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Elementary School Teacher Use of EdTech: Preliminary Teacher Survey Results

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Elementary School Teacher Use of EdTech: Preliminary Teacher Survey Results

A REPORT BY

Program on Economics & Privacy
Law & Economics Center
George Mason University, Antonin Scalia Law School

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Acknowledgements
Hannah Engle, Andrew Mercado, and Sophia Morris provided outstanding research assistance in the preparation of this report.

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INTRODUCTION

Digital educational technology ("edtech") has grown to become a core component of education. Most students use computers or tablets during school, and teachers routinely incorporate videos, apps, and other web-based content into their lesson plans. What is more, many schools use tech platforms to distribute assignments, post grades, and provide information to students and parents. And as the pandemic has ushered in an era of remote instruction, edtech has proven indispensable to the continuation of primary and secondary schooling.

While edtech promises to provide important benefits for students and teachers, at the same time privacy concerns arise. Both federal and state privacy laws potentially apply to the use of edtech. Although enacted long before the advent of edtech, at the federal level the Family Education Rights Privacy Act (FERPA) places limits on the ability of schools to share student record information.[1] The Children's Online Privacy Protection Act (COPPA), which was born in the digital age, requires online content providers to obtain verifiable parental consent before collecting personal information from children under thirteen.[2] In recent years, states have begun to enact student privacy laws that directly implicate the collection and use of student data by edtech providers. For example, California's Student Online Personal Information Protection Act (SOPIPA), which limits the ability of edtech providers to collect and monetize student data has served as a model for several states' student privacy laws.[3] Louisiana, Colorado, and Connecticut have each adopted student privacy laws that also implicate edtech providers' access to student data, but that differ in important ways from the SOPIPA model. At the same time, many states lack any specific student privacy laws that apply to edtech.[4]

This report is based on information from an online survey of elementary school educators from 111 schools across ninety-three school districts in nine states with varying student privacy laws (Alabama, California, Colorado, Connecticut, Illinois, Louisiana, New Jersey, Pennsylvania, and Texas) during the 2018-19 academic year designed to shed light on how elementary school teachers utilize edtech. Specifically, we examine the frequency and type of edtech used both in the classroom and assigned as homework. Further, we also study the extent to which schools provide guidelines for edtech use, and educators are aware of, and receive training on, federal and state student privacy laws. The study also explores the relationship between the presence of privacy training or edtech guidelines, state student privacy laws, and the willingness to use edtech.

Below we highlight some of the key findings:

- Nearly all educators sampled (97%) employ edtech inside the classroom, and 92% of these educators use it at least a few times a week, with a majority (63%) using it daily. At the same time, less than half (41%) of sampled educators regularly ask their students to use edtech outside the classroom as part of homework. This average masks a marked difference across grades – not surprisingly, edtech homework is more common for older students, with 52% of grades 3-5 teachers report assigning edtech homework, compared to only 31% of educators who teach grades K-2.

- The frequency of edtech use inside and outside the classroom is relatively uniform across school locations. Over 90% of educators across the categories report daily or weekly use of edtech inside the classroom, and 59% of educators assign edtech homework and at least a few times week.

[1] 20 U.SC § 1232g *et seq*.
[2] 15 U.SC. § 6501 *et seq*. *See also* Federal Trade Commission, Complying with COPPA: Frequently Asked Questions, *COPPA and Schools*, at https://www.ftc.gov/tips-advice/business-center/guidance/complying-coppa-frequently-asked-questions-0#N.%20COPPA%20AND%20SCHOOLS.
[3] Cal. Bus. & Prof. Code § 22584 *et seq*.
[4] Many states have general student privacy laws modeled after FERPA, but that have no direct application to edtech. *See, e.g.*, Ky. Rev. Stat. §§ 160.700 et seq.; Wis. Stat. Ann. §§ 118.125 *et seq*.

Rural and suburban respondents were more likely to report daily and weekly edtech homework than their urban counterparts.

- A majority (62%) of respondents say that their administration encourages use of edtech, but only 44% of respondents are given edtech training, and even fewer (38%) say that their administration fosters their use of edtech by providing funding. Further, urban schools lag significantly behind both rural and suburban schools in training and funding.

- Video (e.g, YouTube) is the most commonly used type of edtech inside the classroom. Web-based learning applications, such as Scratch or Google Apps for Education are the most common form of edtech homework. Social media, robotics, and virtual reality were the least commonly reported types of edtech used either inside or outside the classroom.

- Most educators (82%) report using online applications (e.g., Google Apps for Education, Blackboard, or Class Dojo) to communicate with parents and students. About half as many (43%) report using social media (e.g., Twitter, Facebook) to broadcast classroom or school information.

- A little more than half of the sample (53%) reported having mandatory privacy training, and 57% reported having received some privacy training at least once. A majority of those who have had privacy training report having done so more than once.

- About half (51%) of those teachers who use edtech reported needing parental consent, whereas 39% said they needed administrative approval. 52% of teachers said that their school had a list of pre-approved edtech.

- A majority of educators are at least "somewhat familiar" with each of the most relevant student privacy laws. Specifically, educators were more likely to have knowledge of FERPA (69%) and their state privacy law (59%) than COPPA (51%).

- Educators who receive privacy training, or whose schools have edtech guidelines in place, are more likely to report using edtech and are more likely to take actions that reflect an awareness of student privacy:

    - 50% of educators who had privacy training, and 48% of those from schools with edtech guidelines in place, report "always" reading privacy policies compared to only 29% of those educators who have not had privacy training, and 24% of those who come from schools without edtech guidelines in place.

    - The presence of privacy training and edtech guidelines is also associated with higher levels of student privacy awareness across various situations, such as emailing parents and colleagues, social media posting, and the use of website content.

- There does not appear to be any general relationship between the presence of a student privacy law and the overall use of edtech. However, the data suggest that educators from states with student privacy laws assign edtech homework more frequently.

OVERVIEW OF DATA

2.1 Sample Construction

The sample includes educators (teachers and administrators) from nine states (Alabama, California, Colorado, Connecticut, Illinois, Louisiana, New Jersey, Pennsylvania, and Texas) that differ with respect to how their student privacy laws apply to edtech. For example, Alabama, Pennsylvania, and New Jersey lacked specific student privacy laws that apply to edtech at the time of the survey.[5] California, Illinois, and Texas each have nearly identical laws that limit edtech providers' ability to collect and use student data. Colorado, Connecticut, and Louisiana, on the other hand, each have distinct student privacy laws directed at edtech.

The study randomly sampled districts within each state based on "probability proportionate to size" methodology, where the number of teachers in each district was the size variable, and the same number of schools are randomly sampled within each district. From the schools that we sampled, we used Amazon's Mechanical Turk to collect publicly available email information from elementary school teachers and administrators. This yielded a total of 5,878 unique email addresses. The online survey was delivered to this sample approximately once every two weeks from May 2018 through June 2019. After removing duplicates and incomplete responses, the final sample consists of 237 educator responses from 111 elementary schools, which are located in 93 unique school districts.

2.2 Sample Overview

Figure 1 shows the distribution of respondents by state. The most heavily sampled state is Colorado (62), with more than twice the number of respondents than from the next most heavily sampled state, California (30). The least sampled state is New Jersey, with only 13 responses. As shown in Table 1, the number of districts sampled from each state ranges from 6 in Louisiana to 23 in Colorado.

FIGURE 1
DISTRIBUTION OF RESPONSES BY STATE

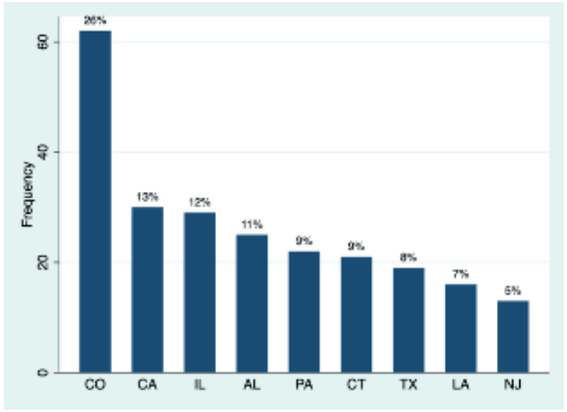
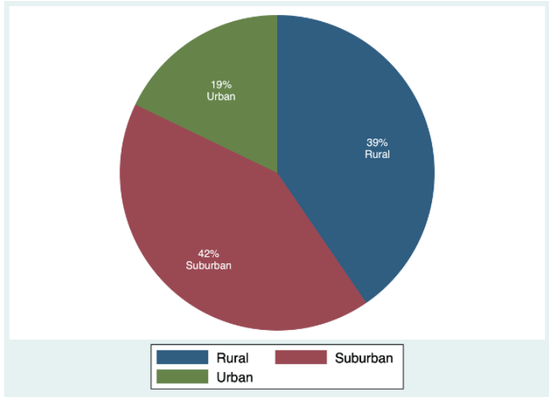


TABLE 1
DISTRICTS AND SCHOOLS SAMPLED PER STATE

State	Number of Districts Sampled	Number of Schools Sampled
Alabama	11	14
California	10	13
Colorado	23	27
Connecticut	8	10
Illinois	12	14
Louisiana	6	7
New Jersey	7	7
Pennsylvania	10	12
Texas	6	7
TOTAL	93	111

Figure 2 shows the distribution of responses by the geographic location of the school districts sampled. Suburban and rural schools are almost equally represented in the sample, comprising 42 and 39% of the sample, respectively.[6] Only 19% of the sample is from schools in urban areas. The proportion of the sample from suburban districts is nationally representative, however, due to the relatively high response rate from Colorado – which is predominantly rural and suburban – the sample is over-weighted for rural and under-weighted for urban respondents.[7]

FIGURE 2
DISTRIBUTION OF SAMPLE BY GEOGRAPHIC LOCATION



Figures 3 and 4 describe the positions held by the survey respondents.[8] The vast majority (78%) of the respondents are teachers, with administrators comprising about 6% of the sample, and librarians and tech specialists each accounting for around 3%. 10% of the sample is made up of a variety of non-teacher educators, such as paraprofessionals, teachers' aides, and counselors. More than a third of the sample (86 respondents) report teaching more than one grade. The distribution of grades taught is roughly similar for kindergarten (K) – 5th grade, ranging from 30% of respondents teaching kindergarten to 35% of respondents teaching grades 3 and 4. A very small percentage of respondents report teaching grades 6 to 8 (8%, 4%, 2%, respectively).

