant, interest, and depreciation.

[26] National Center for Education Statistics (NCES). (2016). *IPEDS 2016-2017 Data Collection System, 2016-2017 Survey Materials: Glossary*. Web: https://nces.ed.gov/ipeds/glossary.

Term	Definition
Student Services	A functional expense category that includes expenses for admissions, registrar activities, and activities whose primary purpose is to contribute to students emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal instructional program. Examples include student activities, cultural events, student newspapers, intramural athletics, student organizations, supplemental instruction outside the normal administration, and student records. Intercollegiate athletics and student health services may also be included except when operated as self-supporting auxiliary enterprises. Also may include information technology expenses related to student service activities if the institution separately budgets and expenses information technology resources (otherwise these expenses are included in institutional support.) Institutions include actual or allocated costs for operation and maintenance of plant, interest, and depreciation.
Institutional Support	A functional expense category that includes expenses for the day-to-day operational support of the institution. Includes expenses for general administrative services, central executive-level activities concerned with management and long range planning, legal and fiscal operations, space management, employee personnel and records, logistical services such as purchasing and printing, and public relations and development. Also includes information technology expenses related to institutional support activities. If an institution does not separately budget and expense information technology resources, the IT costs associated with student services and operation and maintenance of plant will also be applied to this function.
Operation and Maintenance of Plant	An expense category that includes expenses for operations established to provide service and maintenance related to campus grounds and facilities used for educational and general purposes. Specific expenses include utilities, fire protection, property insurance, and similar items. This expense does include amounts charged to auxiliary enterprises, hospitals, and independent operations. Also includes information technology expenses related to operation and maintenance of plant activities if the institution separately budgets and expenses information technology resources (otherwise these expenses are included in institutional support).
Scholarships and Fellowships	Outright grants-in-aid, trainee stipends, tuition and fee waivers, and prizes awarded to students by the institution, including Pell grants. Awards to undergraduate students are most commonly referred to as "scholarships" and those to graduate students as "fellowships." These awards do not require the performance of services while a student (such as teaching) or subsequently as a result of the scholarship or fellowship. The term does not include loans to students (subject to repayment), College Work-Study Program (CWS), or awards granted to a parent of a student because of the parent's faculty or staff status. Also not included are awards to students where the selection of the student recipient is not made by the institution.

Appendix 2: IPEDS Survey Guide – Finance Variables for E&G Calculation

The following variables were directly extracted from IPEDS survey data to calculate E&G and E&G per 12-month FTE student costs for E&G Dashboard: Part II.

Instruction, Public Service, Academic Support, Student Services, and Operation Maintenance of Plant (O&M Plant) were calculated using 3 categories: Salaries and Wages + Employee Fringe Benefits + All Other = Total.

Scholarships and Fellowship total is not calculated like other E&G finance categories; instead, it is determined by pulling the *Total Gross Scholarships and Fellowships* variable from IPEDS, which takes into account actual scholarship expenses. Salaries and benefits related to Scholarships and Fellowships are included under Student Services. If Scholarships and Fellowships were calculated like other E&G categories, then it would only be picking up the administrative costs of the activity.

IPEDS Custom Data Files: E&G Variables
Finance / Public Institutions – GASB 34/35: Fiscal Year(s) 2005-06 – 2014-15*
Expenses and Other Deductions
Instruction – Salaries and Wages
Instruction – Employee Fringe Benefits
Instruction – All Other
Public Service – Salaries and Wages
Public Service – Employee Fringe Benefits
Public Service – All Other
Academic Support – Salaries and Wages
Academic Support – Employee Fringe Benefits
Academic Support – All Other
Student Services – Salaries and Wages
Student Services – Employee Fringe Benefits
Student Services – All Other
Institutional Support – Salaries and Wages
Institutional Support – Employee Fringe Benefits
Institutional Support – All Other
O&M Plant – Salaries and Wages
O&M Plant – Employee Fringe Benefits
O&M Plant – All Other
Scholarships and Fellowships
Total Gross Scholarships and Fellowships
Frequently Used / Derived Variables / 12-month Enrollment: Fiscal Year(s) 2005-06 – 2014-15*
Enrollment
12-month full-time equivalent enrollment

***Fiscal year 2014-15 is provisional data.**

Appendix 3: Peer Institution List

Peer institutions used for analysis and comparisons made throughout this report are as follows:

Arizona State University	
• **Florida State University***	• University of Illinois at Urbana
• **Indiana University – Bloomington***	• University of Iowa
• Michigan State University	• University of Maryland – College Park
• Ohio State University - Main Campus	• University of Minnesota – Twin Cities
• Pennsylvania State University – Main**	• **University of Washington***
• **Rutgers University***	• University of Wisconsin – Madison
• University of California – Los Angeles	
• **University of Connecticut***	
Northern Arizona University	
• Bowling Green State University	• **University of Akron***
• **George Mason University***	• University of Alabama
• **Georgia State University***	• University of Maine
• Kent State University	• **University of Nevada – Las Vegas***
• Northern Illinois University	• UNC at Greensboro
• Ohio University	• Western Michigan University
• Old Dominion University	• Wichita State University
• **Southern Illinois – Carbondale***	
University of Arizona	
• **Michigan State University***	• University of Illinois
• **Ohio State University***	• University of Iowa
• Pennsylvania State University	• University of Maryland – College Park
• **Texas A & M University***	• University of Minnesota – Twin Cities
• University of Texas	• **University of North Carolina at Chapel Hill***
• University of California – Davis	• University of Washington
• **University of California – Los Angeles***	• University of Wisconsin – Madison
• University of Florida	

*Note: Identified peer institutions were selected as a peer sample. In Tableau, including all 15 peer institutions for each Arizona school caused readability and scale issues. Thus, a sample group of peer institutions were selected for comparisons against respective Arizona institutions. Sample peer institutions represent varying locations and regions. In addition, peer institutions that were clear outliers (extremely high or low) compared to its Arizona institutions were not selected for peer sample comparison.

**Pennsylvania State University is not included for Peer Average and Peer Median data in E&G Dashboard: Part II. Unlike IPEDS Analytics data which accounts for variance in reporting standards, inflation, and other data anomalies, E&G Dashboard Part II is based on direct extract IPEDS financial data. Pennsylvania State University uses FASB accounting standards, instead of GASB which is used by all other universities; this variance is accounted for in the IPEDS Analytics dataset, not the direct extract data.

Appendix 4. Full Description of Direct and Indirect Validation Procedures

In this appendix, a full explanation of the process and findings of the review and validation of the methodology to calculate the categories defined in the E&G cost per student FTE metric is provided.

Direct Validation

A critical component of validating an institution's cost categorization methodology is studying the approach by which the organization's low level accounts are mapped to the higher level categories reported to internal and external stakeholders. This is studied to confirm that the value reported for each category are proportionally consistent with institutional operations. For Arizona institutions, the relationships to evaluate include how account names are mapped to the E&G categories as defined by NACUBO. While these mappings and categorizations do not impact the revenue or expense figures for an institution, they impact the components of the IPEDS metrics and impact data related to performance and benchmarking.

While this direct validation has certain similarities to an audit traditionally performed by accountants, there are key differences to note. While auditors are concerned with confirming the legitimacy of reported expenses or revenues, this review does not attempt to validate these values. Rather, this review seeks to confirm the appropriateness of how these values are assigned to the NACUBO cost categories reported to IPEDS. In other words, it is a review of the rules used to classify expenses versus a review of what expenses were incurred.

The direct validation process consisted of meetings with financial administrators at ASU, U of A, and NAU. Each university provided insight into the methodology and process leveraged to aggregate account level transaction information to NACUBO cost categories. Each university also provided a breakdown of all FY14 expenses incurred by account, and how those expenses were mapped to NACUBO cost categories. The review focused on FY14 data, and it was assumed that mappings in this year are indicative of the current and ongoing process being followed.

