IES Institute of Education Sciences

Encouraging Families to Visit a Literacy Website: A Randomized Study of the Impact of Email and Text Message Communications

Regional Educational Laboratory Southwest

At American Institutes for Research

REL 2023-143
U.S. DEPARTMENT OF EDUCATION

A Publication of the National Center for Education Evaluation and Regional Assistance at IES

Encouraging Families to Visit a Literacy Website: A Randomized Study of the Impact of Email and Text Message Communications

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December 2022

The Arkansas Department of Education partnered with the Regional Educational Laboratory Southwest to study the feasibility and effectiveness of using brief email and text message communications to increase the number of parent and guardian visits to the Reading Initiative for Student Excellence (R.I.S.E.) state literacy website. In November 2021 the department sent test messages to families to determine the percentage of households with children in kindergarten–grade 6 in Arkansas public schools that had a working email address or cell phone number and whether the percentage differed by school locale (rural or nonrural) or demographic composition (percentage of economically disadvantaged students, Black students and Hispanic students, or English learner students). Subsequently, the study team randomly assigned 700 Arkansas public elementary schools to one of eight conditions, which varied the mode of communication (email only or email and text message), the presentation of information (no graphic or with a graphic), and the type of sender (generic sender or known sender). In January 2022 households with children in these schools were sent three rounds of communications with information about literacy and a link to the R.I.S.E. website. The study examined the impact of these communications on whether parents and guardians clicked the link to visit the website (click rate) and conducted an exploratory analysis of differences in how long they spent on the website (time on page). The study found that nearly all households had a working email address or cell phone number. Households with children in rural schools or schools with higher percentages of economically disadvantaged students were less likely than other households to have a working email address. The percentage of households that had a working cell phone number did not vary by school locale or demographic composition. Nearly one in five households opened at least one email, and nearly 80 percent of households were delivered at least one text message. The click rate was highest for households assigned to receive both emails and text messages, with a graphic, and from a known sender. The higher click rate can be attributed to adding text messages and to sending communications from a known sender. The impact on the click rate was similar for schools in different locales and with different demographic compositions. The Arkansas Department of Education can use the findings from this study to inform decisions about how best to communicate with families about literacy and other evidence-based resources. The findings can also be used by other state and local education agencies to inform decisions about using email or text message communications to share resources with families.

Why this study?

In 2019 Arkansas students had the fourth-lowest reading scores in the nation, with only 31 percent of grade 4 and 8 students reaching proficiency (National Assessment of Educational Progress, 2019). On average, students eligible for the National School Lunch Program (an indicator of economic disadvantage) had lower reading scores than their more advantaged peers, and Black and Hispanic students had lower reading scores than White students. As one approach to improving reading proficiency, the Arkansas Department of Education

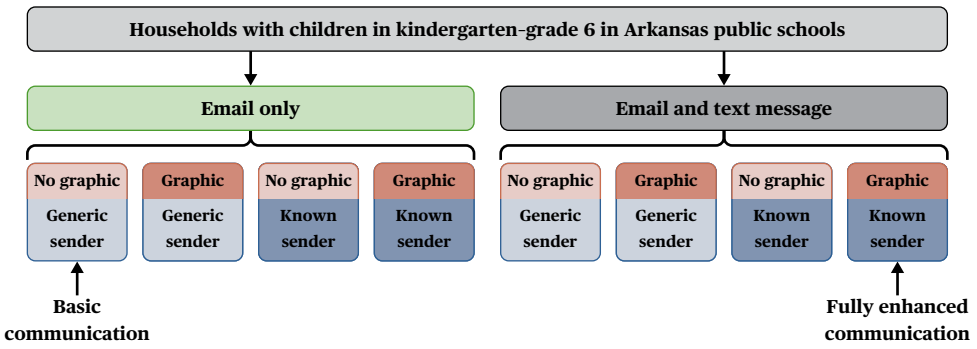
For additional information, including background on the study design, technical methods, supporting analyses, and supplemental analyses, access the report appendixes at https://ies.ed.gov/ncee/rel/Products/Publication/100918.

developed the Reading Initiative for Student Excellence (R.I.S.E.).[1] Grounded in evidence that caregivers such as parents and guardians can play a pivotal role in developing their children's reading proficiency (Carnegie Council on Advancing Adolescent Literacy, 2010; Sénéchal & Young, 2008; Van Voorhis et al., 2013; York et al., 2019), the initiative provides family-based literacy activities. The Arkansas Department of Education would like to increase traffic to resources on the R.I.S.E. website among parents and guardians.