FIGURE 3
POSITION OF RESPONDENTS

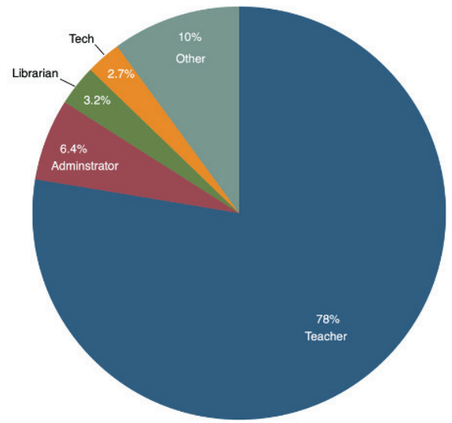
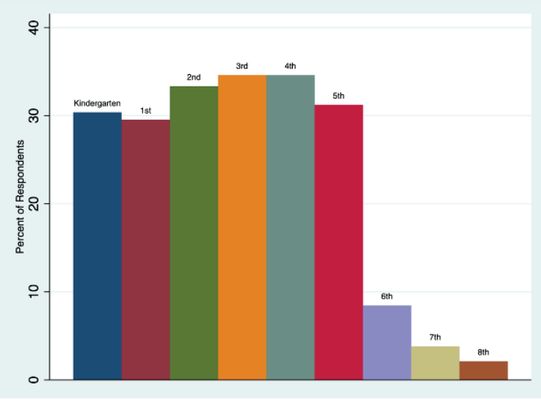


FIGURE 4
DISTRIBUTION OF GRADES TAUGHT



[5] New Jersey recently enacted a student privacy law that applies to "operators of online educational services." N.J. Stat. Ann. §§ 56:8-217 *et seq*.
[6] Designations were from the Department of Education. Districts classified as "Towns" were included with the rural total.
[7] The national distribution of students of 30% urban and 30% rural/town. *See* https://nces.ed.gov/pubs2018/2018052/tables/table_04.asp
[8] Due to rounding, percentages in figures may not always sum to 100%.

EDTECH USE

This section examines the technology resources of the school – whether schools have access to high-speed internet, and how students access edtech. This section also presents data on the how the type and frequency of edtech use varies by school location and grade taught.

3.1 Internet and Computer Access

To utilize edtech, a school must have access to high-speed internet. This does not appear to be a binding constraint for schools we sampled. Almost all schools reported having high-speed internet (98%) and Wi-Fi in their classroom (95%). Surprisingly, all of the rural schools sampled have high-speed internet: of the five schools that lack high-speed internet, three are suburban and two are urban. Of the ten schools that lack in-class Wi-Fi, five are rural, three are suburban, and two are urban.

Figure 5 shows the computing technology that students use to access edtech at school. The most commonly reported means of access is 1:1 electronic devices (e.g., laptops or tablets) that remain at school, with 58% of educators responding that their school has this type of program. Dedicated classroom computers (44%), computer labs (43%), and computer carts (41%) have similar rates of use. 1:1 electronic devices that students can take home (24%) and "bring-your-own device" programs (14%) were the least commonly reported types of classroom technology.

Figure 6 shows that computer technology used by students varies somewhat by school location. For example, while 1:1 electronic devices that remain at school is the most frequent response of teachers in all regions, dedicated classroom computers are less popular in suburban schools (36%) than urban (52%) and rural schools (51%). Further, teachers in rural and urban schools were roughly equally likely to respond using 1:1 at school, dedicated classroom computers, and computer labs, whereas suburban teachers are almost 20 percentage points more likely to report using 1:1 at school devices (57%) than the next most commonly used technologies, computer labs (38%), computer carts (38%), and dedicated classroom computers (36%). 1:1 devices that students take home and "bring-your-own" device programs are more common in rural and suburban than urban schools.

FIGURE 5
COMPUTER TECHNOLOGY USED BY STUDENTS

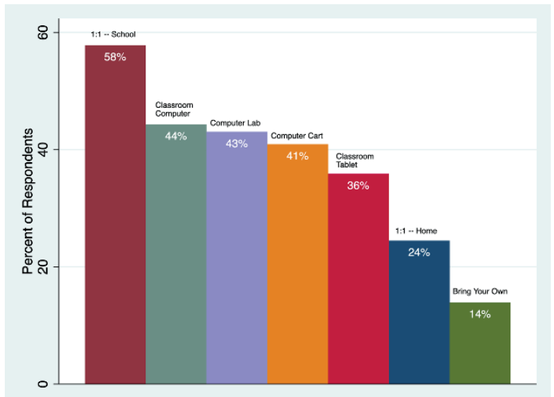
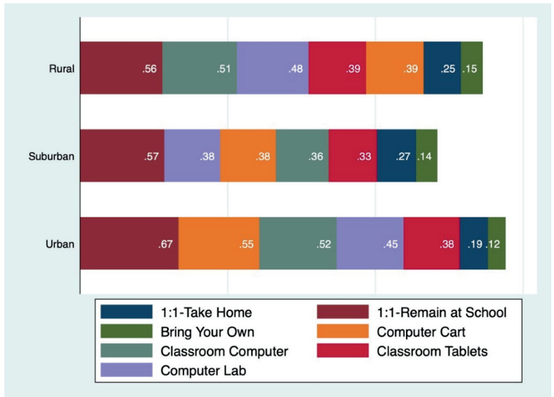


FIGURE 6
COMPUTER TECHNOLOGY BY SCHOOL LOCATION



3.2 Support

A majority (62%) of respondents say that their administration encourages use of edtech. As seen in Figure 7, however, only 44% of respondents are given edtech training, and even fewer (38%) say that their administration fosters their use of edtech by providing funding. When broken down by school location, the same general pattern remains, but Figure 8 shows that suburban schools are more likely than rural and urban schools to receive training (53% vs. 41% and 31%) and funding (45% vs. 37% and 29%) to support the use of edtech. Further, urban schools lag significantly behind both rural and suburban schools in training and funding.

FIGURE 7
MEANS FOR FOSTERING EDTECH

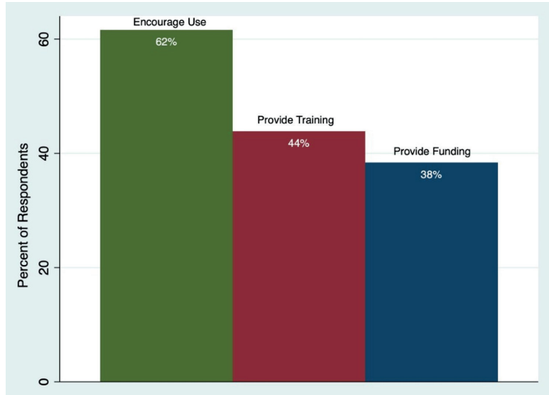
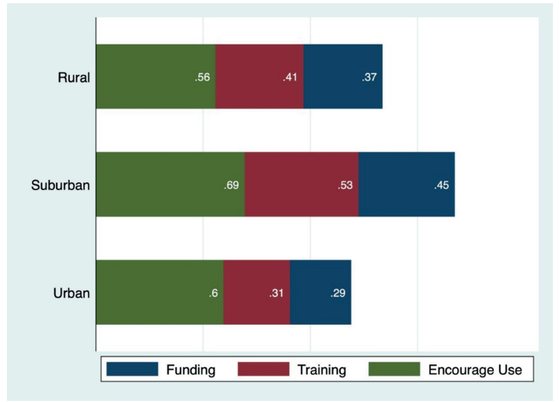


FIGURE 8
MEANS FOR FOSTERING EDTECH BY SCHOOL LOCATION



3.3 Edtech In the Classroom

Frequency

Almost the entire sample (97%) of educators reports using edtech in the classroom, and as shown in **Figure 9**, of these respondents, 92% use it daily or a few times a week.[9] Only around 8% of teachers report using edtech in the classroom only a few times a month or rarely.[10]

FIGURE 9
FREQUENCY OF EDTECH
USE IN THE CLASSROOM

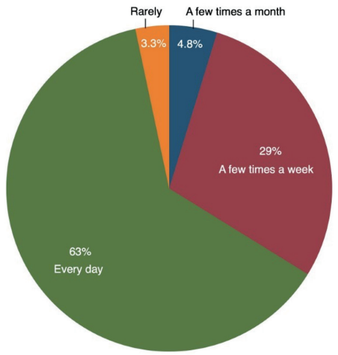


FIGURE 10a
FREQUENCY OF EDTECH
USE IN THE CLASSROOM BY LOCATION

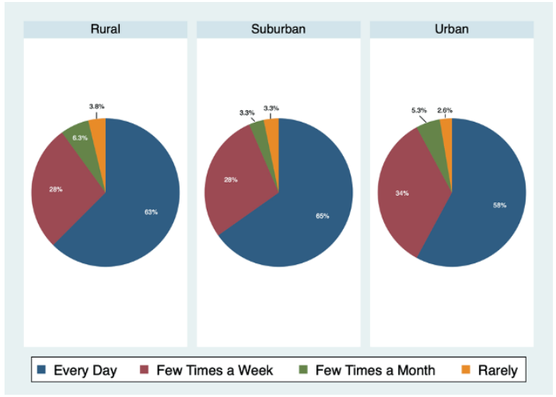
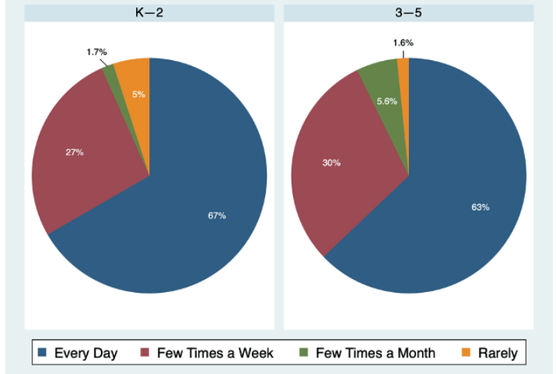


FIGURE 10b
FREQUENCY OF EDTECH
USE IN THE CLASSROOM BY GRADE



Figures 10a and **10b** show that frequency of use is almost uniform across locations and grades, with over 90% of educators reporting daily or weekly use of edtech in the classroom. Educators from urban schools are slightly less likely than rural or suburban educators to use edtech in the classroom daily, and K – 2 educators are more likely to say that they rarely use edtech in the classroom, although both levels are quite small (5% vs. 1.6%).