The assessment aimed to validate consistent application of methodology, and identify categorizations that were potentially inaccurate, inconsistent, or incomplete. The specific review process included the following steps:

- Reviewing how each 'transaction type' (each combination of expense level detail) was mapped to NACUBO categories. For example, if a dataset's relevant fields included Account Description and Fund Description, every combination of the two was compared to the NACUBO category it was mapped against. In the cases where a transaction type was mapped to more than one category, other financial detail (e.g., Object Code description) was incorporated into the review to provide further insight.
- Reviewing each transaction's descriptive text and comparing it to the NACUBO category descriptive text (a text mining approach). For example, library expenses are aligned to the NACUBO category 'Academic Support', and all transaction types with text related to libraries were evaluated to ensure alignment to this category. If not aligned, other financial detail in the dataset was evaluated to understand why the assignment was made or these transactions were flagged for follow up discussion.
- Scanning all transaction types (i.e., records with the same combination of accounting codes relevant to the analysis) and how they are aligned to NACUBO categories. This involved creating a roll up extract of the financial detail and evaluating transaction type individually. Given the scope of this engagement, instances where the nature of the expense type was unclear were assumed to be correct (i.e., there was no indication that the transaction was assigned incorrectly); only transaction types that appeared to have descriptive text that suggested it should be assigned to a different NACUBO category were flagged for follow up discussion.

Direct Validation Key Findings

Upon review of each dataset, it was found that the vast majority of transaction mappings could be validated, with ~7% requiring follow up discussion. When these transactions were discussed with Arizona institutions to better understand the logic in mapping particular transactions to defined NACUBO categories, the financial managers provided additional clarifying detail not found in the transaction data to indicate why the assignment to NACUBO category was correct. Grant Thornton was able to validate that the majority of the expenses (over 95%) were assigned appropriately to NACUBO category, and any anomalies would not have a material impact on the information reported to IPEDS.

Indirect Validation

In addition to the direct validation of the application of E&G costs per student FTE methodology, an indirect validation of how expenses are aggregated to defined IPEDS E&G categories was conducted. This validation focused on evaluating changes in E&G figures reported to IPEDS. The evaluation focused on two primary data trends:

III. **E&G cost components over time**: How have the E&G cost components changed across each institution between FY2007-2008 and FY2013-2014? Are the nominal and proportional changes in E&G cost components consistent for each institution?

IV. **Across institutions**: How have E&G costs shifted across institutions in the peer group? Data evaluated includes the nominal, proportional and per-unit E&G related figures.

Each type of trend analysis was designed to identify patterns that warrant additional consideration. While the NACUBO documentation provides a reference on how to code expenses, some of the more subjective allocations (i.e., professor time spent on instruction versus research) may be treated differently across institutions. Unusual patterns over time may speak more to school operations, but a significant, asymmetrical change in costs may indicate an issue to follow up on. Large differences across peer institutions on a nominal or proportional basis may arise due to legitimate operational differences between institutions (e.g., a larger footprint), but also may point to a difference in how certain expenses are classified. Geographic inconsistencies may highlight how groupings of institutions behave relative to one another. It is important to note that patterns identified during the indirect validation do not necessarily indicate an inconsistent or inaccurate approach to cost classification methodology. The patterns only serve to highlight inconsistencies that may indicate an approach that varies from other institutions or one that has changed during the period being examined.

Indirect Validation Key Findings

- There are no significant changes that would indicate an inconsistency in coding of costs across Arizona schools.
- The U of A had a noticeable proportional increase in Academic Support costs during the period FY2007-2008 to FY2013-2014 (moving from approximately 12% to 17%). There was also a decrease in the proportion of costs related to Instruction (41% to 35%). While the other Arizona institutions saw a decrease in the proportion of Instruction costs, they also saw a decrease in the proportion of Academic Support costs during the period.
- All three Arizona institutions had noticeable increases in Scholarships and Fellowship expense during the period FY2007-2008 to FY2013-2014.

Specific analysis and findings are offered below.

Arizona E&G cost components over time

This analysis is illustrated in Figure 6 - 8 below. An explanation of each is provided:

Figure 6: A summary of the E&G costs for all institutions by E&G category by year (for each year between FY2007-2008 and FY2013-2014). This baseline chart illustrates the overall national average, allowing for comparison to particular institutions.

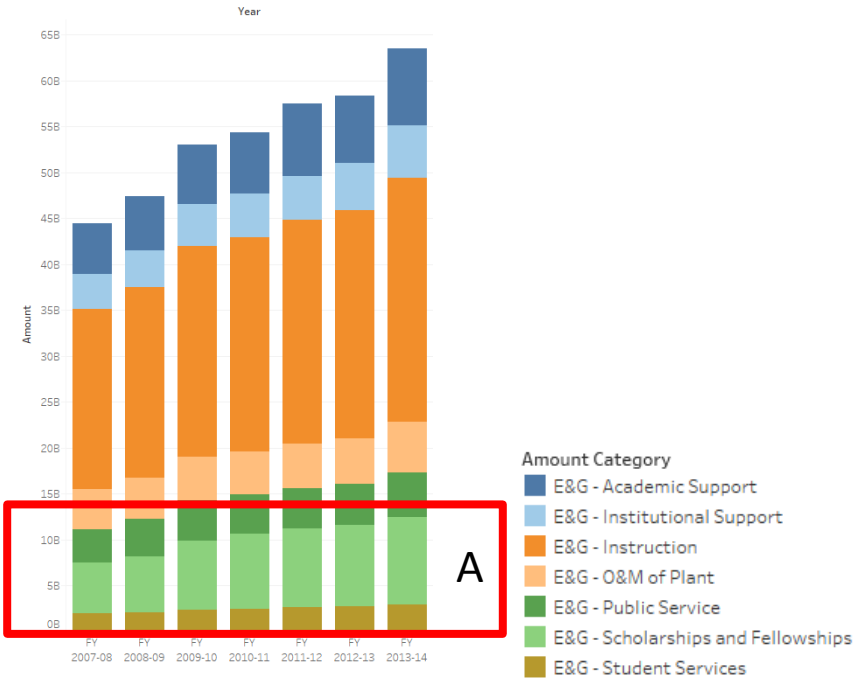


Figure 6: Total E&G (all schools)

Figure 7: The total E&G cost for Arizona institutions by E&G category by year. This chart illustrates the scale of operations and the consistency of the changes in cost over time. Similarities in the shape of each institution's cost curve by component indicates similar changes to the scale of operations (as captured by expenses), cost of living, or the consistent classification of costs by NACUBO category.

