Dear Colleague,

Thank you for your interest in the *Educators, Technology and 21st Century Skills* report we prepared for Laureate Education's Walden University. It is attached, and we hope you find it helpful. You may also be interested in our other public research reports, which can be found at http://www.grunwald.com/reports/ and our research + consulting services, which include:

1) Strategic Counsel

We provide advisory services to clients on strategy and the competitive landscape. Our extensive learning industry background – combined with P&L experience – allows us to work directly with executive-level decision makers. And we frequently leverage our industry relationships and experience to assist clients in their business development activities. Background on our team members is at http://www.grunwald.com/about/team/index.php

2) Market Research

We bring the power of sophisticated market research tools into the consumer, education and innovation markets. And we are the only research firm that works in both the institutional school market as well as the home market for learning services. All of our market research is designed to help our clients with real world decisions including pricing, product line configuration, brand positioning, and choice of business alliance partners. We also conduct research on government investment in innovation, including a study on the effectiveness Small Business Innovation Grants (SBIR) across multiple Federal agencies for the **National Academy of Sciences/ National Research Council**. More details on our custom research can be found at http://www.grunwald.com/research/
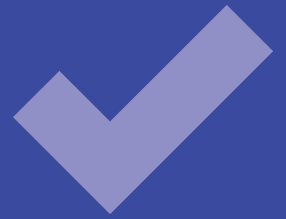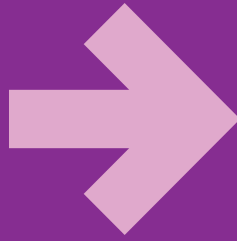
3) Public Research

We conduct high impact public studies with a broad range of corporate and association partners. Our seminal public research has explored the impact of parental participation on school technology decision-making, and defined new segments such as school district technology adopters, and Kid Influencers.. We have a special understanding of – and access to – national education opinion makers, innovation leaders and hard to reach respondents. Many of our public reports are downloadable at http://www.grunwald.com/reports/

4) Online Community

We create and manage vibrant online communities for clients such as the National Science Foundation, and the U.S. Department of Education. Examples include: http://www.linkedin.com/groups?mostPopular=&gid=1851525 and http://www.mediasciencelearning.com/CaseStudies?sort=viewed and education community managers network

Peter Grunwald
President, Grunwald Associates LLC

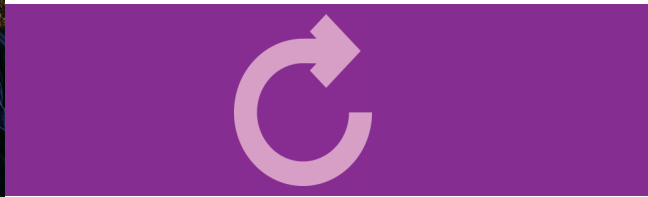## Educators, Technology and 21st Century Skills: Dispelling Five Myths

A Study on the Connection Between K–12 Technology Use and 21st Century Skills

The Richard W. Riley
College of Education and Leadership

WALDEN UNIVERSITY
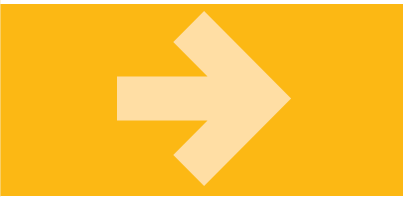
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A Message from the President and Dean

Walden University's Richard W. Riley College of Education and Leadership, named for the former Secretary of the U.S. Department of Education, focuses on helping educators become more effective and preparing them to meet the challenges and opportunities of education worldwide.

From our teacher preparation programs to our master's and doctoral degree programs, Walden University supports the needs of educators at all levels, at every phase of their careers. The college is the choice of more than 44,000 students and alumni, many of whom are working professionals who share our commitment to inspiring students and preparing them for success.

Our commitment to educating educators with high-caliber programs led us to commission this study, which aims to shed light on the debates and the intersections of technology and 21st century skills from the underexplored vantage point of school-based educators. We hoped to clarify whether classroom teachers and school administrators believe that using technology and fostering 21st century skills benefit their students. We wanted to explore the connections between technology and 21st century skills. We wanted to know whether teachers, administrators, postsecondary educators and policymakers

have compelling reasons to put greater emphasis on technology and 21st century skills as levers for improving educational effectiveness.

The findings are based on a survey of more than 1,000 U.S. educators, including 783 teachers and 274 principals or assistant principals.

We believe the findings have broad implications for classroom instruction; for teacher preparation, training and professional development programs; and for those who support classroom teachers, including administrators, policymakers and postsecondary educators. Therefore, we are pleased to share the findings, implications and recommendations with you. We look forward to an open and engaging discussion about this report.

Jonathan A. Kaplan
President
Walden University

Dr. Kate Steffens
Dean
The Richard W. Riley College
of Education and Leadership

Executive Summary

The more that K–12 teachers use technology, the more they recognize and value its strong positive effects on student learning and engagement and its connection to 21st century skills.

Across the nation today, K–12 education leaders and policymakers are deeply engaged in efforts to transform schools in ways that improve student achievement and readiness for college and careers.

Among the topics of debate are technology and 21st century skills. Observers, from educators and policymakers to parents and businesspeople, overwhelmingly agree that technology is an essential component of education. Federal and state governments and school districts have spent billions of dollars on technology equipment and Internet access for schools. Yet many schools continue to struggle to integrate technology into instructional programs. And most schools still limit or ban student access to some Web resources and technology, especially the smart, mobile devices that students increasingly prefer to use in their daily lives outside of school.

As for 21st century skills, the debate is different. Proponents of 21st century skills argue that all students today—not only a select few—need to master both core subjects and applied skills. Twenty-first century skills, which are summarized on page 7, include familiar and timeless skills for navigating life and work environments, as well as new and different kinds of skills that are particularly relevant in a competitive global economy. Critics of 21st century skills argue that teaching these skills detracts from the more important focus on developing content knowledge in core subjects.

The debates over technology and 21st century skills share common themes. Both revolve around the balance between the traditional and the new, between research-based and emerging practices, between playing it safe and choosing to try different approaches. Both debates center on results: Does integrating technology or 21st century skills (or both) distract from or enhance critical educational outcomes? Time is a sticking point in both debates as well: Is there time in instructional and professional development programs, or during the school day, to make effective use of technology or to develop 21st century skills?

> **“** In the 21st century, students must be fully engaged. This requires the use of technology tools and resources, involvement with interesting and relevant projects, and learning environments—including online environments—that are supportive and safe.
>
> ... In the 21st century, educators must be given and be prepared to use technology tools; they must be collaborators in learning—constantly seeking knowledge and acquiring new skills along with their students. **”**
>
> — **Arne Duncan, U.S. Secretary of Education**
> **March 3, 2010**

Technology and 21st century skills are intrinsically related as well, in that learning 21st century skills requires the use of technology. Information, media and technology skills themselves are one set of 21st century skills —and technology supports the learning of other 21st century skills, including critical thinking and problem solving; communication and collaboration; and creativity and innovation. Conversely, maximizing the use of technology requires applying a good number of the skills articulated by proponents of 21st century skills.

Walden University's Richard W. Riley College of Education and Leadership's nationwide survey of classroom teachers, principals and assistant principals addresses five myths:

Myth 1

Teachers who are newer to the profession and teachers who have greater access to technology are more likely to use technology frequently for instruction than other teachers. In reality, veteran teachers are just as likely as newer teachers to use technology to support learning. And lack of access to technology does *not* appear to be the main reason why teachers do not use technology.

Myth 2

Only high-achieving students benefit from using technology. In reality, both teachers and administrators believe that technology helps them engage many different types of students, including high-achieving students, students with academic needs and English language learners.

Myth 3

Given that students today are comfortable with technology, teachers' use of technology is less important to student learning. In reality, teachers' use of technology matters a great deal. Teachers who use technology frequently to support learning in their classrooms report greater benefits to student learning, engagement and skills from technology than teachers who spend less time using technology to support learning. Teachers who are frequent technology users also put more emphasis on 21st century skills—and report more pronounced effects on student learning of these skills.

Myth 4

Teachers and administrators have shared understandings about classroom technology use and 21st century skills. In reality, there are disparities between teachers' and administrators' perceptions of support for classroom technology use, as well as in their perceptions of the impact of and their emphasis on 21st century skills. Administrators believe that teachers are using technology to support learning more than teachers report that they actually do. Administrators also have somewhat stronger perceptions about the positive impact of technology use on student outcomes.

Myth 5

Teachers feel well prepared by their initial teacher preparation programs to effectively incorporate technology into classroom instruction and to foster 21st century skills. In reality,

most teachers do not believe that their pre-service programs prepared them well in either technology or 21st century skills. Teachers place more value on advanced training programs. The findings suggest that on-the-job technology training for teachers may focus on how to operate new equipment, but not on how to incorporate it effectively into instruction. Education, training, professional development and leadership support make a difference in teachers' use of technology and in their emphasis on 21st century skills.

This report is addressed to teachers, school administrators, higher education institutions and policymakers at the local, state and national levels. The report includes insights from school administrators and teachers and excerpts from extensive interviews with educational experts.

