Association of Mathematics Teacher Educators

Welcome to Today's Webinar:
The Current Status of Novice Mathematics Teachers: Findings from the 2018 NSSME+
Wednesday, February 26, 2020, 12 PM Eastern Time

Presenter:

Kristen Malzahn, *Horizon Research, Inc.*

Hosted by:

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AMTE Association of Mathematics Teacher Educators

Upcoming Webinar

Designing and Implementing Equitable K-14 Mathematics Pathways

- **Presenter: Diane Briars, Chair of the Conference Board of the Mathematical Sciences**
- **Date: Wednesday, March 25, 2020, 4-5:00 PM**

Watch your email—registration will open soon!

NSSME | THE NATIONAL SURVEY OF SCIENCE & MATHEMATICS EDUCATION

The Current Status of Novice Mathematics Teachers: Findings from the 2018 NSSME+

AMTE WEBINAR

FEBRUARY 26, 2020

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horizon RESEARCH, INC.

Webinar Overview

- **Describe the 2018 NSSME+**
- **Share novice teacher findings**
  - ***Who makes up the novice mathematics teaching force?***
  - ***What is the nature of their preparation and inservice support?***
  - ***What are their beliefs and perceptions of preparedness?***
  - ***What is the nature of their mathematics instruction?***
  - ***How do novices compare to veterans?***
- **Q&A**

2018 NSSME+

- **The 2018 NSSME+ is the sixth in a series of surveys dating back to 1977.**
- **It is the only survey specific to STEM education that provides nationally representative results.**
- **The results are national estimate of schools, teachers, and classes—not characteristics of the respondents.**

The 2018 NSSME+, and this presentation, is based upon work supported by the National Science Foundation under Grant No. DGE-1642413. Any opinions, findings, and conclusions or recommendations expressed are those of the authors and do not necessarily reflect the views of the National Science Foundation.

2018 NSSME+

- **Program questionnaire**
- **Teacher questionnaire**

- **Two-stage random sample that targeted:**
  - 2,000 schools (public and private)
  - Over 10,000 K–12 teachers

- **Very good response rate:**
  - 1,273 schools participated
  - 86 percent of program representatives
  - 78 percent of sampled teachers

Endorsing Organizations

- American Association of Chemistry Teachers
- American Association of Physics Teachers
- American Federation of Teachers
- Association of Mathematics Teacher Educators
- American Society for Engineering Education
- Association of State Supervisors of Mathematics
- Association for Science Teacher Education
- Council of State Science Supervisors
- Computer Science Teachers Association
- National Association of Biology Teachers
- National Association of Elementary School Principals
- National Association of Secondary School Principals
- National Council of Supervisors of Mathematics
- National Council of Teachers of Mathematics
- National Earth Science Teachers Association
- National Education Association
- National Science Education Leadership Association
- National Science Teachers Association

Situating the Novice Teacher Findings

- Novice teachers: those in their first five years of teaching mathematics
- The 2018 NSSME+ was not primarily designed to focus on novice teachers.
- A rich source of data for examining K–12 novice mathematics teachers and the similarities and differences between novices and veteran teachers
- How can these national results inform the work that you do in mathematics teacher education and/or professional development?

Who Makes Up the Novice Mathematics Teaching Force?

What is the Nature of Their Teacher Preparation and Inservice Support?

Novice Teacher Characteristics

- Majority female
- ≤ 30 years old

Novice Teacher Race/Ethnicity

	Percent of Novice Teachers
White	89
Hispanic/Latino	9
Black or African American	7
Asian	4
American Indian or Alaskan Native	1
Native Hawaiian or Other Pacific Islander	1

Novice Teacher Content Background

- **Degree in mathematics or mathematics education**
  - 1 in 10 percent (elem.)
  - 4 in 10 teachers (middle)
  - 7 in 10 teachers (high)*

- **Fewer novice high school teachers have a degree in these areas than veteran high school teachers (70 vs. 82 percent).**

Coursework Related to NCTM Preparation Standards

Elementary (5 areas)

- Algebra
- Geometry
- Number and Operations
- Probability
- Statistics

Middle School (6 areas)

- Algebra
- Geometry
- Probability
- Statistics
- Calculus
- Number theory

High School (7 areas)

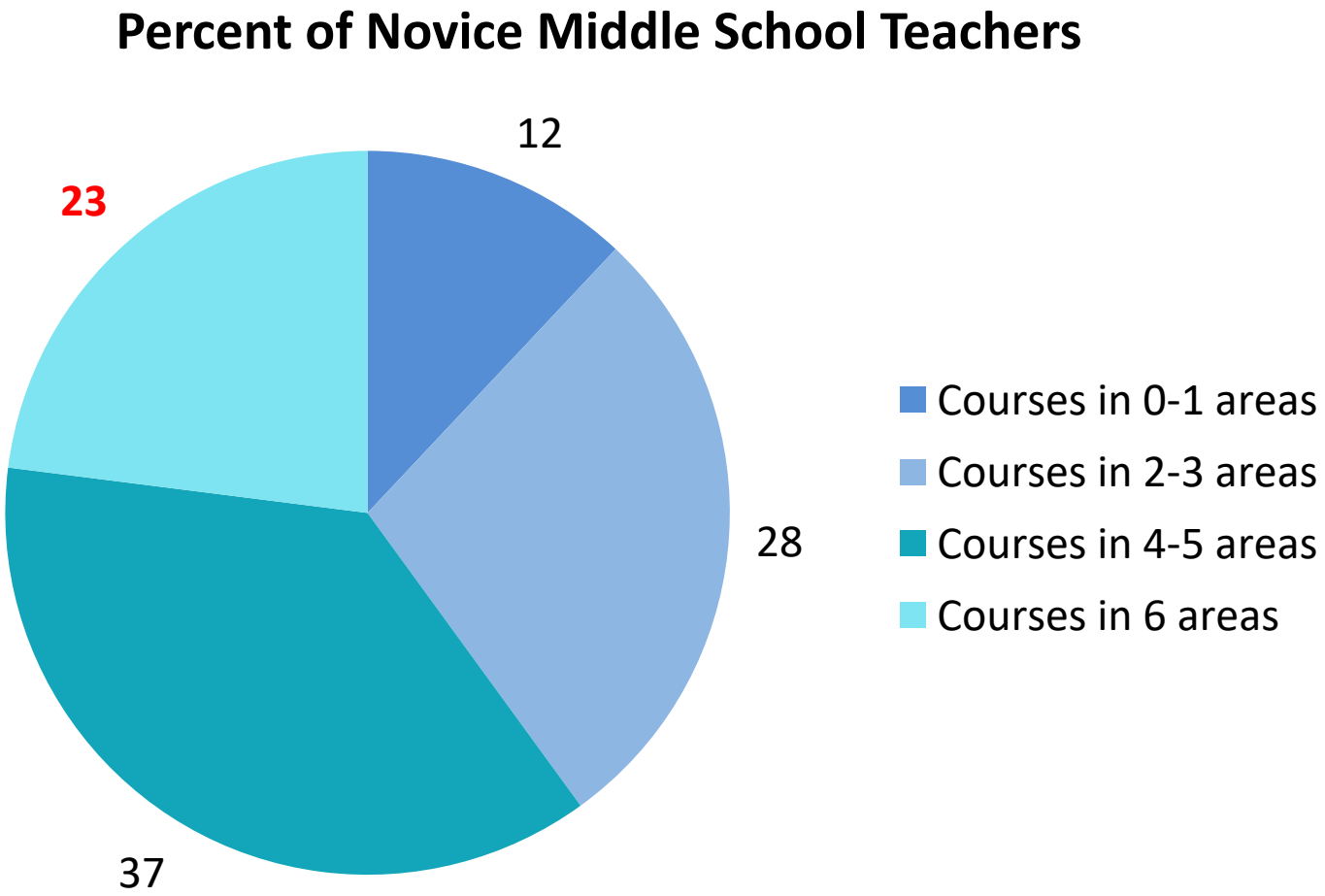
- Algebra
- Geometry
- Probability
- Statistics
- Calculus
- Number theory
- Discrete math