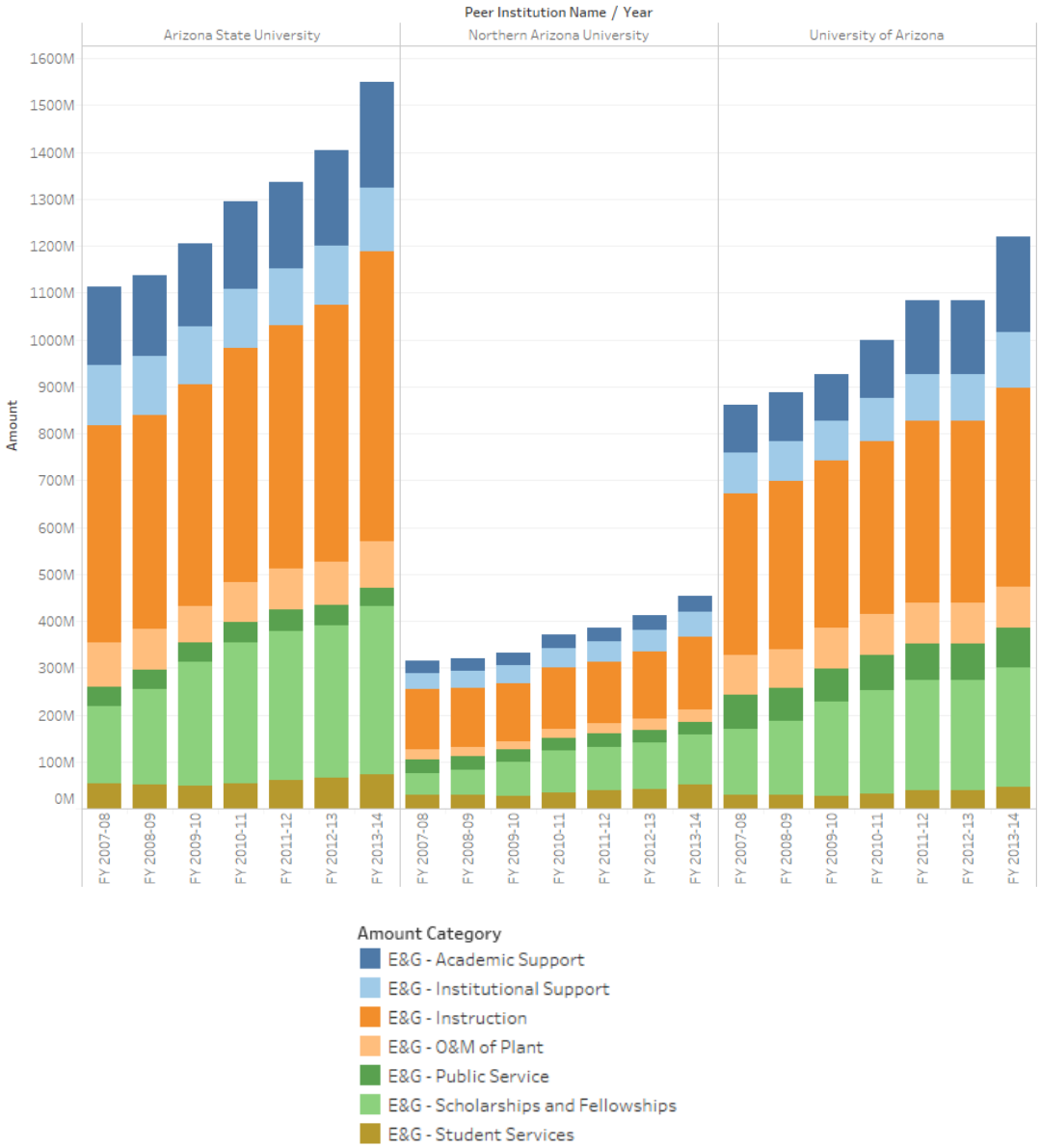


Figure 7: Total E&G (Arizona schools)

Figure 8: The proportion of E&G cost for Arizona institutions by category by year. This chart identifies the relative change in costs and any change in how an institution classifies any material cost into E&G category may be represented by a significant year to year change in the illustration. This type of comparison allows institutions of different sizes to be compared against one another, and significant differences in proportions across institutions may also indicate a different classification of costs by E&G component.

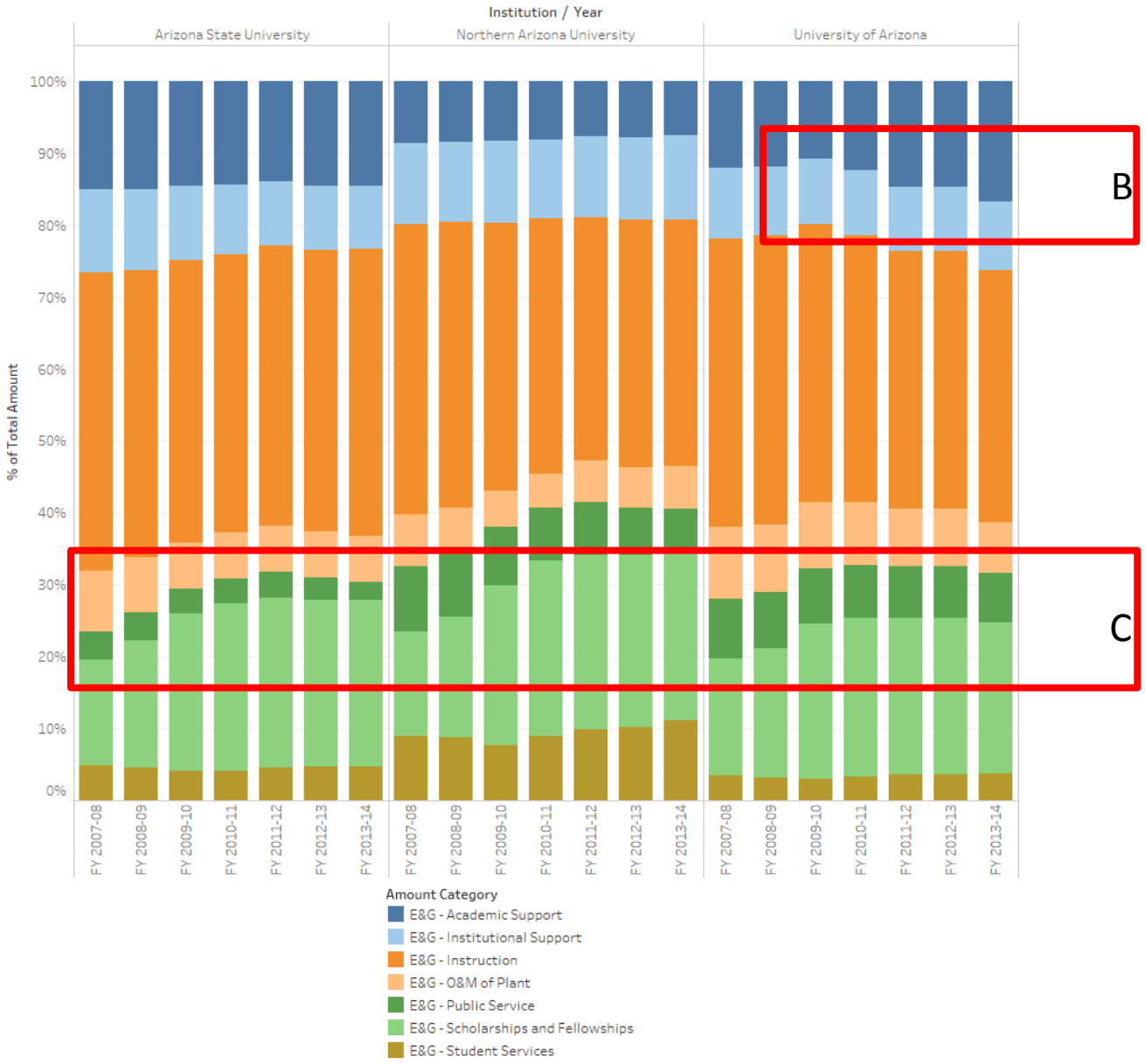


Figure 8: Proportion of E&G (Arizona schools) Findings

A. There are no significant changes that would indicate an inconsistency in coding of costs across Arizona schools (Figures 6 and 8). The only category that saw significant increase is Scholarships and Fellowships which grew from $5.5B to $9.5B during the period (Figure 6). This is presumably in response to increased alternative subsides to counterbalance the reduced funding provided by the states.

B. U of A had a noticeable proportional increase in Academic Support costs during the period FY2007-2008 to FY2013-2014 (moving from approximately 12% to 17%). There was also a decrease in the proportion of costs related to Instruction (41% to 35%). While the other Arizona institutions saw a decrease in the proportion of Instruction costs, they also saw a decrease in the proportion of Academic Support costs during the period.

C. All three Arizona institutions had noticeable increases in Scholarships and Fellowship expense during the period FY2007-2008 to FY2013-2014

Evaluation of E&G cost components across institutions

Figure 9 below examines the proportion of E&G cost by component for all NAU peer institutions by year (the analysis for ASU and the U of A peer set was also performed, but excluded from this section because no significant anomalies were identified). This chart identifies the relative change in E&G cost categories for each peer institution across the time period FY2007-2008 to FY2013-2014. Any material change to the E&G cost component proportions may represent changes to operations or changes to how costs were classified.