Defining Terms: "21st Century Skills"

In this survey, the term "21st century skills" refers to the set of skills identified by the Partnership for 21st Century Skills, the key national organization focused on infusing 21st century skills into education. The Partnership's Framework for 21st Century Learning proposes these 21st century student outcomes:

Core Subjects
- English, reading or language arts
- Mathematics
- Science
- History
- Geography
- Government and civics
- Economics
- World languages
- The arts

21st Century Themes
- Global awareness
- Financial, economic, business and entrepreneurial literacy
- Civic literacy
- Health literacy
- Environmental literacy

21st Century Skills
- Critical thinking and problem solving
- Communication
- Collaboration
- Creativity and innovation
- Information, media and technology skills
- Life and career skills, such as flexibility and adaptability
- Initiative and self-direction
- Social and cross-cultural skills
- Productivity and accountability
- Leadership and responsibility

Source:
Partnership for 21st Century Skills
www.21stcenturyskills.org

Introduction

There is considerable disparity in the amount of time that teachers spend using technology as an instructional tool.

While most K–12 teachers spend at least some of their class time using technology to support student learning, there is great disparity in the amount of time they spend using technology as an instructional tool, according to teachers who participated in the study.

Researchers used the following criteria to segment teachers into technology usage categories:

- **Frequent users** spend *31 percent—or more—*of their class time using technology to support learning.
- **Moderate users** spend *21 percent to 30 percent* of their class time using technology to support learning.
- **Sporadic users** spend *11 percent to 20 percent* of their class time using technology to support learning.
- **Infrequent users** spend *10 percent or less* of their class time using technology to support learning.

Figure 1 shows the breakdowns of teachers in these usage categories. About one in five teachers (22 percent) are categorized as frequent users, while 17 percent are moderate users and 26 percent are sporadic users. The largest segment of teachers (34 percent) are infrequent users.

Figure 1. **Distribution of K–12 Teachers by Frequency of Technology Use**
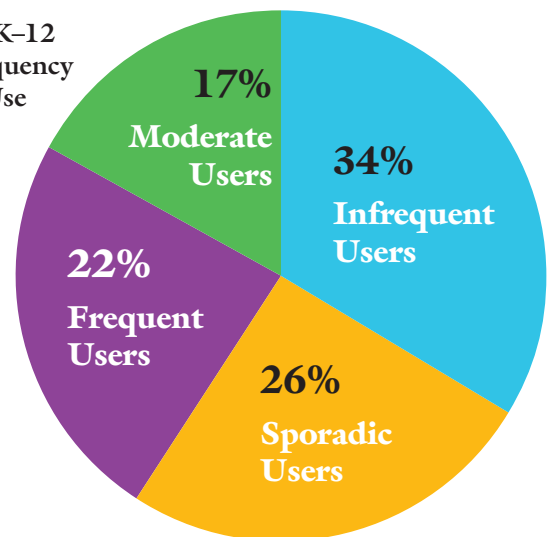
Elementary teachers are much less likely than secondary teachers to be frequent users. More than four in 10 elementary teachers (43 percent), in fact, use technology infrequently to support learning. **Figure 2** shows the frequency of technology use by school level.

Among secondary educators, social studies and English teachers demonstrate significant differences in technology use, compared to teachers overall, with social studies teachers more likely to be frequent use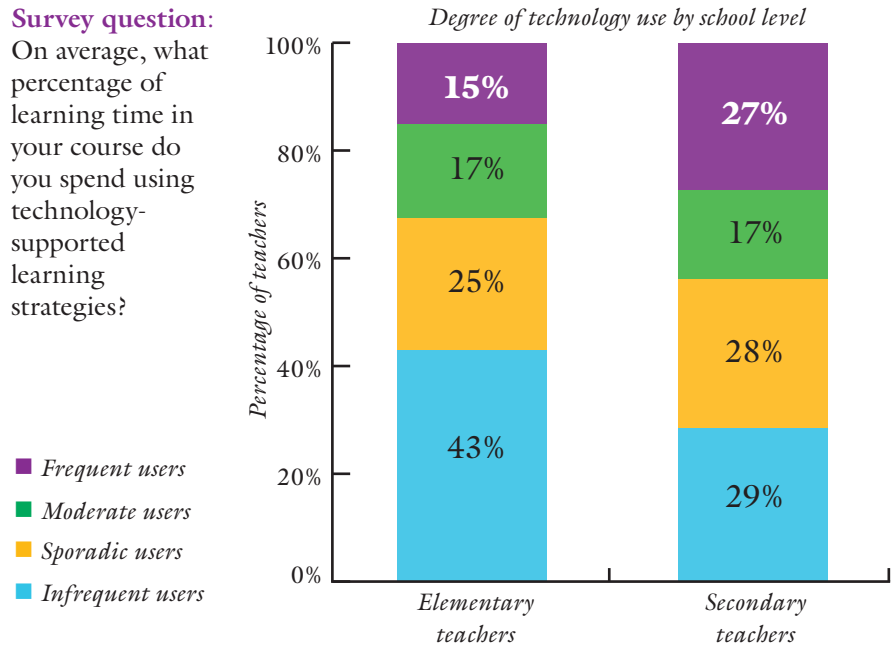rs and English teachers less likely to be frequent users, as shown in **figure 3.** Mathematics and science teachers also appear more likely than other secondary teachers to use technology frequently, but their usage drops off somewhat in the moderate user category.

Figure 2. **Elementary Teachers Use Technology Less Frequently Than Secondary Teachers**

Survey question: On average, what percentage of learning time in your course do you spend using technology-supported learning strategies?

- ■ *Frequent users*
- ■ *Moderate users*
- ■ *Sporadic users*
- ■ *Infrequent users*

Degree of technology use by school level

	Elementary teachers	Secondary teachers
Frequent users	15%	27%
Moderate users	17%	17%
Sporadic users	25%	28%
Infrequent users	43%	29%

Figure 3. **Among Secondary Teachers, Mathematics, Science and Social Studies Teachers Use Technology More Frequently**

Segmentation of teachers' technology use by subject area

	Social studies teachers	English/language arts teachers	Mathematics teachers	Science teachers	All secondary teachers
Frequent users	33%	16%	31%	33%	22%
Moderate users	23%	18%	15%	18%	17%
Sporadic users	19%	36%	25%	27%	26%
Infrequent users	25%	31%	28%	22%	34%
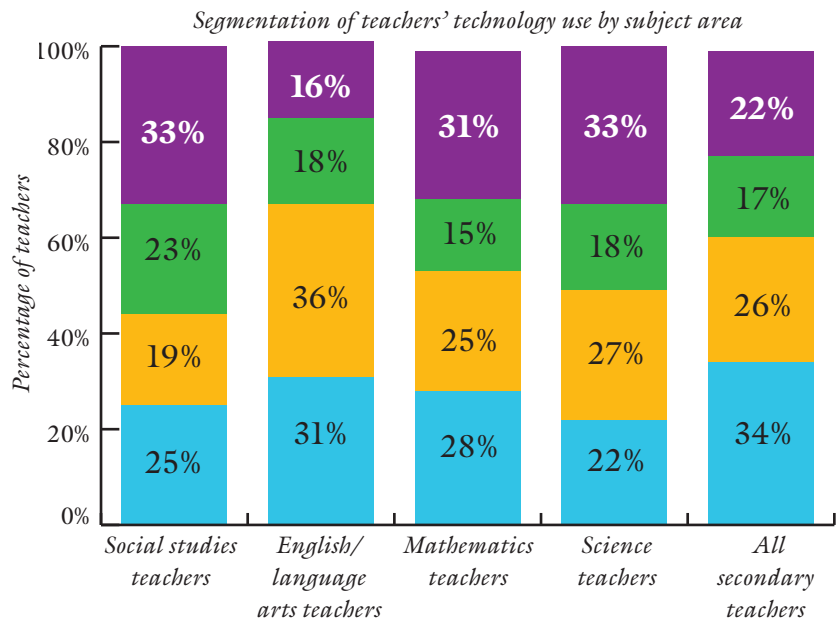
Dispelling the Myths

The key message of the survey findings is that teachers' technology habits make a difference in their perceptions of student outcomes.

Myth 1

Teachers who are newer to the profession and teachers who have greater access to technology are more likely to use technology frequently for instruction than other teachers.
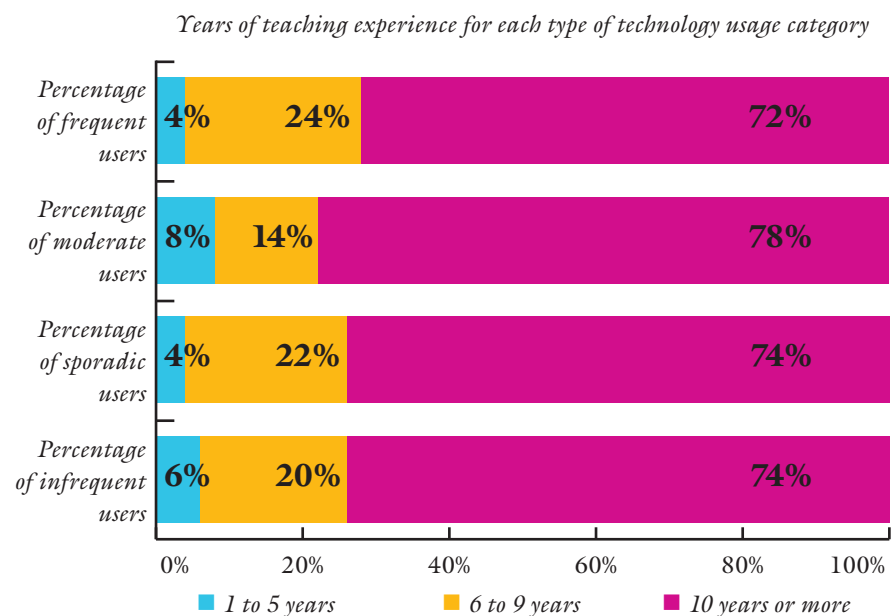
In reality, the survey results cast doubt on stereotypes about the groups of teachers who are power users of technology—and those who aren't. Anyone who believes, for example, that technology use is the exclusive purview of newer teachers might want to reconsider.