Evidence suggests that brief email and text message communications—also referred to as nudges (see box 1 for definitions of key terms)—can encourage behavior that leads to positive outcomes for students. In particular, nudges sent to parents and guardians have had positive impacts on early literacy (York et al., 2019), attendance (Heppen et al., 2020; Rogers & Feller, 2018), homework completion (Bergman, 2014; Kraft & Dougherty, 2013), and grade point average (Bergman, 2014). However, not all studies have found nudges to be effective (for example, Bettinger et al., 2022; Oreopoulos & Petronijevic, 2019). Features of nudges—such as the level of personalization—can matter (Head et al., 2013). Further, the effectiveness of nudges depends on being able to receive them. Individuals who reside in rural areas, who are economically disadvantaged, or who are Black or Hispanic are less likely than their counterparts to have consistent access to broadband Internet (Atske & Perrin, 2021; Vogels, 2021) and therefore may be less likely to use email.

The Arkansas Department of Education partnered with the Regional Educational Laboratory Southwest to study the feasibility and effectiveness of using email and text message nudges to increase parent and guardian visits to the R.I.S.E. website. In November 2021 the department sent test messages to determine the percentage of households with children in kindergarten-grade 6 in Arkansas public schools that had a working email address or cell phone number and whether the percentage differed by school locale (rural or nonrural) or demographic composition (percentage of economically disadvantaged students, Black and Hispanic students, or English learner students[2]). Subsequently, the study team randomly assigned 700 Arkansas public elementary schools to one of eight conditions, which varied the mode of communication (email only or email and text message), the presentation of information (no graphic or with a graphic), and the type of sender (generic sender or known sender; figure 1). In January 2022 households with children in these schools were sent three nudges with information about literacy and a link to the R.I.S.E. website (see appendix A for more information on study design). The study examined the impact of these nudges on whether parents and guardians clicked the link to

Figure 1. The study tested three factors across eight conditions, January 2022



Source: Authors' compilation.

1. See https://dese.ade.arkansas.gov/Offices/learning-services/rise-arkansas.
2. As of fall 2020, approximately 60 percent of Arkansas K-12 students identified as White, 20 percent identified as Black, and 14 percent identified as Hispanic. Less than 5 percent of students identified as Asian, Pacific Islander, American Indian/Alaska Native, or two or more races (National Center for Education Statistics, 2021). Therefore, the study focused on the percentage of Black students and Hispanic students at a school.

visit the website (click rate) and conducted an exploratory analysis of differences in how long they spent on the website (time on page).

The Arkansas Department of Education can use the findings from this study to inform decisions about how best to communicate with families about literacy and other evidence-based resources. The findings can also be used by other state and local education agencies to inform decisions about using email or text message communications to share resources with families.

Research questions

The study addressed four research questions, including two implementation questions and two impact questions about households with children in kindergarten–grade 6 in Arkansas public schools:

Implementation research questions

1. What percentage of households had a working email address or cell phone number at the beginning of the study period? Did the percentage vary by school locale or demographic composition?

2. What percentage of households opened an email or were delivered a text message in any of the three rounds of communications? Did the percentage vary by school locale or demographic composition?

Impact research questions

3. Did communication mode, presentation, or sender impact the average percentage of households that visited the R.I.S.E. website? Did the impact vary by school locale or demographic composition?

4. Did time spent on the R.I.S.E. website vary by communication mode (email only or email and text message)?

The data sources, sample, methods, and limitations are summarized in box 2 and detailed in appendix B.

Box 1. Key terms

Click rate. The total number of clicks divided by the number of messages sent that did not bounce back, for each school, averaged across all schools in the sample.

Graphic. An image included in the email or text message related to the content of the message.

Fully enhanced communication. The communication consisting of both an email and a text message with a graphic that were sent from a known sender (the school principal).

Known sender. Having the email sender field show as the school principal (as opposed to the Arkansas Department of Education) or including the principal's name in the body of the text message.