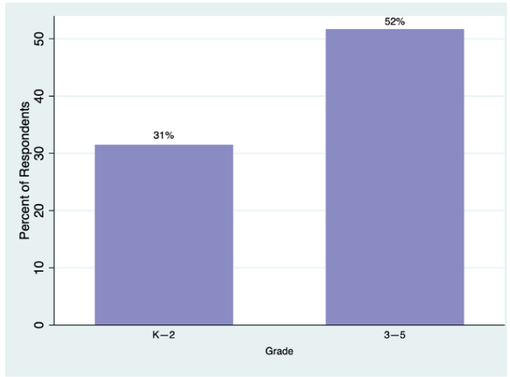
[9] The survey provided respondents the following classifications and examples of edtech: Video (e.g., watching clips from YouTube, Apps used on tablets or mobile devices (e.g., Explain Everything, Book Creator, Kodable), Software used on laptop or desktop computers (e.g., Microsoft Office, iMovie, Minecraft Education), Web-based learning tools (e.g. Google Apps for Education, Scratch), Content from websites (e.g., CNN.com), Social Media (e.g., Twitter, Instagram, Facebook), Robotic Devices (e.g., Sphere, Dash & Dot), Virtual Reality (e.g., Google Cardboard), Other

[10] 5 non-teachers responded that they never used edtech in the classroom.

3.4 Edtech Outside the Classroom

Although almost all educators report using edtech in the classroom, only 41% say that they ask their students to use edtech resources outside of the classroom, for example, as part of homework. This average, however, masks a difference across grades. **Figure 11** shows, not surprisingly, that edtech homework is more common for higher grades, with 52% of teachers in grades 3 – 5 asking their students to use edtech outside of the classroom, compared to only 31% of K – 2 teachers.

FIGURE 11
EDTECH HOMEWORK BY GRADE TAUGHT



As seen in **Figure 12**, for those teachers who assign homework involving edtech, most do it a few times a week (47%) or a few times a month (30%). Only 12% of responding teachers assign edtech homework every day, and 11% report assigning rarely.

As was the case with in-class edtech, the frequency of edtech homework is similar across school location, with suburban and rural educators slightly more likely to assign edtech weekly or daily than their urban counterparts. K – 2 educators are almost twice as likely to assign edtech homework rarely, but also slightly more likely to assign it daily.

FIGURE 12
FREQUENCY OF EDTECH HOMEWORK

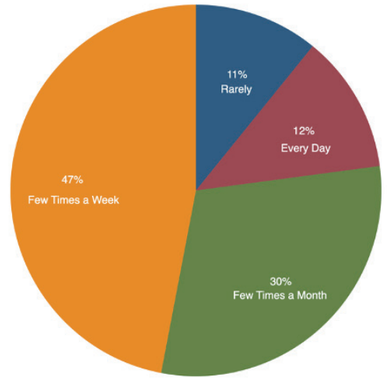


FIGURE 13a
FREQUENCY OF EDTECH
HOMEWORK BY LOCATION

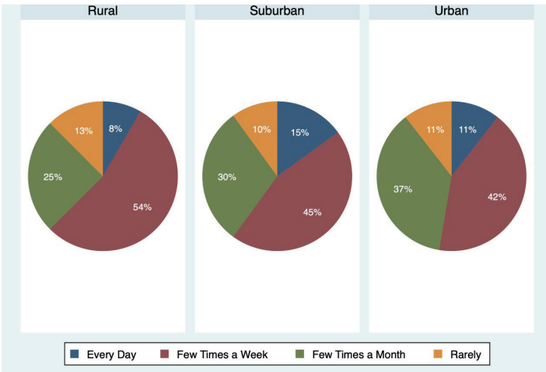
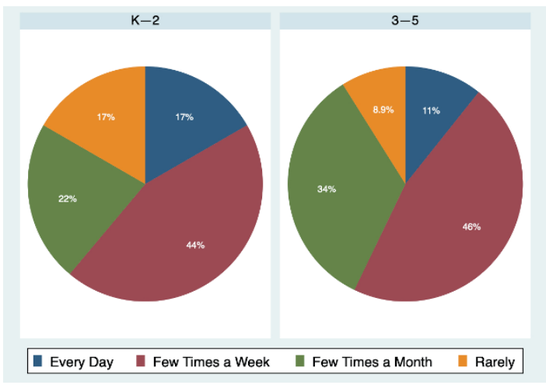


FIGURE 13b
FREQUENCY OF EDTECH



Types of Edtech

By far the most commonly used edtech is online videos from platforms such as YouTube, with 84% of educators reporting that they have used this type of technology in the classroom. As seen in **Figure 14**, web-based tools, software, and online apps are also commonly used, with 61%, 59%, and 54% of respondents reporting their use, respectively. Robotics, social media, and virtual reality are the least popular edtech tools, with only 14%, 9%, and 8% of respondents reporting using them in the classroom, respectively.

FIGURE 14
EDTECH USED IN CLASSROOM

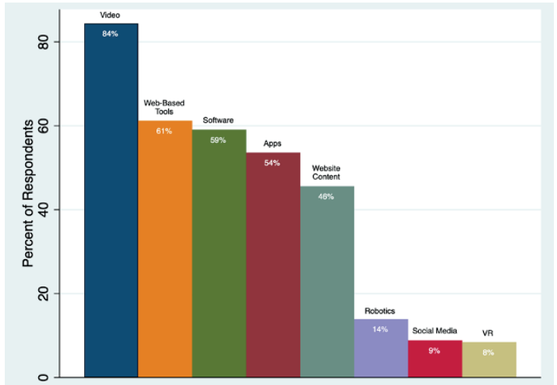


Figure 15 shows the type of classroom edtech used broken down by location, and it reveals a similar pattern. Video is by far the most commonly reported edtech in all regions, followed by web-based tools, apps, and software. Suburban schools are about 20 percentage points more likely to use web-based tools, than urban and rural schools. Usage of software and apps in class is similar across regions, whereas respondents in both rural (48%) and suburban (47%) schools are more likely to report using website content than respondents from urban schools (38%). Urban and rural schools are less likely to report using robotics than suburban schools (10% and 12% vs. 18%). Finally, suburban and rural schools are 4 to 5 times more likely to report using social media in class than urban schools (12% and 8% vs. 2%), and while a relatively small number of respondents from rural and suburban schools report using virtual reality (VR) tools (10% and 11%), no urban school respondents report using VR.

FIGURE 15
CLASSROOM EDTECH
BY SCHOOL GEOGRAPHY

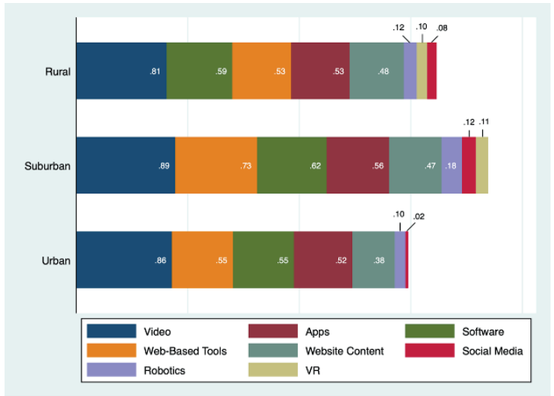


Figure 16 shows the percentage of respondents teaching grades K – 2 and 3 – 5 who use each category of edtech. The rank order of use is nearly identical across grades, except that robotics is the least used among K – 2 and the third least used for 3 – 5 teachers, with VR being their least used edtech in the classroom. The other noticeable pattern is that the use of video (88% and 92%) and social media (58% and 57%) is roughly equivalent across grades, whereas those teaching grades 3 – 5 are significantly more likely to use all other forms of edtech in the classroom. For example, 75% of 3 – 5 teachers reported using web-based tools compared to 48% of K - 2 teachers. Not surprisingly, robotics are much more likely to be used in older classrooms, with only 3% of K – 2 teachers reporting using robotics versus 20% of 3 – 5 teachers.

