Natick Public Schools
21st Century Teaching and Learning Study:
Evaluation Introduction and Baseline Results

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Background

"All of us, professionals as well as laymen, must consciously break the habits we bring to thinking about the computer. Computation is in its infancy."

"It is hard to think about computers of the future without projecting onto them the properties and the limitations of those we think we know today. And nowhere is this more true than in imagining how computers can enter the world of education."

—Seymour Papert, Mindstorms, 1980

Computer technology has transformed society and industry

- Computers and digital technology have profoundly transformed many aspects of 21st century life
- Increasing presence of digital technologies within schools, although access and use have historically been limited and sporadic
- Generation of “digital natives”
- Increased public and political interest in educational reform

History and Trends in Educational Technology

Purported Benefits/Reform Model

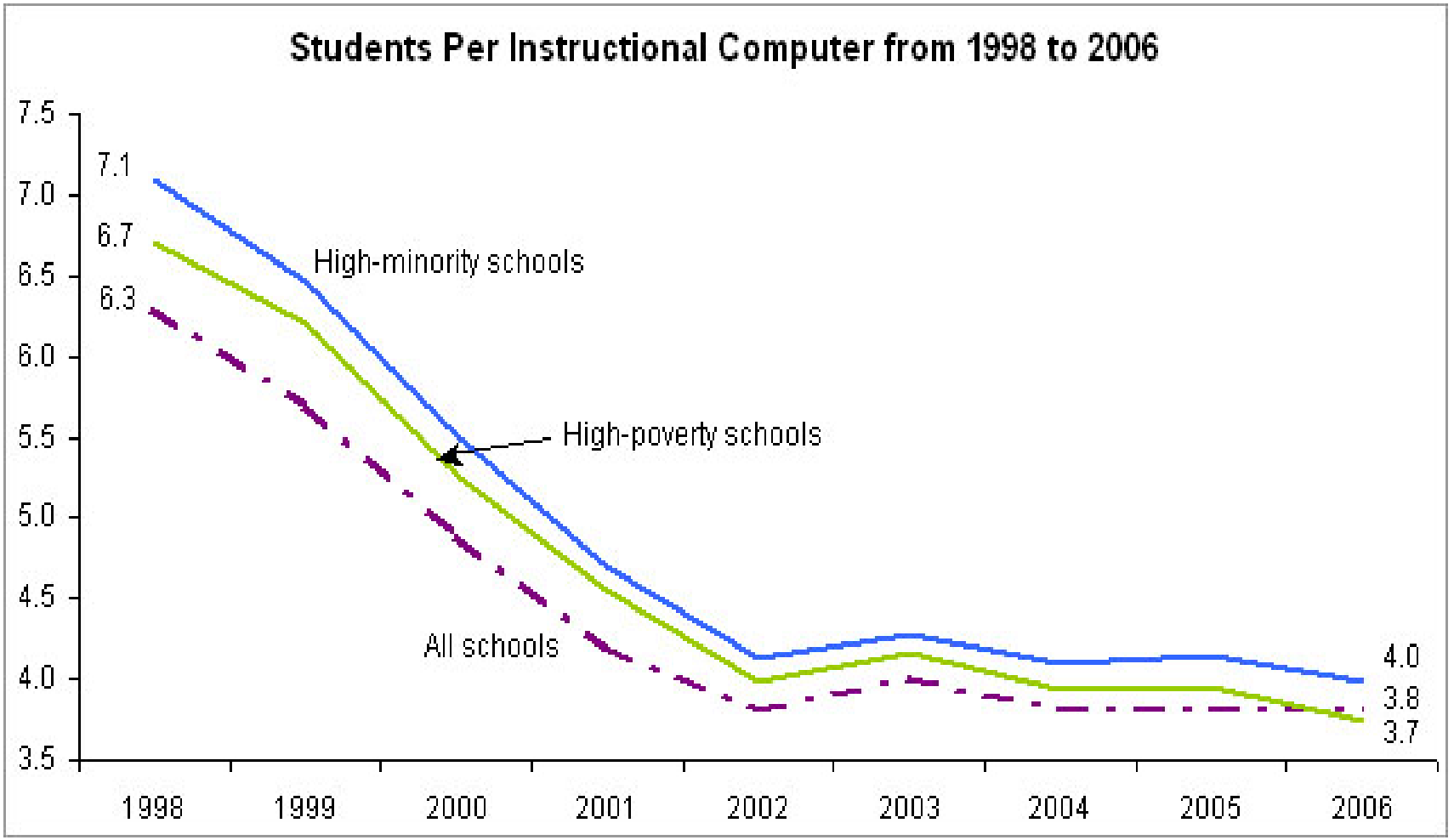
- Increase resources and information
- Exposure to computer literacy, technology, new learning (21st century skills)
- Improve teaching (lesson plans, communication, instruction)
- Motivate and engage students
- Movement towards student-centered classrooms
- Streamline and improve record keeping
- Better serve special needs/accommodations
- Differentiate Instruction/learning
- Improve student learning and test scores

Radical transformation of teaching and learning?
-or-
"Jet powered stagecoach"

Quantifying computer access

US Average Student : Computer Ratios

1983 = 125 : 1 ⇨ 1998 = 6 : 1 ⇨ 2007= 4 : 1 ⇨ 2010=3 : 1



Source: Market Data Retrieval, Public School Technology Survey 1998-2006; Education Week, 2007; Gray, Thomas, & Lewis, 2010

The rise of 1:1 Computing

Shared access →

Sporadic use

→ Limited impact

1:1 Computing

24 years of 1:1 computing programs continuously evolving

Widespread proliferation across world

Few programs have more than 5 years experience

Fewer still have invested in empirical research and evaluation efforts

So, lots of interest but limited research and evidence

Common Trends and Findings: Inputs and Setting

- Research and evaluation efforts have been systemically underfunded and lacked rigor
- 1:1 defines an access ratio, little else
- Despite common access, significant variations in the type and levels of use across schools and classrooms
- Numerous obstacles to implementation
- Pivotal role and responsibility of teacher
- Importance of building and school level leadership
- Curricular and technical support (PD)

Common Research Trends and Findings: Outcomes

- Substantial increase in student and teacher technology use for a wide variety of purposes
- Documented changes in teaching and learning practices for most participants
- Widespread increases in student engagement, motivation
- Improvements in student products, activities, opportunities
- Differentiation of content and material
- 3 of the 4 JTLA research studies examined student achievement

www.escholarship.bc.edu/jtla/

Natick/Boston College Research Partnership

Fall 2012- June 2014

Design and conduct quantitative external evaluation study to document impacts and changes as students and teachers transition to new technology rich computing environments.

Document the evolving teaching and learning practices afforded by the rich learning settings

Document how Natick teachers and students accessing, using, and relating to technology in support of teaching and learning.

Provide NPS with a rich empirical model (and data) for all future inquiries and investigations of how technology is leveraged across the district and it's impact on a variety of outcomes:

- student achievement
- student engagement
- students motivation
- evolution of teaching practices
- changes in students educational access and opportunities

www.bc.edu/natick21

NHS Research/Evaluation Design

- 7th- 12th Student Survey (Fall 2010, Fall 2012, Spring 2013)
- 7th- 12th Teacher Survey (Fall 2012, Spring 2013)
- Classroom Observations
- Focus Groups
- Attendance Analyses
- Course taking Patterns
- Student Achievement
- Student Video Competition

Results Available to Date

1) **Examine practices and attitudes across teachers and students during the 2012/2013 school year.**

1) **Examine students' practices and attitudes in pre and post-1:1 student computing settings**.

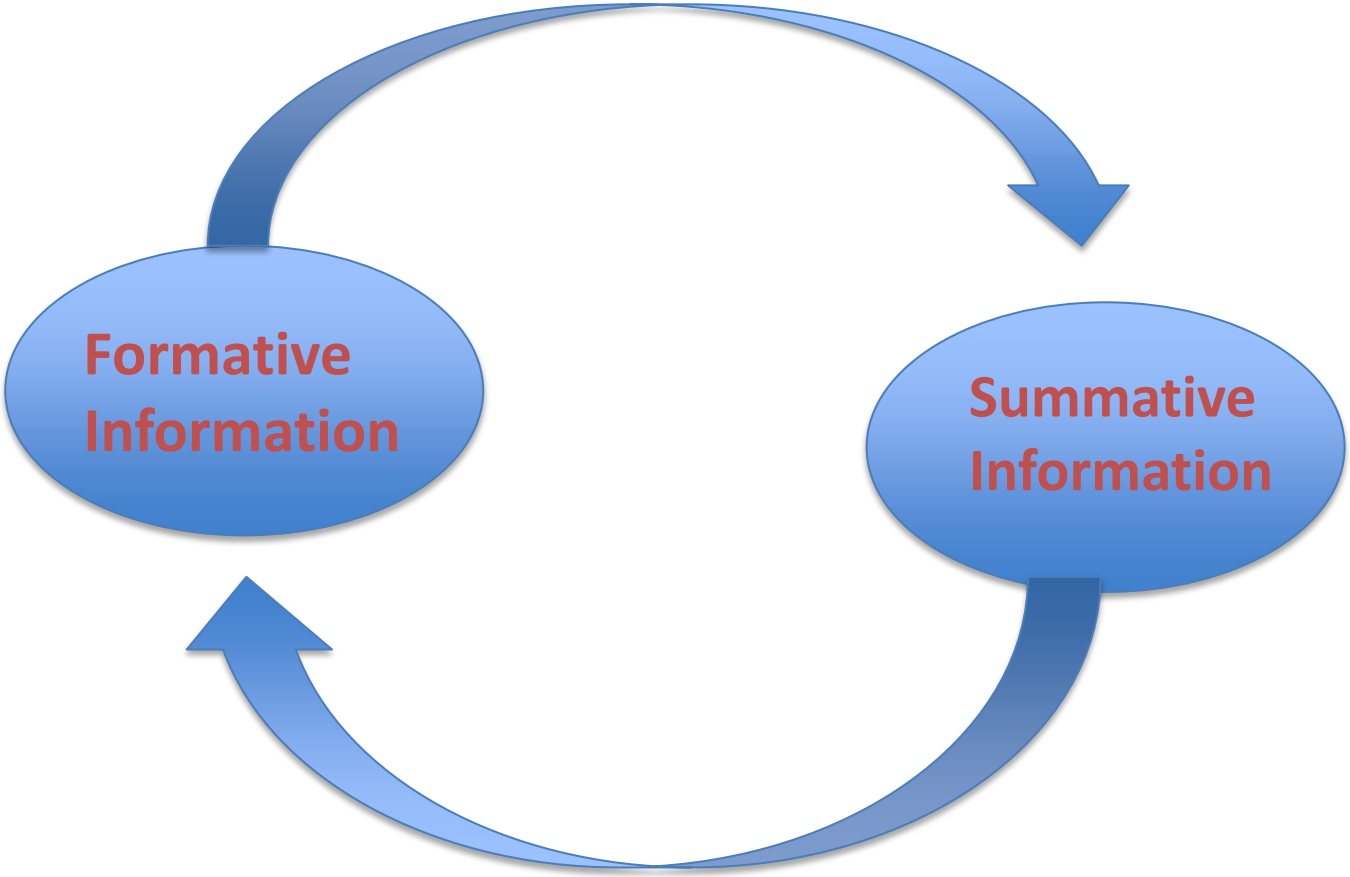
How do the resources of the new High School change teaching and learning practices?