Teachers' years of experience—and, presumably, their ages—seem to make little difference in their frequency of technology use to support learning, as shown in **figure 4.** The distribution of teachers, segmented by their years of experience and frequency of technology use, is similar. Newer teachers might very well use technology more in their personal lives, but when it comes to frequency of technology use in classrooms, they don't seem to have any edge over veteran teachers.

Lack of access to technology, meanwhile, appears *not* to

Figure 4. **Frequency of Technology Use Does Not Differ Significantly From Entry-Level to More Experienced Teachers**

Years of teaching experience for each type of technology usage category

Category	1 to 5 years	6 to 9 years	10 years or more
Percentage of frequent users	4%	24%	72%
Percentage of moderate users	8%	14%	78%
Percentage of sporadic users	4%	22%	74%
Percentage of infrequent users	6%	20%	74%

be the main reason why teachers do not use technology. The survey results indicate that simply providing teachers with access to technology is no guarantee they will use it.

Overwhelmingly, teachers who use technology infrequently, if at all, instead say that technology is not necessary for their lessons. When asked why they do not use specific technologies, almost half (49 percent) of teachers say that the device in question is not necessary for their lessons,
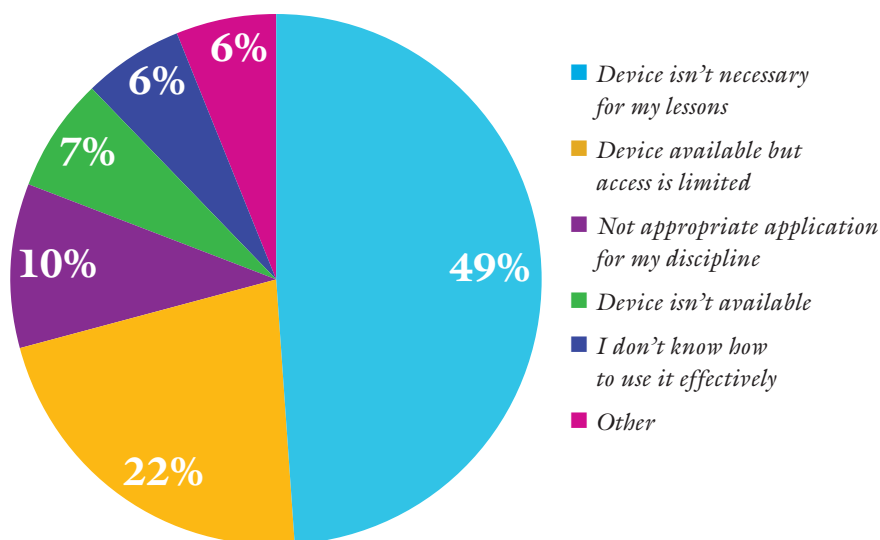
as shown in **figure 5**. This compares to 22 percent of teachers who say that the device is available but access is limited, 10 percent who say the device is not appropriate for their discipline, 7 percent who say the device isn't available, 6 percent who say they do not know how to use the device effectively and 6 percent who cite other reasons.

Teachers do not have access to every type of technological device—but lack of access is not the primary reason that teachers

cite for not using them. Many teachers, in fact, have access to many types of common and emerging educational technologies, including LCD projectors, laptop computers and interactive whiteboards; DVD or VCR players; digital cameras and digital video cameras; and smart, mobile devices, such as iPods.

As expected, teachers who are frequent technology users spend more time using technology not only for administrative tasks, but also for educational

Figure 5. **Reasons Teachers Say They Don't Use Specific Technology Devices**

Legend:
- Device isn't necessary for my lessons — 49%
- Device available but access is limited — 22%
- Not appropriate application for my discipline — 10%
- Device isn't available — 7%
- I don't know how to use it effectively — 6%
- Other — 6%

Survey question: For each technology device that you use less than once a week, please indicate the primary reason why you don't use it more often.

purposes. Frequent technology users and their students spend more time using technology devices to access:

- Productivity and subject-specific software
- State, district or school intranet portals
- Web sites for information on specific subjects, educator resources and other educational information

Educator Insights

Survey question: What do you wish you could learn regarding the use of technology in your classroom?

- "I am well versed in the use of technology in the classroom. I wish I had more time to develop specific lessons and to work with my students on special projects like the use of digital cameras."
- "How to more effectively incorporate blogs into my discipline with student participation."
- "I want to learn more computer graphics skills so that I can teach my students for future careers in the arts."
- "How to better utilize multimedia tools like video editing software, podcasting, online video and how to best incorporate them into the classroom."
- "How to more effectively develop projects that start in the classroom and then branch out to the technology."
- "I don't know so many things related to the computer that it would be nice to have a compiled list of what I could do on a computer relevant to my subject area."
- "Using student response systems."
- "More about creating a Web site that can be used by students and staff."

Myth 2

Only high-achieving students benefit from using technology.

In reality, both teachers and administrators believe that using technology helps them engage many different types of students. This perception holds true for high-achieving students, English language learners and students with academic needs, among others, as shown in **figure 6**. Frequent technology users believe that technology helps them engage these specific groups of students in learning to a much greater degree than infrequent users do.

Administrators have similar views on technology's effect on student engagement for these student populations.

Survey question:
What is technology's effect on student engagement for the high-achieving student, the student with academic needs, the English language learner and the student with emotional or behavioral issues on a scale of 1 to 5, where 1 is "no effect" and 5 is "significant effect."

Figure 6. **Teachers Believe Technology Helps Them Engage Many Different Types of Students**
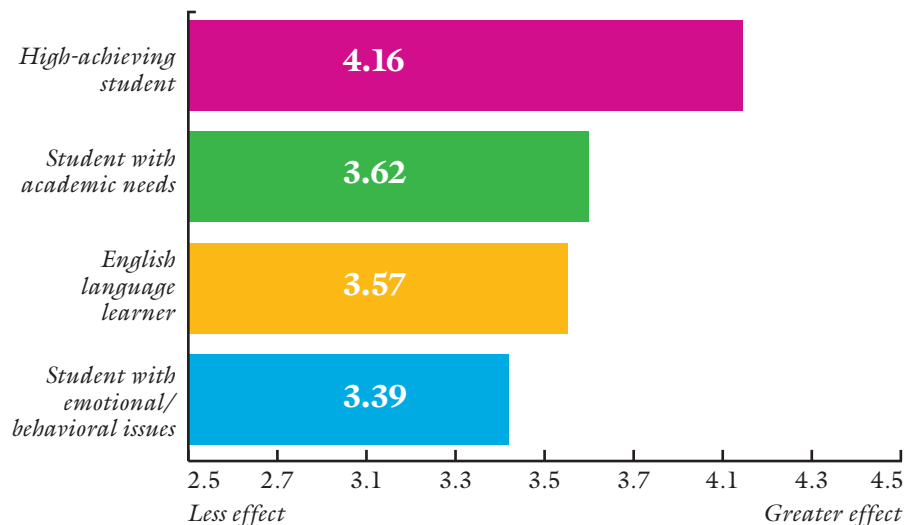
Note: These results are mean scores of all teacher responses. The mean teacher response for these selected types of students is approximately 3.69.

Myth 3

Given that students today are comfortable with technology, teachers' use of technology is less important to student learning.

In reality, teachers' use of technology matters a great deal. Teachers who are frequent technology users report greater benefits to student learning, engagement and skills from the use of that technology than teachers who spend less time using technology to support learning. Frequent technology users place considerably more emphasis on developing students' 21st century skills—specifically, skills in accountability, collaboration, communication, creativity, critical thinking, ethics, global awareness, innovation, leadership, problem solving, productivity and self-direction. Frequent users also have more positive perceptions about technology's effects on student learning of these skills—and on student behaviors associated with these skills.

Expert Voices

" Is the tech coordinator for the district getting up and saying, 'I've got a way that you can do your lectures in a much more interesting fashion, we're going to learn all about PowerPoint,' or is the tech coordinator getting up and saying, 'Kids will be much more excited if they're helping you construct what they're learning, and so we're going to learn about wikis.' Because people—whether or not they're fans of 21st century skills—will typically agree that 21st century skills cannot be taught through presentational means, they have to be taught through active learning. And so if, at any level, if you're going to advocate for 21st century skills, you basically have to advocate for a shift in typical pedagogy along with that. **"**

—Chris Dede
Timothy E. Wirth Professor in Learning Technologies,
Technology, Innovation, and Education
Harvard Graduate School of Education

Figures 7 and 8 show the relationship between infrequent users' emphasis on 21st century skills and their perceptions of the effect of student use of technology on these skills, and the same relationship for frequent users.