FIGURE 16
CLASSROOM EDTECH BY GRADE

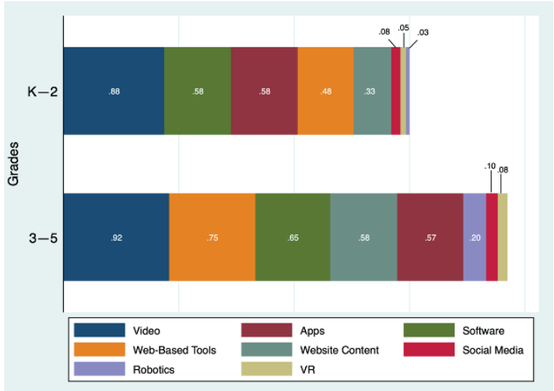


Figure 17 shows the type of edtech assigned by those teachers who report asking students to work with edtech outside of the classroom. Web-based assignments, such as those posted on Class Dojo or Google are by far the most common, with 56% of teachers reporting that they assign this type of homework. The percent of teachers who report assigning homework based on software (33%), video (31%), apps (29%), and websites (26%) are roughly equivalent. A very small proportion of teachers (2%) report assigning homework based on VR or social media. Nobody reports assigning robotics homework, likely because it would require equipment most children do not have access to at home.

FIGURE 17
TYPE OF EDTECH HOMEWORK

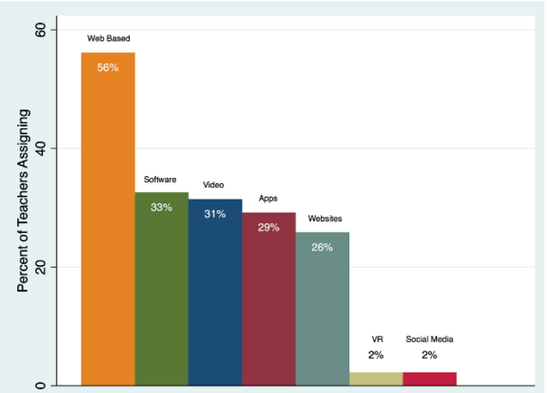
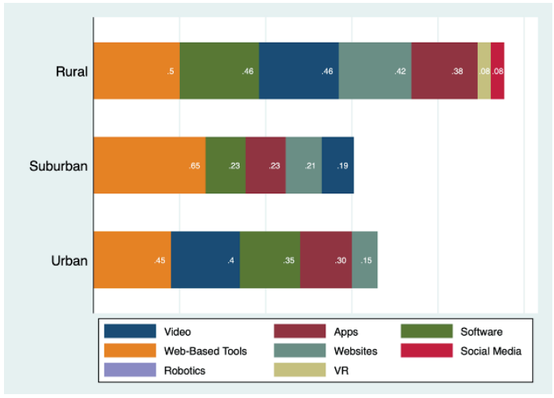


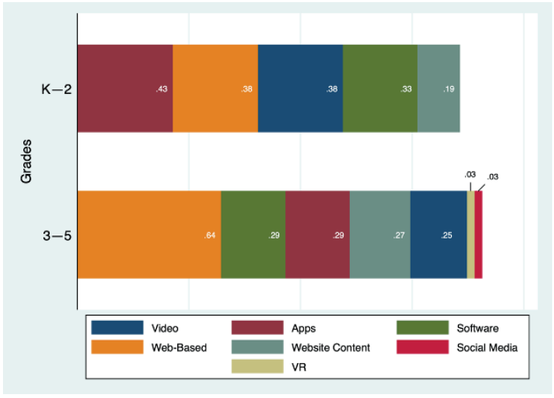
Figure 18 breaks down the type of edtech homework assigned by school location. As with the national average, web-based homework is the most common in all locations. Teachers from rural schools are more likely than their urban and suburban counterparts to assign every remaining type of edtech homework. Although, suburban teachers are about 12 percentage points more likely than rural educators to assign web-based homework, rural teachers are around twice as likely as suburban teachers to assign other types of edtech as homework. Urban teachers are similar to their rural counterparts in assigning software or video homework, but are far less likely to ask children to use apps or websites outside of school. No urban or suburban teachers report assigning homework based around VR or social media, compared with 8% of rural educators. The distribution of edtech homework is quite different across grades.

FIGURE 18
EDTECH HOMEWORK TYPE BY SCHOOL GEOGRAPHY



As seen in Figure 19 teachers of grades K - 2 are more likely than those who teach 3 – 5 to assign app-based homework (43% versus 29%), whereas web-based homework is almost twice as common in grades 3 – 5 as grades K – 2 (64% versus 38%). K – 2 teachers also are more likely to assign software and video homework than those in grades 3 - 5, while 3 - 5 teachers are more likely to assign homework involving web site content. Homework involving VR or social media is quite uncommon, and not surprisingly, it is assigned only to relatively older children (grades 3 – 5).

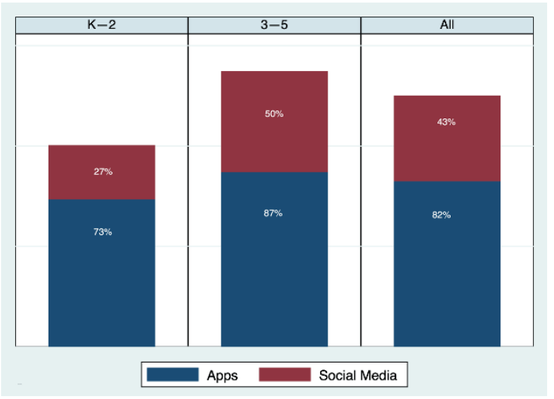
FIGURE 19
EDTECH HOMEWORK TYPE BY SCHOOL GRADE



3.5 Edtech, Social Media and Communication

Figure 20 shows the percentage of respondents who report using online applications to communicate with parents or students, and social media to share school and classroom information with students, parents, and the larger community. 82% of sampled educators say they use applications to communicate with students and parents. Among the most commonly reported apps used to communicate directly with students and parents were Blackboard, Class Dojo, Reminder, Google for Education, OnCourse, Smore, and Seesaw. About half as many educators report using social media to communicate (43%). Twitter and Facebook were by far the most widely used social media platforms to broadcast classroom and school information, although some teachers report using YouTube, Instagram, Snapchat, and Class Dojo. Use of either tool to communicate is more common for teachers with older students, but the differences are more pronounced for social media: those teaching grades 3 - 5 are almost twice as likely as K – 2 teachers to use social media (50% versus 27%).

FIGURE 20
COMMUNICATION VIA ONLINE APPS AND SOCIAL MEDIA



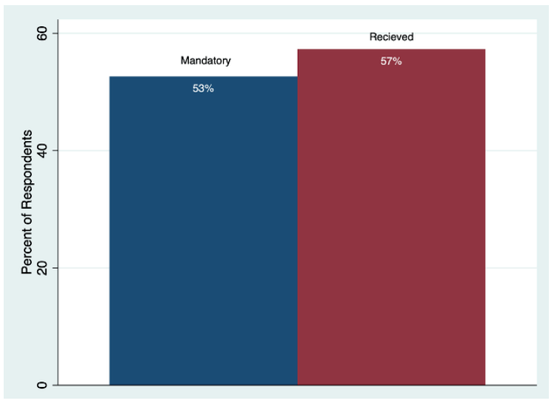
STUDENT PRIVACY: TRAINING, GUIDANCE, AND AWARENESS

This section presents data on privacy training, guidelines on edtech use, and the extent to which educators need administrative or parental approval to use edtech. We also examine the extent to which educators consider student privacy when using edtech. Most schools support student privacy by providing teachers with training and having guidelines in place for using edtech. The data also suggest a positive relationship between training, guidelines, and educator awareness of student privacy.

4.1 Training, Approvals, and Guidelines

Most educators have had some sort of privacy training. **Figure 21** shows that 57% of respondents reported having had received privacy training, and 53% of all respondents (93% of those with training) say their training was mandatory. Of those who received training, 53% reported having had training more than once.[11]

FIGURE 21
PRIVACY TRAINING

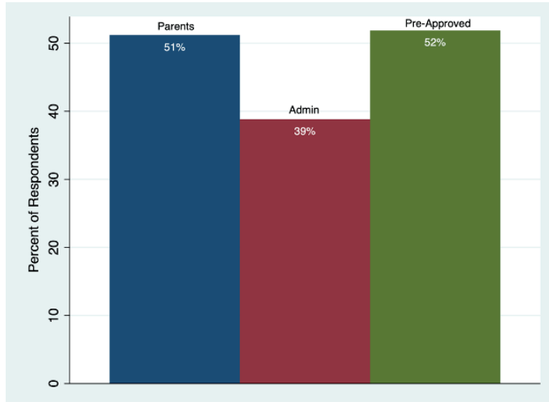


The vast majority (77%) of educators report having guidelines in place governing the use of edtech. Many respondents explained that schools have technology "plans" or "policies" in place, on which teachers are briefed and agree to follow. Indeed, some noted that their contracts require them to follow school guidelines for edtech use. Many educators also responded that they were required to seek district or parental consent for certain uses. For example, one teacher from Alabama noted that "all sites/apps/software that require student accounts MUST be approved by the data governance board." Others stated that they had to gain parental consent for students to participate in a program that allows them to take home a Chromebook, to "go online," or to go into the computer lab. Another common response was that the administration monitored educators' online actions for compliance with guidelines. Educators also said that the district administration IT departments will filter or block certain apps or web pages. Further, several educators explained that they try to avoid using social media in a way that identifies students, such as posting student pictures.

[11] Over half (53%) of respondents reported having more than one privacy training. 26.5% of respondents reported having training every year or annually, and another 26.5% reported having a specific number of privacy trainings more than one.

On the specific issue of approvals, a majority of educators (51%) say that they need parental consent before using or assigning edtech resources. Only 39% say that they must seek administrative approval, but this may be due to the fact that 52% of teachers have a pre-approved list of edtech resources. The most commonly listed approvers were the district administration, school principal, or the IT department. Educators commonly answered that pre-approved resources came preloaded on computers or tablets, or listed on the district or school website. Khan Academy, Google Classroom, Raz Kids, Lexia, and Scratch were the most commonly reported specific resources used.