Poll Question #1

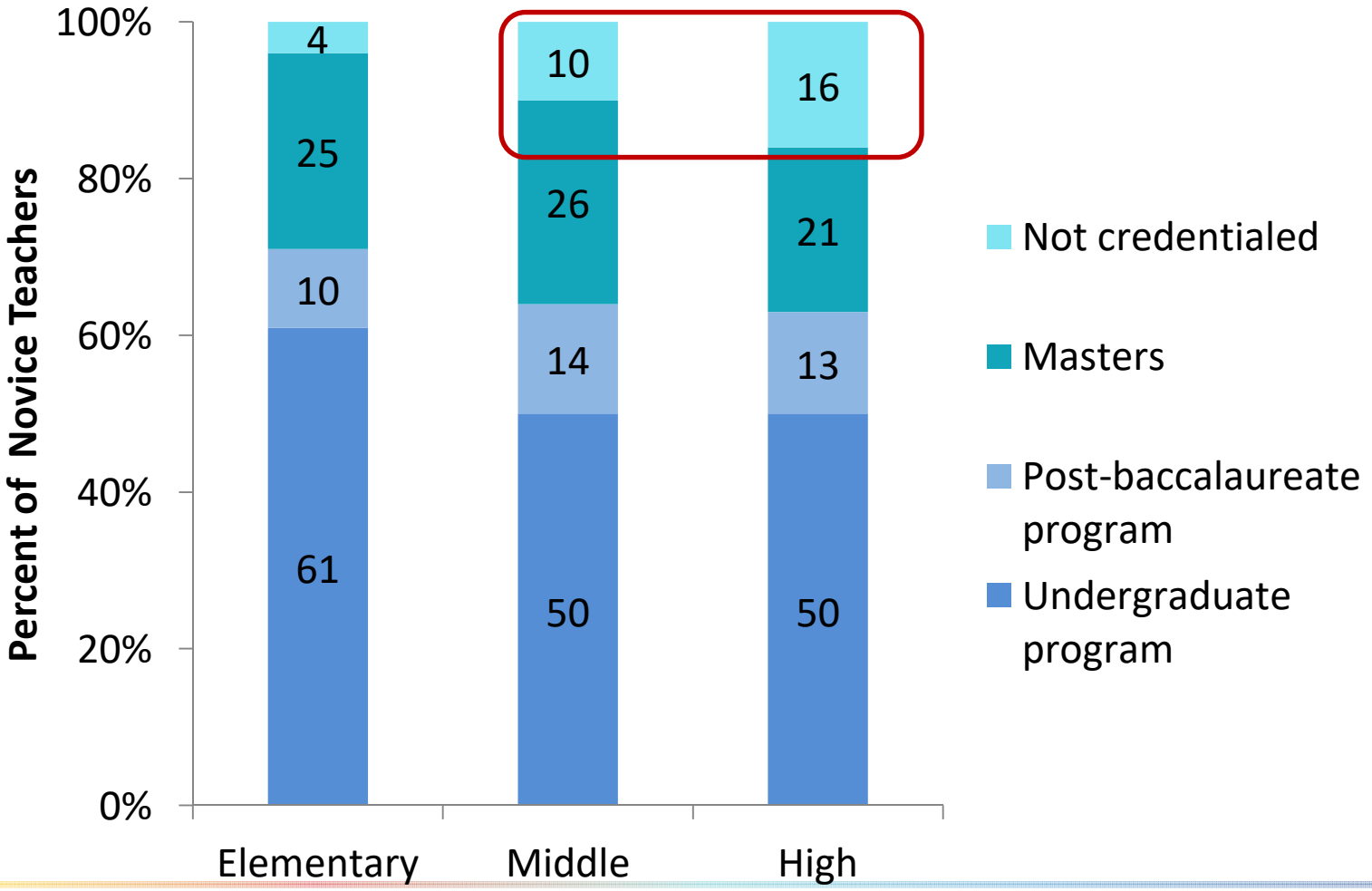
Approximately what percentage of novice middle school teachers have taken coursework in all 6 content areas recommended by NCTM?