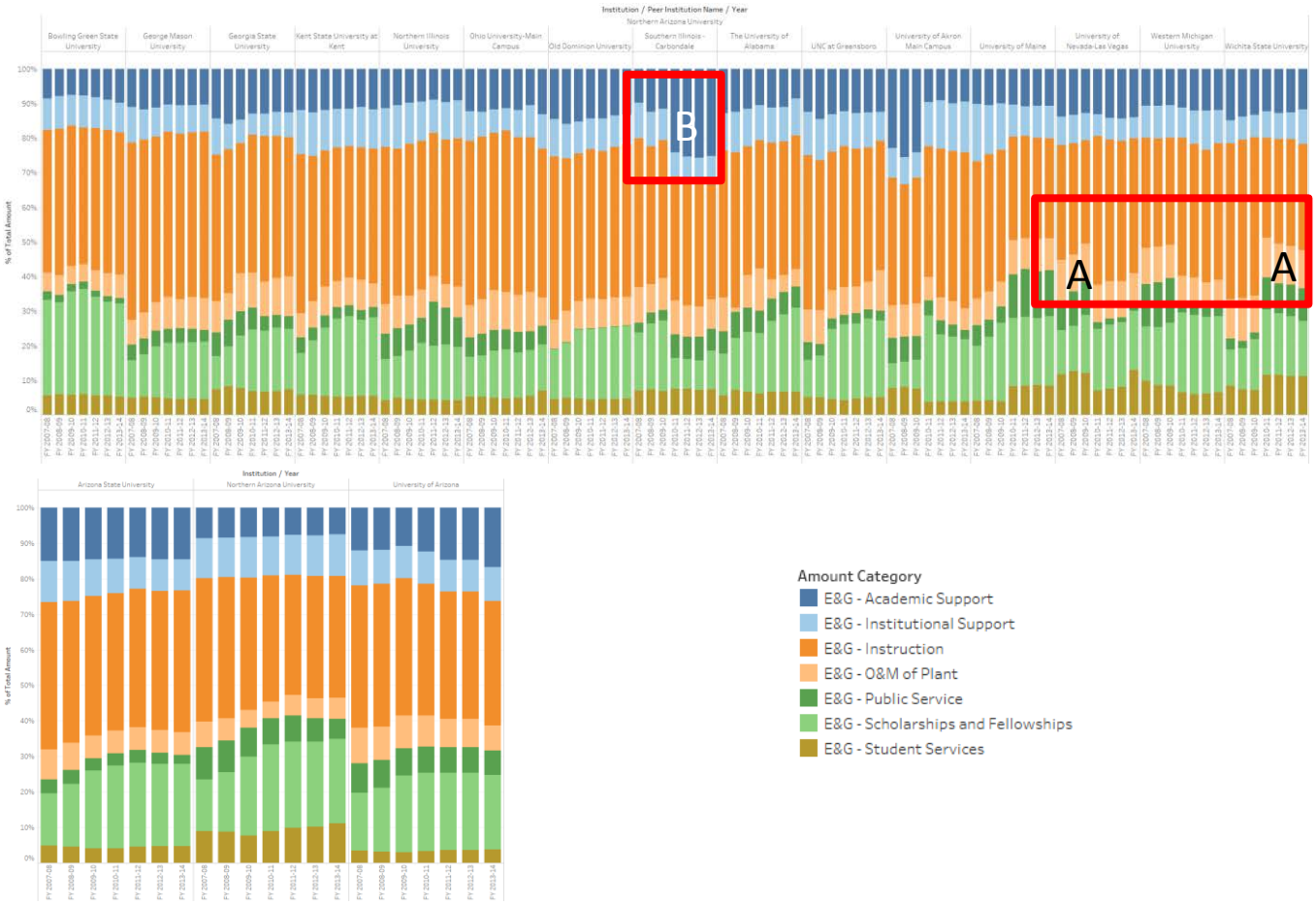


Figure 9a: Total proportion of E&G cost components over time (Northern Arizona University peer schools)
Figure 9b: Arizona Schools

Findings

A. Certain institutions had significant variances in the proportion of E&G costs from one year to the next (although it should be noted that none of the Arizona institutions had these types of variances). For example, Wichita State University had a significant decrease in the proportion of Instruction costs between FY2009-2010 and FY2010-2011, while the University of Nevada's increased. However, these changes were in line with changes to enrollment figures.

B. Certain institutions had variances that were not explained by available data, as not all E&G cost fluctuations were explained by enrollment. Southern Illinois-Carbondale had a significant increase in Academic Support in FY2010-2011, but enrollment actually declined that year.

Evaluation of E&G and enrollment

Figure 10 examines the E&G expense per student compared to the number of students enrolled for each Arizona institution against its peers. The charts allow the comparison of how an institution's unit E&G expenses changes over time. The distinct pattern in each chart demonstrates the operational differences (expense profiles and scale of operations) between peer groups, and their similarity to one another. Evaluating by peer group provides insight into the differences in variation across groups.

This method of indirect validation involves identifying the institutions with large variability in the per unit E&G expenses (relative to peers and enrollment over time). Schools that have noticeable vertical variance represent significant changes in the expense profiles over time. Any significant variation could indicate the need for further research to understand if rising costs, changes to operations, or changes to cost classifications are contributing to the difference.

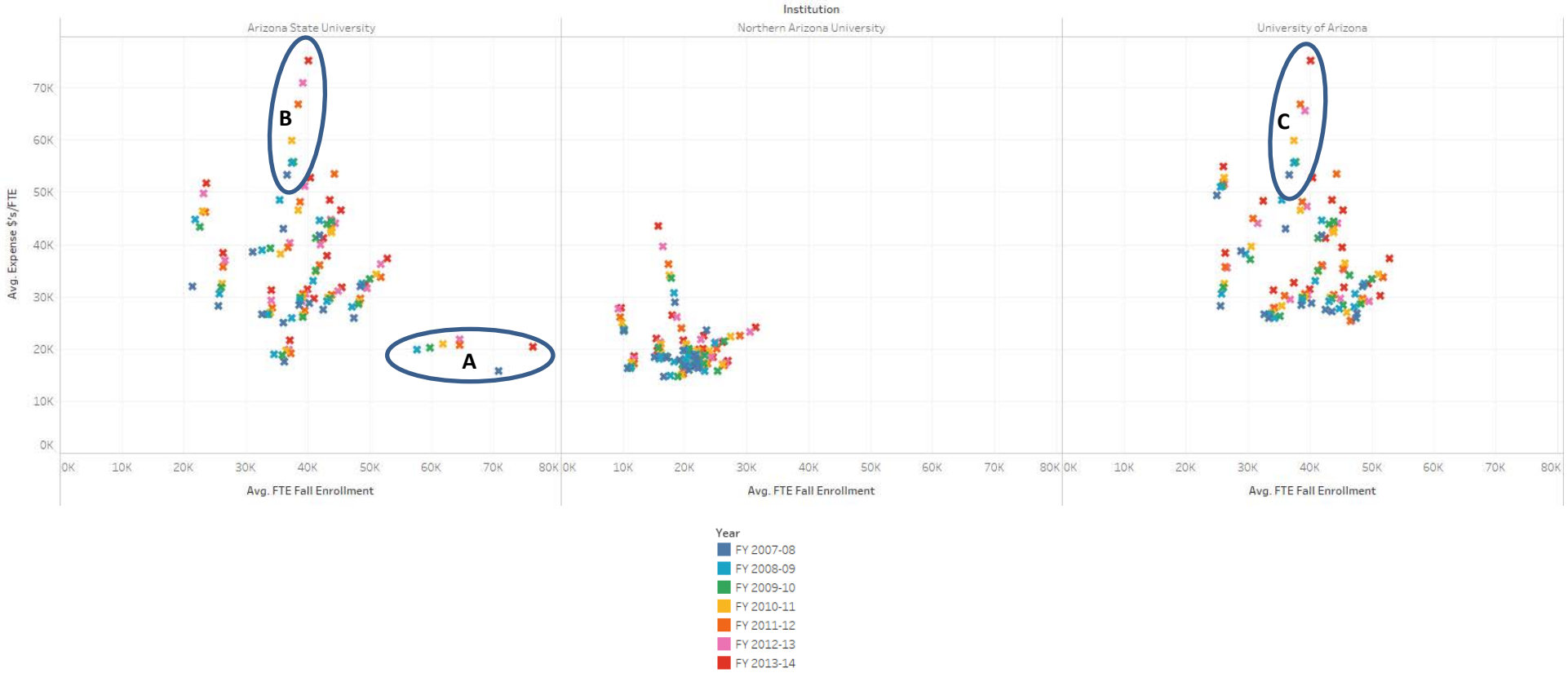


Figure 10: E&G expense and enrollment figures by school and year – for each peer group

Findings

A. ASU – almost no change to E&G expenses per student even though enrollment increased significantly during the period.
B. University of Connecticut – the change to E&G expenses per student outpaced the peer median. If the majority of this change is within instruction, this could be partly to increase in cost of living, or even a change to how Instruction costs are classified under research or E&G related instruction.
C. University of California-Los Angeles – the change to E&G expenses per student outpaced the peer median.