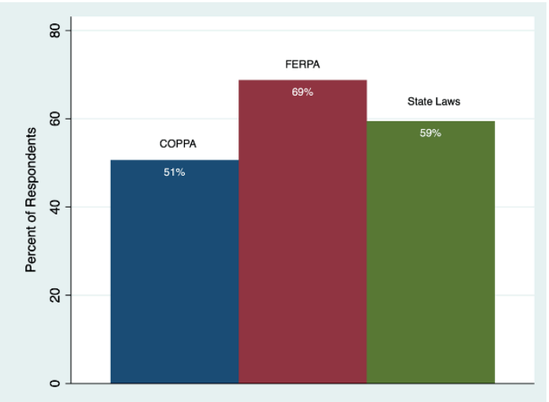
FIGURE 22
EDTECH APPROVALS REQUIRED



4.2 Teacher Legal Knowledge and Privacy Awareness

Figure 23 reports that a majority of respondents reported that they were "somewhat" or "extremely" familiar with relevant student privacy laws. Respondents were most likely to have a good knowledge of FERPA (69%), followed by their state's student privacy laws (59%). Teachers were least likely to have fluency with COPPA, with only 51% of teachers reporting being somewhat or extremely familiar with this law.

FIGURE 23
PRIVACY LAW AWARENESS



When asked whether they read privacy policies for the edtech they use, a sizable majority (78%) of teachers reported that they either "always" or "sometimes" read them. As seen in **Figure 24a**, however, nearly a quarter (22%) of respondents reported that they never read privacy policies.

Of those who do read policies, **Figure 24b** reports that only 19% give them a close read. Almost half (49%) of the teachers say that they read privacy policies "somewhat closely," and 32% of respondents who read privacy policies say they only skim them. These data suggest that about 51% of sampled teachers spend some amount of time reading privacy policies for edtech.

FIGURE 24a
HOW OFTEN DO YOU READ PRIVACY POLICIES ASSOCIATED WITH EDTECH

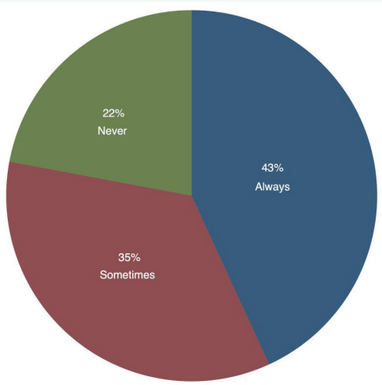


FIGURE 24b
HOW CLOSELY DO YOU READ PRIVACY POLICIES?

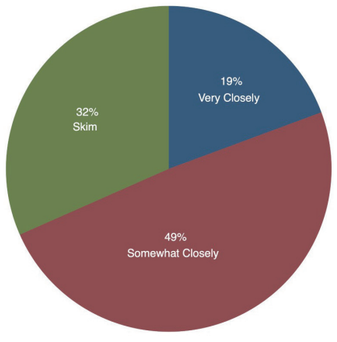
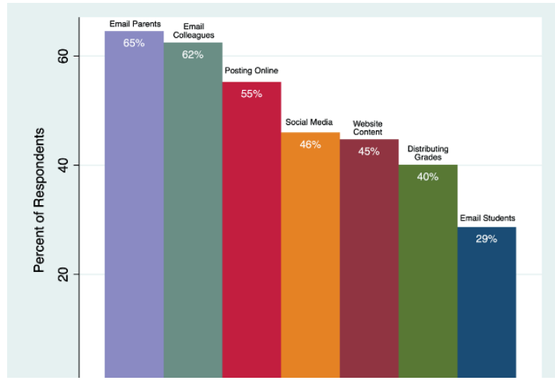


Figure 25 shows the percentage of respondents who said that they "have considered student privacy" in various situations. Well over half (65% and 62%) of respondents say that emailing parents and colleagues trigger student privacy considerations. Only 29% of respondents say that emailing students caused them to consider student privacy. This pattern could be explained by the fact that emails to colleagues and parents concern third parties, whereas emails to students do not. Slightly more than half (55%) of respondents say they consider student privacy when posting information online, whereas slightly less than half responded that they consider privacy when engaging social media (46%) or website content (45%). 40% of respondents say they consider student privacy when distributing grades.

FIGURE 25
SITUATIONS IN WHICH YOU HAVE CONSIDERED STUDENT PRIVACY

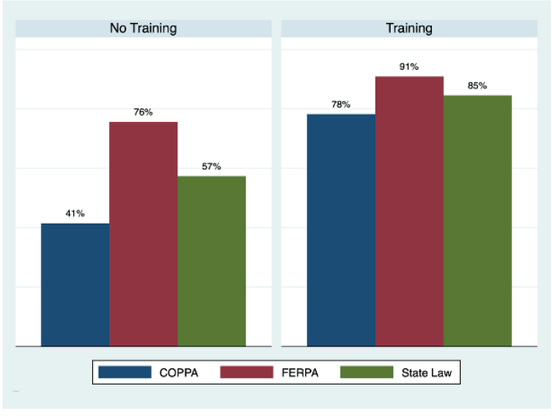


4.3 Relationship Between School Training & Guidance and Educator Privacy Awareness

Next we examine whether there is any relationship between the actions taken by schools and administrations to educate and guide teachers on student privacy, and teachers' privacy awareness. From the outset, it is important to note that this analysis can demonstrate only association, not causation. For example, privacy awareness on the part of educators could lead to a demand for more training and guidance. Further, the coexistence of privacy training, guidance, and educator awareness could be linked to some unobserved underlying taste for privacy within the school.

Figure 26 shows the percentage of respondents who claim to be "somewhat" or "extremely" familiar with COPPA, FERPA, and their state student privacy law, sorted by whether they received privacy training. Privacy training should improve teacher knowledge of these legal requirements, and the data is consistent with this hypothesis. Those who have had privacy training are more likely to have familiarity with each student privacy law, with the largest gap in knowledge of COPPA (37 percentage points).[12]

FIGURE 26
PRIVACY TRAINING AND LEGAL KNOWLEDGE



[12] Chi-square tests rejects the null hypothesis that training and privacy law knowledge are independent. X^2 (*Training, COPPA*) = 27.02, p = .000; X^2(*Training, FERPA*) = 8.34, p = .004; X^2(*Training, State Law*) = 17.63, p = .000.

Next, we examine whether teachers with training take actions consistent with greater privacy awareness, like reading privacy policies or considering student privacy in various situations involving edtech. **Figure 27** shows the attention that teachers pay to privacy policies sorted by whether they had privacy training. Those with privacy training clearly are more likely to pay attention to privacy policies: 82% of teachers with privacy training "always" or "sometimes" read privacy policies, compared to only 67% of teachers who had no training. Teachers with privacy training are more than 21 percentage points more likely to always read privacy policies than those without training, and almost twice as many teachers who did not have privacy training are likely to say that they never read privacy policies.[13]

The data also suggest a relationship between privacy awareness in various situations and training. **Figure 28** lists the percent of respondents who report considering student privacy in various situations by whether they received privacy training. The percentage of teachers reporting awareness is higher for every situation when the teacher has had privacy training, with the biggest differences for getting educational content from websites (18 percentage points), online posting (14 percentage points), and social media and emailing students (12 percentage points).[14]

FIGURE 27
PRIVACY POLICY ATTENTION
BY PRIVACY TRAINING

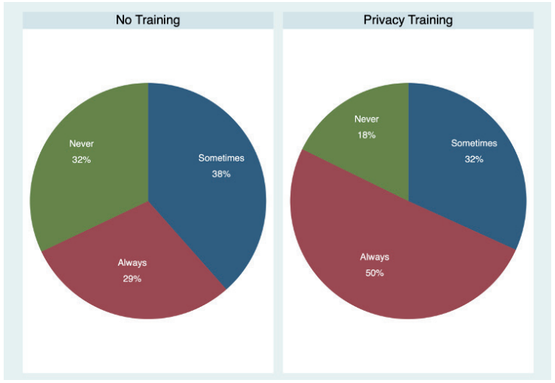
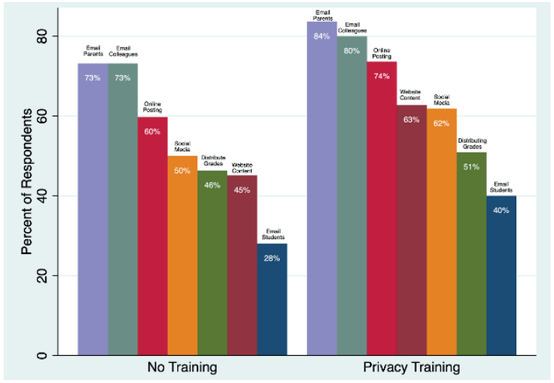


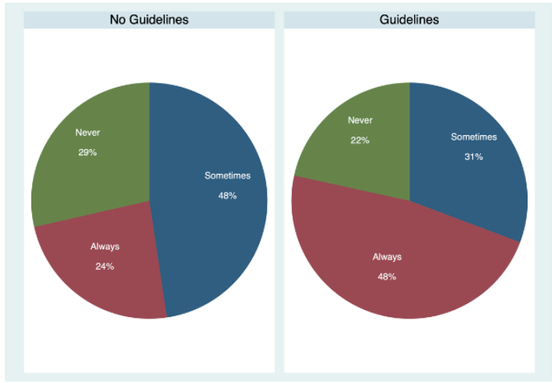
FIGURE 28
STUDENT PRIVACY AWARENESS
BY PRIVACY TRAINING



[13] Chi-square tests rejects the null hypothesis that these variables are independent. X^2(*Training, Read Privacy Policy*) = 9.23, p = .01.
[14] Chi-square tests reject the null hypothesis that the presence of edtech guidelines and privacy awareness in situations involving online posting (X^2 = 4.14, p = .042) and Website content (X^2 = 5.89, p = .015) are independent. The null hypothesis that the presence of edtech guidelines and privacy awareness in other situations are independent cannot be rejected at the 95% level of confidence.