a. 15 percent
b. 25 percent
c. 35 percent
d. 45 percent

Coursework Related to NCTM Preparation Standards



Paths to Certification

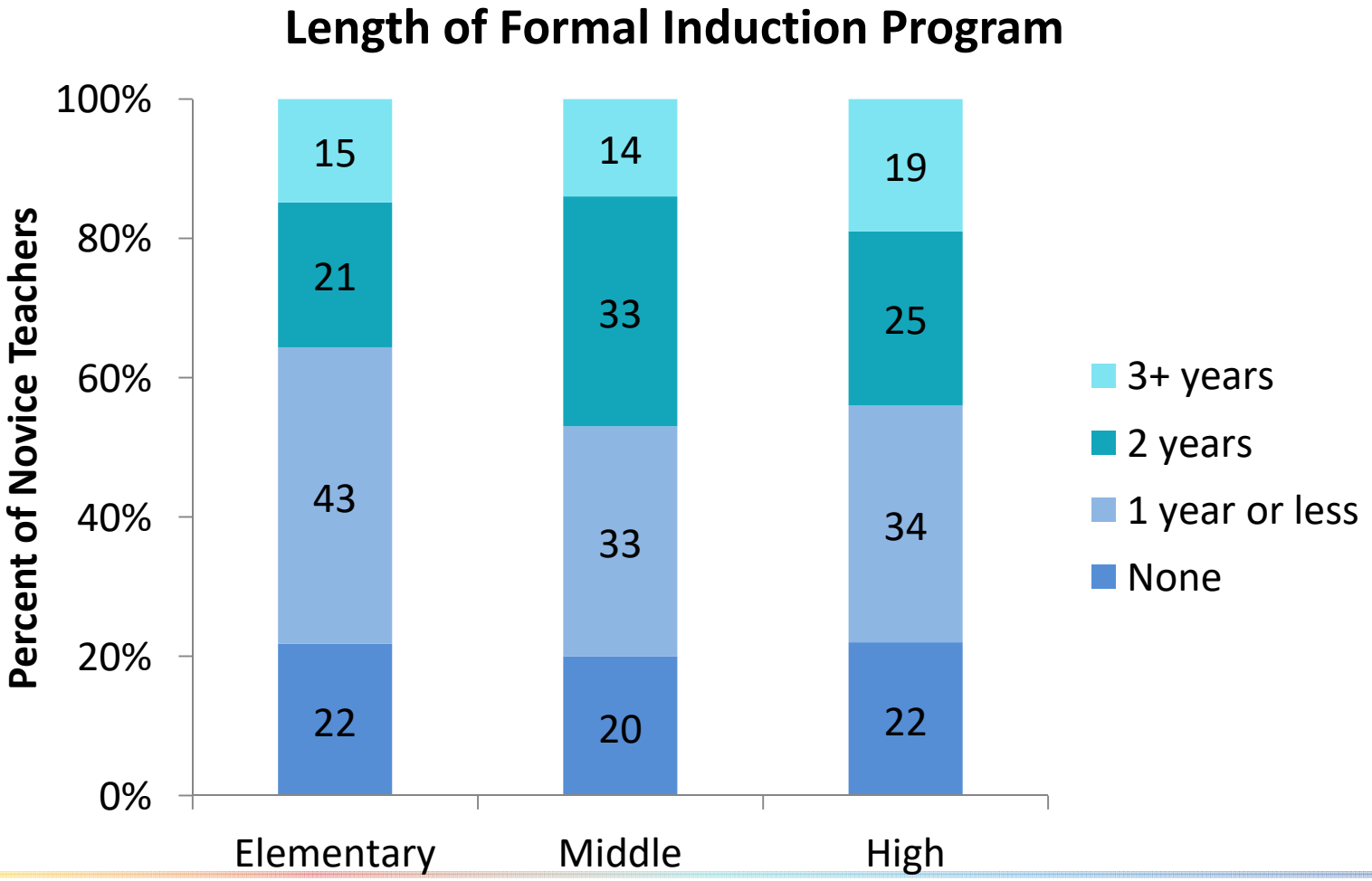


Poll Question #2

Approximately what percentage of novice teachers worked in schools offering a formal induction program?

a. 40 percent
b. 60 percent
c. 80 percent
d. 100 percent

Induction Programs



Induction Programs

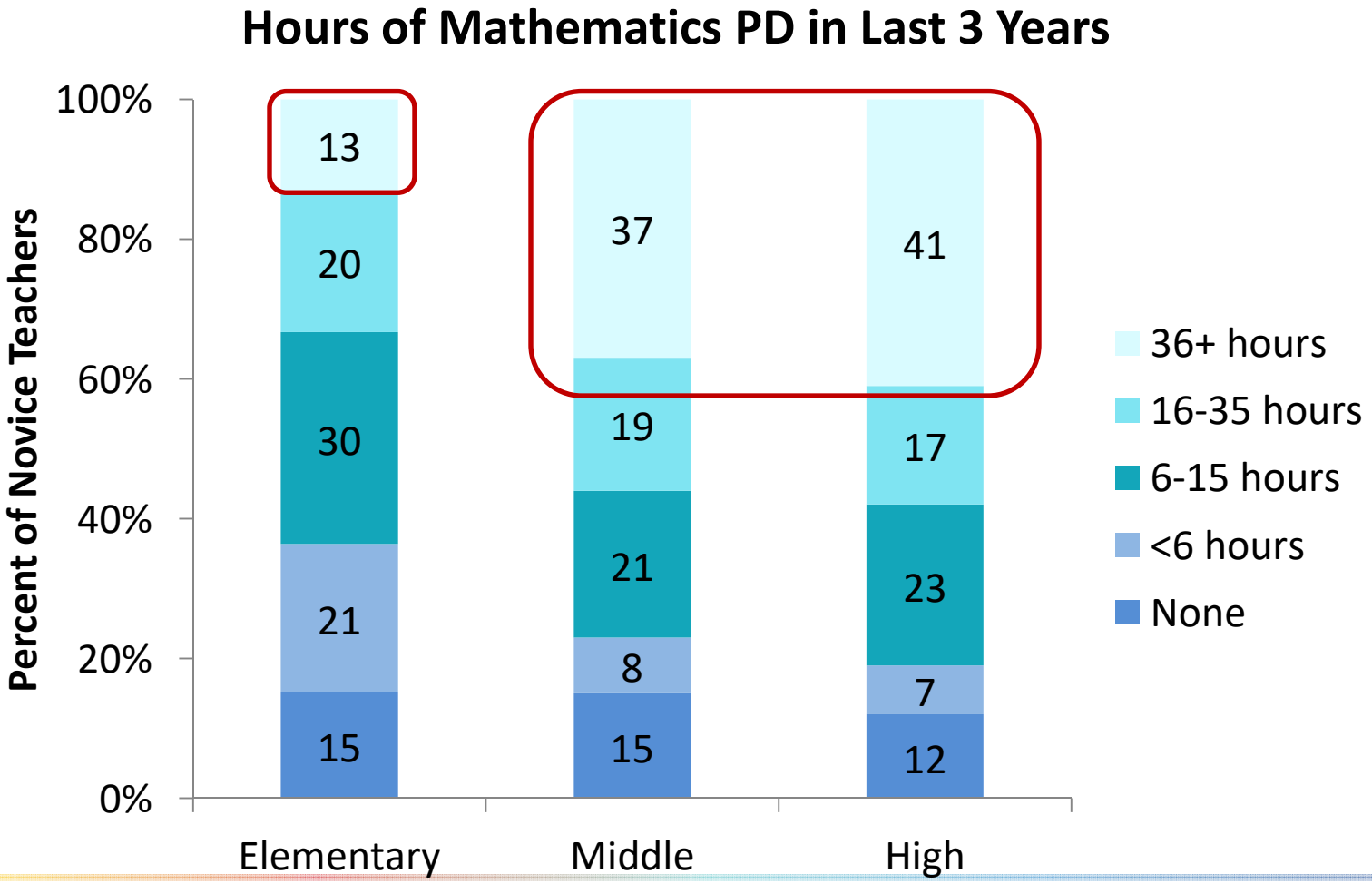
Common features

- An orientation meeting
- Formal school-based mentor
- Subject-specific PD opportunities
- Release time to observe other teachers
- Common planning time with experienced teachers

Uncommon features

- Classroom aide/teaching assistant
- Reduced number of preparations
- Reduced course load
- Reduced class size

Professional Development



Characteristics of PD

Math PD That Had Each a Number of Characteristics to a Substantial Extent

	Percent of Novice Teachers		
	Elementary	**Middle**	**High**
Work closely with teachers in school	69	70	75
Work with those teaching same subject or grade level	62	59	59
Apply what they learn in classroom and come back to discuss	47	48	53
Examine classroom artifacts	45	55	49
Experience lessons as students	50	51	48
Rehearse instructional practices	34	37	41
Engage in math investigations	43	50	31