The difference between infrequent and frequent technology users' emphasis on and perceived benefits of 21st century skills raises interesting questions. Which comes first?

Do teachers use technology frequently because they are trying deliberately to foster 21st century skills? Or are 21st century skills necessary conditions, byproducts or logical outcomes of frequent technology use? It is not possible to determine causation from the survey results, but it is clear that frequent technology use is associated with greater emphasis on and perceived benefits of 21st century skills.

At the secondary level, frequent technology users also see a much bigger impact than infrequent users do on student behaviors associated with 21st century skills, as shown in **figure 9** on page 18.

Many of these behaviors—including coming to class, participating in class, staying focused on task, taking initiative, and managing time to meet goals—are associated with meeting other

Figure 7.
Infrequent Technology Users Do Emphasize 21st Century Skills …

Infrequent technology users' reported level of emphasis on 21st century skills and their perceptions of technology's effect on these skills

Effect of student use of technology on skill

4.5
4.3
4.1 — Critical thinking ● Productivity ● Communication ●
Global awareness ● ● Innovation ● Self- direction ● Problem solving ●
3.9 — Collaboration ● Creativity ●
3.7 — Leadership ● Accountability ●
3.5
3.3 — Ethics ●
3.1

3.1 3.3 3.5 3.7 3.9 4.1 4.3 4.5
Neutral   *Strong*
Level of emphasis placed on skill in classroom
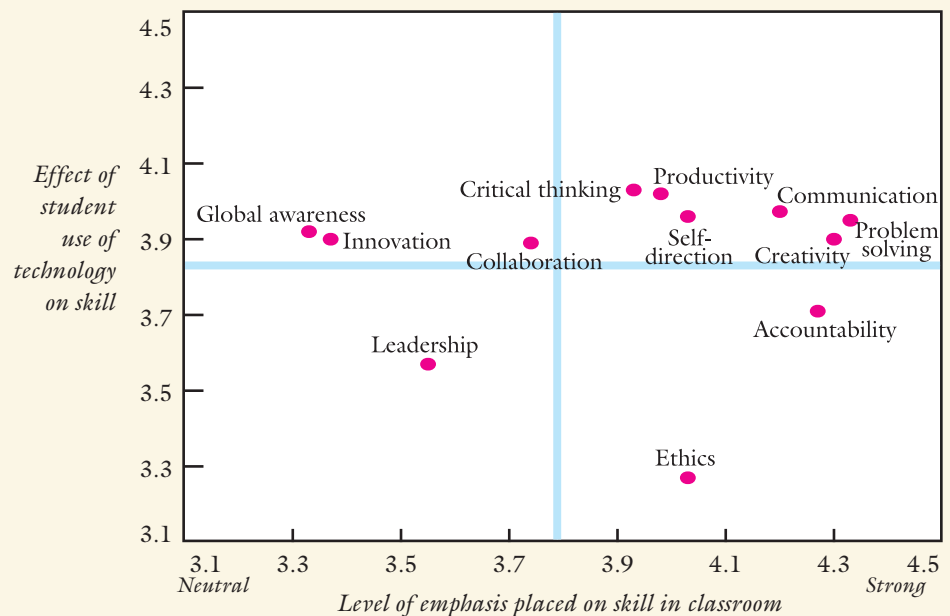
critical educational challenges. For example, these behaviors may contribute to improving student achievement, keeping students in school, reducing dropout rates and reaching high-needs students, which are priority goals in federal initiatives such as Race to the Top and the reauthorization of the Elementary and Secondary Education Act. These behaviors also are indicators of student engagement and motivation.

Teachers did not find as much improvement in other student behaviors they were asked about, including:
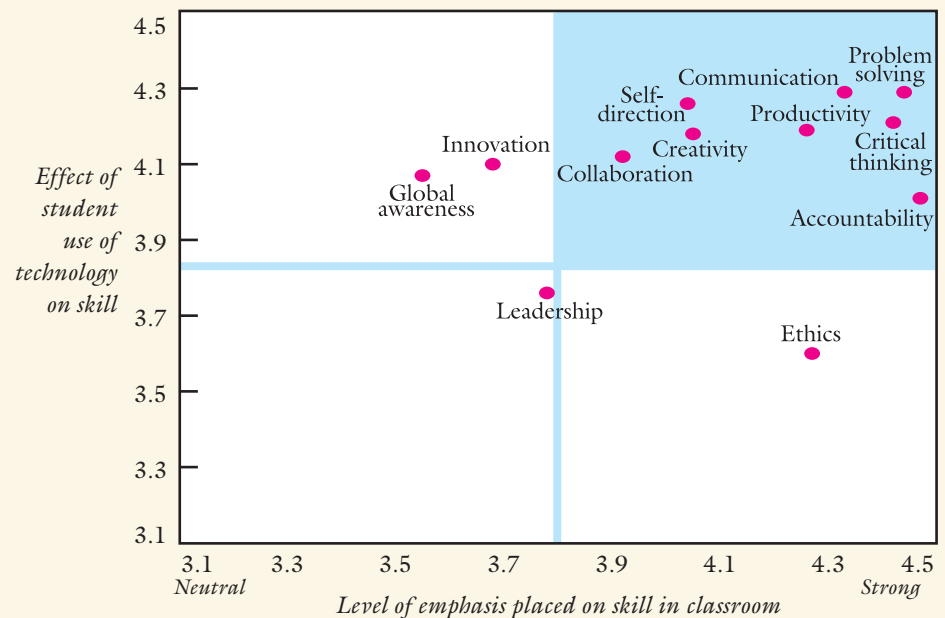
- Completing homework thoroughly
- Being open to diverse perspectives
- Understanding the global issues and implications for their work
- Analyzing information
- Communicating thoughts effectively in written form
- Communicating thoughts effectively in visual form
- Taking a leadership role in activities or assignments

Administrators, on the other hand, do believe that technology has a strong positive effect on some of these behaviors, as discussed in Myth 4 on page 20.

Note for figures 7 and 8: For communication and ethics, the significant difference between frequent and infrequent users' emphasis in the classroom is at the 90% confidence level, rather than the 95% confidence level for other findings in this survey. For self-direction and collaboration, there is no significant difference between frequent and infrequent users' emphasis in the classroom. However, differences in the perceived impact of technology's effects on students for all these skills is significant between frequent and infrequent users.

Figure 8.
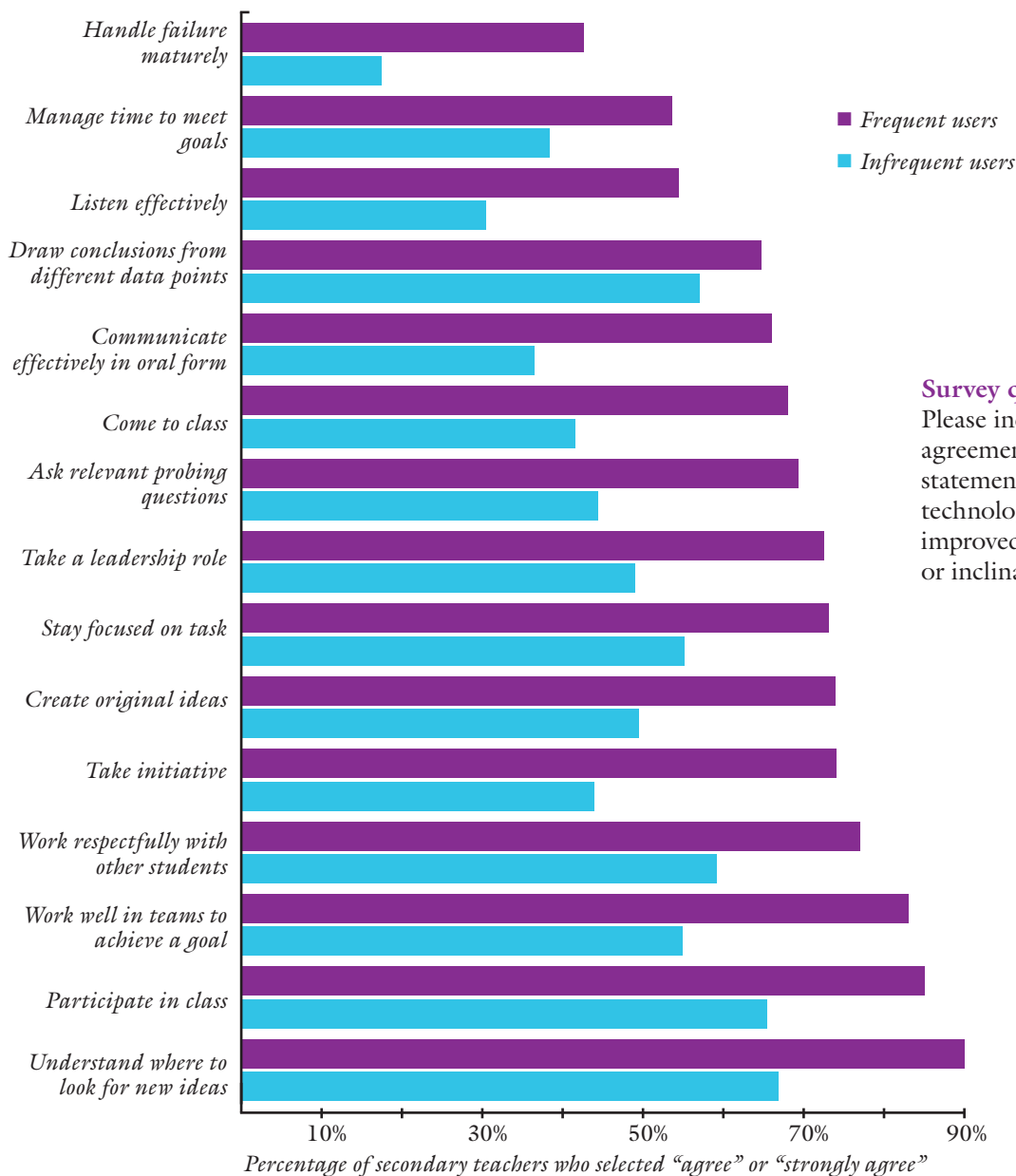**… But Frequent Technology Users Put More Emphasis on 21st Century Skills and See More Impact on Student Learning**