Figure 11 below isolates Arizona institutions and an example of an institution with higher variance in unit E&G expenses. Also included is Southern Illinois – Carbondale - this institution has been included for comparison to help examine types of E&G per student variation in greater detail.

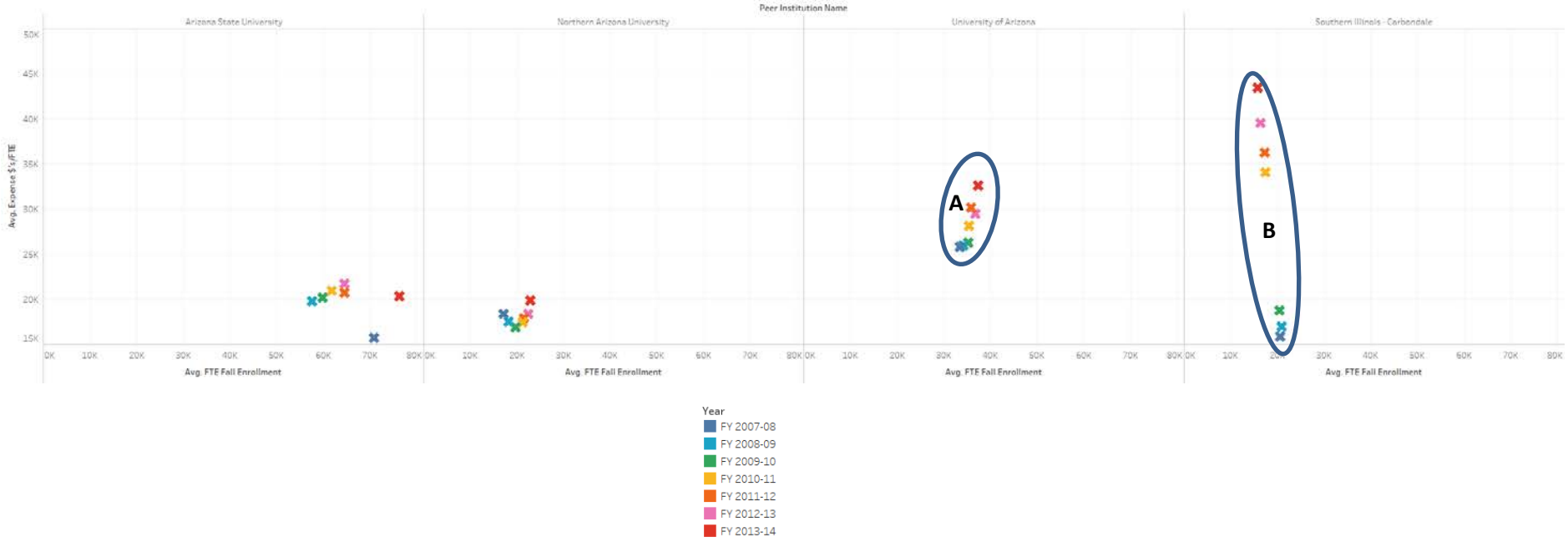


Figure 11: E&G expense and enrollment figures by school – Arizona schools

Findings

A. U of A had the most unit E&G cost increases over the period of any Arizona institution (approx. 30% over the period). Looking back at Figures 6 and 7 shows this increase occurred within Academic Support, and understanding the factors beyond cost of living increases that caused this change (i.e., increase in average teacher salary versus change to costs classified as "E&G Academic Support") would help reinforce the consistency of the costing approach taken by the U of A. It should be noted that the overall FY2007-2014 E&G per student change for all schools is in line with the U of A, the additional discussion around Academic Support is recommended only because of the disproportionate increase in that cost as outlined in Figure 8. In addition, when viewed against schools with significant unit variances (Southern Illinois – Carbondale (B in Figure 11)), the unit variances of all Arizona schools are modest.

Indirect Validation Summary

While there was some variation in the E&G cost pools (particularly Academic Support and Instruction) that may warrant further review, there is no data within the IPEDS E&G cost information that by itself indicates an inconsistent cost approach at any of the Arizona institutions. However, there are several peer institutions with very high variability in their E&G cost data (e.g., Southern Illinois – Carbondale, University of North Carolina – Chapel Hill, and University of California – Los Angeles), and these may need to be excluded for benchmarking purposes to increase the accuracy of peer averages (or adjusted to account for regional expense differences).

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Appendix C[1]

Reconciliation To E&G ASU

College	Published E&G Per FTE	Public Service Exclusions	Overhead Exclusions	Scholarship/ Fellowship Expense	Depreciation	Thunderbird	Total Changes	Cost Study Cost per FTE
Business	$17,084	($10)	($739)	$1,672	$942	$0	$1,865	$18,949
CISA / University College	$12,467	($11)	($818)	$1,850	$1,043	$0	$2,064	$14,531
Design and the Arts	$14,517	($10)	($749)	$1,694	$955	$0	$1,890	$16,407
Engineering	$17,062	($10)	($720)	$1,630	$919	$0	$1,819	$18,881
Future of Innovation in Society	$67,532	($9)	($637)	$1,442	$813	$0	$1,609	$69,141
Health Solutions	$15,569	($10)	($751)	$1,699	$957	$0	$1,895	$17,464
Journalism	$25,631	($8,067)	($757)	$1,714	$966	$0	($6,144)	$19,487
Law	$30,912	($8)	($547)	$1,238	$698	$0	$1,381	$32,293
Liberal Arts and Sciences	$14,629	($11)	($780)	$1,765	$995	$0	$1,969	$16,598
New College	$12,951	($11)	($810)	$1,832	$1,032	$0	$2,043	$14,994
Nursing and Health Innovation	$22,587	($11)	($799)	$1,808	$1,019	$0	$2,017	$24,604
Public Service & Community Solutions	$15,005	($10)	($750)	$1,696	$956	$0	$1,892	$16,897
Sustainability	$31,534	($12)	($888)	$2,009	$1,132	$0	$2,241	$33,775
Teachers College	$18,478	($10)	($735)	$1,662	$937	$0	$1,854	$20,332
Thunderbird	$54,531	$0	($711)	$0	$0	($53,820)	($54,531)	$0
FY 2016 Total Colleges	**$16,077**	**($125)**	**($761)**	**$1,714**	**$966**	**($165)**	**$1,629**	**$17,706**

[1] The tables in Appendix C calculate the cost per FTE student for each college or school, based n the number of FTE students in that college or school. The total cost is based on the weighted average across all colleges and schools.

Appendix C[1]

Reconciliation To E&G NAU

College	Published E&G Per FTE	Public Service Exclusions	Overhead Exclusions	Scholarship/ Fellowship Expense	Depreciation	Total Changes	Cost Study Cost per FTE
Arts and Letters	$13,719	$0	($576)	$1,164	$1,138	$1,726	$15,445
Business	$13,534	($1,378)	($558)	$1,128	$1,103	$295	$13,828
Forestry, Engineering, and Natural Sciences	$12,474	($82)	($570)	$1,153	$1,127	$1,627	$14,101
Education	$17,591	($3,251)	($512)	$1,035	$1,011	($1,717)	$15,874
Social and Behavioral Sciences	$12,888	($810)	($584)	$1,181	$1,154	$941	$13,829
Health and Human Services	$14,913	$0	($589)	$1,190	$1,163	$1,764	$16,677
Total Colleges	**$13,667**	**($735)**	**($569)**	**$1,150**	**$1,124**	**$970**	**$14,637**

[1] The tables in Appendix C calculate the cost per FTE student for each college or school, based n the number of FTE students in that college or school. The total cost is based on the weighted average across all colleges and schools.