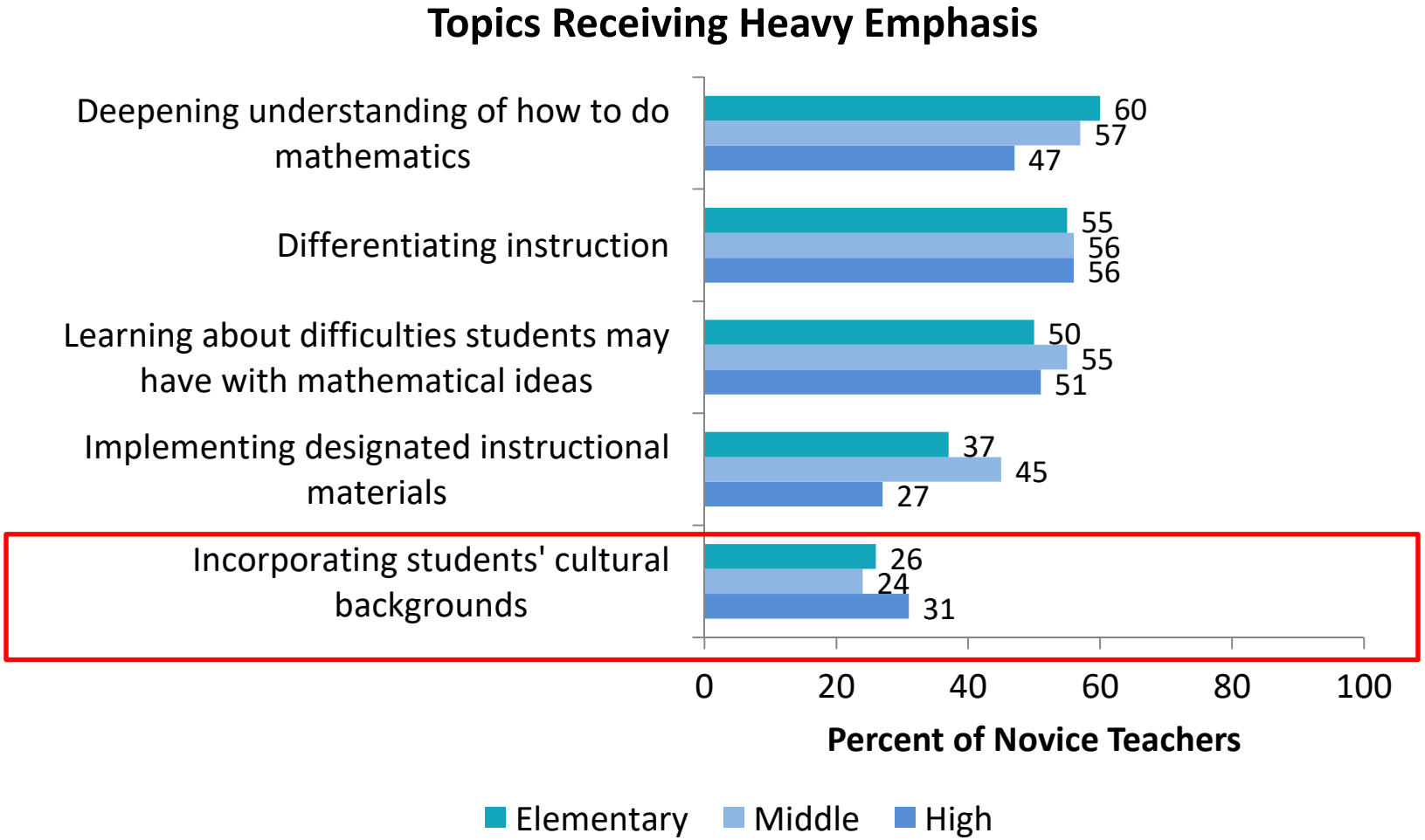
Only somewhat aligned with elements of effective PD

Poll Question #3

Given what you know, what area do you think requires the greatest emphasis in PD for novice teachers?

a. Deepening teachers' understanding of how to do mathematics
b. Differentiating instruction
c. Using culturally responsive teaching
d. Learning about difficulties students may have with mathematical ideas
e. Implementing designated instructional materials

Emphasis of PD



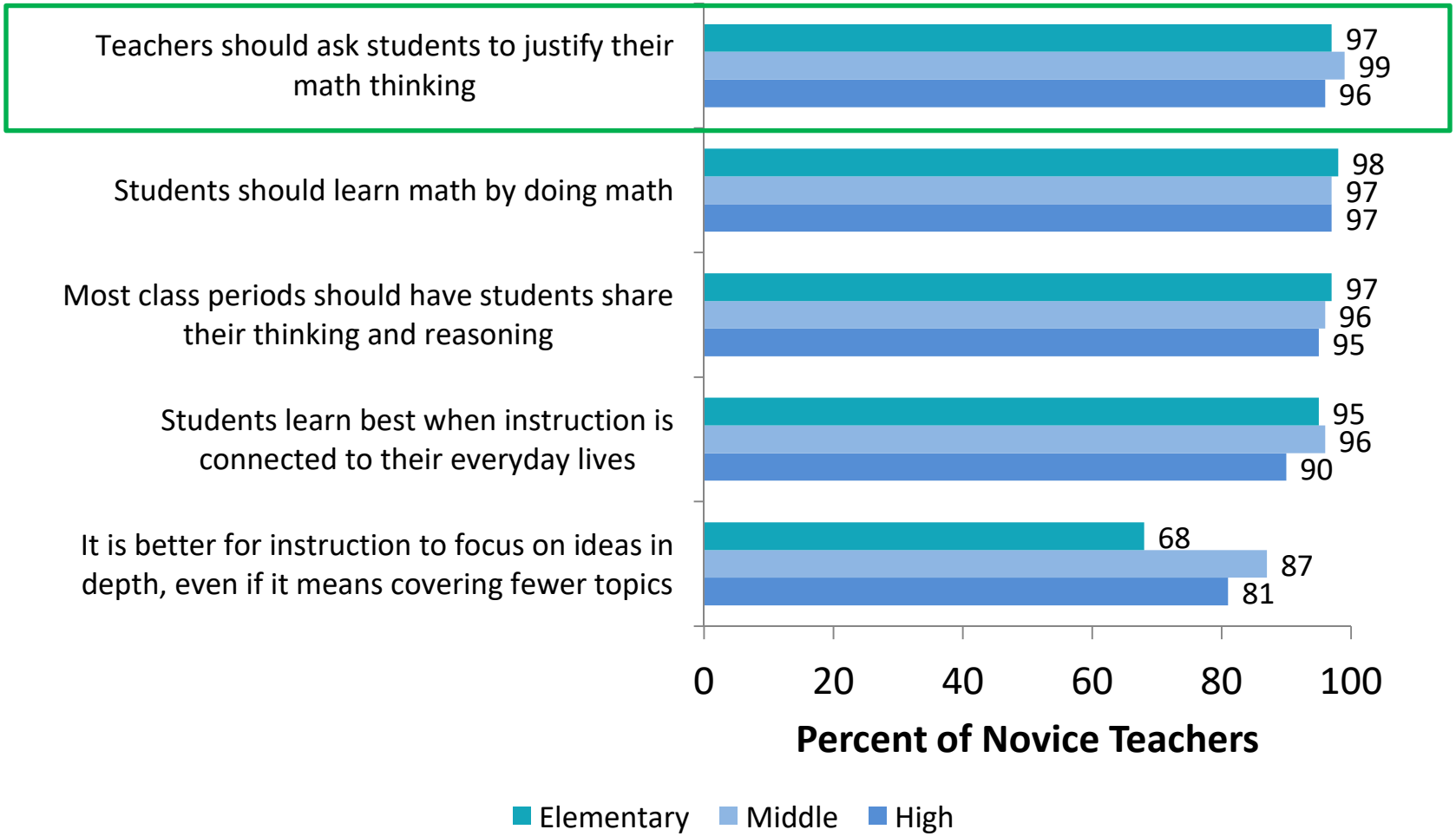
What Are Their Beliefs and Perceptions of Preparedness?