Frequent technology users' reported level of emphasis on 21st century skills and their perceptions of technology's effect on these skills

Figure 9. Frequent Technology Users See More Impact on Behaviors Associated With 21st Century Skills Than Infrequent Users Do

■ Frequent users
■ Infrequent users

Handle failure maturely
Manage time to meet goals
Listen effectively
Draw conclusions from different data points
Communicate effectively in oral form
Come to class
Ask relevant probing questions
Take a leadership role
Stay focused on task
Create original ideas
Take initiative
Work respectfully with other students
Work well in teams to achieve a goal
Participate in class
Understand where to look for new ideas

10%   30%   50%   70%   90%

Percentage of secondary teachers who selected "agree" or "strongly agree"

Survey question:
Please indicate your level of agreement with the following statements: Incorporation of technology in the classroom has improved our students' ability or inclination to …

Awareness of "21st Century Skills"
A Matter of Semantics, Technology Use and Leadership

Teachers' awareness and understanding of the concept of "21st century skills" varies widely, but the kinds of skills that comprise this term do resonate strongly with teachers—especially those who use technology frequently.

Relatively small percentages of teachers say that they are very familiar with the term and could provide a list of skills commonly associated with it. However, when asked about specific skills that are encapsulated in "21st century skills"—such as critical thinking and problem solving; communication; collaboration; and creativity and innovation—teachers know what these skills are and believe these skills are emphasized to at least some degree in their classrooms, as shown in **figures 7 and 8.**
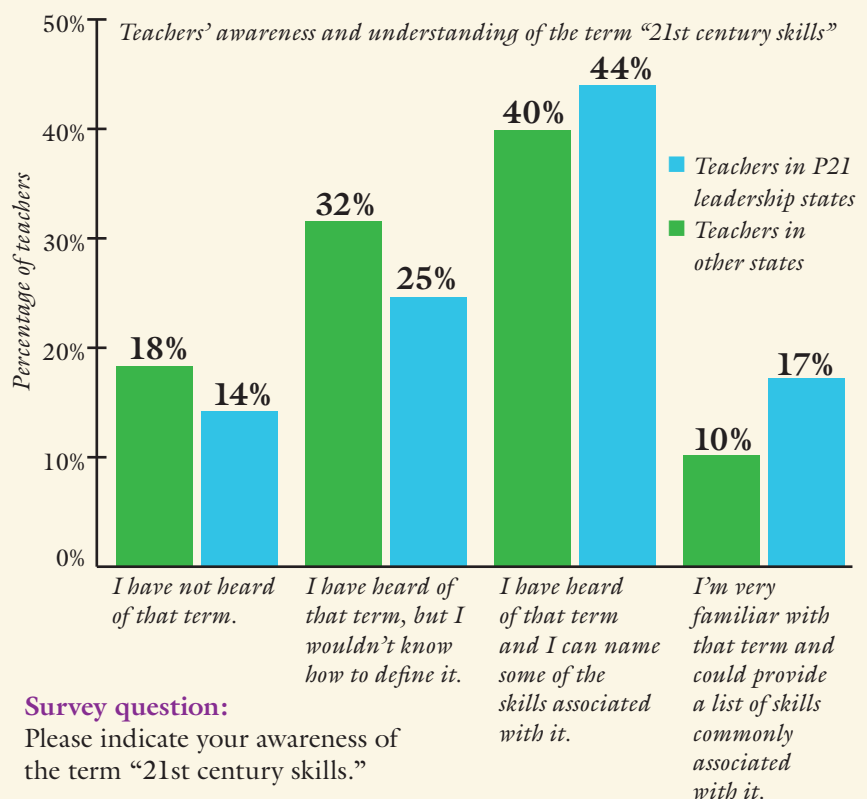
In the states that have formally committed to the Partnership for 21st Century Skills (P21) State Leadership Initiative, teachers appear to be more aware of the term "21st century skills" and more familiar with what these skills are, as shown in **figure 10.**

In the 14 states that had become leadership states by the spring of 2010, both the governor and the chief state school officer had committed to integrating 21st century skills into standards, assessments and professional development. While states are in different stages of this work, the leading states seem to be communicating the message to teachers that change is on the way.

Figure 10. Teachers in Partnership States Are More Familiar With the Term "21st Century Skills"

Teachers' awareness and understanding of the term "21st century skills"

Legend:
- Teachers in P21 leadership states (blue)
- Teachers in other states (green)

Data:
- *I have not heard of that term.* — 18% (other states), 14% (P21)
- *I have heard of that term, but I wouldn't know how to define it.* — 32% (other states), 25% (P21)
- *I have heard of that term and I can name some of the skills associated with it.* — 40% (other states), 44% (P21)
- *I'm very familiar with that term and could provide a list of skills commonly associated with it.* — 10% (other states), 17% (P21)

Y-axis: Percentage of teachers

Survey question:
Please indicate your awareness of the term "21st century skills."

Myth 4

Teachers and administrators have shared understandings about classroom technology use and 21st century skills.

In reality, there are disparities between teachers' and administrators' perceptions of support for classroom technology use, as well as their perceptions of the impact of and their emphasis on 21st century skills.
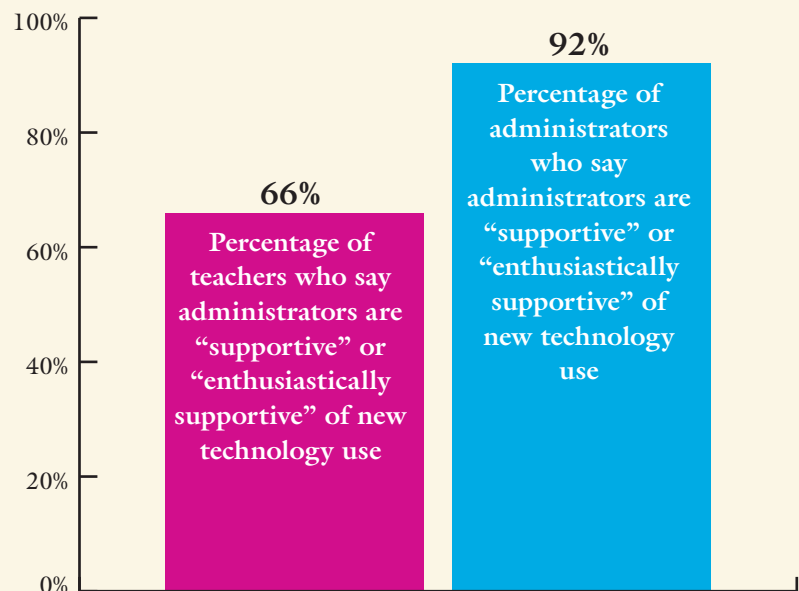
Administrators—principals and assistant principals—say they are strong proponents of classroom technology use. They believe that they encourage classroom technology use and make it a top priority. In fact, they believe that they and their fellow administrators are more supportive of new technology use than teachers perceive them to be, as shown in **figure 11.**

There is also a disconnect between administrators' and teachers' views of support for new technology use among teachers. Administrators believe that teachers are more supportive of new technology use than teachers report is the case among the teaching staff in their schools, as shown in **figure 12.**

Administrators also have different views on why teachers do not use technology. While

Figure 11. **Teachers' and Administrators' Views of *Administrators' Support for Technology Use***

Support for Classroom Technology Use:
Teachers, Administrators Don't See Eye to Eye

66%
Percentage of teachers who say administrators are "supportive" or "enthusiastically supportive" of new technology use

92%
Percentage of administrators who say administrators are "supportive" or "enthusiastically supportive" of new technology use

49 percent of teachers say that the main reason they do not use technology devices is that they are not necessary for their lessons (as shown in **figure 5**), only 27 percent of administrators cite this as the main reason. Instead, 28 percent of administrators attribute limited use of technology to limited access, compared to 22 percent of teachers, and 14 percent of administrators say the device in question is unavailable, compared to 7 percent of teachers.
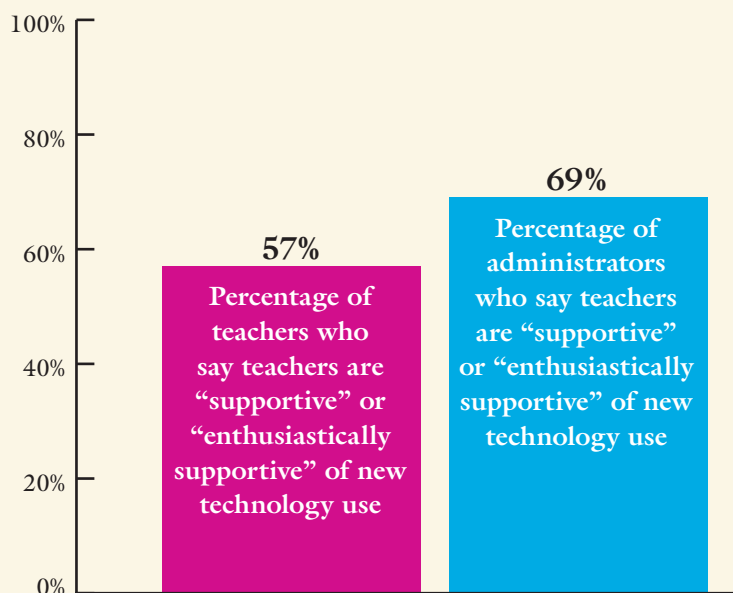
These discrepancies suggest that administrators have a rosier view of technology use in classrooms than the reality that teachers' reported perceptions and use indicates.