Appendix C[1]

Reconciliation With E&G UA

	Published E&G Per FTE	Public Service Exclusions	Overhead Exclusions	Scholarship/ Fellowship Expense	Depreciation	COM Exclusion	Cooperative Extension Exclusion	Total Changes	Cost Study Cost per FTE
COLLEGE OF AGRICULTURE AND LIFE SCIENCES	$12,985	($197)	($1,875)	$1,182	$1,058	$0	$0	$168	$13,153
COLLEGE OF ARCHITECTURE & LANDSCAPE ARCHITECTURE	$17,543	($190)	($1,810)	$1,159	$1,021	$0	$0	$180	$17,723
COLLEGE OF EDUCATION	$16,500	($155)	($1,477)	$900	$833	$0	$0	$101	$16,601
COLLEGE OF ENGINEERING	$17,692	($174)	($1,662)	$1,368	$937	$0	$0	$469	$18,161
COLLEGE OF FINE ARTS	$15,982	($262)	($1,924)	$1,191	$1,085	$0	$0	$90	$16,073
COLLEGE OF HUMANITIES	$13,692	($226)	($2,149)	$1,019	$1,212	$0	$0	($144)	$13,548
COLLEGE OF NURSING	$24,793	($106)	($1,005)	$1,703	$567	$0	$0	$1,159	$25,953
COLLEGE OF OPTICAL SCIENCES	$14,117	($141)	($1,342)	$2,341	$757	$0	$0	$1,615	$15,732
COLLEGE OF PHARMACY	$27,090	($1,676)	($1,400)	$1,888	$790	$0	$0	($398)	$26,692
COLLEGE OF SCIENCE	$15,293	($207)	($1,972)	$984	$1,113	$0	$0	($83)	$15,210
COLLEGE OF SOCIAL & BEHAVIORAL SCIENCES	$14,816	($210)	($1,997)	$1,010	$1,126	$0	$0	($70)	$14,746
ELLER COLLEGE OF MANAGEMENT	$17,181	($189)	($1,805)	$1,171	$1,018	$0	$0	$195	$17,376
JAMES E ROGERS COLLEGE OF LAW	$29,351	($152)	($1,452)	$4,458	$819	$0	$0	$3,673	$33,024
MEL AND ENID ZUCKERMAN COLLEGE OF PUBLIC HEALTH	$21,328	($169)	($1,606)	$1,069	$906	$0	$0	$201	$21,529
UNIVERSITY OF ARIZONA SOUTH	$19,903	($203)	($1,935)	$912	$1,092	$0	$0	($135)	$19,769
COLLEGES OF MEDICINE	$291,202	$0	$0	$0	$0	($291,202)	$0	$0	$0
COOPERATIVE EXTENSION	$794	$0	$0	$0	$0	$0	($794)	$0	$0
FY2016 Total Colleges	**$26,543**	**($229)**	**($1,870)**	**$1,162**	**$1,055**	**($9,518)**	**($794)**	**($10,194)**	**$16,349**

[1] The tables in Appendix C calculate the cost per FTE student for each college or school, based n the number of FTE students in that college or school. The total cost is based on the weighted average across all colleges and schools.

Appendix C

Statewide Reconciliation

	ASU	NAU	UA	System Average
E&G	$16,077	$13,667	$26,543	$18,437
Public Service Exclusions	($125)	($735)	($229)	($258)
Overhead Exclusions	($761)	($569)	($1,870)	($1,022)
Scholarship/Fellowship Expense	$1,714	$1,150	$1,162	$1,470
Depreciation	$966	$1,124	$1,055	$1,017
Colleges of Medicine	$0	$0	($9,518)	($2,527)
Agriculture Exclusions	$0	$0	($794)	($211)
Thunderbird	($165)	$0	$0	($93)
Average Cost per Student	**$17,706**	**$14,637**	**$16,349**	**$16,813**

Appendix D

State Support for Universities Calculation

The below table includes all the revenues (both appropriated and non-appropriated) listed in the JLBC appropriations report. Explanations for the exclusions are provided below the table.

	ASU	NAU	UA	ABOR	Total
Revenues*					
Appropriated					
General Fund Appropriated	$320,259,000	$108,612,800	$269,038,600	$6,909,300	$704,819,700
Collections Fund	$685,087,900	$147,362,100	$456,220,100	$0	$1,288,670,100
TRIF	$3,600,000	$0	$0	$0	$3,600,000
Non-Appropriated					
Federal Funds	$363,675,200	$89,980,200	$349,652,500	$56,700	$803,364,600
Other Funds	$1,481,863,000	$301,915,000	$1,547,065,100	$6,039,200	$3,336,882,300
Total	$2,854,485,100	$647,870,100	$2,621,976,300	$13,005,200	$6,137,336,700
Exclusions					
General Fund					
Research Infrastructure	$13,481,000	$5,896,500	$14,249,300	$0	$33,626,800
AFAT	$5,985,800	$1,326,000	$2,729,400	$0	$10,041,200
Biomedical Research	$0	$3,000,000	$0	$0	$3,000,000
Agriculture	$0	$0	$20,304,200	$0	$20,304,200
Arizona Cooperative Extension	$0	$0	$14,458,100	$0	$14,458,100
Arizona Geological Survey	$0	$0	$950,400	$0	$950,400
Mining & Mineral Museum	$0	$0	$428,300	$0	$428,300
UA Health Sciences	$0	$0	$69,437,700	$0	$69,437,700
Arizona Transfer Articulation	$0	$0	$0	$213,700	$213,700
Western Interstate Office	$0	$0	$0	$145,000	$145,000
WICHE	$0	$0	$0	$4,086,000	$4,086,000
Collections Fund	$685,087,900	$147,362,100	$456,220,100	$0	$1,288,670,100
TRIF	$3,600,000	$0	$0	$0	$3,600,000
Federal Funds	$363,675,200	$89,980,200	$349,652,500	$56,700	$803,364,600
Other Funds	$1,476,604,600	$295,602,500	$1,544,130,900	$6,039,200	$3,322,377,200
Total Exclusions	$2,548,434,500	$543,167,300	$2,472,560,900	$10,540,600	$5,574,703,300
Total State Support	$306,050,600	$104,702,800	$149,415,400	$2,464,600	$562,633,400
Fall 2017 Resident FTE					99,938
FY 2018 State Support Per FTE					$5,630
One Time Funds	$7,639,500	$3,202,800	$4,157,700	$0	$15,000,000
Support if One-Time Funds are not Extended	$298,411,100	$101,500,000	$145,257,700	$2,464,600	$547,633,400
Fall 2017 Resident FTE					99,938
FY 2018 State Support Per FTE W/O One-Time Funds					$5,480
* Source: JLBC FY 2018 Appropriations Report, pg. 352.					

Exclusions

ABOR first developed the resident student funding model in an effort to define the financial relationship between the public universities and the state. At that time, state support was divided between defined and undefined allocations. If an appropriation's use was defined by the budget it was excluded from the calculation. The undefined balance was considered direct support for resident students. Non-general fund support was also excluded.

However, when ABOR developed the cost side of this model, it included all academic related, operating expenditures as defined in the Educational and General Expenditure report. In an effort to align the revenue model with the cost model, revenues provided by the state are now divided between those that fund academic operating expenditures and those that fund non-academic operating expenditures. Revenues supporting excluded expenditures for financial aid, research, and capital are excluded. Portions of non-general fund revenues that support academic operating expenditures are also included. Specific exclusions from each revenue source are discussed below.