Poll Question #4

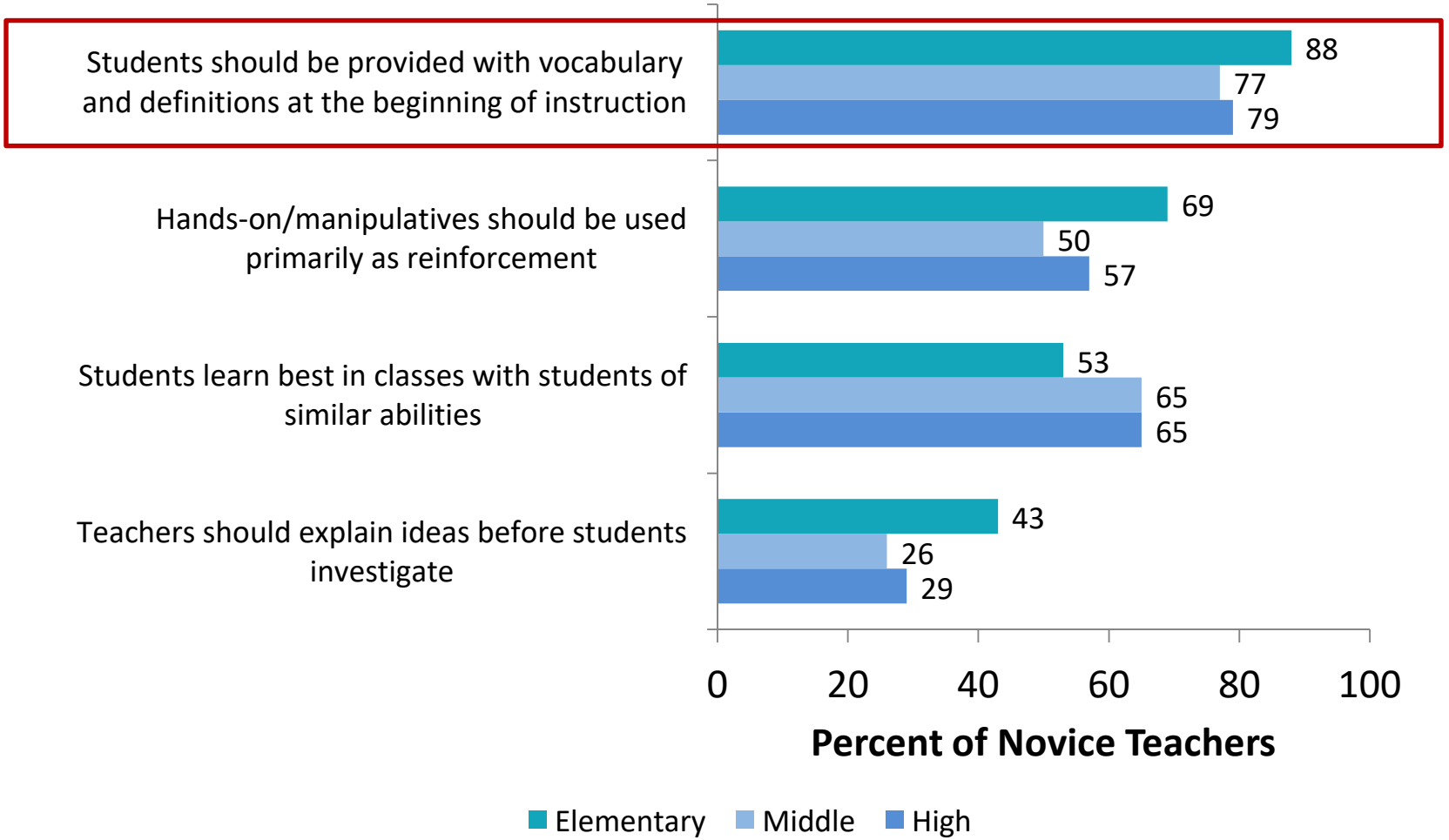
Approximately what percentage of novice teachers believe that students should justify their mathematical thinking?

a. 25 percent
b. 50 percent
c. 75 percent
d. 100 percent

Novice Teachers Agreeing with Reform-Oriented Beliefs



Novice Teachers Agreeing with Traditional Beliefs



Pedagogical Beliefs

Compared to veteran teachers:

- Middle grades novices are more likely to hold reform-oriented beliefs.

- Elementary novices are more likely to hold traditional beliefs.

