

# 100Kin10 ANNUAL PARTNER SURVEY

Updated: October 31st 2016

**BACKGROUND**

# 100Kin10 IS DEDICATED TO SOLVING THE STEM TEACHER SHORTAGE.

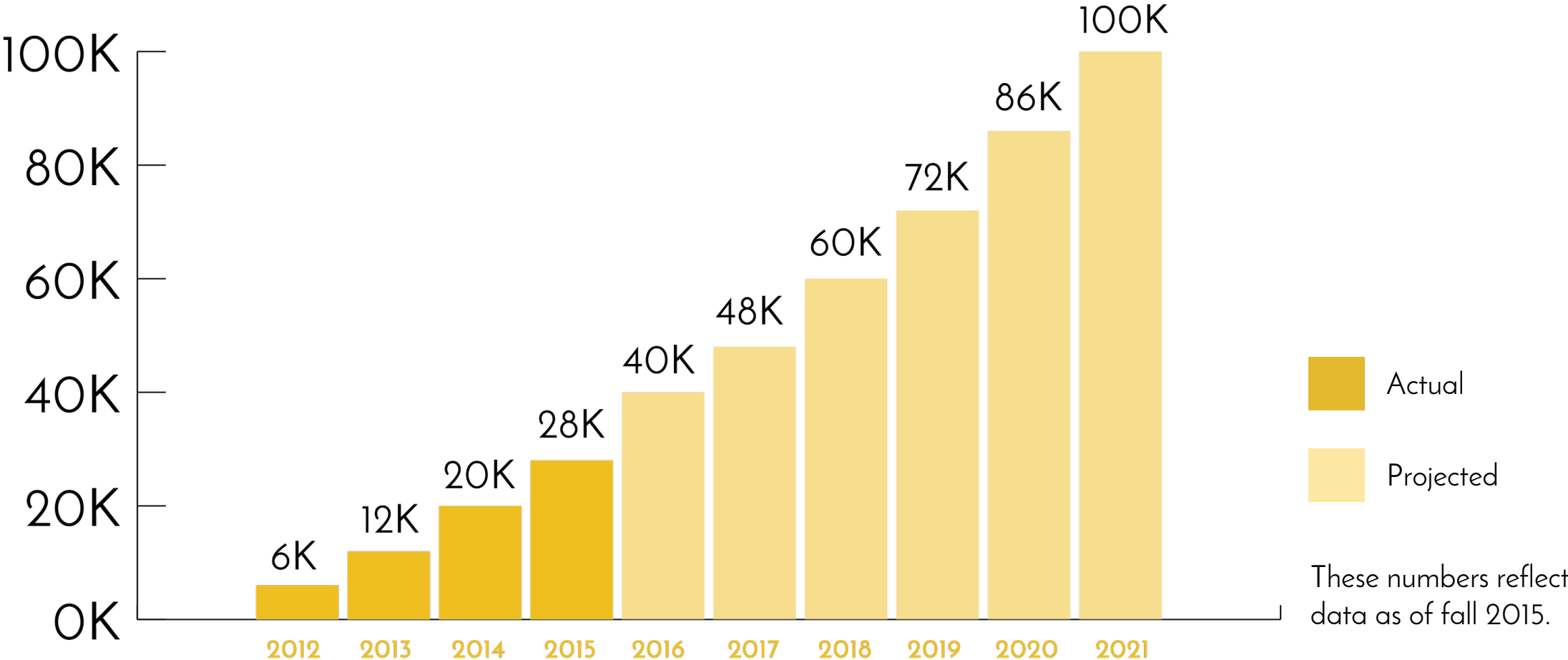
100Kin10 formed in response to the President Obama's call to train 100,000 new STEM teachers by 2021.

To reach that goal, 100Kin10 brings together the right mix of diverse organizations to make commitments, learn, develop solutions and implement effective strategies and programs. They are identifying the big, system-level challenges that make getting excellent STEM teachers into classrooms so hard, and are organizing partners to tackle the most critical of those in the coming years.

Nearly 300 partners strong, the network represents a broad swath of the best organizations working to support STEM teachers across their professional life cycle, from the time of their recruitment into a training program through the opportunity to serve as a teacher leader.

These partners represent a range of approaches and strategies that contribute in different ways to the shared goal of 100,000 excellent STEM teachers.

As of 2015, our partners have recruited and prepared over 28,000 excellent STEM teachers.



# OUR PARTNERS REPRESENT A RANGE OF SECTORS...

As of February 2016, 100Kin10 includes nearly **300** best-in-class partner organizations:

13

School Districts & Charter Management Organizations

9

Professional Associations

13

Government Agencies / Elected Officials

6

Media Organizations

73

Institutions of Higher Education

42

Foundations & Corporations

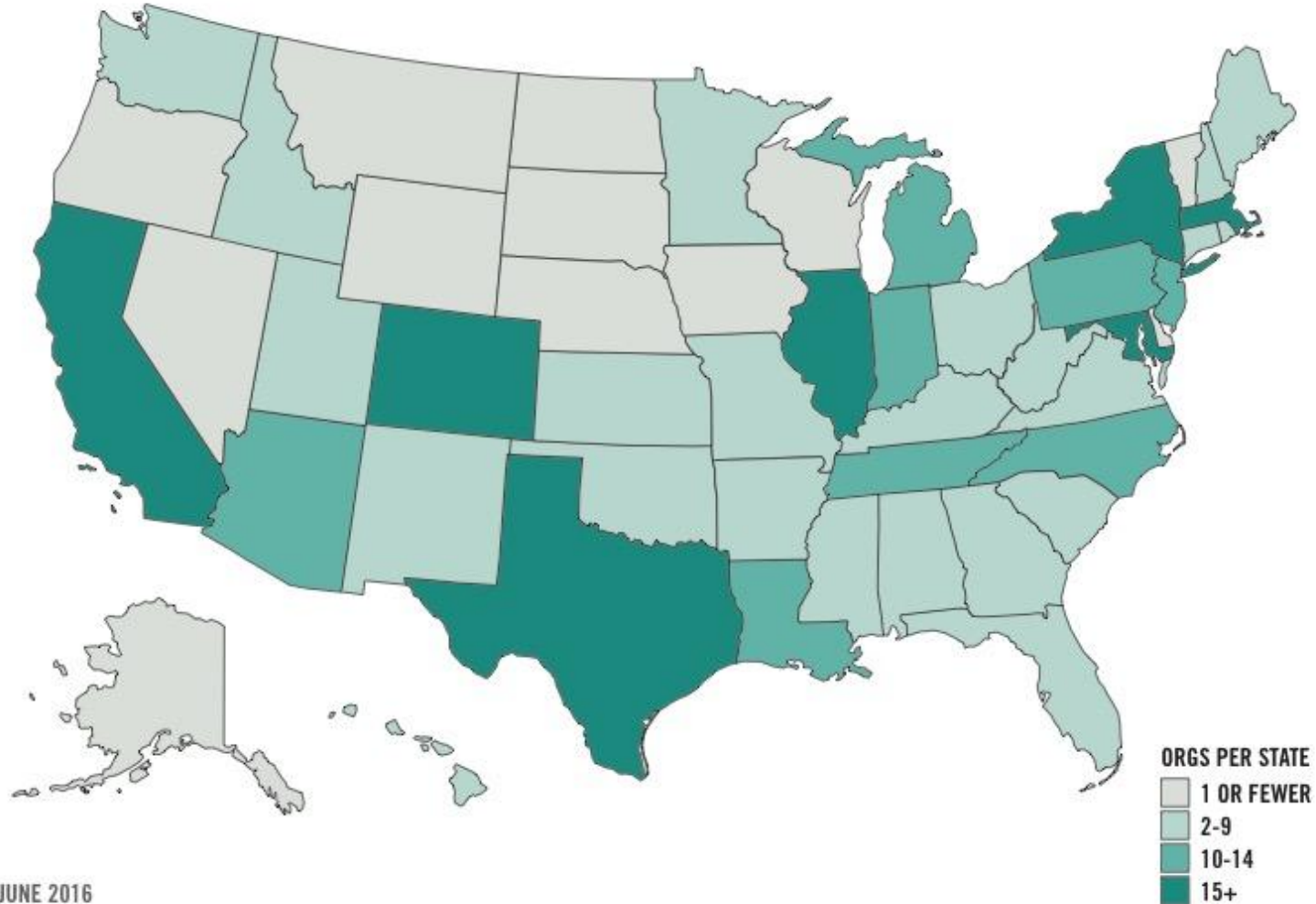
11

Teacher Residencies / Alternative Teacher Preparation Programs

113

Nonprofits (including Museums and Science-Rich Institutions)

# ...AND WORK WITH STEM TEACHERS ACROSS THE COUNTRY.



JUNE 2016

# SURVEY DESIGN AND DISTRIBUTION

The 100Kin10 Partner Survey is one of our signature efforts to hear directly from the network about their work with STEM teachers. The survey was organized to follow the six phases of a K-12 STEM teacher's professional life—recruitment, preparation, hiring, induction, development, and advancement. The goal of this analysis was to gain insight into the best practices, challenges, and trends experienced by organizations working with STEM teachers across the U.S. We asked questions on a range of issues in K-12 STEM education today.

- We administered our second annual survey to all **100Kin10** Partners (excluding funding partners and government agencies) in the summer of 2015
- **Nearly all** eligible Partners responded, creating a nearly unprecedented body of data on **274** programs offered by **165** unique organizations
- Survey data was analyzed with extensive support by American Institutes for Research. Analyses included descriptive and correlational analyses across focus areas, programmatic elements, background characteristics, and outcomes related to teacher hiring and retention.

# EXECUTIVE SUMMARY

100Kin10 is dedicated to ensuring that our nation has the STEM teachers we need to prepare the next generation of innovators and problem solvers. Understanding the levers that may influence that shortage is of paramount importance to us.

Our partners represent many of the nation's best STEM education organizations. For this reason, we believe it is extremely valuable for the field to take note of where they are experiencing success, and where they continue to face challenges. By doing so, we can grow our shared knowledge base, learn from what is working, and raise the level of STEM learning for all kids. At the same time, in the places where 100Kin10 partners are struggling, one can assume that many others around the country are, as well, and thus are areas worthy of special attention, additional research, and targeted work.

To that end, our goal for this analysis was to explore the tactics and strategies that might help address the shortage of excellent STEM teachers.

## **KEY FINDINGS**

- Programs in the “prepare and develop” phases prioritize the following focus areas:
  - Incorporating new standards
  - Pedagogical content knowledge
  - Content knowledge
  - Engineering
- Programs that focus on social and emotional learning and active learning are evident in our sample, but there is room to do more.
- While we would need to collect more data to make a conclusive statement, our analyses indicate that successful hiring rates might be associated with a focus on pedagogical content knowledge during the “prepare” phase and a focus on content knowledge, pedagogical content knowledge and engineering might be associated with successful retention rates in the “in-service professional development” phase.



# THE VISION

# WELL-PREPARED, CUTTING EDGE, AND EXCELLENT: OUR VISION FOR STEM TEACHING AND LEARNING

Science, technology, engineering, and math teachers are a key lever to preparing students to solve the globe's most pressing problems of today and tomorrow. And yet, nearly every state around the country struggles to fill their classrooms with STEM teachers, much less excellent STEM teachers.

We must prepare and support all teachers to deliver excellent STEM content in a consistent and deliberate approach throughout their careers.

This goal is reflected in states' revised expectations for **college- and career-ready standards, such as the Common Core and Next Generation Science Standards**.

These new expectations emphasize **active learning** of STEM content to support students' creative use and authentic experience with these skills and knowledge. To be able to engage students in these new ways, instructors' tools, knowledge, skills, and expectations will need to change, beginning as **early as grades P-3**, and it is imperative that we provide our teachers with the tools, resources, and professional development to make these changes, especially for subjects that are likely new for many of our teachers, like engineering.