- Research Infrastructure: In 2003, the legislature appropriated these dollars to finance lease-purchase payments for research infrastructure. Both research and capital are excluded from the cost per resident student calculation. Therefore, these dollars are excluded from the revenue per resident student calculation.
- Arizona Financial Aid Trust: These dollars support the state financial aid program. Financial aid costs are excluded from the cost per resident student calculation. Therefore these revenues were excluded from the revenue per resident student calculation.
- Biomedical Research: The budget requires NAU to allocate these dollars to a nonprofit medical research foundation. For NAU, this appropriation is strictly a pass through. NAU has awarded these dollars each year to TGen. Since the dollars don't benefit the university, they are excluded from the calculations.
- Agriculture: These dollars support academic and research programs in animal systems, environment and natural resources, family, youth and community, human nutrition, food safety and health, and agricultural research. The amount of the general fund appropriation that is excluded is equal to the amount of agricultural research funded with state funds.
- Arizona Cooperative Extension: This amount supports Agricultural Experiment stations and Cooperative extension services that provide community outreach seminars and youth programs throughout the state. These expenses are not included in the resident cost per student, therefore the revenues are not included in the state support calculations.
- Arizona Geological Survey: State law transferred the Geological Survey office to UA in FY 2017. The cost model is based on FY 2016 costs, therefore this new cost is not captured.
- Arizona Mine and Mineral Museum: State law transferred the Mine and Mineral Museum to UA in FY 2017. The cost model is based on the FY 2016 costs, therefore this new cost is not captured. Further, the majority of the appropriation is allocated for capital costs.
- UA Health Sciences: The general fund appropriation is used exclusively to fund the UA medical schools. Because the cost model for the medical schools is significantly different than the rest of university academic programs, they were excluded from the cost per resident student calculation. Therefore this appropriation is also excluded from the state support per resident student calculation.

- Arizona Transfer Articulation Support System (ATASS): These dollars support a joint initiative among the public community colleges and universities to facilitate efficient transfer of course curricula and credits. The costs associated with this program are not included in the cost per resident student calculation and are therefore excluded from the state support per resident student.
- Western Interstate Office: Monies from this line pay the state's share of the administrative expenditures for the Western Interstate Commission on Higher Education. This cost is not in the per resident cost model. Therefore, these dollars are excluded from the state support calculation.
- Western Interstate Commission for Higher Education (WICHE): Monies in this line provide subsidies to Arizona students participating in the WICHE professional student exchange program. Since the Arizona University System does not offer programs in dentistry, optometry, osteopathy, podiatry or veterinary medicine, this program allows students to enroll in these programs at other institutions at a lower cost. Since tuition revenues paid by students and the state do not flow through Arizona public universities, the funding was excluded from the state support per resident student calculation.
- Collections Fund: This fund includes appropriated tuition and fee dollars as well as some federal grant dollars. Tuition and federal dollars are not considered state support.
- Technology and Research Initiative Fund (TRIF): The budget includes an appropriation of TRIF funds to ASU East and West for a lease purchase payment. Since capital expenditures are excluded from the cost per resident student, these dollars are excluded from the state support per resident student.
- Federal Funds: Federal funds consist of research grants, federal contracts, and student aid. None of these dollars relate to state support and therefore are excluded from the calculation.
- Other Funds: Other funds include non-appropriated tuition and fee dollars, non-appropriated TRIF dollars, the balance of land trust revenues, and internal university revenues including fee for service funds, athletics, and income from retail activities. Although the State Land Trust is an asset granted by the Federal Government and constitutionally dedicated for university support, revenues from the Trust are counted as state support. TRIF dollars are generated through a statewide sales tax (Prop. 301), but the majority are used for research activities and are therefore excluded. Approximately $4 million of NAU's TRIF allocation are used for access and workforce development. This program includes instruction and academic support expenditures that are included as academic operating costs. Therefore, $4 million of TRIF revenues are included as state support. All other funds in this category are university developed revenues and not considered state support.
- One-Time Funds: For FY 2018, the legislature provided $15 million in one-time funds. The state support per resident FTE calculation includes these funds for FY 2018. At the bottom of the calculation, the impact from the loss of the one-time funds is shown. At the current resident FTE count, the one-time funds increase support by about $150 per resident student.

Appendix E

ASU Overhead Allocation

Expense information is from FY 2016 CAFR

Program Expenses	FY 2016	Percent of Program Expenditures	Overhead Applied to Academic Expenditure Categories	Excluded Overhead
Instruction	$749,722,000	47.7%	$125,752,821	$808,142
Research	$261,055,000	16.6%	$43,787,434	$43,787,434
Public Service	$36,807,000	2.3%	$6,173,734	$685,379
Academic Support	$265,540,000	16.9%	$44,539,715	$252,500
Student Services	$111,018,000	7.1%	$18,621,338	$124,671
Auxiliary enterprises	$147,562,000	9.4%	$24,750,958	$24,750,958
Total Academic	$1,571,704,000		$263,626,000	$70,409,084
Overhead				
Insitutional Support	$155,172,000			
Operation & Maintenance	$108,454,000			
Total Overhead	$263,626,000			
Other				
Depreciation	$116,381,000			
Scholarships and Fellowships	$152,802,000			
Total Other	$269,183,000			
Total Expenditures	$2,104,513,000			

Appendix E

NAU Overhead Allocation

Expense information is from FY 2016 CAFR

Program Expenses	FY 2016	Percent of Program Expenditures	Overhead Applied to Academic Expenditure Categories	Excluded Overhead
Instruction	$169,385,422	47.0%	$38,682,513	
Research	$30,142,356	8.4%	$6,883,604	$6,883,604
Public Service	$28,163,526	7.8%	$6,431,699	
Academic Support	$40,505,929	11.2%	$9,250,330	
Student Services	$53,834,205	14.9%	$12,294,106	
Auxiliary enterprises	$38,070,671	10.6%	$8,694,191	$8,694,191
Total	$360,102,109		$82,236,443	$15,577,795
Overhead Expenses				
Institutional Support	$52,446,684			
Operation & Maintenance	$29,789,759			
Total Overhead	$82,236,443			
Other				
Depreciation	$37,964,192			
Scholarships and Fellowships	$31,484,582			
Total Other	$69,448,774			
Total Expenditures	$511,787,326			

Appendix E

UA Overhead Allocation

Expense information is from FY 2016 CAFR

Program Expenses	FY 2016	Percent of Program Expenditures	Overhead Applied to Academic Expenditure Categories	Excluded Overhead
Instruction	$460,005,000	30.8%	$65,983,883	
Research	$391,122,000	26.2%	$56,103,190	$56,103,190
Public Service	$78,604,000	5.3%	$11,275,089	
Academic Support	$344,380,000	23.1%	$49,398,440	
Student Services	$53,033,000	3.6%	$7,607,142	
Auxiliary enterprises	$164,187,000	11.0%	$23,551,256	$23,551,256
Total Academic	$1,491,331,000		$213,919,000	$79,654,447
Overhead				
Institutional Support	$129,501,000			
Operation & Maintenance	$84,418,000			
Total Overhead	$213,919,000			
Other				
Depreciation	$125,455,000			
Scholarships and Fellowships	$51,808,000			
Total Other	$177,263,000			
Total Expenditures	$1,882,513,000			

Appendix F

Expenditures by College

ASU

COLLEGES	FTE	Instruction	Public Service	Academic Support	Student Services	Institutional Support	O&M	Depreciation	Scholarship / Fellowship Expense	Grand Total
Business	10,075	$9,279	$93	$3,257	$1,495	$1,234	$976	$942	$1,672	$18,949
CISA / University College	6,530	$5,017	$64	$2,970	$1,259	$1,366	$962	$1,043	$1,850	$14,531
Design and the Arts	6,003	$7,527	$101	$2,690	$1,308	$1,250	$881	$955	$1,694	$16,406
Engineering	12,220	$10,064	$236	$2,912	$1,068	$1,203	$848	$919	$1,630	$18,881
Future of Innovation in Society	71	$24,925	$1,489	$37,796	$861	$1,065	$750	$813	$1,442	$69,141
Health Solutions	3,292	$8,011	$139	$3,499	$1,022	$1,254	$883	$957	$1,699	$17,464
Journalism	1,256	$9,729	$1,058	$2,841	$1,022	$1,265	$891	$966	$1,714	$19,487
Law	1,147	$15,185	$931	$8,545	$3,741	$1,310	$644	$698	$1,238	$32,293
Liberal Arts and Sciences	31,770	$8,134	$117	$2,310	$1,056	$1,302	$918	$995	$1,765	$16,597
New College	3,983	$6,306	$74	$2,177	$1,266	$1,354	$953	$1,032	$1,832	$14,994
Nursing and Health Innovation	1,405	$11,055	$187	$5,762	$2,481	$1,352	$940	$1,019	$1,808	$24,604
Public Service & Community Solutions	5,491	$6,392	$975	$3,731	$1,013	$1,252	$882	$956	$1,696	$16,897
Sustainability	538	$18,246	$149	$6,741	$2,967	$1,485	$1,045	$1,132	$2,009	$33,775
Teachers College	4,554	$8,922	$1,769	$3,450	$1,448	$1,279	$864	$937	$1,662	$20,332
FY16 TOTAL	**88,335**	**$8,341**	**$290**	**$2,960**	**$1,234**	**$1,279**	**$908**	**$971**	**$1,722**	**$17,706**