Perceptions of Content Preparedness

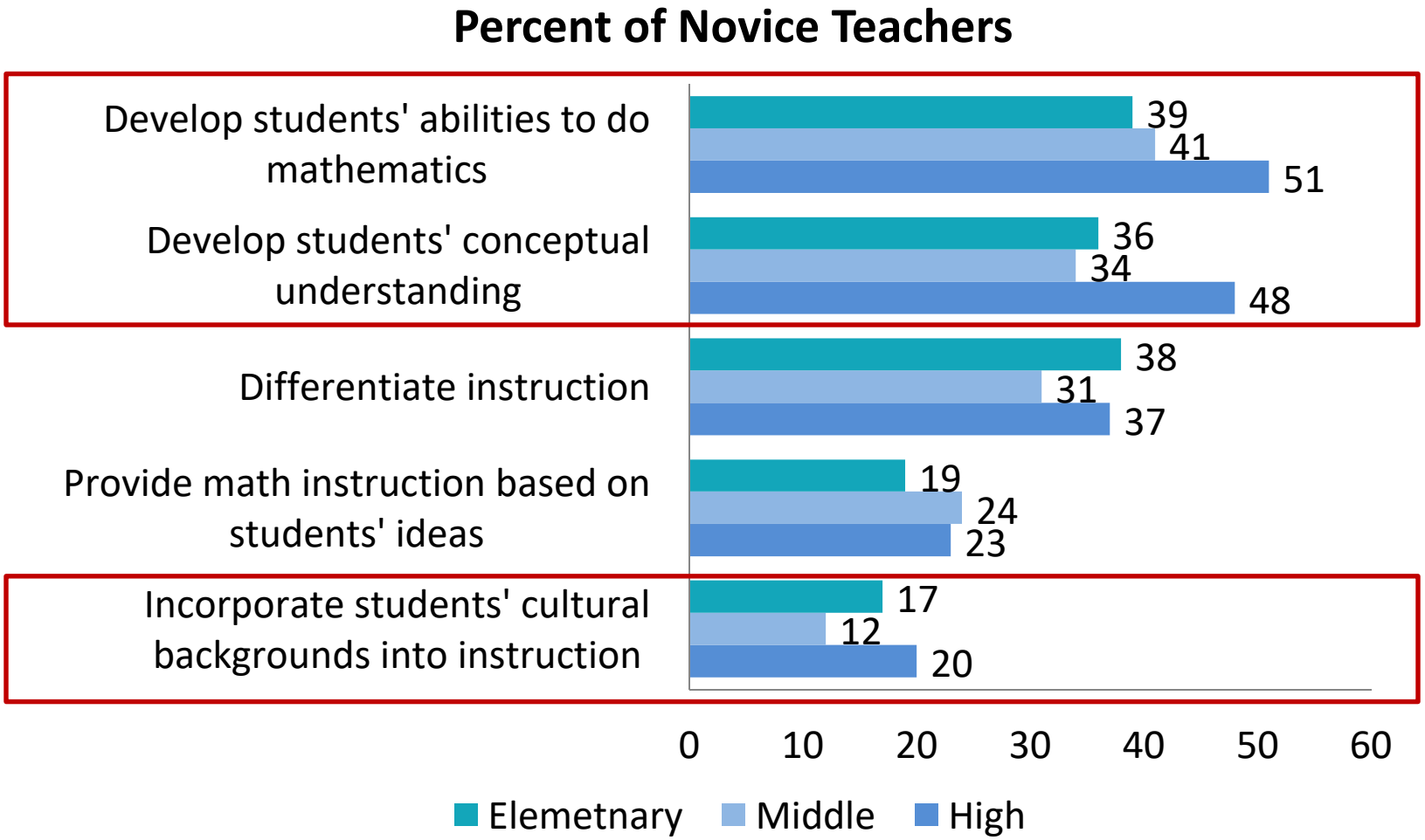
- Overall, K–12 novices feel generally well prepared to teach math topics.

- Elementary and high school novices feel somewhat less prepared than their veteran counterparts.

Perceptions of Pedagogical Preparedness

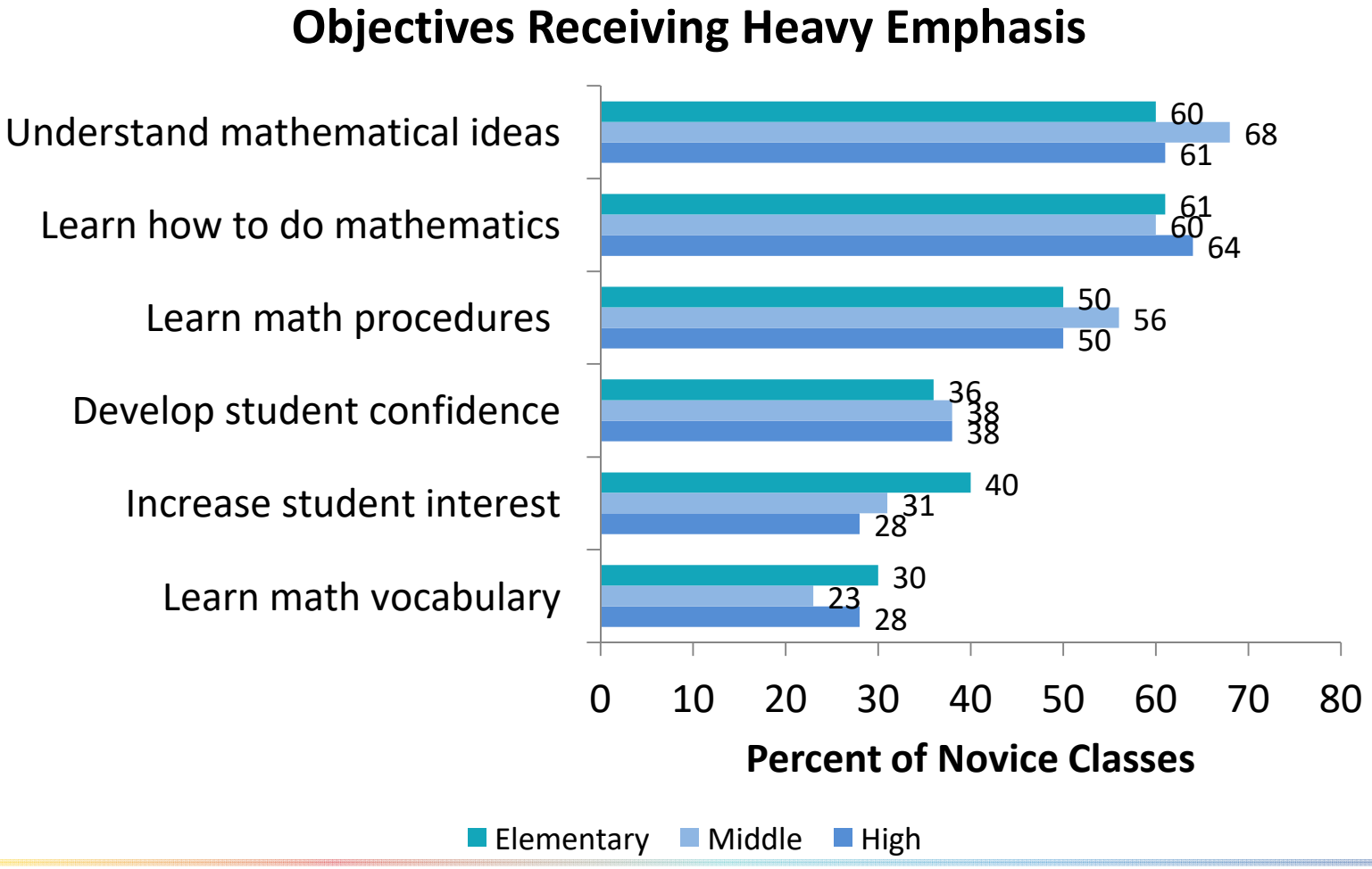
- Overall, K–12 novices feel only somewhat prepared to use student-centered pedagogies.
- Novices feel less well prepared to use student-centered pedagogies than teach content.
- Novices and veterans have similar perceptions of pedagogical preparedness.