And it is not only their knowledge that needs to shift. Teachers also need to understand how students learn, and account for their **social and emotional learning needs**.

OUR GOAL FOR THIS ANALYSIS WAS TO  
EXPLORE THE TACTICS AND STRATEGIES THAT  
MIGHT HELP ADDRESS THE SHORTAGE OF  
EXCELLENT STEM TEACHERS

**100Kin10** is dedicated to ensuring that our nation has the STEM teachers we need to prepare the next generation of innovators and problem solvers. Understanding the levers that may influence that shortage is of paramount importance to us.

To that end, we analyzed our survey to understand if there were any commonalities among programs that did a great job preparing teachers to be hired and supporting teachers to continue working in the classroom and growing in their practice, year after year.

IF YOU ARE INTERESTED IN THE NUTS AND BOLTS OF HOW WE ANALYZED THE DATA,  
CONTINUE READING.

IF YOU WANT TO GET TO THE RESULTS, SKIP TO PAGE 17.

## OUR PARTNERS AND THEIR PROGRAMS ARE VERY DIVERSE. ACCORDINGLY, WE DEVELOPED 6 DISTINCT SURVEYS FOR PROGRAMS WORKING AT DIFFERENT STAGES ALONG THE TEACHER LIFECYCLE

- **Recruit:** “Recruitment” is defined as the stage in a teacher’s career when they are considering teaching, but have yet to be selected by a teacher preparation organization. For purposes of this survey, we define recruitment as ending once an individual has entered a teacher preparation program.
- **Prepare:** “Preparation” is defined as the stage in a teacher’s career when they are formally preparing (or learning) to become a classroom teacher. For purposes of this survey, we define preparation as beginning when a teacher candidate matriculates in a teacher preparation program and ending when a teacher candidate receives their teaching certification.
- **Hire:** “Hire” is defined as the stage in a teacher’s career when they are placed or hired as a teacher of record.
- **Induct:** “Induction” is defined as the phase in the first few years of a teacher’s career when they receive specialized support, such as training, coaching, and mentoring, to develop and improve their effectiveness in the classroom.
- **Develop:** “Develop” is defined as the stage in an in-service teacher’s career when they are trained, coached, mentored, supported, or given access to professional development with the objective of further improving their effectiveness and retention.
- **Advance:** “Advance” is defined as the stage in a teacher’s career when they advance to informal or formal leadership positions and/or increase their influence on other adults (teachers, administrators, parents) and students.

## ANALYSES FOCUSED ON THE PREPARE AND DEVELOP PHASES, AND WERE DESCRIPTIVE AND EXAMINED THE RELATIONSHIPS BETWEEN FOCUS AREAS AND PROGRAMMATIC ELEMENTS AND SELF-REPORTED OUTCOMES

For each survey, we are able to report from the focus area questions the percentage of all responding programs who indicate one of the 11 focus areas as being in their top 3 focus areas. We can identify the focus areas that are the most common for a very high percentage of programs. Similarly, for most surveys (but for recruit and hire), we are able to report from the programmatic element questions the percentage of all responding programs who indicate one of the 11 programmatic elements areas as being in their top 3 programmatic elements. We can identify the programmatic elements areas that are most common for a very high percentage of programs.

Great “success” was defined as at least 90% of participants being hired into teaching roles in the previous year (Prepare) or returning to teaching (Develop). Outcomes data were available for 43% of programs that responded to the Prepare survey, 62% of programs that responded to the Induct survey, and 62% of programs that responded to the Develop survey. There were not sufficient outcomes data in the Recruit, Hire, and Advance surveys to perform these analyses. In our descriptive analyses, we looked for places where the most “successful” programs emphasized a particular focus area or programmatic element to a much greater extent than programs overall.

# THERE WERE TWO TYPES OF MEASURES WE LOOKED AT TO UNDERSTAND THE RELATIONSHIP BETWEEN PROGRAMMATIC FOCUS AND THE TEACHER SHORTAGE

## OUTCOMES

To understand how successful programs had been at addressing the teacher shortage, we analyzed the following:

- For programs that prepare teachers, we calculated the percentage of STEM teacher candidates who graduated at the end of the 2013-2014 school year, and were **hired as full-time teachers of record** during the 2014-2015 school year.
- For programs that develop teachers, we looked at the percentage of STEM teachers in the 2013-2014 school year that **returned to teach for the 2014-2015 school year**.