The easy of technology access has changed dramatically for current cohort of NHS students, how are teachers and students responding to that change?

Compare 7th grade (Fall 2010) practices to 9th grade student cohort in newly opened NHS.

92% of the NPS seventh grade student population participated in a pilot survey in Fall 2010. These results provide a valuable snapshot of students learning practices as well as their attitudes and beliefs towards school and computing technologies before 1:1 computing was available.

Formative and summative evaluation



The information you collect about your program can inform the day-to-day operation of your program (formative information) which over time provides evidence of success/goals met (summative information).

Fall 2012 Survey Response Rates

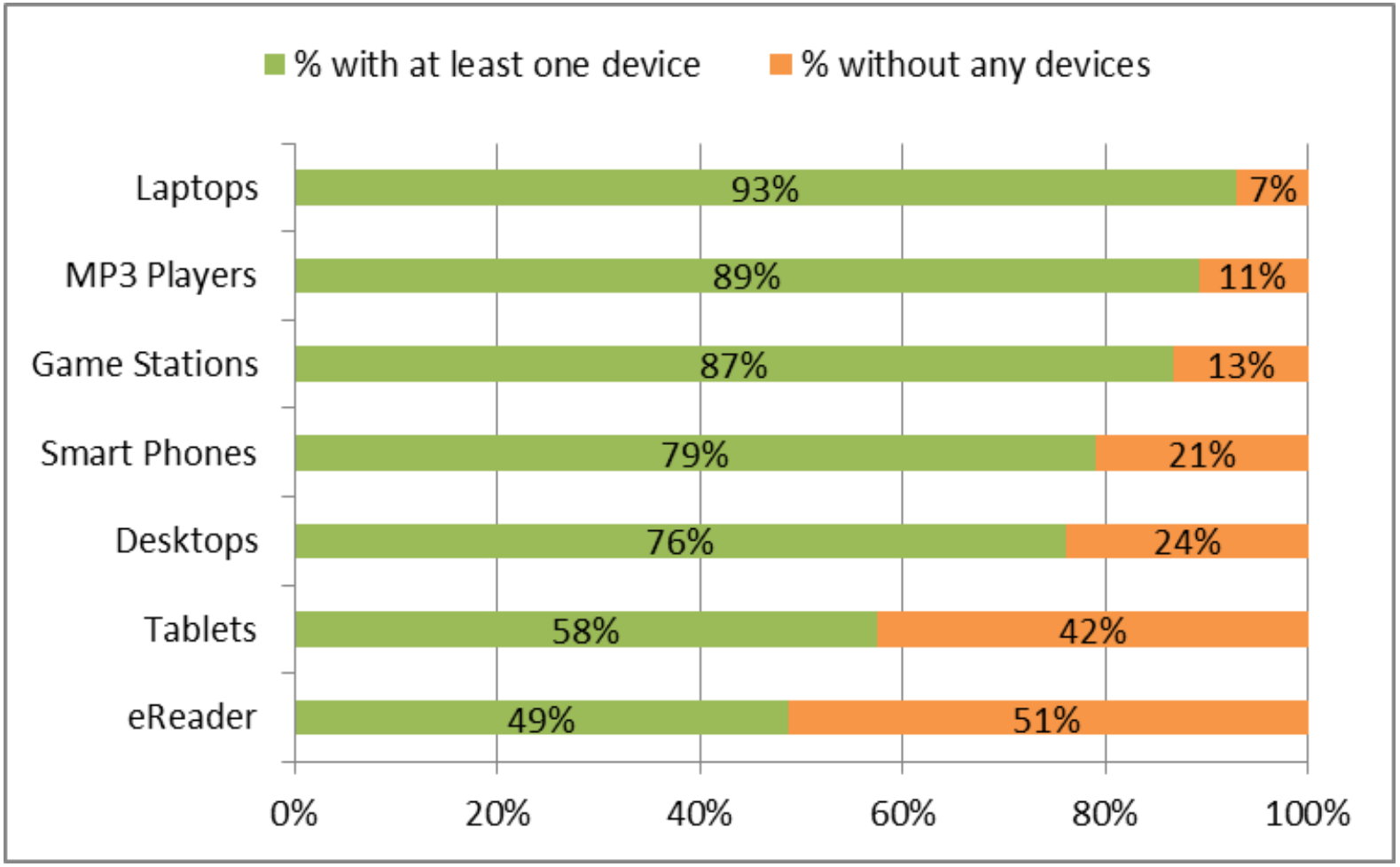
Student:

School Name	Grade	Total # of students	# Completed Surveys	Response rate
Kennedy Middle School		**303**	**292**	**96%**
	7	166	157	95%
	8	137	135	99%
Wilson Middle School		**426**	**411**	**96%**
	7	212	197	93%
	8	214	214	100%
Natick High School		**1354**	**1217**	**90%**
	9	383	369	96%
	10	330	309	94%
	11	328	273	83%
	12	313	266	85%
Total		**2083**	**1920**	**92%**

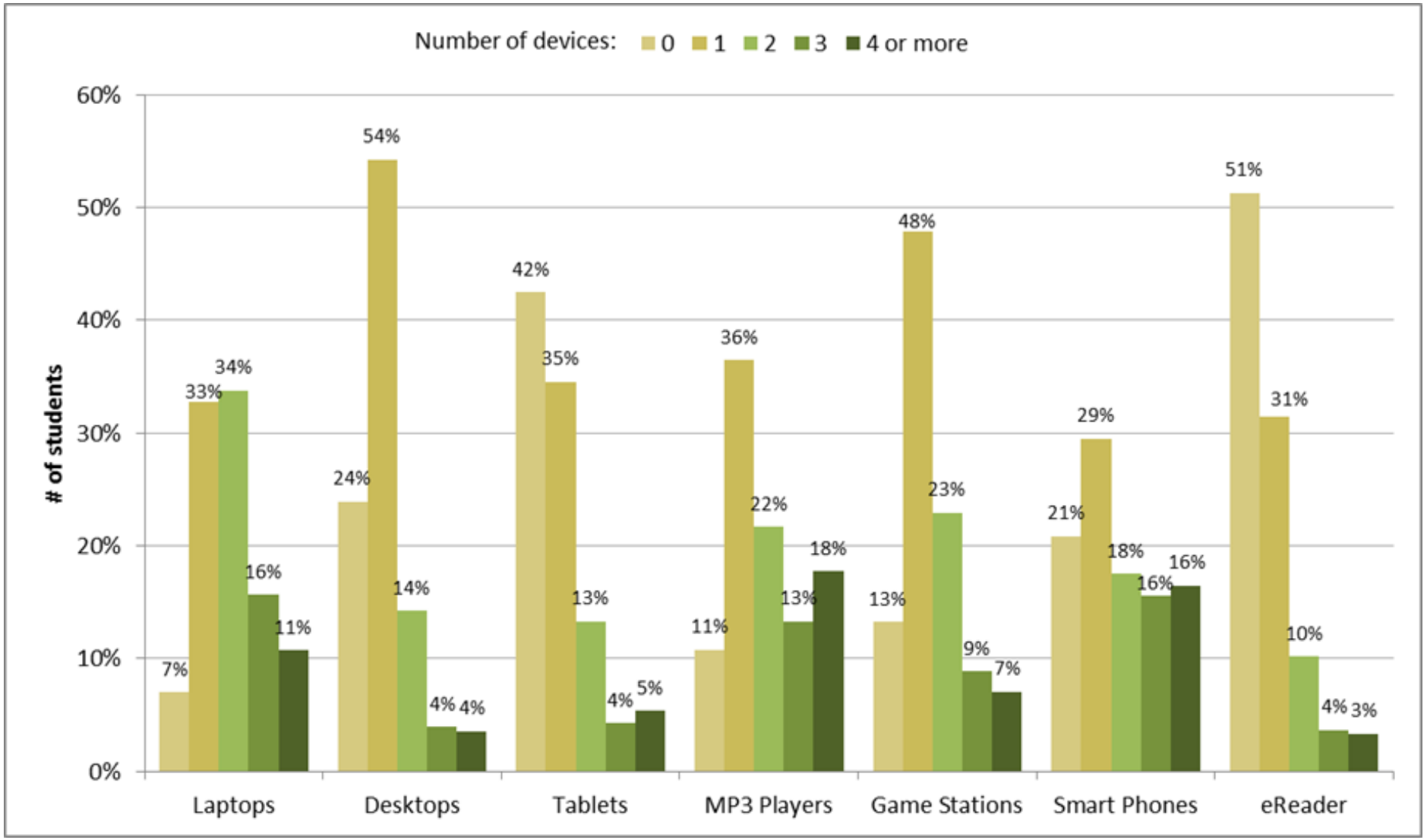
Results (to date)

- Students home access and use of technology
- Students use of technology across grades and subject areas
- Students attitudes and beliefs towards technology
- Teachers attitudes and beliefs towards technology