Novice Teachers Feeling Very Well Prepared for Student-Centered Tasks

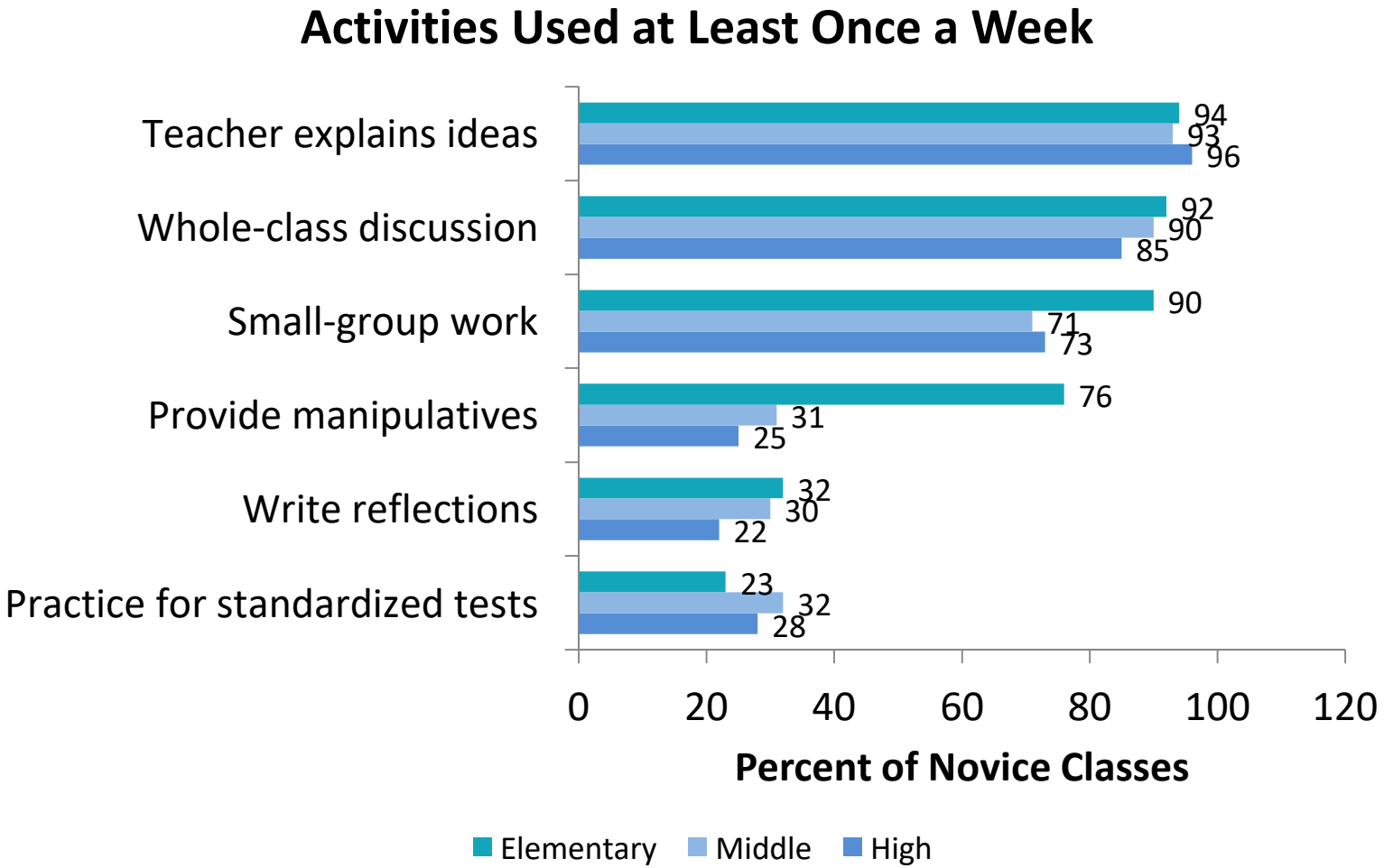


What is the Nature of Their Mathematics Instruction?

Instructional Objectives



Instructional Activities



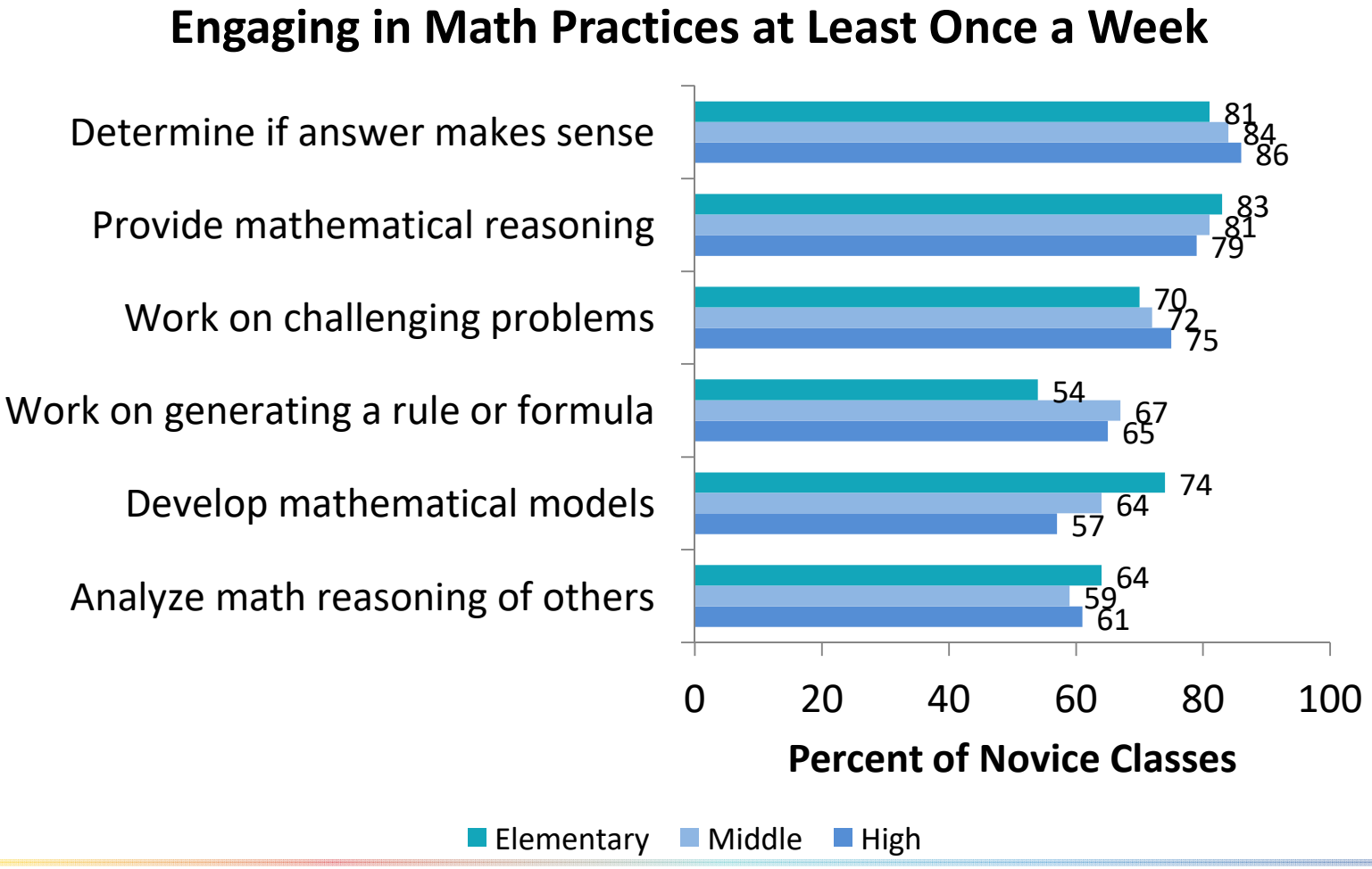
Poll Question #5

Students of novice teachers are less likely than those of veteran teachers to engage in aspects of mathematical practices.