Multimedia messaging service (MMS). A type of text message that supports images and links and has a 1,600 character limit. MMS messages can be received only by smartphones whose owners have not disabled MMS in their cell phone service plan.

Nudge. An informational intervention, such as an email or text message, that encourages recipients to take an action. In this study the nudge was an email or text message encouraging households to visit the Reading Initiative for Student Excellence website.

Schools with higher percentages of Black students and Hispanic students. Schools where the percentage of students who were Black and the percentage of students who were Hispanic exceeded 22.7 percent, the 50th percentile for the state.

Schools with higher percentages of economically disadvantaged students. Schools where the percentage of students who were eligible for the National School Lunch Program exceeded 71.6 percent, the 50th percentile for the state.

Schools with higher percentages of English learner students. Schools where the percentage of students who were English learner students exceeded 3.4 percent, the 50th percentile for the state.

Short message service (SMS). A type of text message that supports only plain text and has a 160 character limit. SMS messages cannot include images, but they may include links to images. SMS messages can be received by all types of cell phones, including cell phones without computing or internet capability. In this study, text messages with images were first sent by MMS, but if MMS failed, they were sent by SMS.

Box 2. Data sources, sample, and methods

Data sources. The study used data from three sources. The Arkansas Department of Education provided data on the number of households and on the characteristics of schools and districts. The study team did not have access to characteristics of individual students or households. The email and text message vendor provided information on whether the household had a working email address or cell phone number and on click rates. Google Analytics provided information on the number of users and time spent on the Reading Initiative for Student Excellence (R.I.S.E.) website.

Sample. The study population included households with children in kindergarten-grade 6 in Arkansas public schools. In 2021/22 there were 242,837 records of households with children in 706 public schools with at least one grade of kindergarten-grade 6. Some households had duplicate records because they had more than one child in elementary school and the children attended different schools. In these cases the study team randomly selected one school, which resulted in a final sample of 180,531 households with children in 700 public schools.

In November 2021 the Arkansas Department of Education worked with an email and text message vendor to send two test messages to the 180,531 households in the sample (see appendix A for more information). These messages established whether households had a working email address (email did not bounce back) or cell phone number (text message was delivered). At this stage 11,784 households opted out of being contacted. The remaining 168,747 households with children in 700 schools constituted the sample that was randomly assigned to the study conditions (the analytic sample).

Methodology. After removing households that opted out of being contacted, the study team randomly assigned schools to one of eight conditions characterized by three factors: mode of communication (email only or email and text message), presentation of information (no graphic or with a graphic), and type of sender (generic sender or known sender). The fully enhanced communication consisted of both an email and a text message, with a graphic, that were sent from a known sender (the school principal). See figure 1 in the main text for descriptions of the eight conditions.

In January 2022 the email and text message vendor sent three rounds of communications created by the Arkansas Department of Education to households in the sample. Each communication included information encouraging the recipient to visit the R.I.S.E. website. The randomly assigned condition was the same for all three nudges, but the content of each nudge differed (see table A1 and figures A1-A3 in appendix A for images of the information sent). Communications were sent in English or Spanish, depending on the households' registered preference. The findings include results for communications sent in either language.

For research question 1 the study team calculated the percentage of households that had a working email address or cell phone number overall and by school locale and demographic composition. If the email and text message vendor did not receive an email bounce back or a response indicating that the text message was not delivered, the email address or cell phone number was considered to be working. For research question 2 the study team calculated the percentage of households that opened at least one email or were delivered at least one text message overall and by school locale and demographic composition. For both questions the study team considered a difference of 5 percentage points or more to be meaningful.

For research question 3 the study team estimated the impact of being assigned to receive a communication (rather than actually receiving one) with different features on school average click rates (called intent-to-treat analyses). First, the team calculated school average click rates. Next, using regression models, the study team controlled for school characteristics.

To determine whether the impact varied by school locale or demographic composition, the analyses were conducted separately for four subsamples: households with children in rural schools, households with children in schools with higher percentages of economically disadvantaged students (more than 71.6 percent, the 50th percentile for the state),[1] households with children in schools with higher percentages of Black students and Hispanic students (more than 22.7 percent, the 50th percentile for the state), and households with children in schools with higher percentages of English learner students (more than 3.4 percent, the 50th percentile for the state). The study team conducted additional sensitivity analyses to check whether the results changed with different specifications (see appendix D).