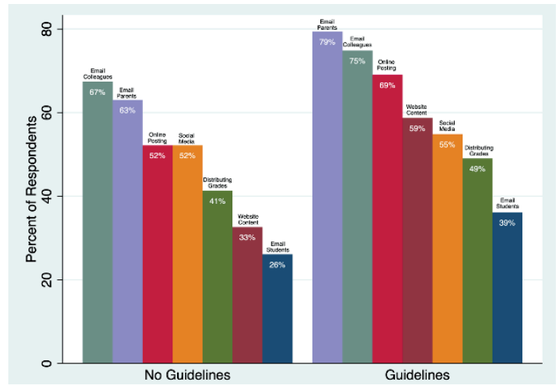
In addition to training, schools can promote student privacy by providing guidelines to educators. As noted above, a large majority of respondents (77%) say that they have guidelines in place governing the use of edtech. **Figures 29** and **30** explore whether guidelines are associated with educator awareness. First, **Figure 29** shows that educators from schools with guidelines in place are twice as likely to "always" read privacy policies than educators from schools without guidelines. They are also slightly less likely to "never" read privacy policies.[15]

FIGURE 29
PRIVACY POLICY ATTENTION BY
PRESENCE OF EDTECH GUIDELINES



Second, **Figure 30** shows awareness of student privacy in different situations by whether the school has edtech guidelines in place. As with privacy training, the presence of guidelines appears to be associated with higher levels of privacy awareness in all situations. The rank order of situations that trigger student privacy considerations is nearly identical for both groups, although emailing parents is more likely to raise privacy concerns than emailing colleagues for those educators with edtech guidelines in place. Further, using website content is more likely to cause educators with guidelines in place to consider student privacy than those without edtech guidelines. As was the case with privacy training, the largest difference between likelihood of student privacy consideration is for website content, with 59% of educators from schools with guidelines saying they consider student privacy when obtaining educational content from websites, versus 33% of teachers from schools without edtech guidelines Online posting and emailing parents represent the next largest gaps in student privacy consideration (17 and 16 percentage points, respectively).[16]

FIGURE 30
PRIVACY AWARENESS BY
PRESENCE OF EDTECH GUIDELINES



[15] A Chi-square test rejects the null hypothesis that these variables are independent: X^2(Guidelines, How Closely Read) = 7.86, p = .02.
[16] Chi-square tests reject the null hypothesis that the presence of edtech guidelines and privacy awareness in situations involving emailing parents (X^2 = 5.12, p = .024), online posting (X^2 = 4.42, p = .04), and Website content (X^2 = 9.70, p = .002) are independent. The null hypothesis that the presence of edtech guidelines and privacy awareness in other situations are unrelated cannot be rejected at a 95% confidence level.

EDTECH USE AND STATE PRIVACY LAWS

The states sampled vary with respect to student privacy laws that limit the collection and use of student data by edtech providers. Three states, for example, had no such student privacy laws at the time of the survey (PA, NJ, and AL).[17] As discussed in more detail below, there is also significant variation in legal provisions among the states that have student privacy laws. For example, some laws apply broadly to limit the ability of edtech providers to collect student data, while others apply only to edtech providers that have entered into contracts with school districts. Further, some laws require schools to make public the types of edtech they use. Most state laws are aimed at edtech providers, but at least one state holds teachers potentially criminally liable for violations of its student privacy law.

This section examines whether there is any empirical relationship between these student privacy laws and educators' willingness to use edtech. As discussed below, most state privacy laws do not directly bind teachers' actions because they make edtech providers liable for failure to adhere to limits on the collection and use of student data. Nonetheless, student privacy laws could impact educators' behavior by, for example, limiting the edtech that is available for use. Further, restrictive student privacy laws could foster an environment that is highly privacy protective – indirectly or directly through contract terms that limit the use of edtech due to privacy concerns. As was the case with Section 4's examination of the relationship between training, guidelines, and awareness of student privacy, it is important to note that due to the cross-sectional nature of the data, we can report only associations, not causal inference.[18]

5.1 Overview of State Privacy Laws

Although each sampled state's privacy law is slightly different, more than half appear to follow the model laid out in California's Student Online Personal Information Protection Act (SOPIPA).[19] SOPIPA covers a wide array of information collected by third-party "operators" of websites and apps that have "actual knowledge" that their product "is used primarily" and "marketed" for K – 12 school purposes.[20] More specifically, SOPIPA applies to "personally identifiable information or materials" that a student, parent, or school employee "creates or provides" in the course of using the operator's product for school purposes.[21] Covered information is "descriptive of a student or otherwise identifies a student," including: (1) information that could be used to "allow physical or online contact," such as name, address, email or home address; (2) educational record information, such as discipline records, test results, special education data, juvenile dependency records, and grades; (3) biometric, voice, search history, photos, and geolocation data; and (4) other potentially sensitive data, such as religious and political affiliation.[22]

[17] New Jersey recently enacted a student privacy law that applies to "operators of online educational services." N.J. Stat. Ann. §§ 56:8-217 *et seq*.
[18] For example, differences could arise because state privacy laws restrict the use of edtech that may collect student data. Further, the existence of state privacy laws could be correlated with underlying population demands for privacy, which are revealed through teachers who are reluctant to use edtech that may threaten privacy. At the same time, privacy laws could be related to greater edtech use because states that have strong preferences for edtech may want to enact student privacy laws to ensure that such does not harm students. Similarly, educators in states with student privacy laws may be more willing to use edtech because they feel more confident that student privacy is protected. Causal inference requires comparing outcomes of interest over time in treatment and control groups, with the treatment being randomly assigned. For example, future work could compare differences in edtech use over time in states that enacted student privacy laws with those that never enacted student privacy laws. A panel setting would also allow to control for potential unobserved state-specific factors that are correlated with edtech use and the enactment of student privacy laws, as the enactment of such laws is not randomly assigned.
[19] Cal. Bus. & Prof. Code § 22584 et seq.
[20] Cal. Bus. & Prof. Code § 22584(a). SOPIPA specifically exempts "general audience" Web sites and apps. Id. at § 22584(m).
[21] Id. at § 22584(i)(1)-(2).
[22] Id. at § 22584(i)(3).

SOPIPA prohibits an operator from "knowingly" engaging in targeted advertising, both on the operator's educational product or any other product, if the targeting is based on covered information derived from the educational product.[23] SOPIPA also prohibits an operator from "amass[ing] a profile" about a student or selling or disclosing covered information.[24] SOPIPA additionally lays out affirmative duties for an operator, including providing reasonable security measures and data deletion rights.[25]

Illinois and Texas have adopted laws that closely mirror the SOPIPA model. For example, the Illinois Student Online Personal Protection Act is nearly identical to SOPIPA in terms of prohibitions and duties placed on "operators."[26] It also provides that a violation of the Act constitutes a violation of the Illinois Consumer Fraud and Deceptive Business Practices Act, which the Attorney General may enforce.[27] Texas adopts SOPIPA's definitions of covered information and operator nearly verbatim, and similarly prohibits operators from "knowingly" using covered information to engage in targeted advertising on or off its educational products.[28] Also like SOPIPA, the Texas law provides exceptions for the use or disclosure of student data to improve the product for "school purposes" or "legitimate research," although there is no de-identification requirement.[29]

Connecticut's student privacy law also follows SOPIPA closely. For example, it uses definitions nearly identical to those found in SOPIPA, limits operators to using covered information for the furtherance of "school purposes," and explicitly prohibits operators from "knowingly" engaging in targeted advertising or disclosing or selling covered information.[30] Connecticut's law, however, goes beyond SOPIPA, requiring educators to use only edtech from operators that have agreed to be bound by prescribed contract terms, declaring that student-generated data is the property of the student or their parents, and providing certain access and deletion rights for parents and students.[31] It also requires school districts post on their websites all edtech contracts entered into, along with a description of the student information that could be collected pursuant to the contract.[32]

Colorado's student privacy law shares some common DNA with SOPIPA, but is distinct is several ways. First, much of the law applies to the transfer and use of student data within the Colorado

[23] Id. at § 22584(b)
[24] Id. at § 22584(b)(2)-(4). Disclosures are allowed in certain circumstances, including in furtherance of an educational purpose, to ensure legal and regulatory compliance, to respond to judicial process, or to protect the safety of users or the security of the site. Id. at § 22584(b)(4)(A)-(D). Further, student data can be used for research required or permitted by the government, and deidentified data can be used to improve or demonstrate the effectiveness of educational products. Id. at § 22584(e)-(g). An operator also can use covered information "for adaptive learning or customized student learning purposes." Id. at § 22584(l).
[25] Id. at § 22584(d).
[26] IL. St. CH. 105 § 85/1 et seq.
[27] IL. St. CH. 105 § 85/35.
[28] TX EDUC § 32.152.
[29] TX EDUC § 32.153.
[30] CT St. § 10-234cc(a),(b).
[31] Id. at § 10-234bb(f). Edtech providers can comply with this provision by either explicitly incorporating into their terms of service the requirements found in § 234bb(a) or agreeing to be bound by the "terms of service addendum" found in § 10-234ff, which assures compliance with Connecticut law. Edtech providers do this by agreeing to the "Connecticut Student Data Privacy Pledge," which reads:

> As an authorized representative of my company or organization, which has developed one or more Web sites, online services, or mobile applications for school purposes, I hereby attest that we commit to this Connecticut Student Data Privacy Pledge. In doing so, I acknowledge that we have fully reviewed and comply with all applicable aspects of the state's student data privacy law, as defined in Connecticut General Statutes §§ 10-234aa through 10-234dd. We address and comply with the law's requirements through one or more standard contract vehicles (e.g., terms of service, data-processing agreement, etc.) that we enter into with each of our Connecticut public school customers.

