Overview of goals and pitfalls of data science and education

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How has data science been used in higher education

- Recruiting
- Retention
- Progress
- Course Success
- Concept Mastery
- Improvement of Instruction
- Improvement of Programs
- Elimination of Programs

Survey of Institutions in 2018 (by AIR, NASPA, EDUCAUSE)

- Report by Parnell, Jones, Wesaw, Brooks with over 750 institutions responding
  - Units that are using data are very siloed
    - 96% working to improve student outcomes (mainly retention and course success)
    - 71% working to improve efficiencies of programs or services
    - 39% looking to eliminate or reduce programs
  - Most universities are not tracking benefits vs. costs
  - Most are focused on first year students
  - 76% using for descriptive behavior, 62% for predictive behaviors

Study (cont.)

Table 1. Institutions' Investment in Data and Analytics, by Institution Size

	DESCRIPTIVE					PREDICTIVE				
	Under 1,000 (*N* = 99)	1,000–4,999 (*N* = 336)	5,000–9,999 (*N* = 157)	10,000–19,999 (*N* = 127)	20,000 and over (*N* = 121)	Under 1,000 (*N* = 99)	1,000–4,999 (*N* = 338)	5,000–9,999 (*N* = 158)	10,000–19,999 (*N* = 127)	20,000 and over (*N* = 120)
No investment	12%	7%	6%	3%	2%	12%	10%	8%	7%	2%
Minor investment	51%	57%	45%	47%	29%	48%	50%	50%	43%	25%
Major investment	34%	32%	48%	48%	65%	36%	36%	41%	49%	73%
Don't know	3%	4%	1%	2%	3%	3%	4%	1%	1%	1%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Note. Percentages may not total to 100% due to rounding.

Study (cont.)

Table 3. Focus of Studies in Support of Student Success (*N* varies)

	First-year students	Sophomores	Transfer-in students	Student athletes	Students of color	LGBTQIA students	Nontraditional students	First-generation students
Student pipeline	85%	28%	58%	27%	48%	5%	33%	44%
Academic progress and success	82%	53%	56%	39%	58%	9%	39%	54%
Efficiency of degree completion	68%	45%	38%	19%	35%	7%	27%	32%
Career pathways and postgraduation outcomes	56%	32%	45%	21%	41%	7%	30%	39%
Student ability to afford higher education	48%	29%	30%	12%	23%	5%	22%	28%