Administrators have somewhat stronger perceptions than teachers of the positive effects of technology on student behaviors associated with 21st century skills and engagement in learning. Administrators also perceive the impact of different sets of skills differently than teachers do. For example, administrators have stronger perceptions of the positive effects for students of several skills:

- Communicating thoughts effectively in visual form
- Analyzing information
- Being open to diverse perspectives
- Communicating thoughts effectively in written form
- Understanding the global issues and implications for their work

Figure 12. **Teachers' and Administrators' Views of *Teachers'* Support for Technology Use**

57% Percentage of teachers who say teachers are "supportive" or "enthusiastically supportive" of new technology use

69% Percentage of administrators who say teachers are "supportive" or "enthusiastically supportive" of new technology use

Survey question for figures 11 and 12: How would you rank the general attitude of staff in your school toward new technology use in the classroom?

Administrators, on the whole, seem to be more aware than teachers of the term "21st century skills." In fact, 22 percent of administrators say that they are actively encouraging their teachers to use 21st century skills in their classrooms, 15 percent say that they are very familiar with the term and can provide a list of skills associated with it, and 33 percent say that they are aware of the term and can name some of the skills associated with it.

Administrators also are more likely to believe that teachers in their schools understand and emphasize 21st century skills than many teachers report is the case. Teachers who are infrequent technology users do not place as much emphasis on 21st century skills as frequent users do, as shown in **figures 7 and 8**.

Figure 13 shows that the majority of administrators (59 percent) believe that their schools strongly or very strongly emphasize 21st century skills.

Figure 13. **Most Administrators Believe Their Schools Emphasize 21st Century Skills**

Administrators' perceptions of their school's emphasis of 21st century skills
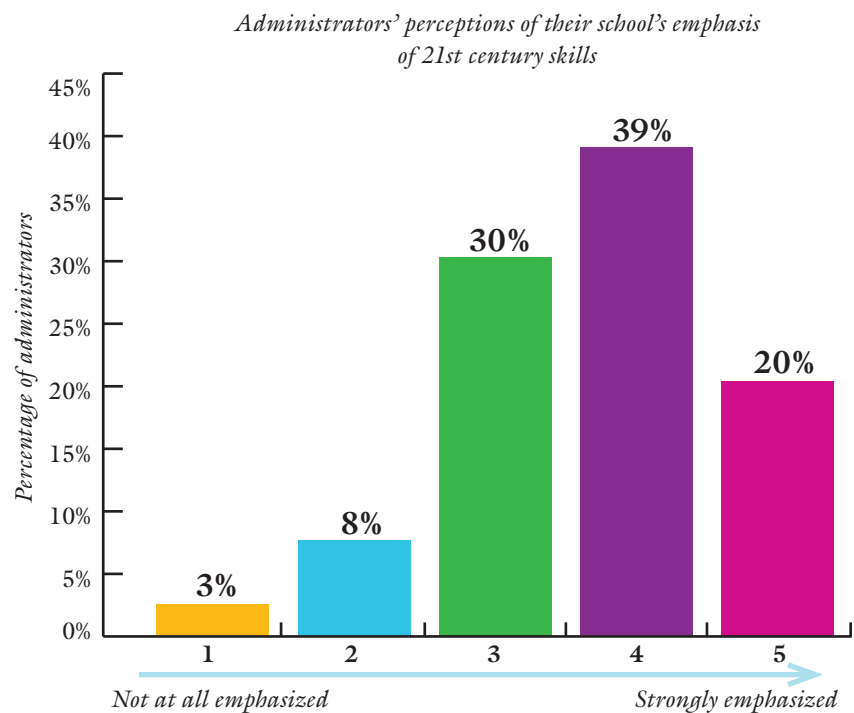
Survey question: Please indicate how much 21st century skills are emphasized in your school on a scale of 1 to 5, where 1 is "not at all emphasized" and 5 is "strongly emphasized."

Myth 5

Teachers feel well prepared by their initial teacher preparation programs to effectively incorporate technology into classroom instruction and to foster 21st century skills.

In reality, teachers who have completed their initial certification or licensure since 2000 do not believe that their pre-service programs taught them how to teach 21st century skills or how to effectively incorporate technology into instruction, as shown in **figure 14.** (Initial certification programs include bachelor's, master's, doctoral, post-baccalaureate and educational specialist degrees; alternative route programs such as Teach for America, Troops to Teachers and teaching fellows; and certificates of advanced studies or certificates of advanced graduate studies.)

Advanced training and certification programs do a better job, teachers believe. Most teachers who completed advanced training or certification programs since 2000 report that their training did equip them with relevant educational experiences, as
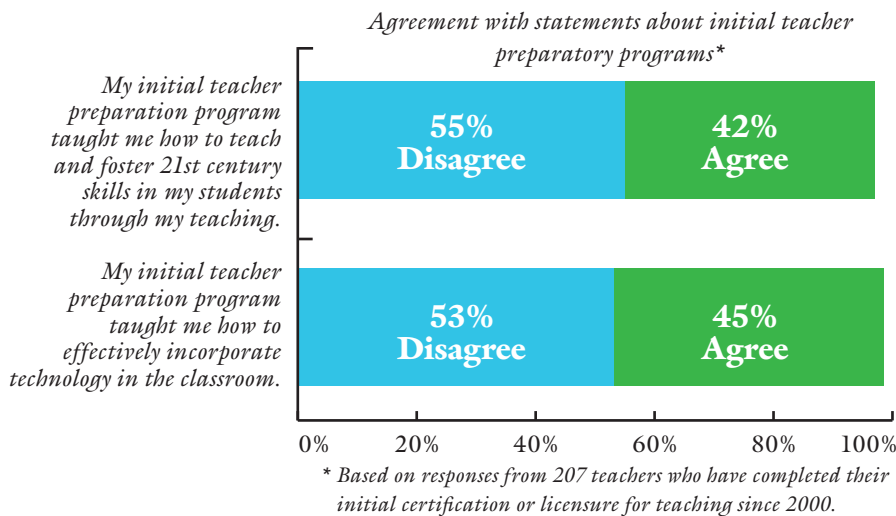
Expert Voices

❝ What kind of an atmosphere do teachers work in? Is there a culture of learning for both the kids and the adults, is there a culture of collaboration, is there a culture of discussion and reflection and looking at student work? If that culture exists, in my experience, you're going to have a higher rate of people using technology successfully than if you're expecting teachers to go to a training, [then] go back to their classroom and business as usual. 'You've learned how to run an application, so now you just put it in your classroom.' Do you see the difference? … The other piece is, what is the philosophical position of the leadership in the building? What kind of technical philosophy is in the building? Are there actually people there to mentor and help the teachers learn things, are there integrators that help them learn how to use various technologies inside particular content areas? ❞

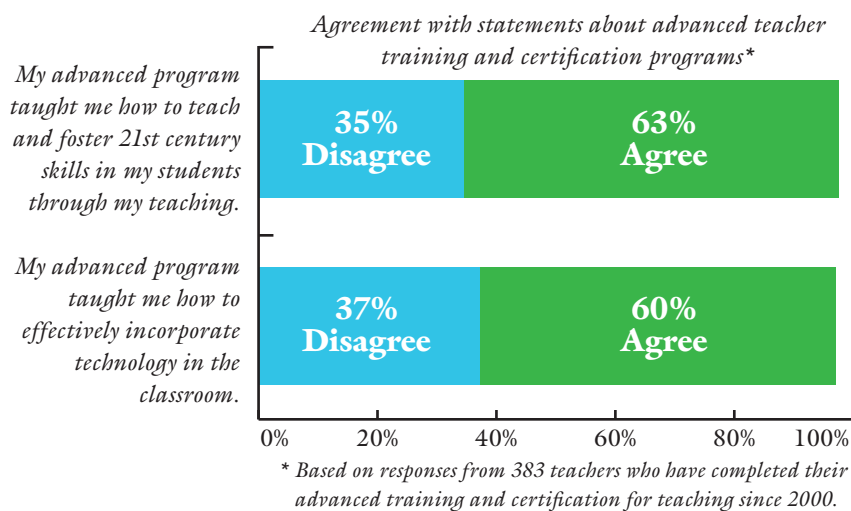—Director of a state learning technology initiative

Figure 14. Most Newer Teachers Aren't So Sure They're Prepared by Pre-Service Programs

Agreement with statements about initial teacher preparatory programs*

My initial teacher preparation program taught me how to teach and foster 21st century skills in my students through my teaching.

| 55% Disagree | 42% Agree |

My initial teacher preparation program taught me how to effectively incorporate technology in the classroom.

| 53% Disagree | 45% Agree |

0%   20%   40%   60%   80%   100%

Based on responses from 207 teachers who have completed their initial certification or licensure for teaching since 2000.