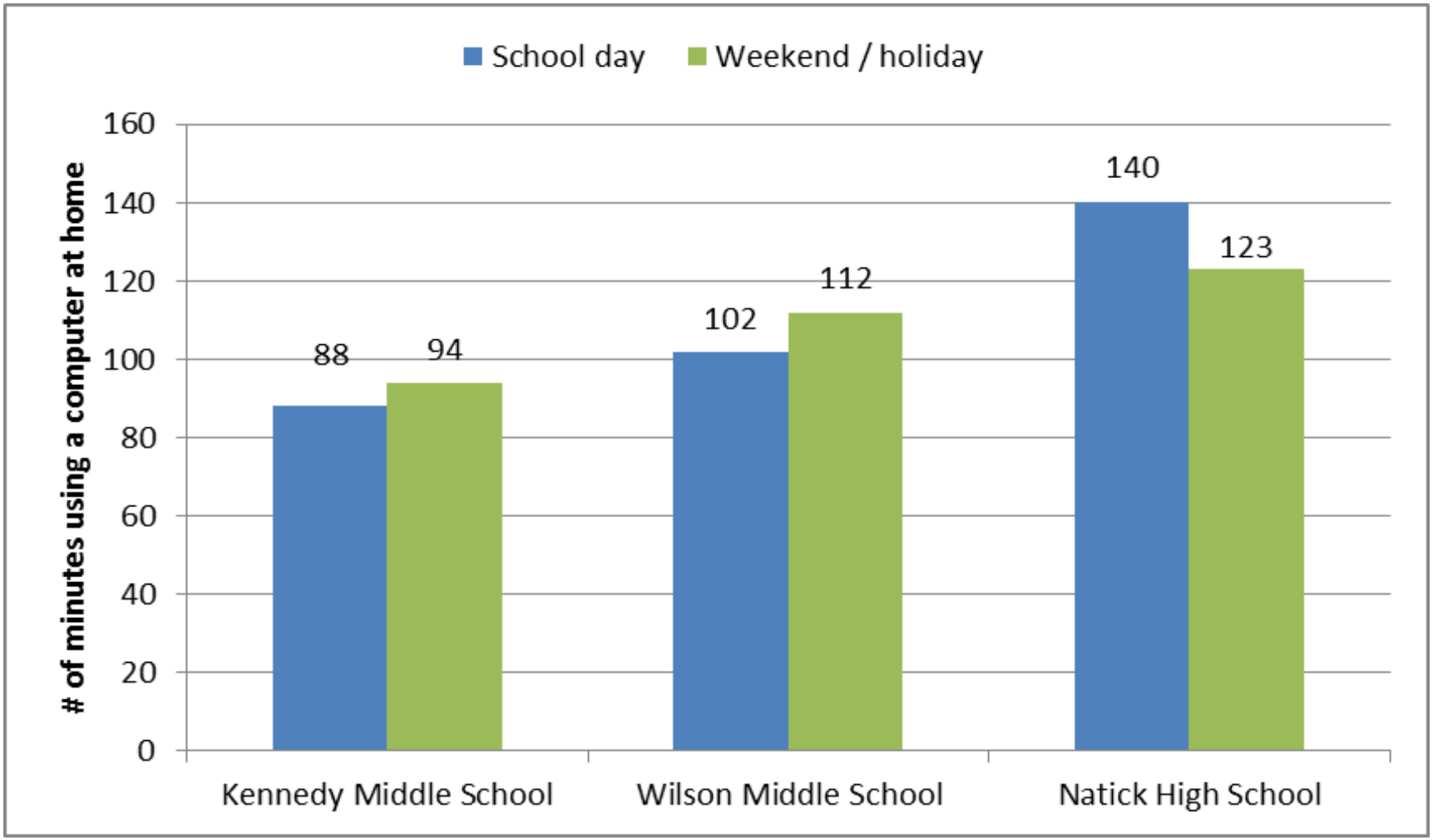
Results: Students' home access and use



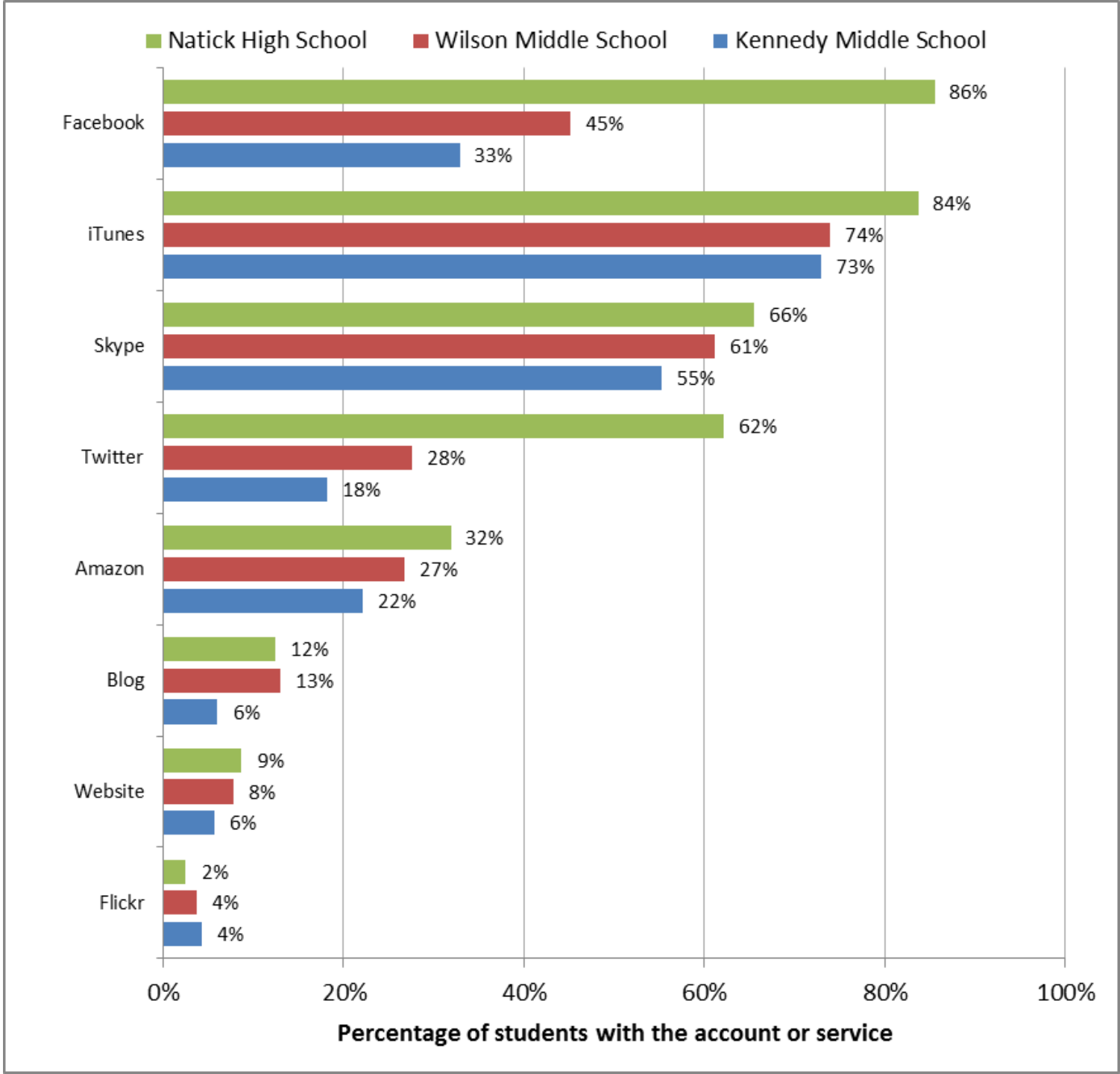
Type and number of digital devices Natick students report in their home:



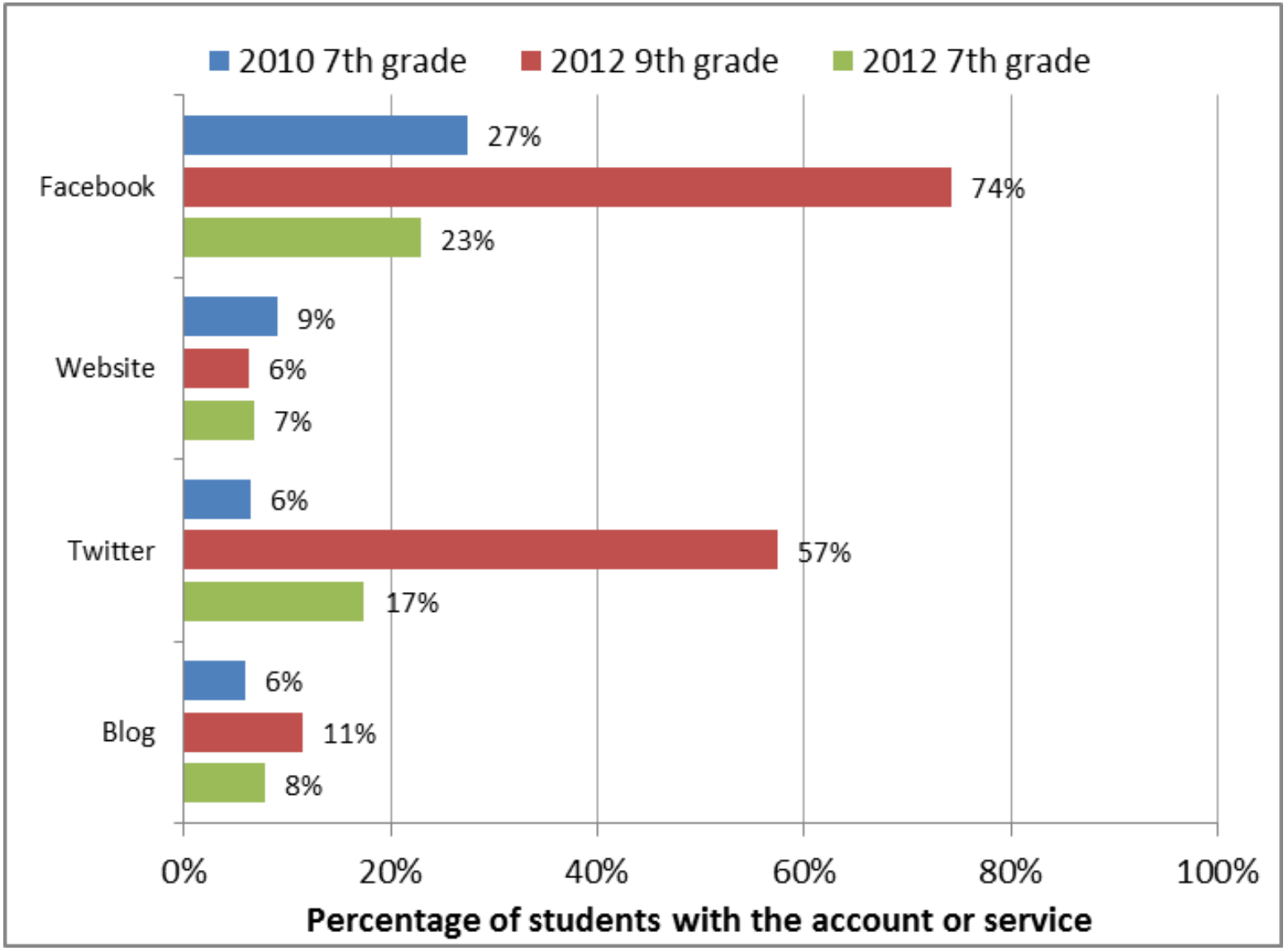
How much, on average, are Natick students using computers at home?