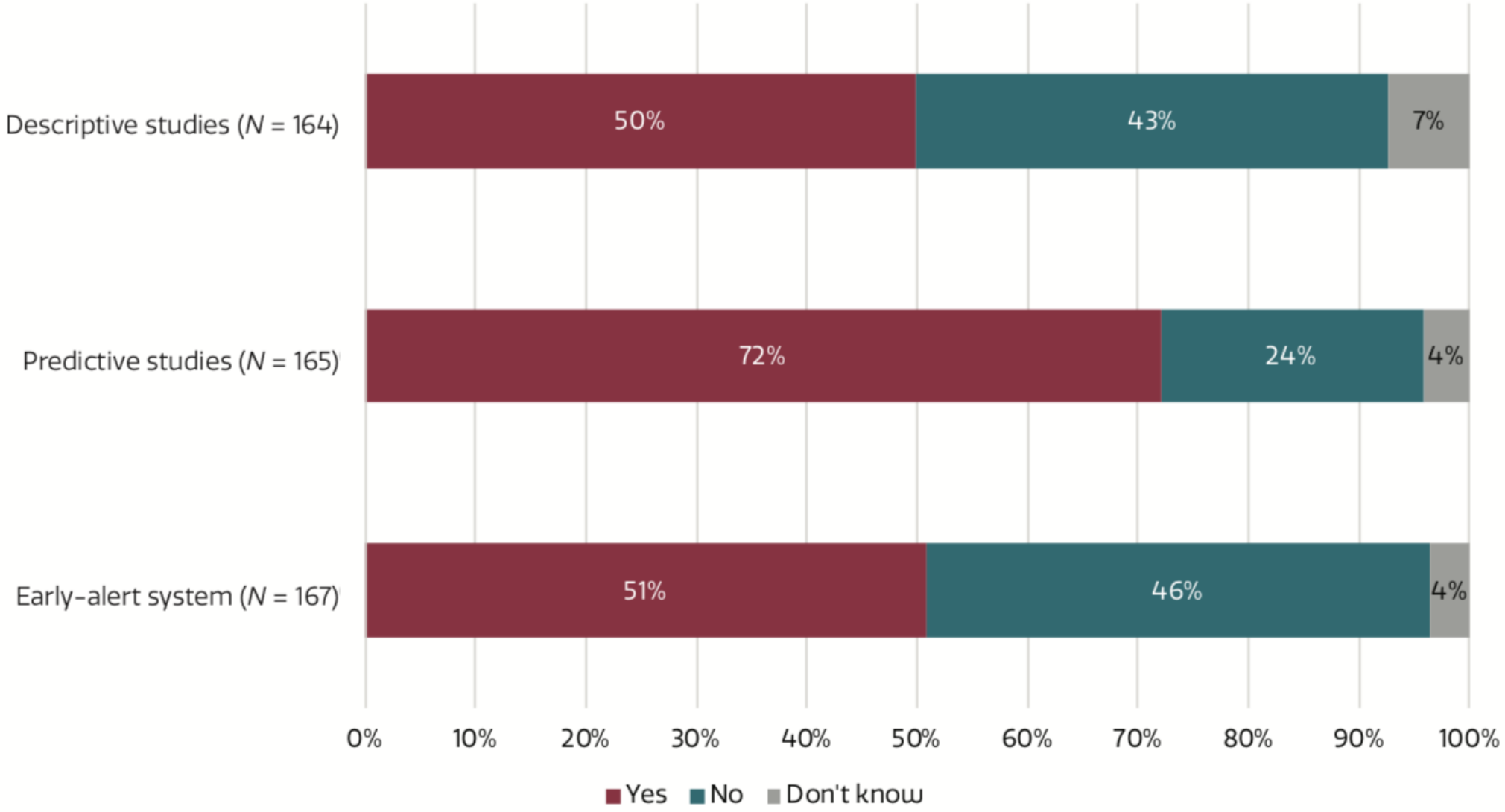
Study (cont.)

Table 4. Types of Studies in Support of Student Success (*N* varies)

	Institution is not conducting these studies	Institution is planning to conduct these studies within the next year	Institution is conducting these studies but not annually	Institution conducts these studies annually
Career pathways and postgraduation outcomes	8%	11%	18%	63%
Student pipeline	2%	11%	32%	54%
Graduate student progress	35%	6%	17%	42%
Faculty workload and performance	21%	10%	28%	40%
Academic progress and success	6%	20%	41%	33%
Student ability to afford higher education	46%	22%	21%	11%
Efficiency of degree completion	16%	32%	42%	10%