## FOCUS AREAS

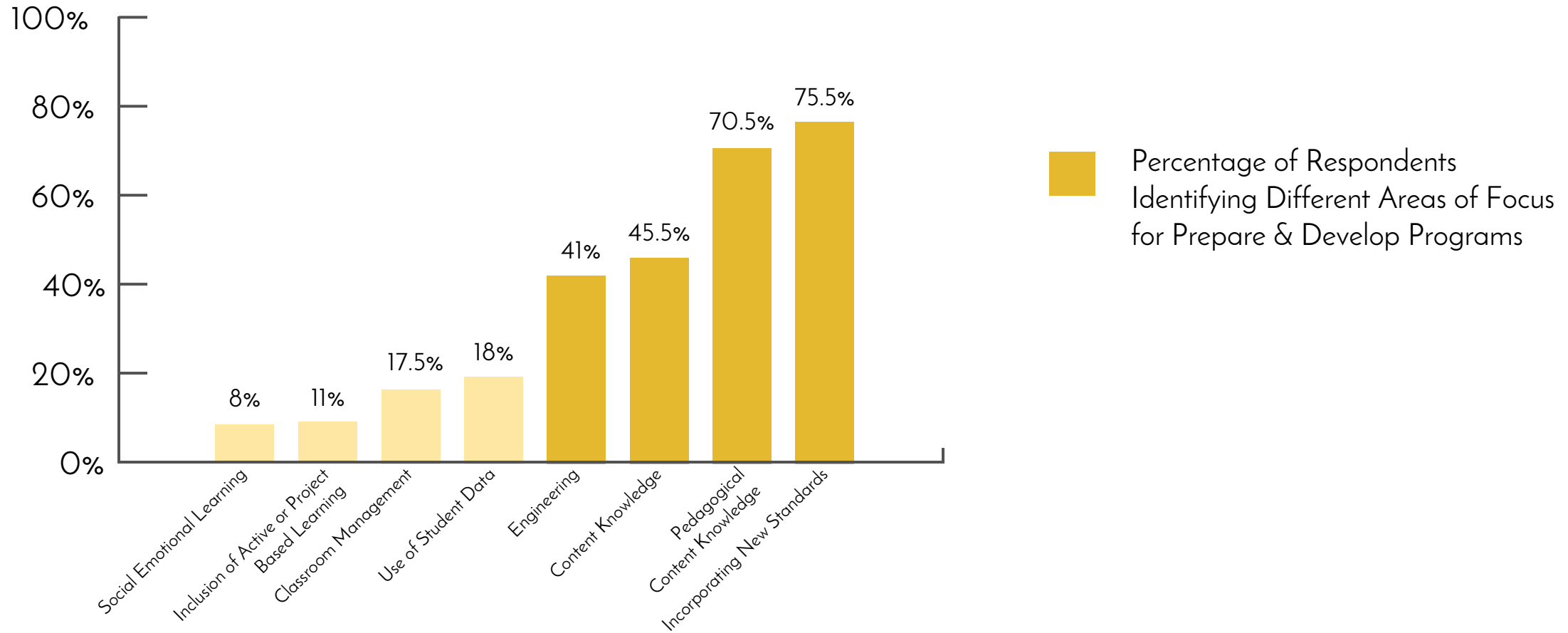
For programs that prepare and develop STEM teachers, we asked for the three top priorities of their programs:

- Social and Emotional Learning
- Inclusion of active or project based learning
- Use of Student Data
- Classroom Management
- Engineering
- Content Knowledge
- Pedagogical Content Knowledge
- Incorporating New Standards



**FIRST, WE LOOKED AT ELEMENTS THAT PROGRAMS PRIORITIZED  
DURING THE PREPARE AND DEVELOP PHASES...**

# PROGRAMS FOCUSED ON INCORPORATING NEW STANDARDS, PEDAGOGICAL CONTENT KNOWLEDGE, CONTENT KNOWLEDGE, AND ENGINEERING



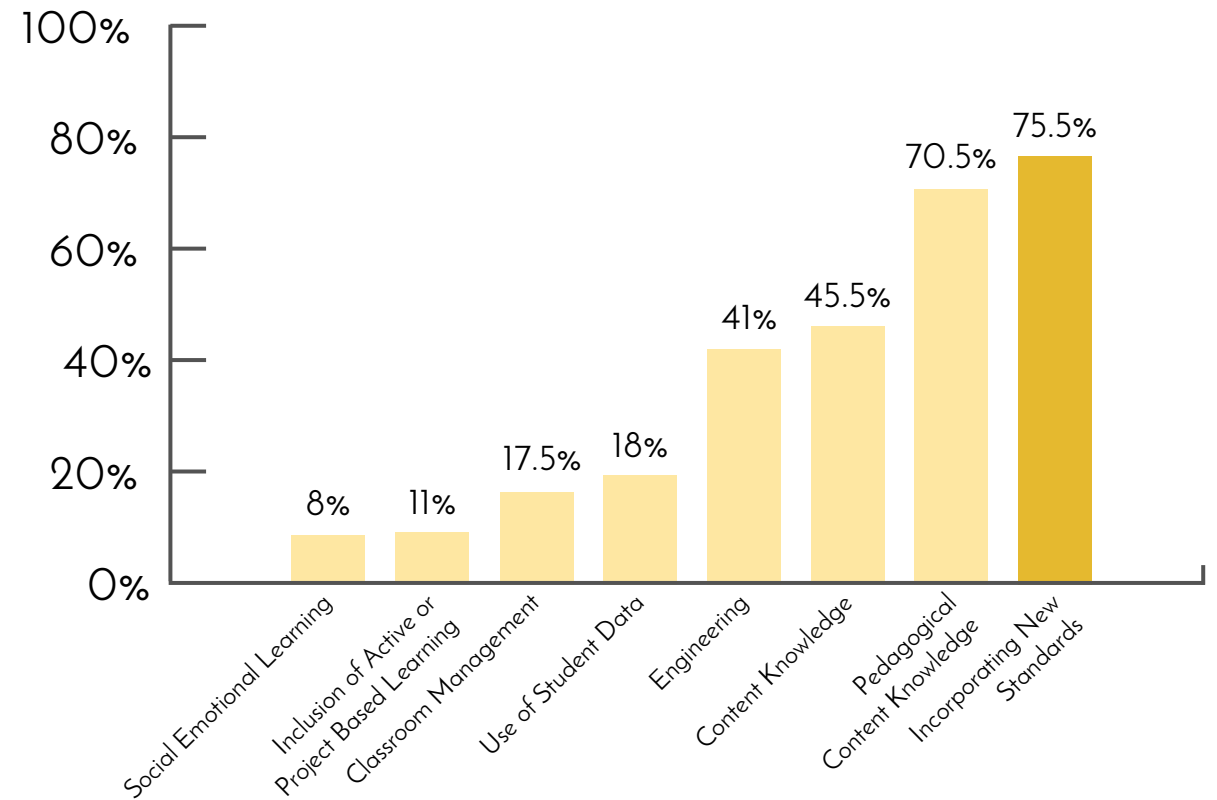
# INCORPORATING NEW STANDARDS

Incorporating new standards refers to programs that report making changes in order to implement new national standards (e.g. the Common Core State Standards- Math and/or the Next Generation Science Standards.)

It is great news that partners are focused on implementing the new standards, because they can arguably increase the quality of instruction. Theoretically, teaching the same content and process skills allows instructors to more easily collaborate around instructional materials and assessments without energy being lost to tailoring to every state.

Moreover, since standards lay out what kids should know by the end of each year, that cuts back substantially on time wasted preparing for standardized tests, because the only preparation they'll need is what they've been learning all year.