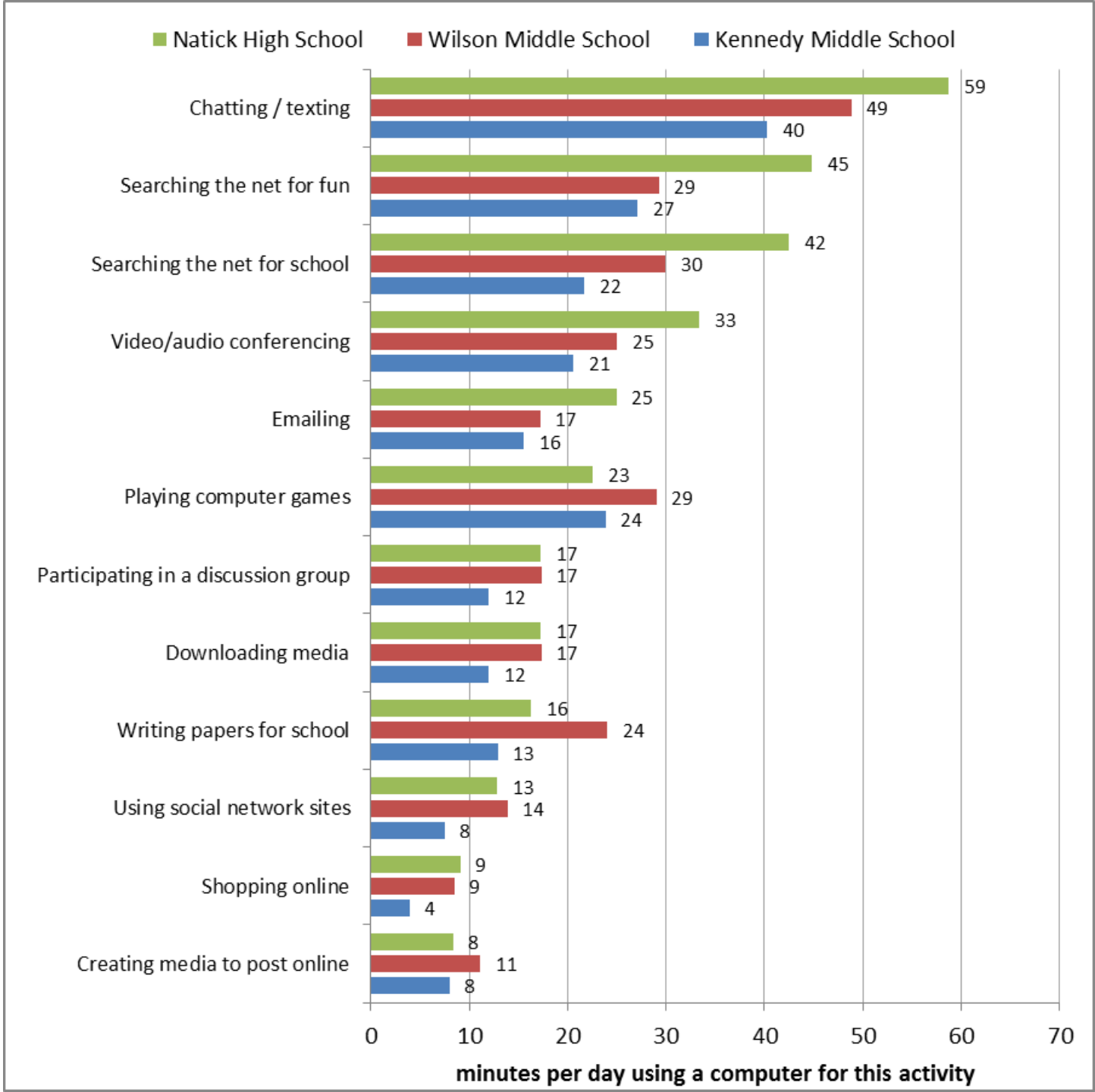
What percent of Natick students are on Facebook and other web-based account or service?



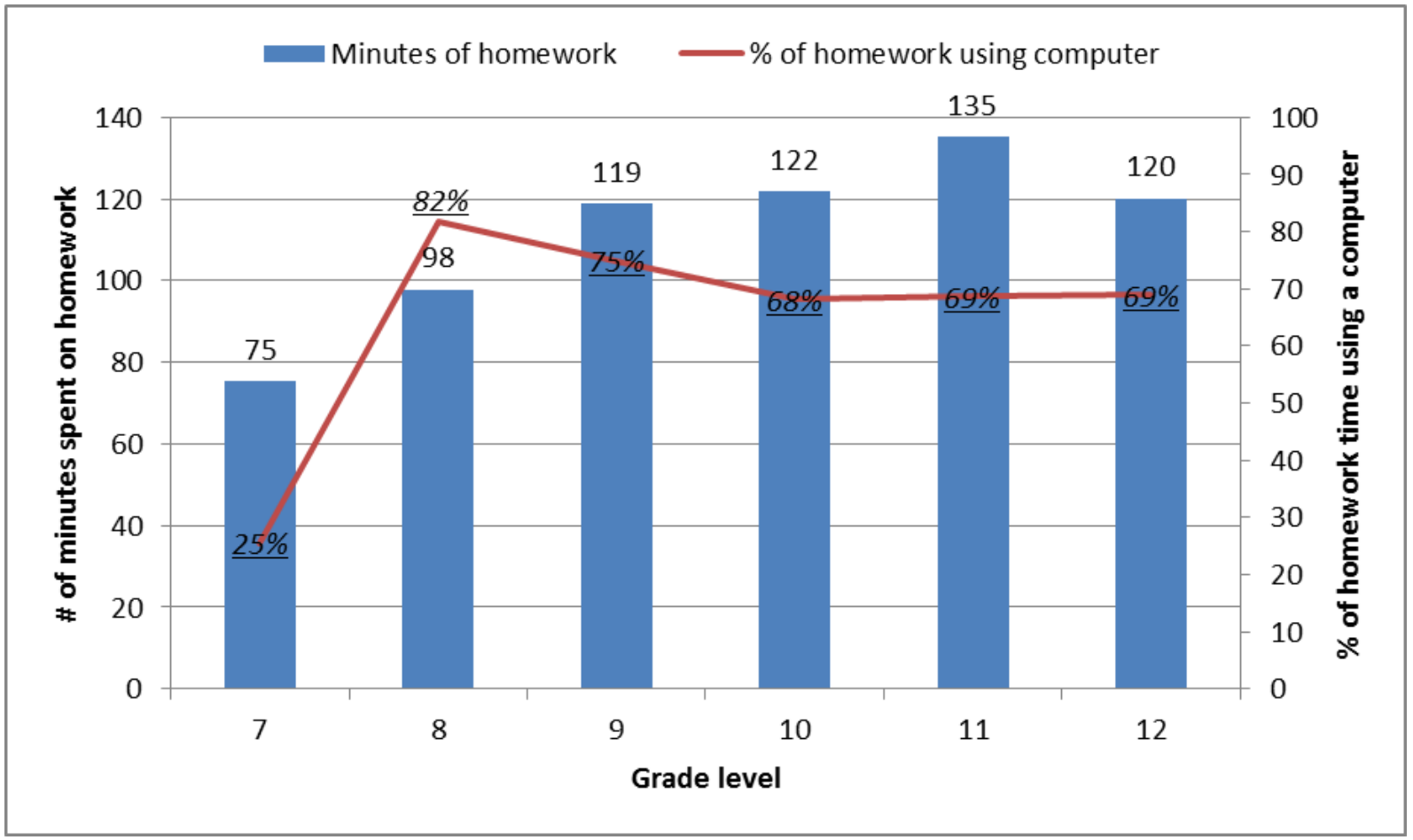
How has Natick students' home technology use changed over the past two years?



How do Natick students use their home technologies?