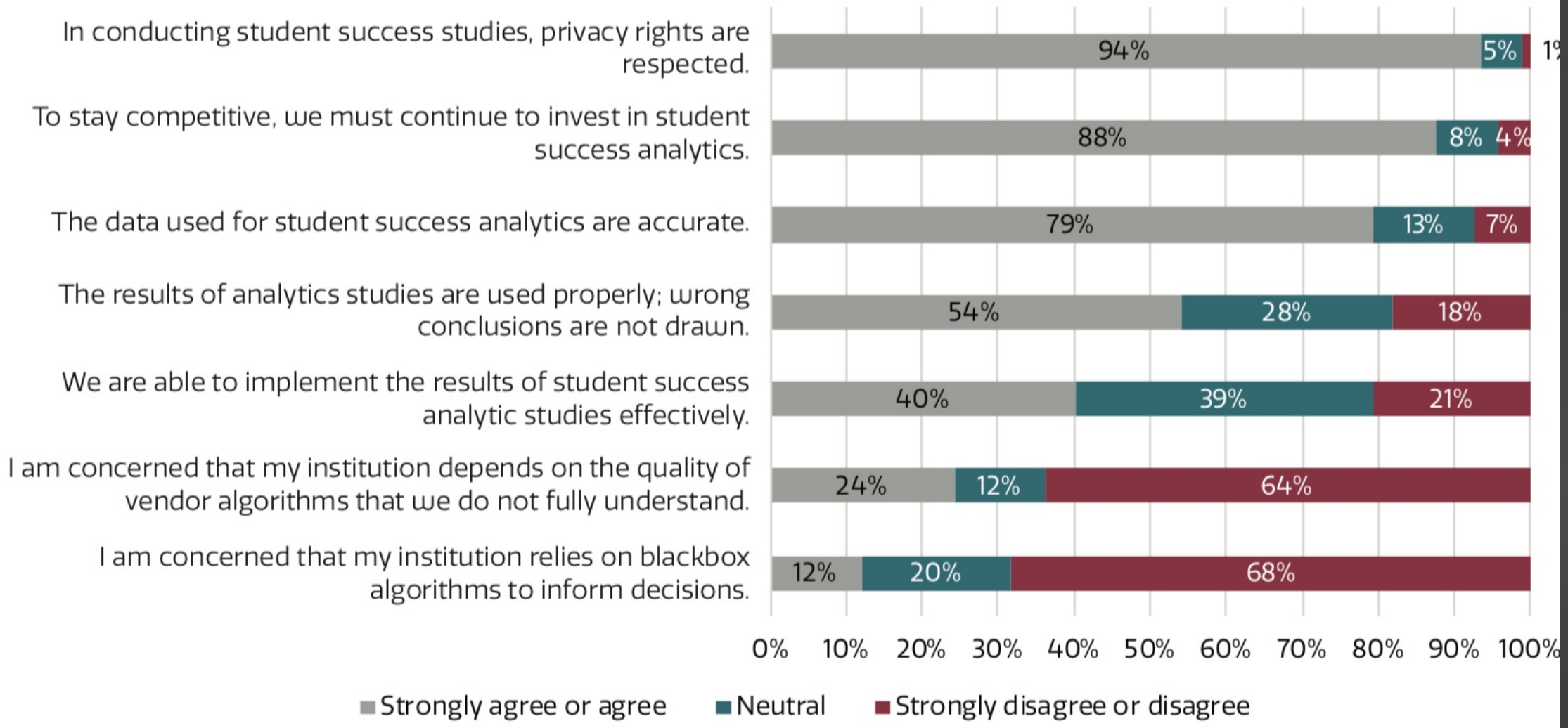
Study (cont.)

Figure 4. Institutions' Use of a Vendor for Student Success Studies



Study (cont.)

Figure 6. Agreement With Statements on Data and Analytics (*N* = 331–432)



At TAMU

- Using ten years of historical data, EAB provides a risk level to currently enrolled undergraduates as to their likelihood to graduate from TAMU. There are three risk levels: High, Moderate and Low. The model looks at both pre-college characteristics (ACT/SAT, ethnicity, first-generation status, high school class rank, etc.) and performance at TAMU (hours completed, hours completed v attempted, GPA, etc.). Currently rerunning on 4 years instead of 10 years of data.
- The product provides a one-stop shop for advising reports. If an advisor asks students to seek other campus resources, advisors can see if students complied with the request v emails and phone calls to campus contacts.
- Students are able to schedule appointments with their advisors through the platform, as well as through the student app that we also purchased with the platform.
- Students receive automatic reminders of appointments.
- Advisors are able to create watch lists of students based on GPA, hours, probation status, classification, etc. and push campus resources or appointment requests.
- EAB provides a list of courses that are most predictive of success in a given major and suggested grades in such courses.
- The app alerts students to blocks on their pre-registration at the time they occur.
- There is an Early Alert System within EAB that I have found to be cumbersome for our faculty, in addition to the limited access we give faculty to student information. Therefore, we are working with Instructional Technology Services on campus to provide reports on students earning D's or less in the 15 highest enrollment/highest Q/D/F courses

To go to Concept Mastery or Instructional improvement

- Instructors must get involved in designing assessments and inputing data
- Instructors must understand learning and appropriate lag times in student behavior so that the system does not over react
- Students must participate to get quality data

- **Is it worth it? Only if the data is high quality**