See Connecticut Student Data Privacy Pledge, *at* https://portal.ct.gov/-/media/DAS/CTEdTech/documents/PA_16-189_CT_Student_Data_Privacy_Pledge.pdf.
[32] Id. at §10-234bb(g).

education system and externally for research. The Colorado law creates two categories of "School Service Providers"—the analog to SOPIPA's "operators." First, there are School Service Providers that supply their services pursuant to a contract with some aspect of the school system. Second, there is edtech that is available "on demand," which means "on occasion" and "subject to agreement . . . to standard, non-negotiable terms and conditions of service established by the "School Service Provider.[33] Contracts with School Service Providers must include reasonable data security requirements, as well as rights to notice, access, correction, and breach notification. Further, like the other SOPIPA-based laws, contracts must prohibit the sale of personally-identifiable information from students, or the use of such data for targeted ads or compiling profiles. [34]

Although "on-demand" service providers are not required to adhere to these mandates, Colorado's law "strongly encourages" local education providers to stop using service providers' products if they are found to be in non-compliance with required contract terms.[35] The Colorado law also provides large doses of transparency, requiring contracts with service providers to be public, as well as a list of "on-demand" service providers. Material breaches in contracts with service providers triggers a public hearing, and parents can notify the local school if an on-demand service provider is not living up to the terms of its privacy policy or uses student data to target ads or create profiles.[36]

Finally, Louisiana's law is a clear departure from SOPIPA. It is concerned more narrowly with data that can identify an individual, defining "personally identifiable information" as information that "can be used on its own or with other information to identify, contact, or locate a single individual."[37] The law lays down broad prohibitions on schools collecting sensitive data from students, such as political affiliation, sexual attitudes, or family income, without parental consent, or providing such information to other public or private entities except under certain circumstances.[38] It also limits access to school computer systems that would contain this sensitive student data.[39] Schools can enter into contracts with education service providers that allow access to covered student information, but these data cannot be used for "predictive modeling for the purposes of limiting the educational opportunities of students," and the contracts must include certain privacy and data security provisions.[41] The law also prohibits any "public or private entity" with access to students' information selling, transferring, or processing these data for use in "commercial advertising, or marketing, or any other commercial purpose." Unlike the other student privacy laws, however, Louisiana's student privacy law appears to allow school districts and operators to contract around its provisions.[40] Importantly, Louisiana's law comes with a bite: violations are subject to up to three years in prison and a $10,000 fine.[42]

[33] Co. St. § 22-16-103(7)-(9).
[34] Co. St. § 22-16-107(2)(a), 108, 109(2). The Act also provides a list of permitted uses of data very similar to those in SOPIPA.
[35] Co. St. § 22-16-107(c).
[36] Co. St. § 22-16-107(3)(a)-(b).
[37] LA R.S. § 17:3914(B). For example, the law focuses on information that can "distinguish or trace an individual's identity," (e.g., name, address) is "linked or linkable to an individual," (e.g, health insurance or employment information), or "two or more pieces of information that separately or when linked together can be used to reasonably ascertain the identity of a person." Id.
[38] Id. at § 17:3914(C).
[39] Id. at § 17:3914(D).
[40] Id. at § 17:3914(F).
[41] Data can be used for commercial purposes if such use is "otherwise stipulated" in a contract for educational services. Id. at § 17:3914(J)(1). The prohibitions on commercial use of PII also does not apply to data collected from parents or students who have reached the legal age of majority. Id. at § 17:3914(J)(2).
[42] Id. at § 17:3914(F)(5)(violations of contract provisions subject to three years in prison and $10,000 fine); Id. at § 17:3914(G)(violations of other provisions subject to six months in prison and a $10,000 fine).

In what follows, we categorize student privacy laws in two ways. First, we pool all six states with student privacy laws together as one comparison group. Second, we break student privacy law states into four categories: we pool California, Illinois, and Texas together, and examine Colorado, Connecticut, and Louisiana separately. As discussed above and summarized in **Table 2**, student privacy laws in California, Illinois, and Texas have almost identical provisions. On the other hand, Colorado, Louisiana, and Connecticut depart from the SOPIPA model in important ways.

TABLE 2
SUMMARY OF PROVISIONS IN STUDENT PRIVACY LAWS

Prohibits commercial use of student data	Applies to all operators	Applies only to contract providers	Contracts can override statutory requirements	Transparency provisions	Edtech providers liable	Teache liable
All	CA, IL, TX, CT, LA*	CO	LA	CO, CT	CA, IL, TX, LA, CT, CO**	LA

*Operators can contract around provisions. **Only contract providers.

5.2 Use of Edtech, Social Media, and Online Communication

Figures 31a and **31b** compare the use of edtech inside and outside of the classroom, social media use, and the use of apps such as Google Classroom or Blackboard to communicate with parents and students across various student privacy law regimes. As seen in **Figure 31a**, the presence of student privacy laws does not seem to deter edtech use. Indeed, with the exception of social media (50% vs. 42%), a larger percentage of teachers in states with student privacy laws are likely to report using each category of edtech. When we take a more granular view of student privacy laws, as shown in **Figure 31b**, a similar pattern emerges: edtech in and out of the classroom, as well as online communications are used at roughly similar or larger rates in states with student privacy laws. **Figure 31b** also shows that the non-SOPIPA states are driving the lower rates of social media use, as SOPIPA states and no-law states use social media at roughly similar rates (53% vs. 50%).[43]

FIGURE 31a
DIGITAL TECHNOLOGY USE BY PRIVACY LAW

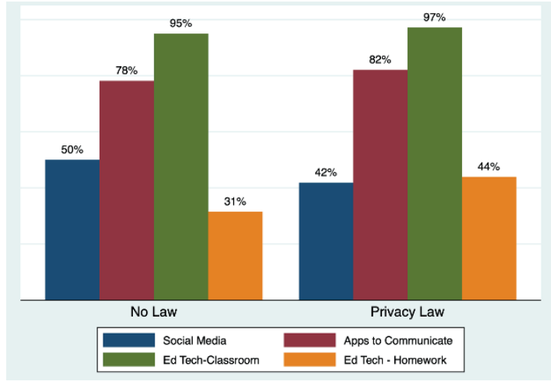
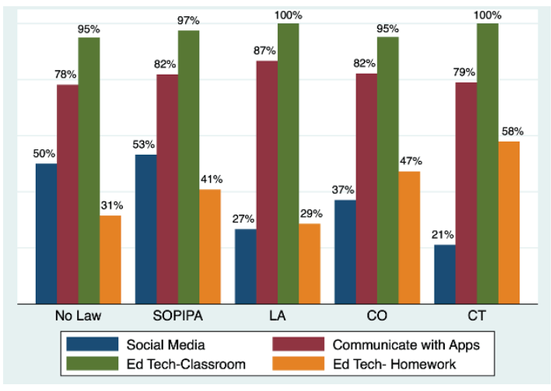


FIGURE 31b
DIGITAL TECHNOLOGY USE BY PRIVACY LAW (DETAIL)



[43] Chi-square tests for independence of categories of edtech and privacy laws: Social Media ($X^2 = 1.1$, $p = 0.29$); App Communication ($X^2 = 0.40$, $p = 0.52$); Classroom ($X^2 = 0.65$, $p = 0.42$); Homework ($X^2 = 2.59$, $p = 0.11$).

5.3 Frequency of Edtech Use

Although **Figures 31a** and **31b** do not suggest any association in the rate of edtech use and student privacy laws, these laws could be associated with the frequency of use. **Figures 32a** and **32b** explore this question, and suggest that educators in states with privacy laws tend to use edtech more frequently than their no-privacy law counterparts. Daily use is slightly more likely in states without student privacy laws (67% vs. 62%), but 95% of teachers in states with student privacy laws use edtech daily or weekly compared with only 75% of teachers in states without laws. What's more, 6% of teachers in states without student privacy laws report "rarely" using edtech in the classroom compared with only 2.5% of those in states with laws.[45]

When we examine specific privacy laws, it appears that frequency patterns are quite similar across states with student privacy laws, with reported daily or weekly use ranging between 91% to 100%. This compares, again, with only 75% daily or weekly use in no-privacy law states. However, the state-specific tallies should be viewed with caution given the small samples sizes.[44] One interesting observation is that among the privacy law states, Louisiana – which has the only privacy law that makes teachers potentially liable – appears to have the lowest frequency of edtech use.

FIGURE 32a
EDTECH IN CLASSROOM
FREQUENCY BY PRIVACY LAW

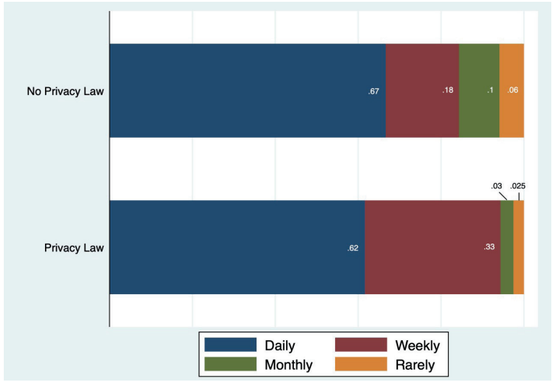
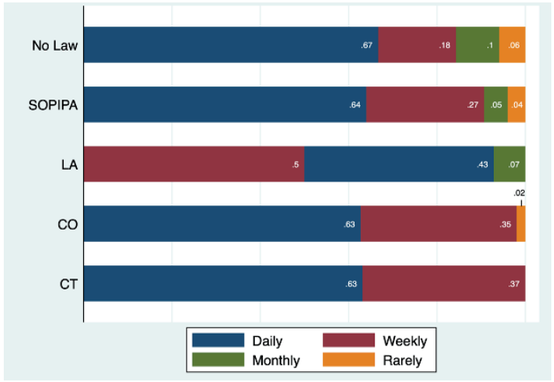


FIGURE 32b
EDTECH IN CLASSROOM
FREQUENCY BY PRIVACY LAW (DETAIL)



[44] X^2 (*privacy law, edtech frequency*) = 8.69, p = 0.069.
[45] That both SOPIPA and no-privacy law states report larger proportions of respondents reporting low frequencies of use could be a function of these categories having more observations.