Appendix F

Expenditures by College

NAU

COLLEGES	FTE	Instruction	Public Service	Academic Support	Student Services	Institutional Support	O&M	Depreciation	Scholarships/ Fellowships	Grand Total
Arts and Letters	4,037	$6,962	$370	$1,418	$1,949	$1,551	$893	$1,138	$1,164	$15,445
Business	3,900	$5,326	$232	$1,604	$2,028	$1,542	$865	$1,103	$1,128	$13,828
Forestry, Engineering, and Natural Sciences	7,145	$5,979	$255	$1,421	$1,747	$1,538	$884	$1,127	$1,153	$14,101
Education	2,675	$7,498	$250	$1,683	$2,156	$1,448	$794	$1,011	$1,035	$15,874
Social and Behavioral Sciences	6,741	$5,207	$349	$1,383	$2,053	$1,595	$906	$1,154	$1,181	$13,829
Health and Human Services	2,877	$7,869	$281	$1,581	$2,075	$1,606	$912	$1,163	$1,190	$16,677
TOTAL COLLEGES	**27,374**	**$6,188**	**$294**	**$1,480**	**$1,967**	**$1,553**	**$882**	**$1,124**	**$1,150**	**$14,637**

Appendix F

Expenditures by College

UA

College	Total FTE	Instruction	Public Service	Academic Support	Student Services	Institutional Support	O&M	Depreciation	Scholarship/ Fellowship Expense	Grand Total
COLLEGE OF AGRICULTURE AND LIFE SCIENCES	2,881	$5,269	$505	$2,136	$1,146	$1,082	$775	$1,058	$1,182	$13,153
COLLEGE OF ARCHITECTURE & LANDSCAPE ARCHITECTURE	601	$9,410	$354	$2,965	$1,105	$1,044	$665	$1,021	$1,159	$17,723
COLLEGE OF EDUCATION	1,669	$9,295	$208	$3,023	$948	$852	$542	$833	$900	$16,601
COLLEGE OF ENGINEERING	2,351	$10,531	$161	$2,579	$1,015	$959	$610	$937	$1,368	$18,161
COLLEGE OF FINE ARTS	2,090	$9,148	$76	$1,580	$1,175	$1,110	$707	$1,085	$1,191	$16,073
COLLEGE OF HUMANITIES	4,392	$6,098	$383	$1,493	$1,313	$1,240	$789	$1,212	$1,019	$13,548
COLLEGE OF NURSING	1,013	$18,497	$434	$3,188	$614	$580	$369	$567	$1,703	$25,953
COLLEGE OF OPTICAL SCIENCES	286	$8,028	$1,074	$1,443	$820	$775	$493	$757	$2,341	$15,732
COLLEGE OF PHARMACY	803	$17,457	$473	$3,859	$903	$808	$514	$790	$1,888	$26,692
COLLEGE OF SCIENCE	9,492	$8,085	$480	$1,323	$1,213	$1,165	$847	$1,113	$984	$15,210
COLLEGE OF SOCIAL & BEHAVIORAL SCIENCES	8,856	$7,636	$395	$1,471	$1,223	$1,153	$733	$1,126	$1,010	$14,746
ELLER COLLEGE OF MANAGEMENT	5,123	$10,214	$92	$2,074	$1,102	$1,042	$663	$1,018	$1,171	$17,376
JAMES E ROGERS COLLEGE OF LAW	671	$17,595	$236	$7,657	$887	$838	$533	$819	$4,458	$33,024
MEL AND ENID ZUCKERMAN COLLEGE OF PUBLIC HEALTH	1,032	$6,643	$7,024	$3,390	$981	$927	$590	$906	$1,069	$21,529
UNIVERSITY OF ARIZONA SOUTH	560	$7,284	$137	$6,340	$1,182	$1,117	$1,704	$1,092	$912	$19,769
FY2016 Total Colleges	**41,819**	**$8,644**	**$511**	**$2,010**	**$1,148**	**$1,085**	**$734**	**$1,055**	**$1,162**	**$16,349**

Appendix G

WICHE Online Costs Survey

Detailed Answers for Course Cost Comparisons
WICHE Cooperative for Educational Technologies' Distance Education Price and Cost Report, Appendix B
http://wcet.wiche.edu/sites/default/files/Price-and-Cost-Report-2017_0.pdf

How Do Distance Course Costs Compare to Those of Similar Face-to-Face Courses for Each of the Following Instructional Components?

Respondents were asked…Compared to Similar Face-to-Face Course, Distance Education Costs are:

Distance Education Costs Compared to Face-to-Face Course Costs						
INSTRUCTIONAL COMPONENTS BY GROUP	Much Less	Slightly Less	The Same	Slightly More	Much More	No Answer
PREPARING FOR THE COURSE						
Accreditation and state authorizations	0.5%	0.0%	41.6%	25.9%	16.2%	15.7%
Technologies/software (LMS, SIS, teaching tools)	0.0%	0.0%	27.9%	34.5%	22.8%	14.7%
Admissions and enrollment, including student identity verification	0.5%	1.5%	52.3%	24.4%	5.1%	16.2%
TEACHING THE COURSE						
Design course specifications	0.5%	0.5%	38.6%	26.9%	17.8%	15.7%
Instructional design of course	0.5%	0.5%	20.3%	31.5%	31.5%	15.7%
Create learning materials	0.5%	1.5%	31.0%	34.0%	16.8%	16.2%
Select/obtain/purchase learning materials	0.0%	2.5%	54.8%	20.3%	6.1%	16.2%
Assuring accessibility and ADA-compliance	0.0%	1.0%	30.5%	32.0%	20.8%	15.7%
Deliver of course content by faculty/other means	3.0%	1.5%	52.3%	20.8%	6.6%	15.7%
Facilitation of group activities	0.5%	2.5%	59.4%	17.8%	4.1%	15.7%
ASSESSING STUDENT LEARNING IN THE COURSE						
Design/select/purchase assessments	0.0%	1.5%	62.4%	16.8%	3.6%	15.7%
Administer/proctor assessments	0.5%	2.0%	32.5%	37.1%	12.2%	15.7%
Verify student identity for assessments	0.0%	0.0%	40.6%	35.0%	8.1%	16.2%
Evaluate/grade assessments	1.0%	2.0%	71.1%	9.1%	1.0%	15.7%
SUPPORTING STUDENTS AND FACULTY						
Student orientation and training	4.1%	3.6%	45.2%	27.9%	3.0%	16.2%
Faculty training	0.0%	50.0%	25.9%	35.0%	22.8%	15.7%
Library and other distance learning resources	0.0%	2.5%	52.3%	24.4%	4.6%	16.2%
Tutoring and academic course assistance	0.0%	5.6%	44.7%	25.4%	8.6%	15.7%
Retention services	0.0%	4.6%	58.9%	15.2%	5.6%	15.7%
Help desk for technical support	0.0%	0.0%	43.1%	26.9%	14.2%	15.7%
Academic Advising	0.0%	1.5%	65.5%	13.2%	4.1%	15.7%