The 100Kin10 Partner Survey finds that 75.5% of programs in the prepare and develop phases focus on incorporating new standards.



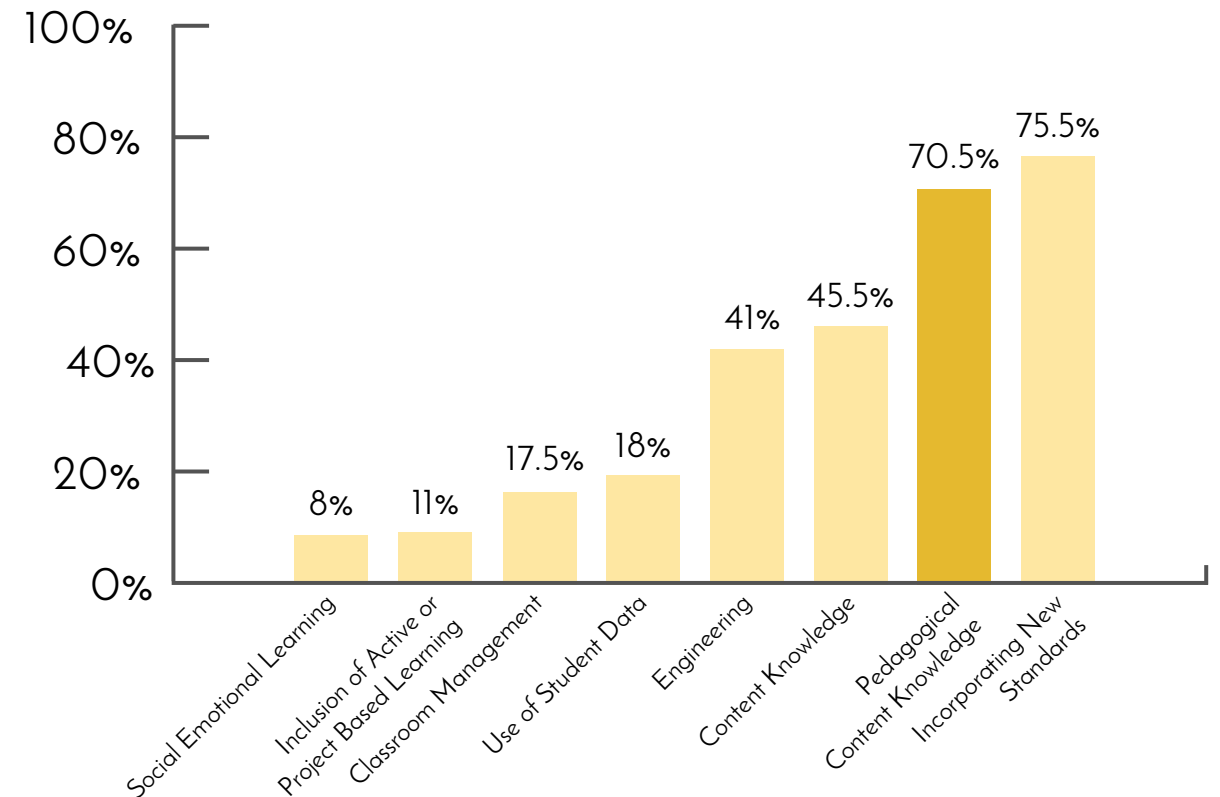
# PEDAGOGICAL CONTENT KNOWLEDGE

Pedagogical content knowledge refers to teachers' ability to develop instructional activities that deepen and improve their students' prior understanding of a specific topic.

For example, when students say that the mitochondrion is like the lungs of the cell, what do they mean? What follow up question would help a teacher figure this out? And if the student is off the mark, what should the teacher do next?

Research has begun to show that skills used in teaching mathematics and science are significantly related to student achievement and attitudinal gains, controlling for key student- and teacher-level factors.

The 100Kin10 Partner Survey finds that 70.5% of programs in the prepare and develop phases focus on pedagogical content knowledge.