Figures 33a and **33b** show the distribution of frequencies teachers report assigning edtech homework. If anything, edtech homework appears to be more frequently assigned in states with student privacy laws. As seen in **Figure 33a**, the percentage of respondents in privacy law states who assign daily or weekly edtech homework is almost twice as high as that in no-privacy law states (63% vs. 38%). Although almost the proportion of teachers who "rarely" assign edtech homework is almost twice as large in privacy law states (12% vs. 6.3%), 6.3% of respondents in no-privacy law states "never" assign edtech homework, compared with no respondents from privacy law states.[46]

Figure 33b shows similar patterns when the non-SOPIPA states are broken out separately. The proportion of respondents in the SOPIPA states, Colorado, and Louisiana assigning edtech homework weekly is at least twice that in no-privacy law states. Only respondents in Connecticut appear to assign homework less frequently than those in no-privacy law states, but this finding should be taken with some caution given the relatively small number of respondents from Connecticut.

FIGURE 33a
EDTECH HOMEWORK
FREQUENCY BY PRIVACY LAW

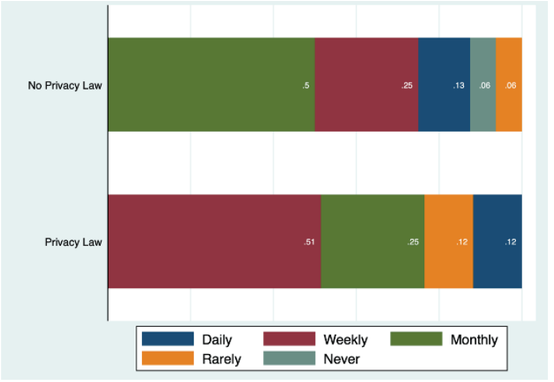
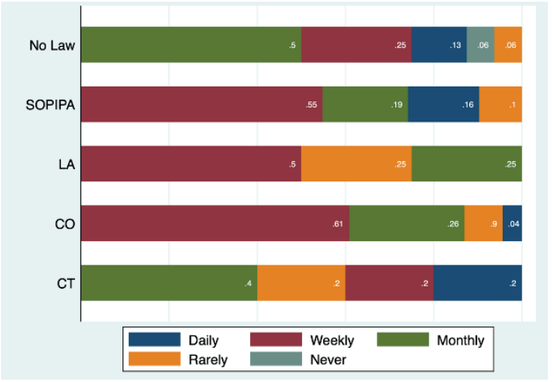


FIGURE 33b
EDTECH HOMEWORK
FREQUENCY BY PRIVACY LAW (DETAIL)



[46] X^2 (*privacy law, edtech HW frequency*) = 9.298, p = 054.

5.4 Types of Edtech Used

Figures 34a and **34b** show the percentage of respondents using types of edtech used in the classroom, broken out by student privacy laws. The rank order across privacy law regimes is similar, with video being the most frequently used type of edtech, followed in similar proportions by apps, software, website content, and web-based tools. There is no discernable pattern: no-privacy-law states reporting slightly lower rates of use of video, web-based tools, apps, and robotics; privacy law states report slightly lower rates of use of software, website content, social media, and VR. Similar patterns are revealed in **Figure 34b**, which breaks out Colorado, Connecticut, and Louisiana separately: video has the highest use rate, followed by some combination of apps, website content, web-based tools, and software. Colorado and the SOPIPA states generally report higher rates of use of social media, VR, and robotics, but again this result could be driven by the fact that use of this type of edtech is overall quite rare, and these states have the largest sample sizes.

FIGURE 34a
TYPE OF IN-CLASS EDTECH AND PRIVACY LAWS

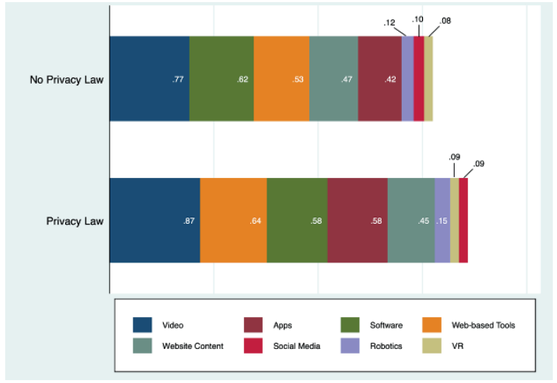
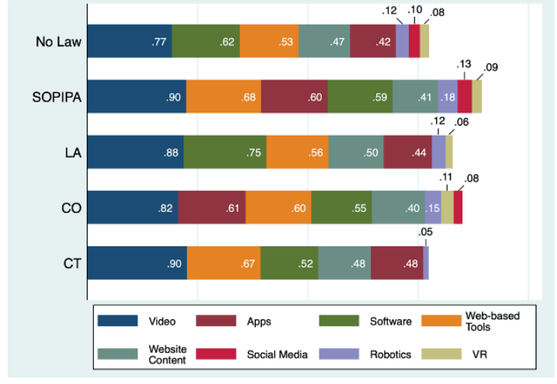


FIGURE 34b
TYPE OF IN-CLASS EDTECH AND PRIVACY LAWS (DETAIL)



Finally, we examine the relationship between the type of edtech assigned as homework and student privacy laws. As seen in **Figure 35a**, states with privacy laws are more likely than no-privacy law states to assign most types of edtech homework – a result that would be expected given that privacy law states generally exhibit higher frequencies of edtech homework, as **Figures 33a** and **33b** illustrate. For example, respondents from privacy law states are almost twice as likely to ask students to use web-based tools at home (24% vs. 12%), and at least as likely to assign software, apps, video, and website content. Only respondents from no-privacy law states assign VR and social media homework, but these types of edtech are very rarely assigned.

Patterns are similar when examining specific state privacy laws. **Figure 35b** shows that the SOPIPA states, along with Colorado and Connecticut, report use rates that are similar to, or greater than, those in no-privacy law states for every type of edtech save social media and VR. Respondents from Louisiana report higher use rates for video, website content, and software than no-privacy states, but are less likely to use apps.

FIGURE 35a
TYPE OF IN-CLASS EDTECH AND PRIVACY LAWS

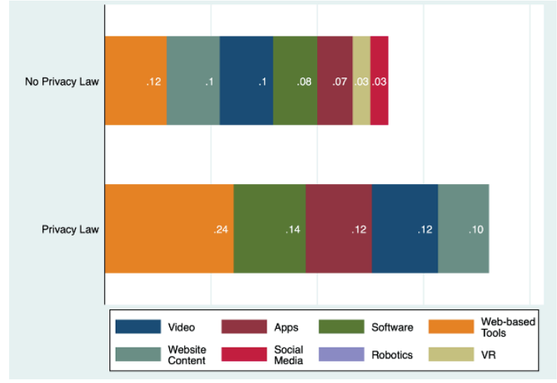
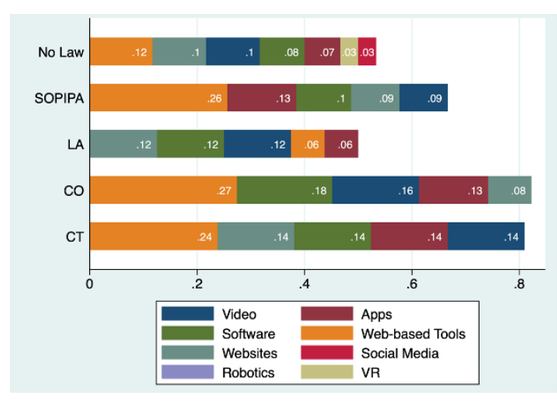


FIGURE 35b
TYPE OF IN-CLASS EDTECH AND PRIVACY LAWS (DETAIL)



CONCLUSION

The results of this preliminary study show that edtech plays an important role in elementary education across all types of schools. Almost all educators sampled report using edtech in the classroom at least a few times each week. Further, a sizable proportion of educators ask their students to use edtech outside of the classroom.

It appears the administrative policies are associated with privacy awareness. Educators who have received privacy training and teach in schools with edtech guidelines are more likely to be familiar with relevant privacy laws, read privacy policies, and consider student privacy across various circumstances involving edtech. At the same time, the data do not appear to suggest any relationship between edtech use and state student privacy laws. In some ways, this finding should not be surprising given that only Louisiana's student privacy law makes teachers liable for violations. Indeed, educators from Louisiana report among the lowest frequencies of edtech use inside the classroom, which is consistent with the fear of potential personal liability deterring the use of edtech.

Because the presence of edtech guidelines and privacy training were positively associated with teacher consideration of student privacy, school support for student privacy could play a larger role in shaping educator behavior than state privacy laws. Of course, even the most privacy-conscious educators have no control over how edtech vendors collect and use data, so laws that specifically cover edtech vendors are likely to serve as an important complement to administrative policies in protecting student privacy. Indeed, teachers may be more likely to ask their students to use edtech if they feel comfortable because their state law limits vendors' data practices.

Although these preliminary results shed some light on educators' use of edtech, and how administrative support, privacy training, and student privacy laws may impact this use, given the relatively small sample size that is not nationally representative, one should exercise caution when generalizing the findings. Future work would collect a larger sample across more states, and over time to allow the possibility of identifying causal relationships.

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