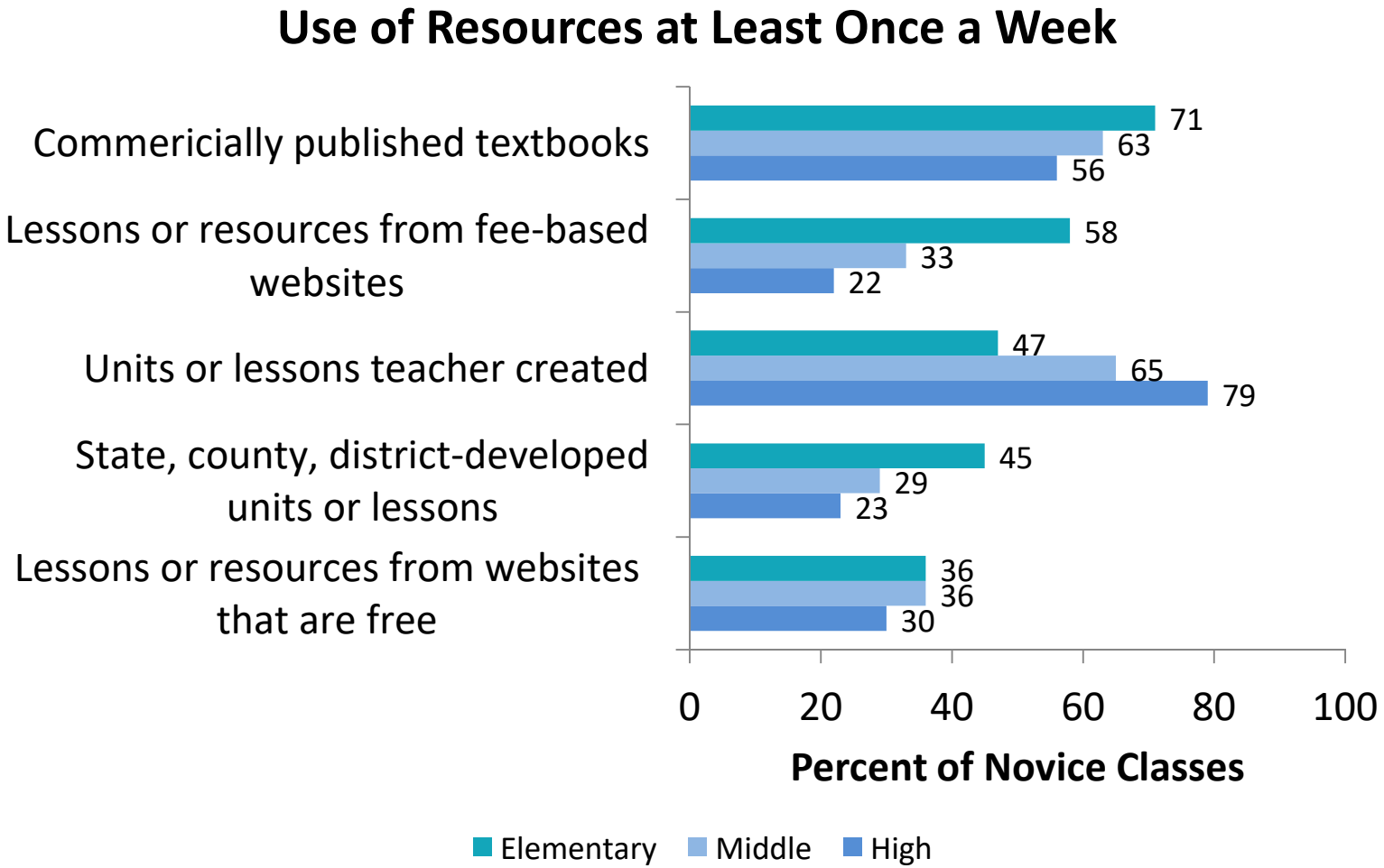
True or False

Classes were generally likely to engage students in these practices.

Engagement in Mathematical Practices



Use of Instructional Resources



Who Makes Up the Math Teaching Force and What is the Nature of their Preparation?

The mathematics teaching force does not reflect the student population in terms of race/ethnicity and gender.

Formal induction programs are prominent, though the duration varies.

PD emphasizes key areas such as differentiating instruction and monitoring student understanding, but is less likely to focus on culturally responsive teaching.

PD experiences are only somewhat well-aligned with elements of effective PD and somewhat supportive of student-centered instruction.

What Are Their Beliefs and Perceptions of Preparedness?

Novices hold a mixture of reform-oriented and traditional beliefs that can influence their instruction.

Novices generally perceive themselves as well prepared to teach content, although many lack the breadth and extent of formal preparation that is recommended.

Novices feel less well prepared to use student-centered pedagogies than teach content.

Few novices feel very well prepared to use culturally responsive teaching.

What is the Nature of Their Mathematics Instruction?

In general, novices emphasize reform-oriented instructional objectives, especially developing conceptual understanding and learning how mathematics is done.

Common class activities include lecture, whole class discussion, and small group work.

Most classes engage students with the mathematical practices on a weekly basis.

A hodgepodge of instructional materials are being used, raising questions about quality and coherence.

How Do Novices Compare to Veterans in These Areas?

There are very few differences between novices and veterans.

Some novices feel less well prepared to teach content.

Some novices hold more traditional beliefs, while others hold more reform-oriented beliefs.

Overall, PD experiences, perceptions of pedagogical preparedness and nature of instruction are similar.

Closing Thoughts

- The NSSME+ sheds some light on the status of novice teachers and how they compare to veterans
- It provides an opportunity for reflection on the effectiveness of mathematics teacher education programs and inservice supports and what areas are in need of further investigation.
- What from this webinar can you take back to your colleagues and use to catalyze change and make further improvements?

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Current reports:

- Technical
- Highlights
- Subject specific
- Compendium of Tables
- **Math Equity {new}**

Upcoming:

- Public Release Data Set

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