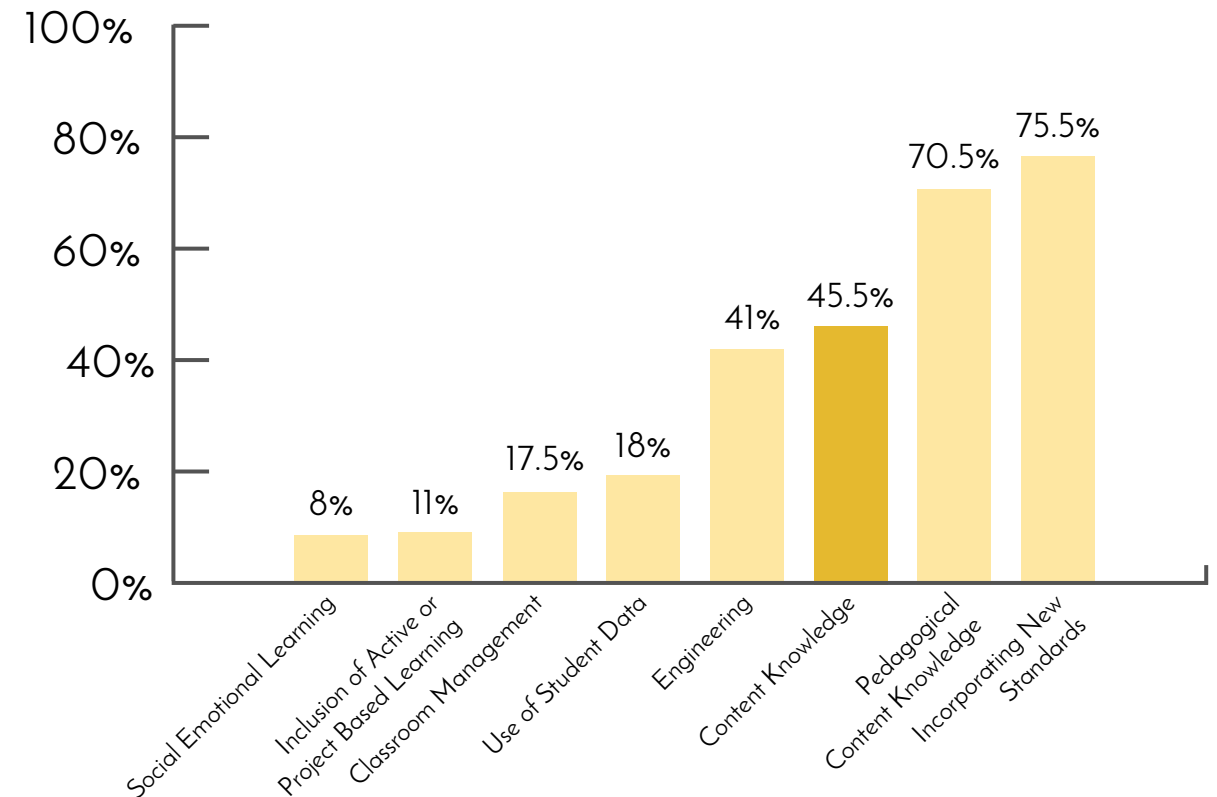
# CONTENT KNOWLEDGE

Content knowledge refers to a focus on improving the teacher's knowledge of the content of the domain, for example the names and functions of all of the organelles and other parts of the cell.

There is the claim that teachers need to know their subject in order to teach it, but despite the seeming reasonableness of this claim, there is not a large body of evidence to defend it, especially when teacher content knowledge is measured using proxies such as courses taken or degrees attained.

However, some research points to how content knowledge is used in classrooms as important in producing student learning (see previous slide on pedagogical content knowledge) and strong pedagogical content knowledge is likely grounded in strong content knowledge.

The 100Kin10 Partner Survey finds that 45.5% of programs in the prepare and develop phases focus on pedagogical content knowledge.



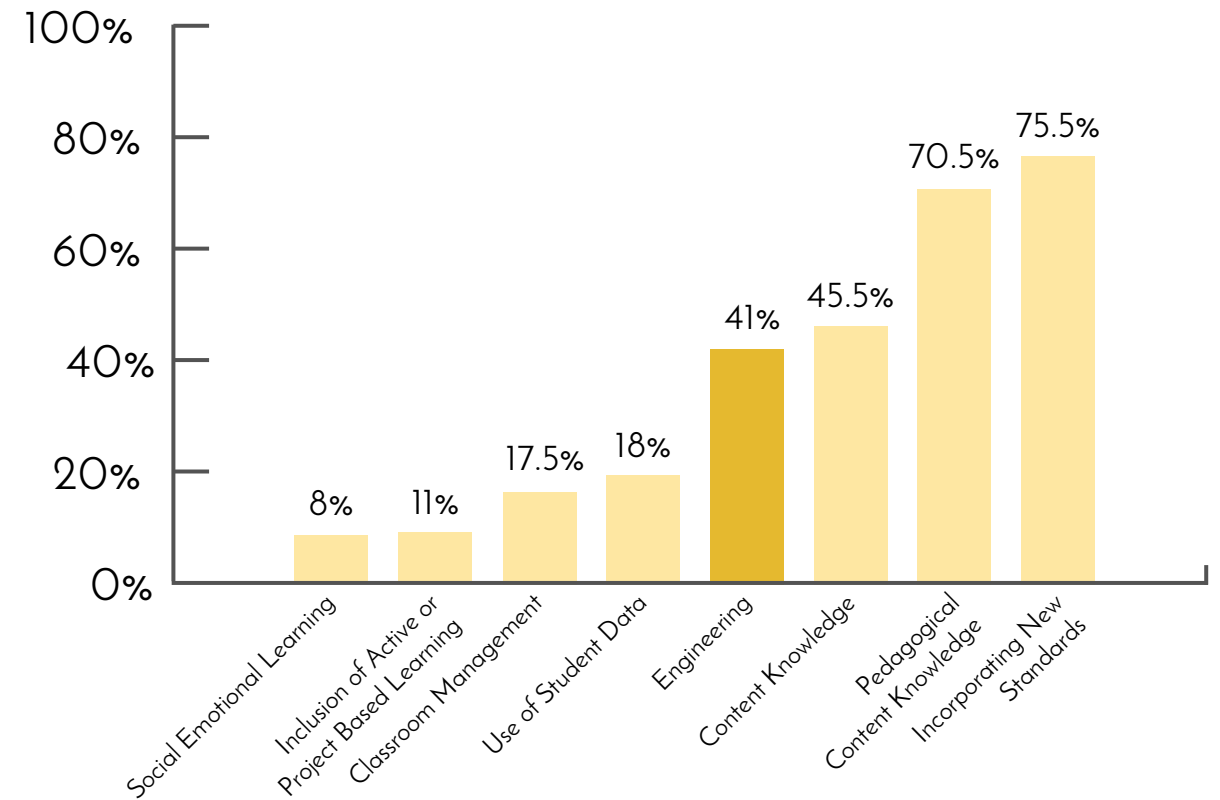
# ENGINEERING

Engineering is explicit in the Next Generation Science Standards and is used as a methodology to contextualize science for deeper learning and to teach students critical thinking skills.