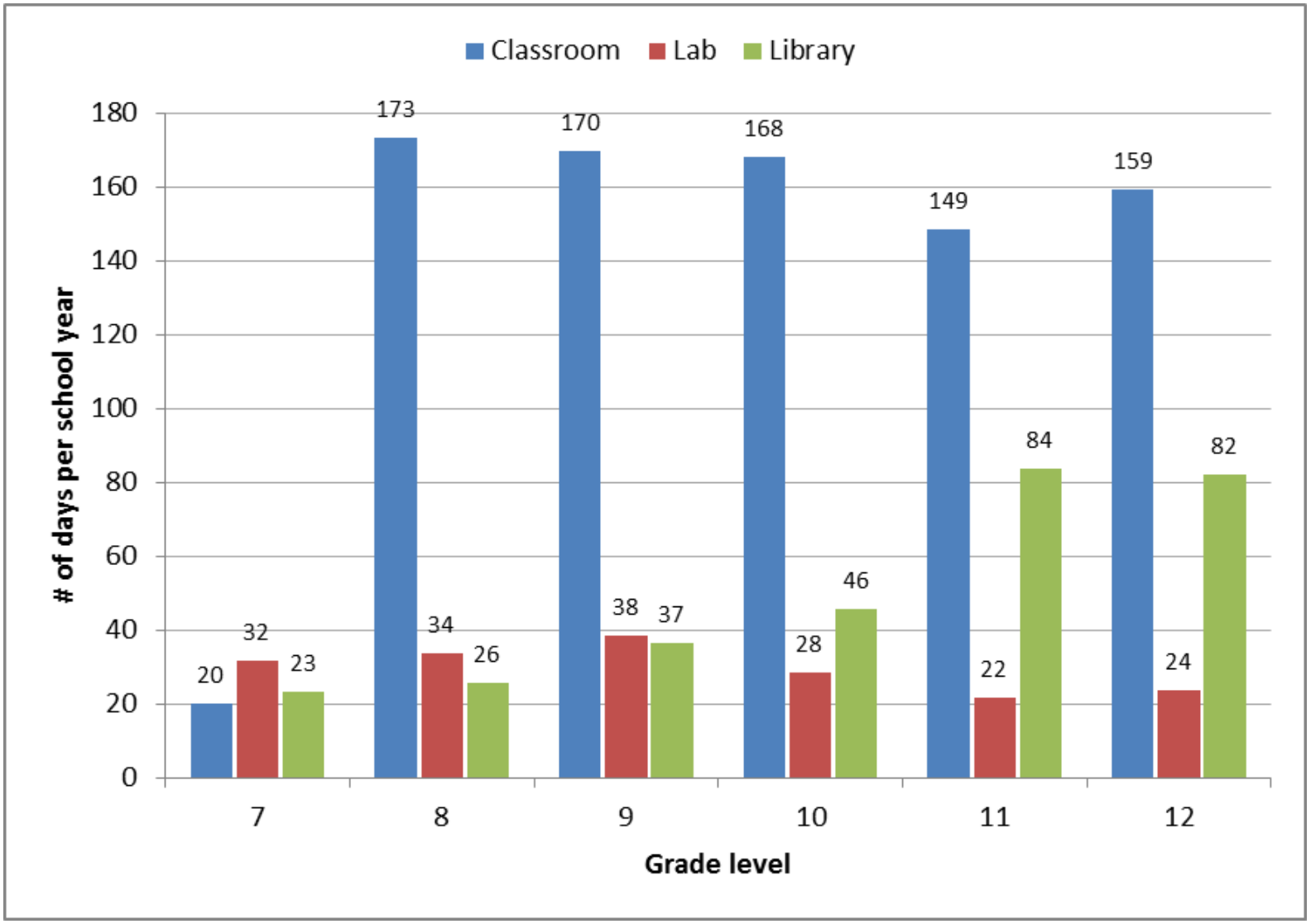


Results: Students' homework time and technology use

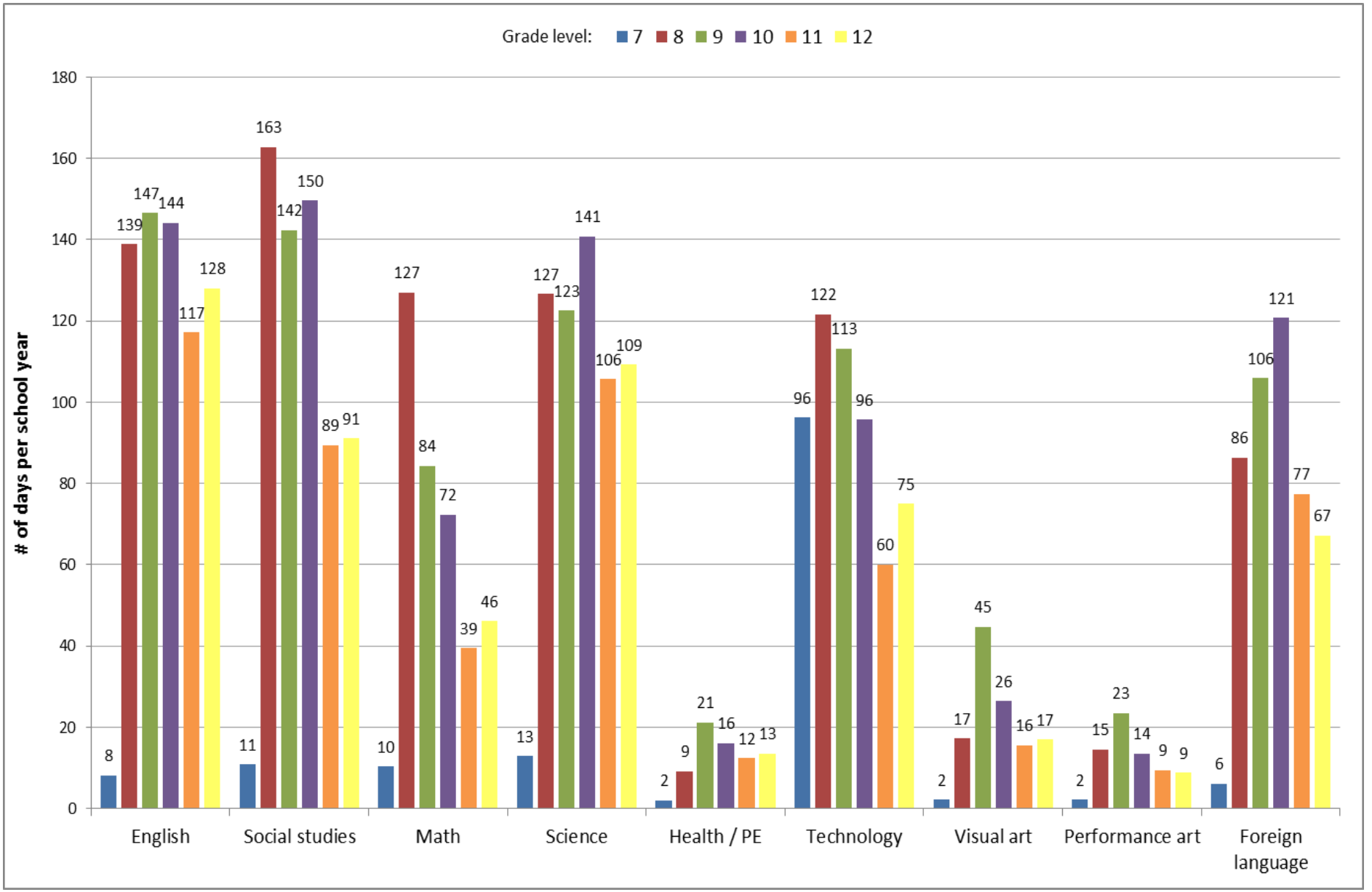


Results: Students' use of technology across grades and subject areas

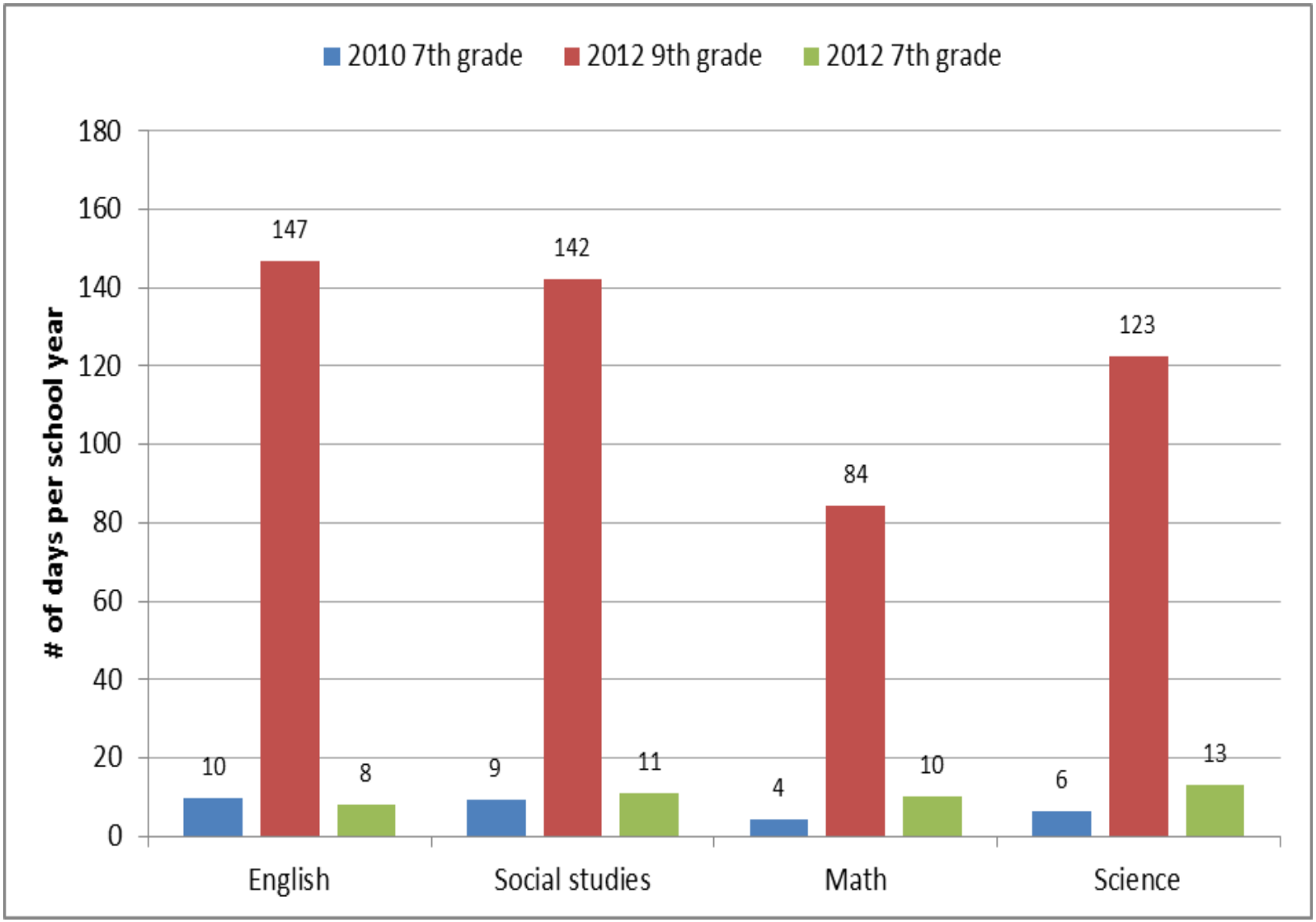
Results: Students' use of technology across grades and location (Fall 2012)



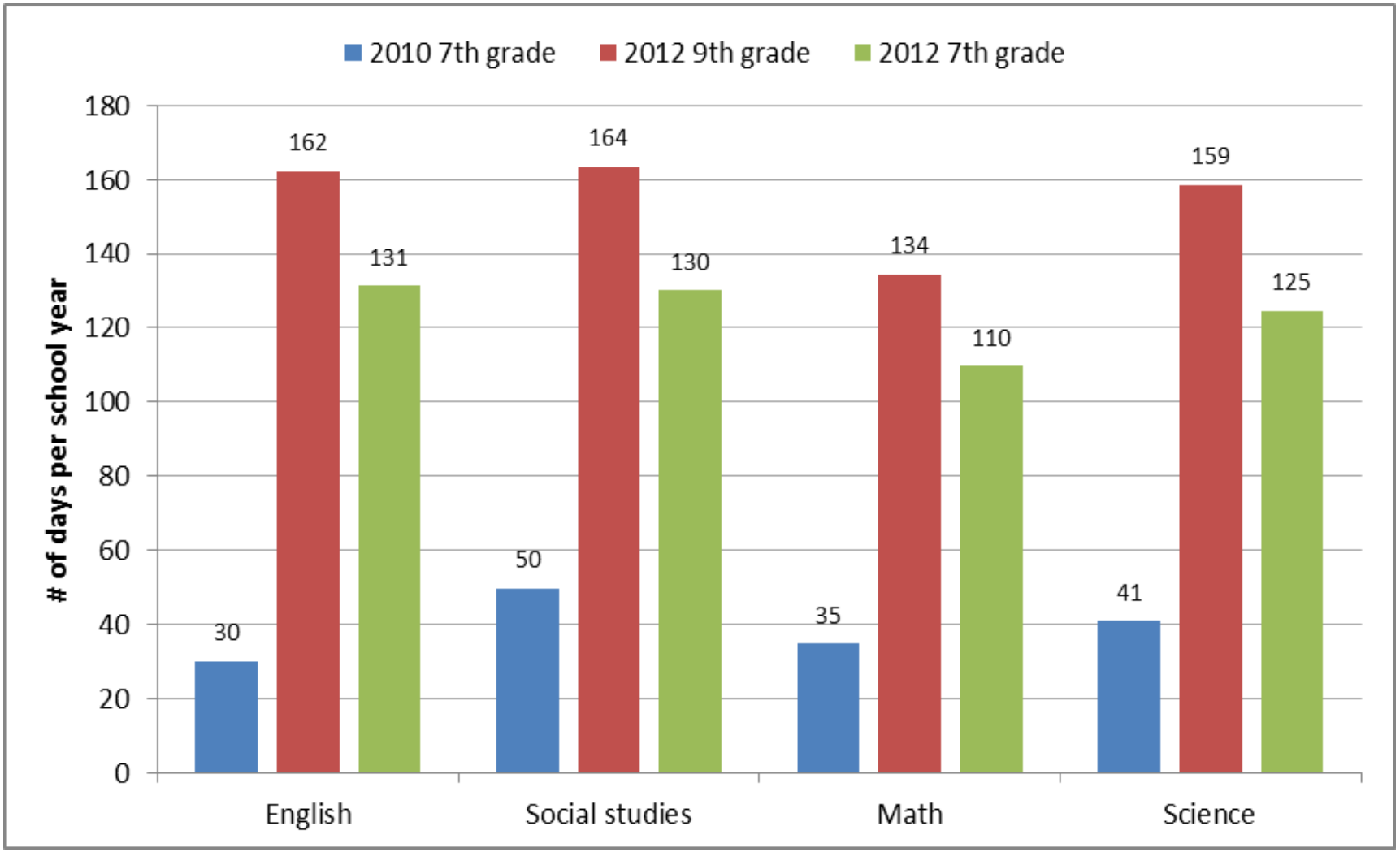
Results: Students' use of technology across grades and subject areas (Fall 2012)