Survey question: Please indicate your agreement with the following statements on your initial teacher preparation program.

Figure 15. Advanced Teacher Training Programs Get Higher Marks

Agreement with statements about advanced teacher training and certification programs*

My advanced program taught me how to teach and foster 21st century skills in my students through my teaching.

| 35% Disagree | 63% Agree |

My advanced program taught me how to effectively incorporate technology in the classroom.

| 37% Disagree | 60% Agree |

0%   20%   40%   60%   80%   100%

Based on responses from 383 teachers who have completed their advanced training and certification for teaching since 2000.

Survey question: Please indicate your agreement with the following statements on your advanced teacher preparation program.

shown in **figure 15**. (Advanced training programs include educational specialist, master's and doctoral degrees; post-baccalaureate certificates, advanced certification and re-certification; and certificates of advanced studies or certificates of advanced graduate studies.)

In another disparity with teachers, most administrators believe that initial teacher preparation programs do a good job of preparing future teachers to effectively incorporate technology in classrooms and to teach and foster 21st century skills. They are generally confident in the abilities of teachers in their schools to incorporate 21st century skills into the curriculum, use technology to lead a classroom lesson or discussion, and facilitate student use of technology during a lesson.

On-the-job professional development, however, might be missing its mark in improving teachers' capacity to use new technologies—and, possibly, to increase their frequency of technology use. Teachers report that their schools typically implement new technologies by training a
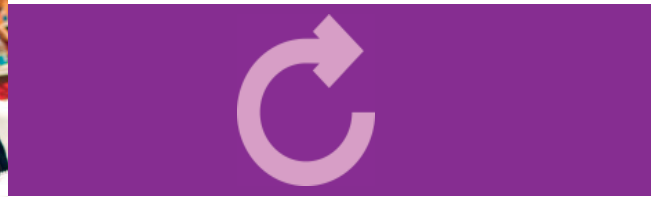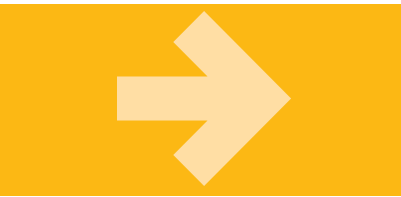
few teachers who then train others, which is known as the "train the trainer" model. Other common methods include providing training from a technology coordinator, sending teachers to training classes or bringing a trainer to school, as shown in **figure 16.**

Only a modest 26 percent of technology training occurs in support teams for teachers to meet and share experiences. Several teacher organizations (such as the National Council for Social Studies, the National Council of Teachers of English, the National Council of Teachers of Mathematics and the National Science Teachers Association) suggest that training that gives teachers opportunities to work together contributes to professional growth.

Twelve percent of training now occurs in online classes, a figure that is likely to increase.

Figure 16. **"Train the Trainer" Method Tops Professional Development Options**

How schools typically train and support teachers in implementing new technologies*
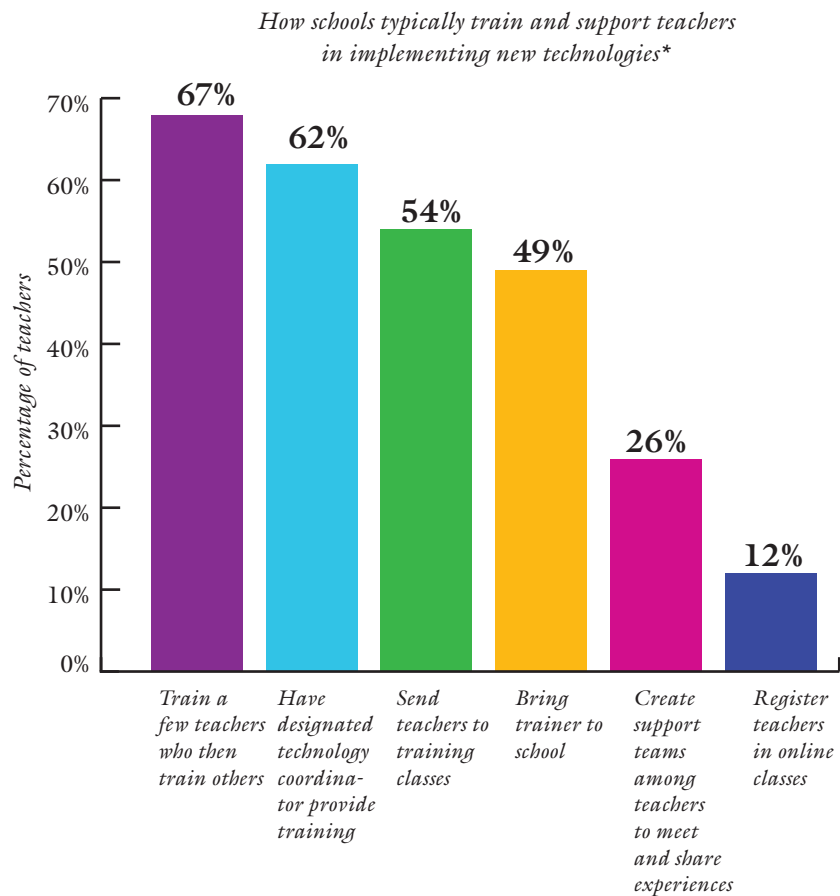
Note: Teachers were asked to pick all training methods that their schools use.

Survey question: When your school wants to implement new technology-supported learning strategies, how does the school typically handle that training and support? Please select all that apply.
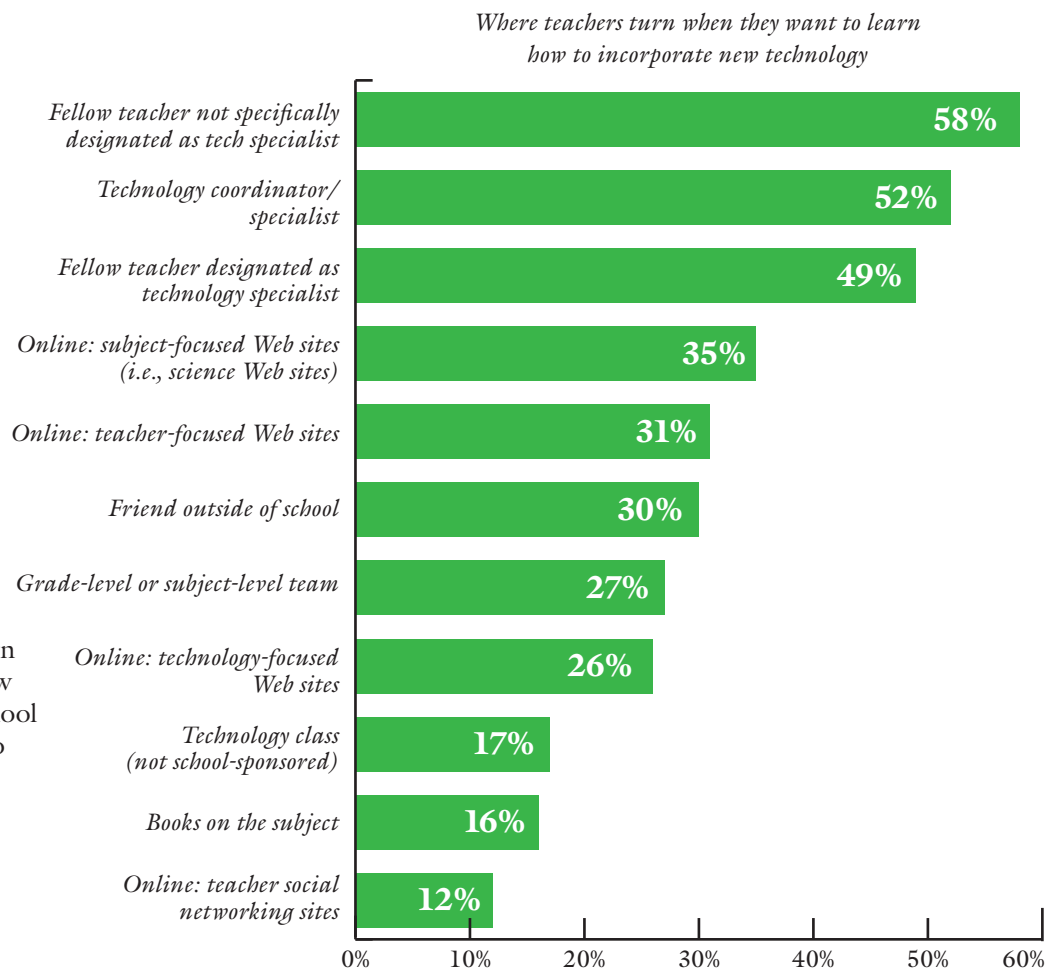
Meanwhile, teachers are most likely to seek out advice on how to incorporate new technologies from fellow teachers, technology coordinators or specialists, as shown in **figure 17.** Many also seek help from online sources.