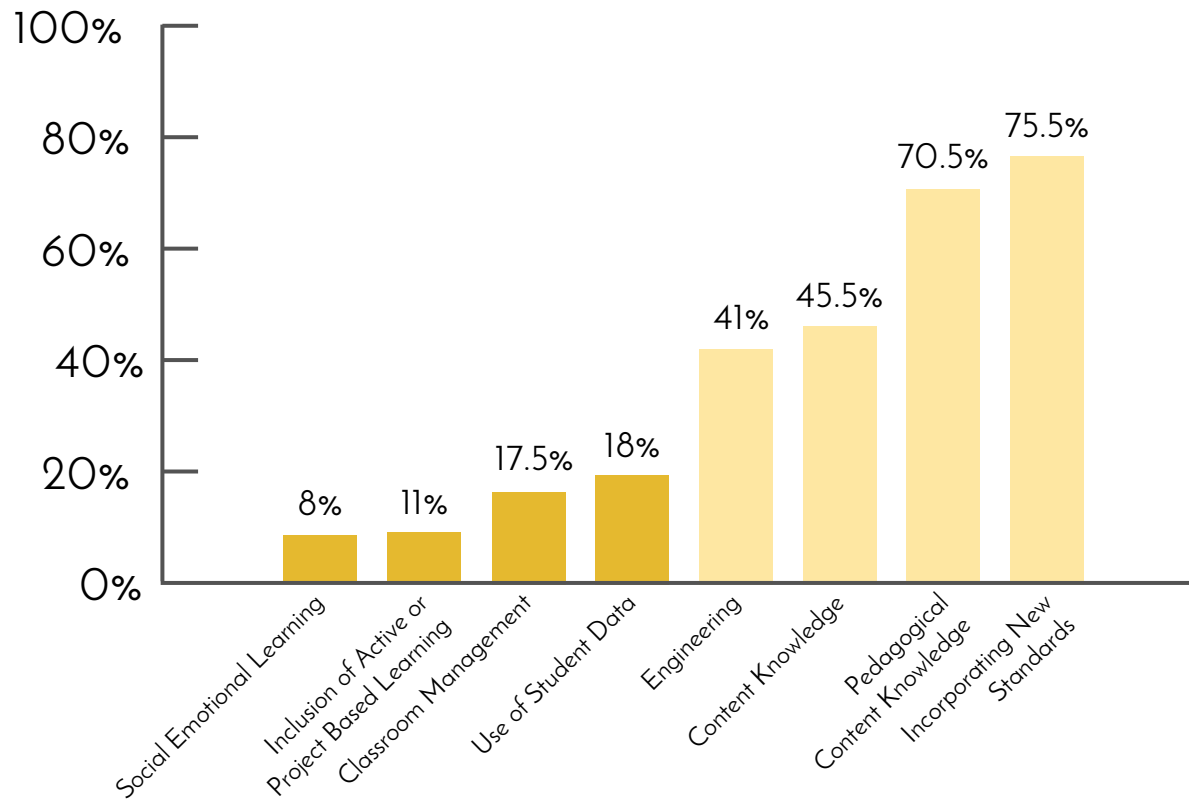
Engineering is a central focus of White House initiatives such as Maker Faires and Maker Spaces, as well as of informal STEM learning spaces like libraries and community centers that can foster spaces and activities for “making.”

The 100Kin10 Partner Survey finds that 100Kin10 partners offer engineering instruction training for teachers, but that there is room to do more.

The 100Kin10 Partner Survey finds that 41% of programs in the prepare and develop phases focus on engineering.



# THERE ARE SEVERAL REALMS IN WHICH PROGRAMS HAVE ROOM TO DO MORE



Active learning—putting students at the center of the learning with project-based activities rather than passive listening or reading—is widely acknowledged as an effective way to teach STEM skills, and also improve STEM student diversity and retention rates.

Social and emotional learning—the term used to describe the acquisition and utilization of knowledge & attitudes required to understand and manage emotions, goals, and relationships, as well as make positive decisions—is widely understood to improve achievement and prosocial behaviors.

However, implementation of both of these approaches is still lagging in classrooms across the country. Programs are also lagging in other important tactics, like the use of student data and classroom management.

While it is encouraging to see some organizations prioritizing these strategies, The 100Kin10 Partner Survey generally affirms this trend. There is clearly room to do more, even amongst 100Kin10 partners.