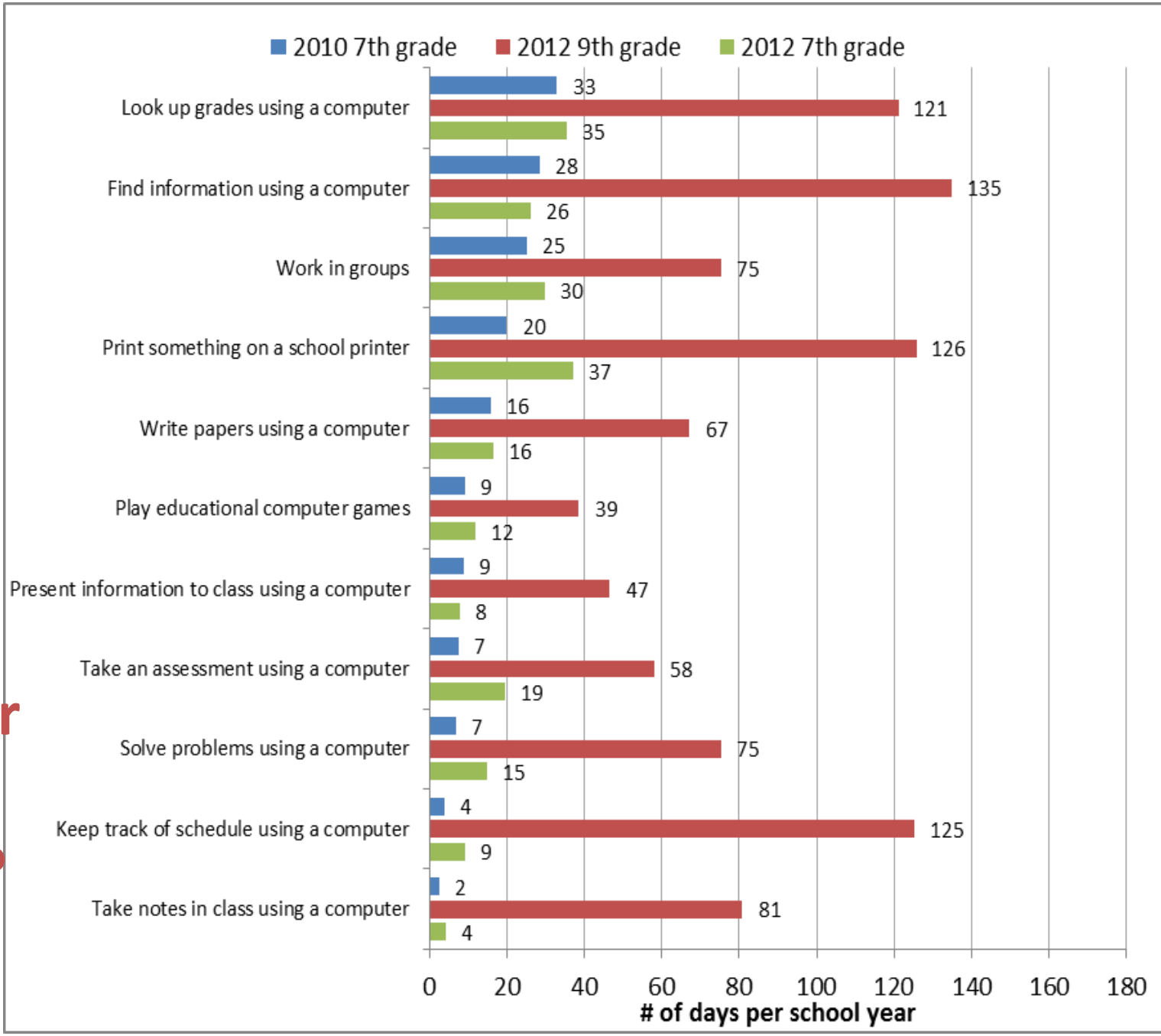
Major increase in students' frequency of technology use across core classes (2010-2012):



Major shift in students' reported teacher frequency of technology use (2010-2012):

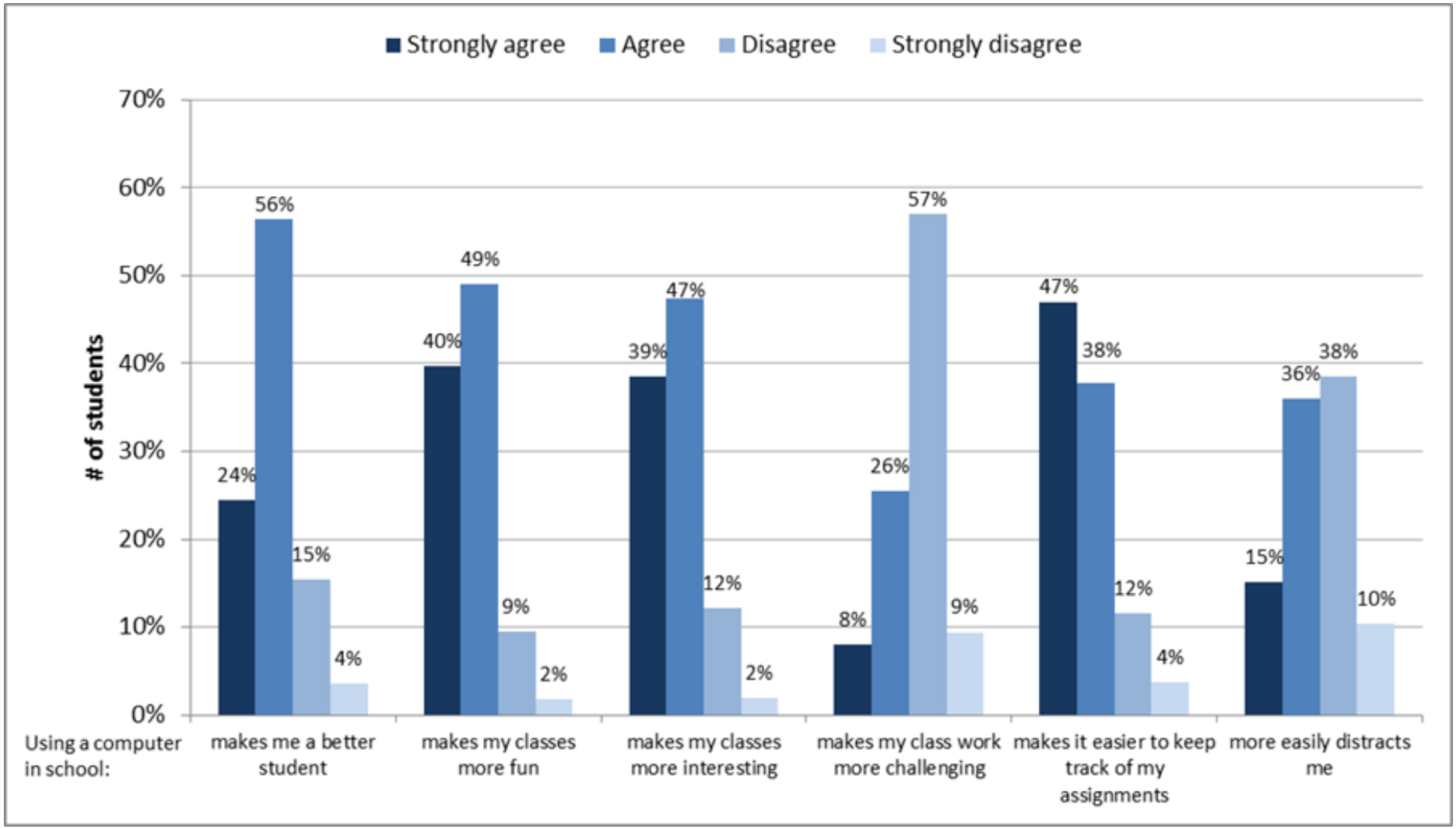


How has 1:1 access and other resources changed teaching and learning in Natick over the past two years?

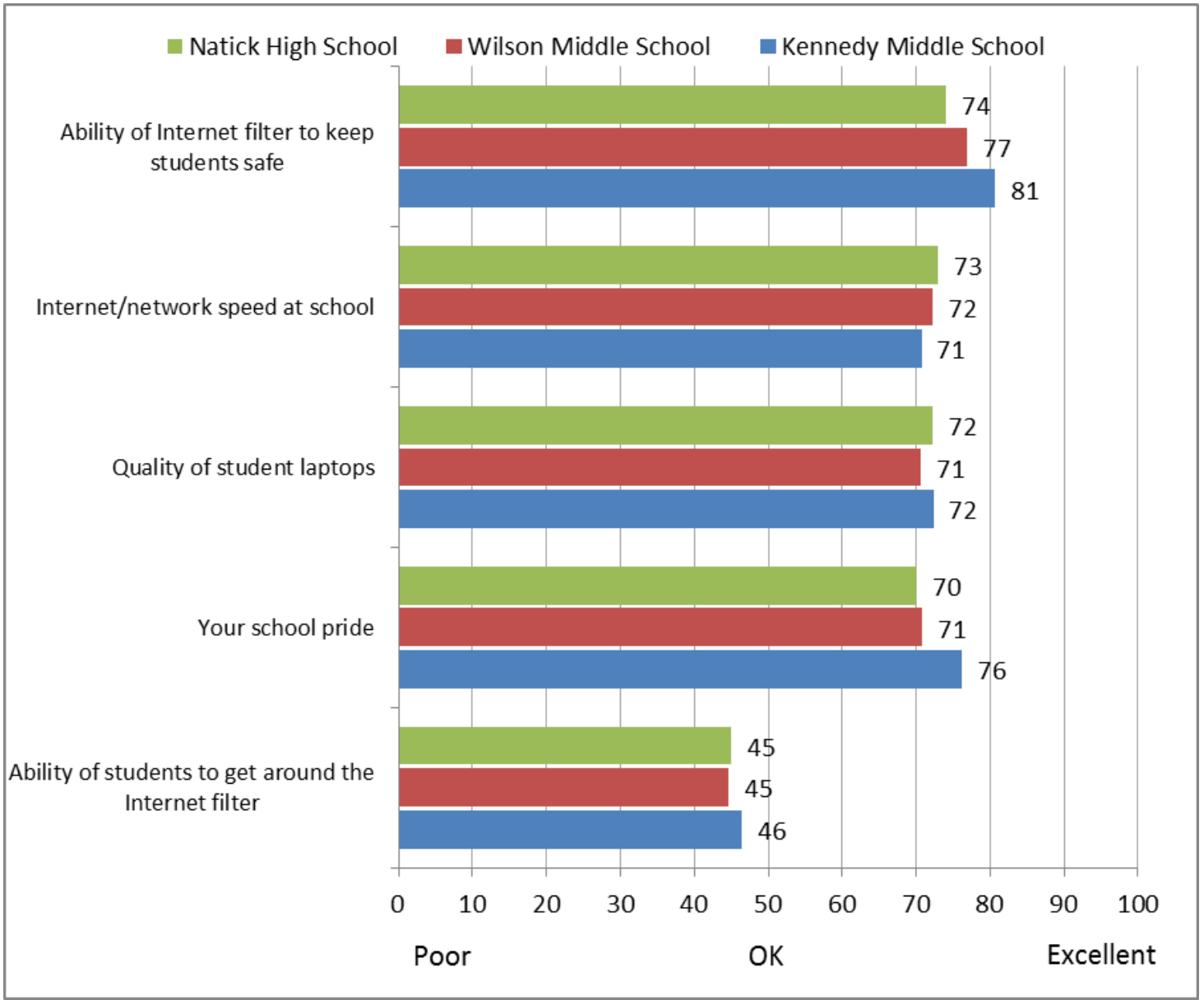


Results: Student attitudes and beliefs

Natick students report using a computer in school improves their education:



Natick students report high satisfaction with technology and NPS in general



Results: Fall 2012 teacher survey

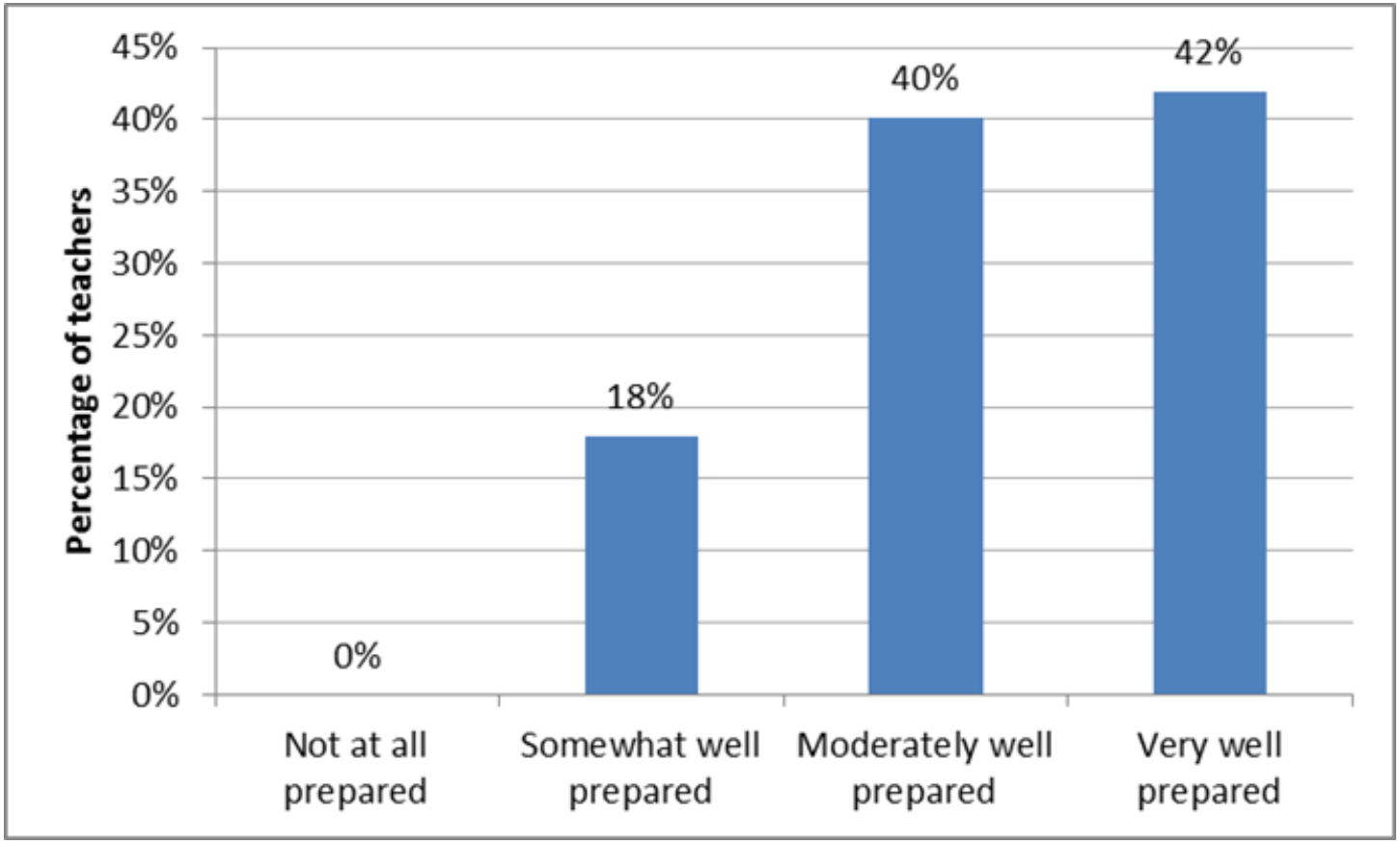
Fall 2012 teacher survey response rates

School Name	Total # of teachers	# Completed Surveys	Response rate
Kennedy Middle School	31	30	97%
Wilson Middle School	47	44	94%
Natick High School	96	92	96%
Total	**174**	**166**	**95%**

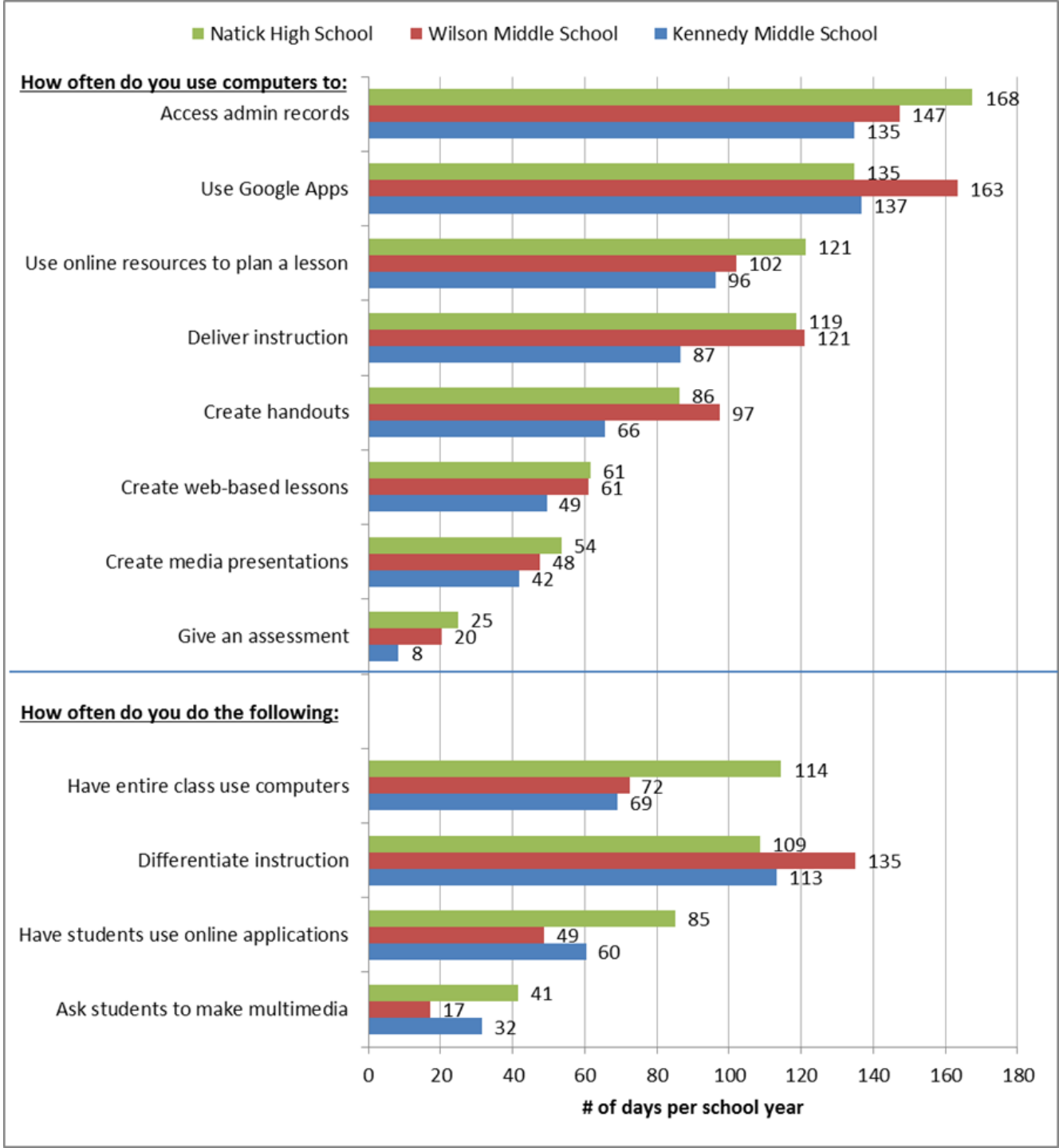
Fall 2012 teacher survey respondents

Subject	Total	Kennedy Middle School		Wilson Middle School		Natick High School	
		# of teachers	% of subject area teachers	# of teachers	% of subject area teachers	# of teachers	% of subject area teachers
English	28	4	14%	8	29%	16	57%
Arts	18	3	17%	6	33%	9	50%
Foreign language	21	3	14%	5	24%	13	62%
Math	29	4	14%	9	31%	16	55%
Health / PE	17	4	24%	4	24%	9	53%
Science	29	4	14%	8	28%	17	59%
Social studies	26	4	15%	8	31%	14	54%
Other	19	5	26%	7	37%	7	37%
Total	**169**	**30**	**18%**	**44**	**26%**	**95**	**56%**