While teachers were not specifically asked about the title "library media specialist," it is fair to assume that such educators are also an important source of advice on technology integration.

Figure 17. **Teachers Are Most Likely to Turn to Fellow Teachers or Technology Specialists for Help**

Where teachers turn when they want to learn how to incorporate new technology

Source	Percentage
Fellow teacher not specifically designated as tech specialist	58%
Technology coordinator/ specialist	52%
Fellow teacher designated as technology specialist	49%
Online: subject-focused Web sites (i.e., science Web sites)	35%
Online: teacher-focused Web sites	31%
Friend outside of school	30%
Grade-level or subject-level team	27%
Online: technology-focused Web sites	26%
Technology class (not school-sponsored)	17%
Books on the subject	16%
Online: teacher social networking sites	12%

Survey question:
When you want to learn how to incorporate new technology in your school or classroom, where do you turn?

Note: Teachers were asked to pick all sources they use.

Implications and Recommendations

The survey findings demonstrate strong connections between technology and 21st century skills. This suggests that it is important to focus on *both* technology *and* 21st century skills to achieve critical education outcomes. The findings show that we need to better prepare and train teachers in technology competencies and 21st century skills, so teachers can lead their students to better outcomes.

Despite the debates about technology use and 21st century skills, this survey shows strong support for both among teachers and administrators. This echoes similar results from other surveys of professional educational associations, policymakers and business leaders.

Yet, unlike professionals in many other fields, many teachers do not rely on technology routinely in their work. The reasons for this are not the obvious ones. The survey findings dispel a number of myths in this regard. It's not teachers' lack of access to technology or background factors that may matter the most, according to the survey findings. Instead, the biggest barrier by far is many teachers' belief that technology is not necessary for student learning—their core

work. In a world where technology penetrates every aspect of the most successful and innovative organizations, this is a telling finding.

The results also indicate that pre-service (undergraduate) programs do not yet prepare teachers well for this new world.

> **"** The smartest people working in education today understand that it is not a choice between content and skills; it's not an either–or, it's a both–and. **"**
>
> —An advocate of 21st century skills

Teachers report that advanced (postgraduate) programs are more likely to instruct them how to use technology and teach 21st century skills.

Clearly, postsecondary institutions with teacher preparation programs, and the policymakers who support them, should take note of these findings. They have a critical role to play in improving pre-service teachers' competencies in using technology as a learning tool and fostering 21st century skills. They also have a

> **"** I think the reason why the 21st century skills movement is seen so positively among practitioners—teachers, primarily—is because they do feel boxed in and they want a way out. Call it whatever you want to call it, it's a way to acknowledge that they want to be able to teach more to their students than they feel like they're able to right now. So, they need to jump on this 21st century skills bandwagon for someone to listen to this larger point, which is, 'I don't just want to teach this rigid or narrow band of basic skills or basic content, I know how to teach more or I want to teach more. Maybe I don't know how to, but I know somehow that I should be teaching more.' So there's a level of frustration there. **"**
>
> —Education policy analyst

role to play in supporting professional development and professional learning communities for the K–12 workforce.

The findings suggest that on-the-job technology training for teachers focuses on how to operate new equipment, but not necessarily on how to integrate it into the fabric of their instruction. For this, schools would need to have technology professionals and academic staff, such as master teachers and instructional coaches, working side by side with teachers as they learn, practice and refine their use of technology to support student learning. Administrators and policymakers could better support teachers with professional development and professional learning communities focused on the intersection of technology and 21st century skills development, in the context of teachers' subject areas and grade levels.

Whatever their reasons for underuse of technology, many teachers (and their students) could be missing out on the benefits enjoyed by frequent technology users, including student engagement, positive behaviors and learning of 21st century skills, according to the survey findings.

Perhaps the most important implication of this survey is that teachers' use of technology for classroom instruction makes a significant difference in improving perceived student outcomes. There is plenty of documentation about technology use by today's students, who are inseparable from and highly adept with digital media. But this doesn't automatically mean students are using technology wisely. Teachers have a vital role to play at the intersection of technology and 21st century skills—modeling their confidence with technology, guiding young minds toward constructive educational purposes, and teaching students the tried and new skills for a competitive world.

In this vein, here are a few starting points for educators and those who support them:

Recommendations for teachers

■ **Be as fearless as your students.** Make a commitment to learning new technologies or applications that can genuinely help your own productivity or student learning. Try them out in your everyday life or with your students. Look to your students or your peers who use technology comfortably. Think through which skills you have and which skills you need to use technology. Use technology more frequently to support student learning.

■ **Seek out or create opportunities to collaborate with and learn from your peers.** Join or launch a professional learning community to share your experiences with using technology and developing 21st century skills. Form a group in your school or district, or find one online, for your grade level or subject area. Consider using online platforms for at least some of these activities.

■ **Evaluate continuing education opportunities.** If you have choices in selecting advanced training, consider options that integrate technology and 21st century skills development into the curriculum.

■ **Communicate with parents.** Parents generally support the use of technology as a tool for learning, and they understand that students need to learn new kinds of skills to be prepared to succeed. Technology itself can help you communicate with parents regularly and explain how technology supports student learning and skills development.

Recommendations for administrators

■ **Talk the talk and walk the walk.** Spend time in classrooms so that you better understand how teachers are actually using technology and developing 21st century skills. Know the strengths, weaknesses and capacities of your teaching force, which will help you target professional development. Learn how to make better use of technology for your own work. Be an advocate for technology use and 21st century skills with your teachers. Develop policies and practices, such as acceptable use policies, that support classroom use of technology.

■ **Provide teachers with sustained, job-embedded professional development.** Help teachers learn and practice specific strategies for integrating technology and 21st century skills into their classroom work—with their students or with teams of teachers in their subject areas or grade levels. Put more focus on professional development for elementary teachers, since these teachers tend not to use technology as frequently as secondary teachers. Foster collaboration among technology specialists and educators—such as curriculum directors, library media specialists, and master teachers—to highlight for teachers the connections among technology, 21st century skills and learning.

- **Involve parents and the community in plans to use technology and develop 21st century skills.** Focus on technology benefits, not just problems, in communicating with stakeholders. Don't oversell, but instead encourage a balanced view of the advantages and disadvantages of technology use. This will help you build community "buy-in"—and will probably result in better plans.

Recommendations for postsecondary educators

- **Help pre-service teachers learn how to integrate technology and 21st century skills into classroom instruction.** Examine the differences between undergraduate and graduate programs, which teachers find more applicable to their teaching practice. Pair pre-service teachers with mentor teachers who are skilled technology users and who have a demonstrated understanding of 21st century skills development.

> " Schools of education need to make technology available so that education professors can model how they want pre-service teachers to use it in their classrooms. "
>
> —Assistant professor at a school of education

- **Collaborate with schools to further evaluate the impact of connecting technology and 21st century skills in K–12 education.** Research is important for understanding what's working—and why.

Recommendations for local, state and national policymakers

- **Signal support for integrating technology and 21st century skills into K–12 education.** Legislation, funding and advocacy are leadership tools that can spur innovation in schools' adoption of technology and focus on 21st century skills.
- **Require teacher preparation programs to develop future teachers' proficiency in integrating technology into**

their work. The expected influx of new teachers into the K–12 system as baby boomers retire over the next decade provides an opportunity to give tomorrow's teachers a better start.

- **Create a balanced assessment system that incorporates the use of technology and measures 21st century skills.** As the saying goes, "What gets measured gets taught." Both formative and summative assessments should be used to evaluate students' mastery of technology and 21st century skills to learn core subjects.

About This Survey

The findings in this report are based on a 2009 survey of more than 1,000 U.S. educators, including 783 teachers and 274 principals or assistant principals. Respondents are closely representative of teacher and administrator populations by region, school level and years of experience.

The margin of error at the 95 percent confidence level for the teacher sample is ± 3.5 percent and for the administrator sample it is ± 5.9 percent, unless noted. When comparing segments within the teacher or administrator populations, the use of the term "significant" indicates a statistical difference between groups; that is, a Pearson chi-square value of ≤ .05.

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Eduventures helps colleges and universities fulfill their missions—educating, engaging and serving students, faculty, and communities in impactful ways. The firm offers consulting services focusing on academic leadership, continuing education, online programming, development, enrollment management and K–12 teacher preparation.

For this survey, Eduventures interviewed nationally recognized experts on educational technology and 21st century skills, and designed the survey instrument and reported results on teachers' and administrators' perceptions of technology use and its impact on 21st century skills.
www.eduventures.com

Resources

To learn more about the intersection of technology and 21st century skills in K–12 education, visit these organizations:

Common Sense Media
www.commonsensemedia.org

Consortium for School Networking
www.cosn.org

The George Lucas Educational Foundation
www.edutopia.org

Grunwald Associates LLC
www.grunwald.com

International Society for Technology in Education
www.iste.org

The John D. and Catherine T. MacArthur Foundation's Digital Media & Learning Initiative
www.macfound.org/education

National School Boards Association Technology Leadership Network
www.nsba.org

The New Media Consortium
www.nmc.org

Partnership for 21st Century Skills
http://www.p21.org/

State Educational Technology Directors Association
www.setda.org

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