**THEN WE LOOKED AT THE RELATIONSHIP BETWEEN FOCUS AREAS AND SUCCESSFUL OUTCOMES...**

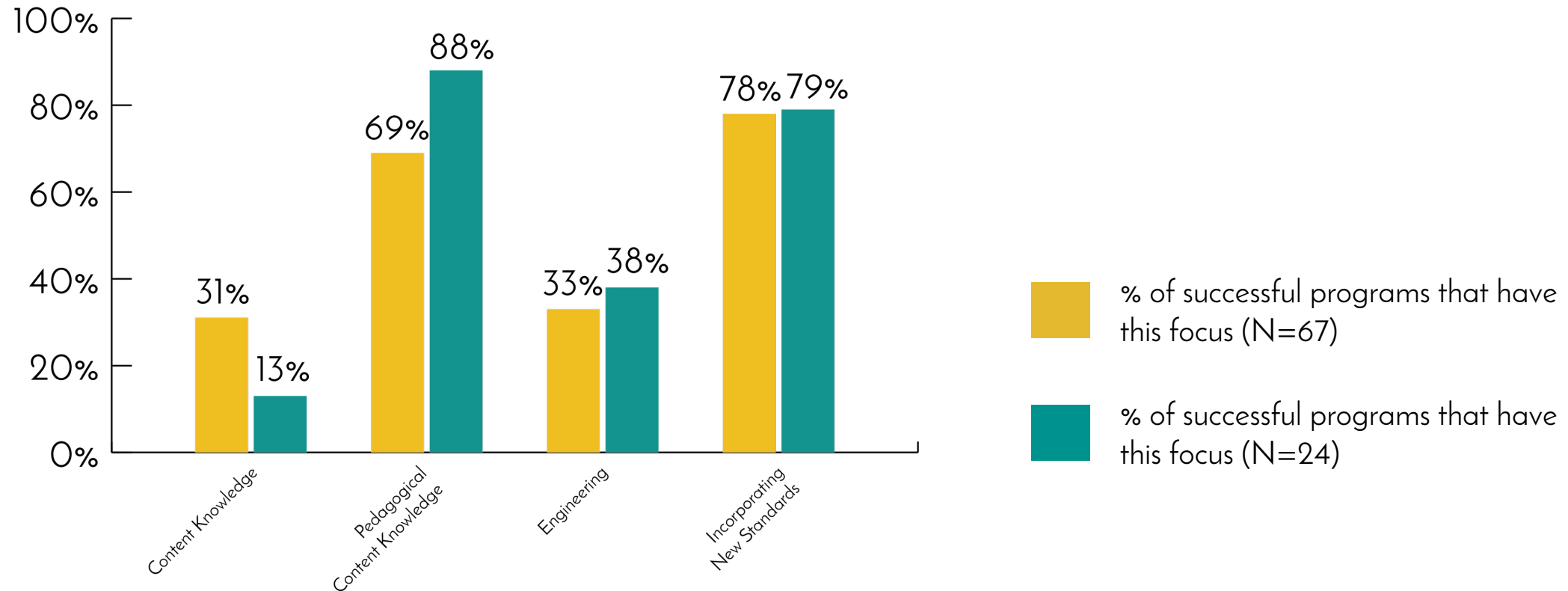


# AS A REMINDER...

Great “success” was defined as at least 90% of participants being hired into teaching roles in the previous year (Prepare) or returning to teaching (Develop). Outcomes data were available for 43% of programs that responded to the Prepare survey, 62% of programs that responded to the Induct survey, and 62% of programs that responded to the Develop survey. In our descriptive analyses, we looked for places where highly “successful” programs emphasized a particular focus area or programmatic element to a much greater extent than programs overall.

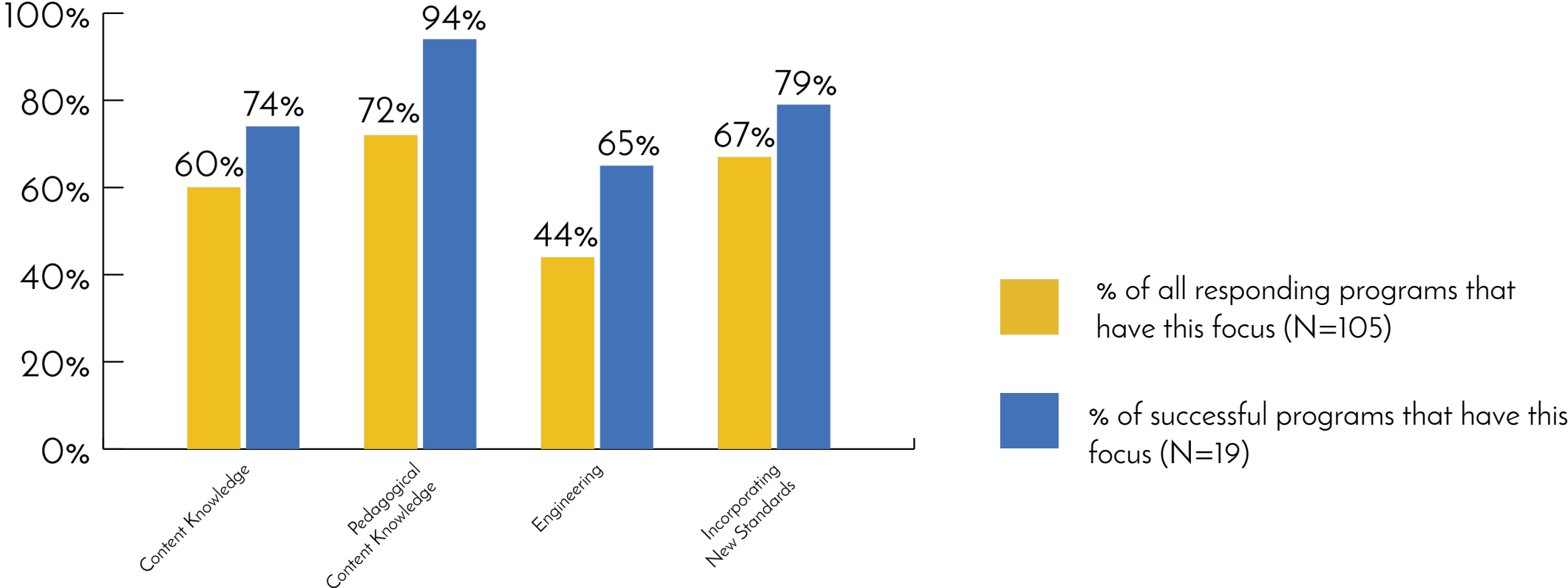
OUR ANALYSES INDICATE THAT THERE ARE SOME INTERESTING RELATIONSHIPS BETWEEN SEVERAL FOCUS AREAS AND OUTCOMES, BUT WE NEED TO COLLECT ADDITIONAL DATA TO MAKE A CONCLUSIVE STATEMENT

Training programs that were successful in getting 90% or more of their participants hired were more likely to have a focus on pedagogical content knowledge than training programs overall.



However, we do not yet have enough outcomes data from programs to say something more definitive about this relationship.

Development programs that were successful in retaining 90% or more of their participants were more likely to have a focus on content knowledge, pedagogical content knowledge, incorporating new standards, and engineering than development programs overall.



However, we do not yet have enough outcomes data from programs to say something more definitive about this relationship.

# NEXT STEPS

100Kin10 is dedicated to ensuring that our nation has the STEM teachers we need to prepare the next generation of innovators and problem solvers. Understanding the levers that may influence that shortage is of paramount importance to us.

Our partners represent many of the nation's best STEM education organizations who are actively working to address the STEM teacher shortage. For this reason, we believe it is extremely valuable for the field to take note of where they are experiencing success, and where they continue to face challenges. By doing so, we can grow our shared knowledge base, learn from what is working, and raise the level of STEM learning for all kids. At the same time, in the places where 100Kin10 partners are struggling, one can assume that many others around the country are, as well, and thus are areas worthy of special attention, additional research, and targeted work. Our hope is that this survey holds a mirror to both our network partners and the field at large to help all of us reflect on priorities and improve.

*As we move forward we'll continue to keep a pulse on what's working--and what isn't--and will continue to share updates as we learn more.*

# THANK YOU

The Annual Partner Survey was made possible in part by funding from Chevron.

For inquiries, contact [info@100Kin10.org](mailto:info@100Kin10.org)