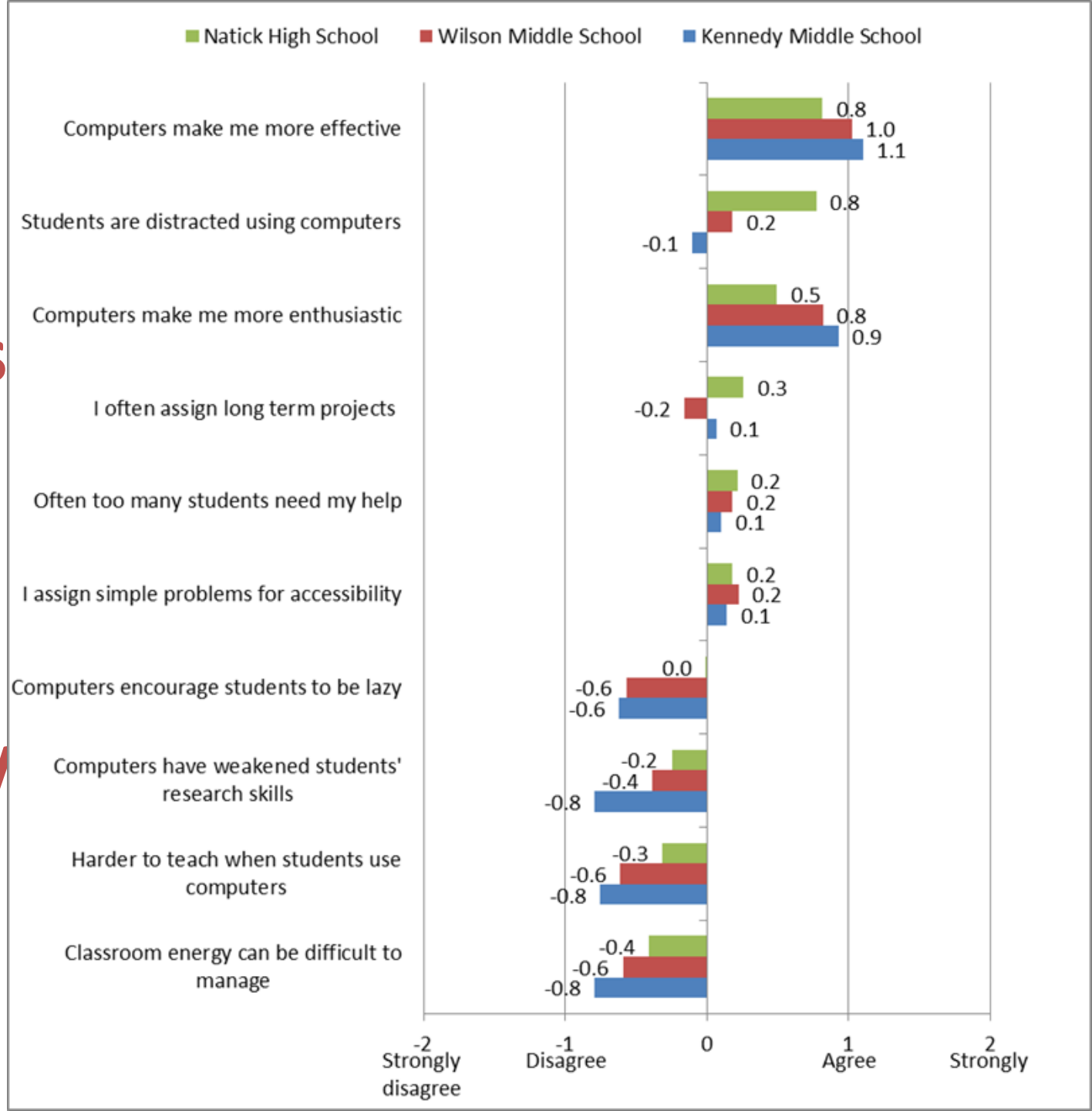
Results: teacher preparedness



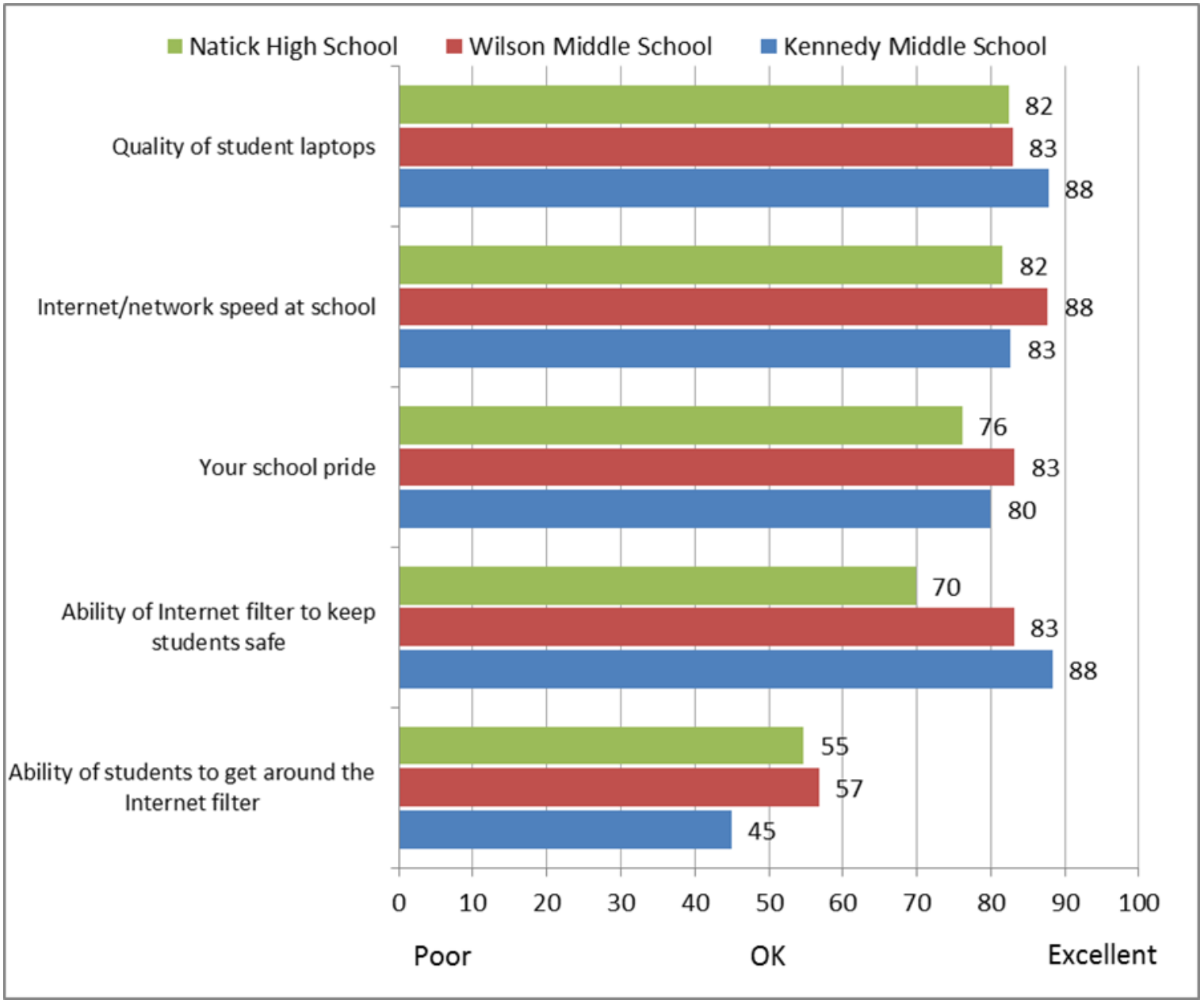
Teachers are using technology for a wide variety of purposes across Natick school settings:



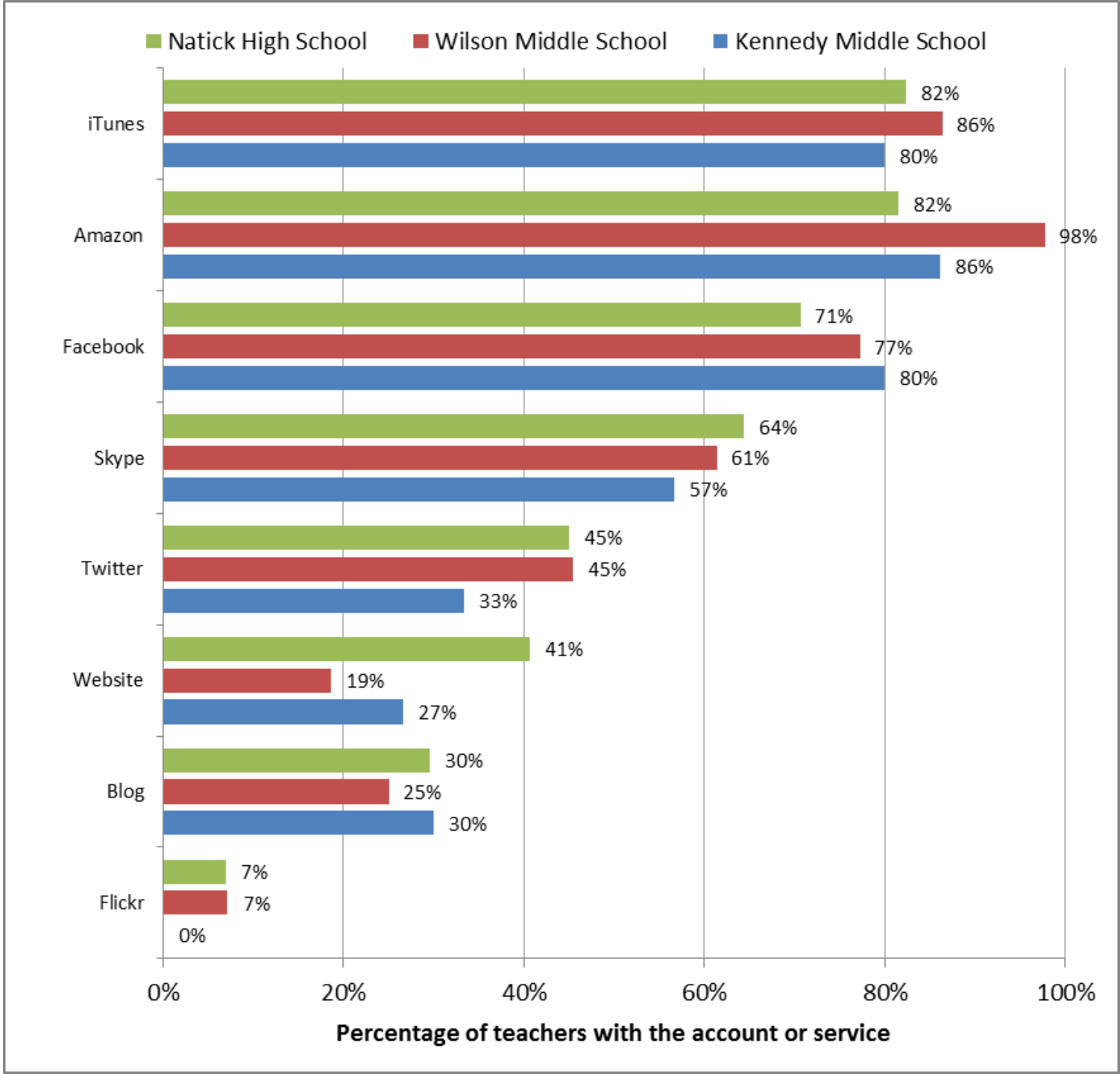
Teachers' attitudes and beliefs towards pedagogy and technology



Natick teachers report high satisfaction with technology



Results: teacher home technology access



Next Steps

- End of year survey for grades 7-12 students and teachers
- Focus groups
- NHS student video competition
- Parent permission letter for NHS test score access
  - Examine achievement trends from current and past MCAS, exploratory relationships between technology practices and achievement patterns
  - Students course history
- NHS student video competition

NHS Student Video Competition

“How have computers and technology changed the way you learn new things and/or how your teachers teach.”

NHS Student Video Competition

CSTEEP
Faculty
Time to Know Study
Natick Public Schools 21st Century Teaching and Learning Study
Natick Student Video Competition
EdX Evaluation Study

Natick Student Video Competition

SUBMISSIONS DUE: MAY 20, 2013

Natick High School

Teaching and Learning in the 21st Century

Student Video Competition

Submissions DUE: May 20, 2013

Natick Public Schools and researchers from Boston College's Lynch School of Education are pleased to announce a Spring 2013 student video competition. Through this student video competition, NHS students can create an entertaining and informative original film describing how computers and other digital tools are used for teaching and learning.

Students can work in groups of up to 4 NHS students to create a 5-minute (or less) original film that addresses:

> **"How have computers and technology changed the way you learn new things and/or how your teachers teach."**

Films should strive to be both informative and entertaining. Submissions must be no longer than 5 minutes in length and represent original student ideas and production. Because the student videos will be posted online and screened publicly, all video content must be free of copywritten materials and appropriate for all audiences.

Who is eligible?

All NHS students are eligible to voluntarily submit videos, although students in some grades and courses may participate as part of their class work. Students may work individually or in groups of up to 4 NHS students. Although more than one video can be submitted by each team or student, individual students will not be eligible to win more than one award.

What is the timeline?

All entries must be uploaded by 11:59PM on May 20, 2013. Winners will be announced on June 3, 2013.

Contact

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www.bc.edu/natick21