For research question 4 the study team calculated the average time spent on the R.I.S.E. website in seconds separately for households that were assigned to receive emails only and for households that were assigned to receive both emails and text messages. The Arkansas Department of Education created a dedicated R.I.S.E. website URL for each school to enable the study team to use Google Analytics data to determine how long each household with children in a given school spent on the website, yielding the school average time on page for each study condition. However, in error, the email and text message vendor redirected clicks in the four email and text message conditions to a single school's URL. Therefore, it was not possible to determine time on page for these study conditions separately, but it was possible to determine time on page for each mode of communication (email only or email and text message).

Limitations. The study had three primary limitations. First, the study findings might not generalize to other states or locations, message content, or time periods. For example, the study was conducted during a time when schools were communicating with households frequently regarding the COVID-19 pandemic. This context might have changed how households interacted with the study communications. They might have had "message fatigue" and ignored communications not related to the pandemic. In addition, caregivers might have had less time available as they managed additional pandemic-related responsibilities.

Second, the study team could examine the impact of communications only on clicking a link and time on page. Information was not available on whether and how households engaged with the resources on the R.I.S.E. website or whether they found them to be useful. Similarly, the analyses did not include visits to the R.I.S.E. website if households navigated to the website without clicking the link from the study communications. The study team also did not have data on the extent to which households' email providers might have blocked graphics from appearing or whether emails or text messages might have been directed to a junk or spam folder.

Finally, there is a possibility of contamination between experimental conditions, as households might have forwarded emails or text messages to other households assigned to different study conditions. Data were not available to determine whether and to what extent contamination occurred.

Note

1. Economically disadvantaged status was based on eligibility for the National School Lunch Program.

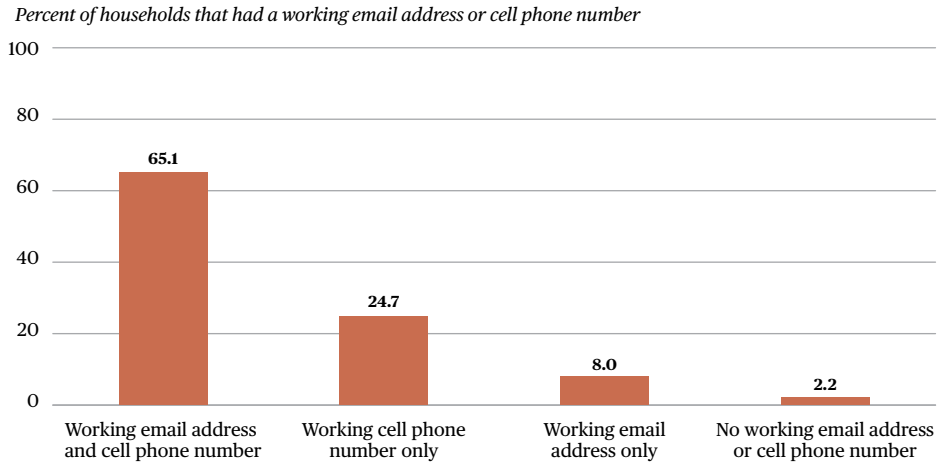
Findings

This section summarizes the main findings. Additional findings from supporting analyses are in appendix C.

Nearly all households had a working email address or cell phone number

Test messages sent in November 2021 showed that 97.8 percent of households with children in kindergarten-grade 6 in Arkansas public schools had a working email address or cell phone number, and nearly two-thirds had both a working email address and a working cell phone number (figure 2; see also table C1 in appendix C). About 89.9 percent of households had a working cell phone number, and 73.1 percent had a working email address, indicating that households may be more likely to receive communications through text messages than through emails.

Figure 2. Nearly two-thirds of households with children in Arkansas public elementary schools had a working email address and cell phone number, November 2021



Note: The sample included 180,531 households with children in kindergarten-grade 6 in Arkansas public schools in November 2021. This sample is larger than the analytic sample for subsequent findings because the test messages were sent to all eligible households, some of which then opted out of being contacted and were removed from the sample. Categories are mutually exclusive. See table C1 in appendix C for full results.

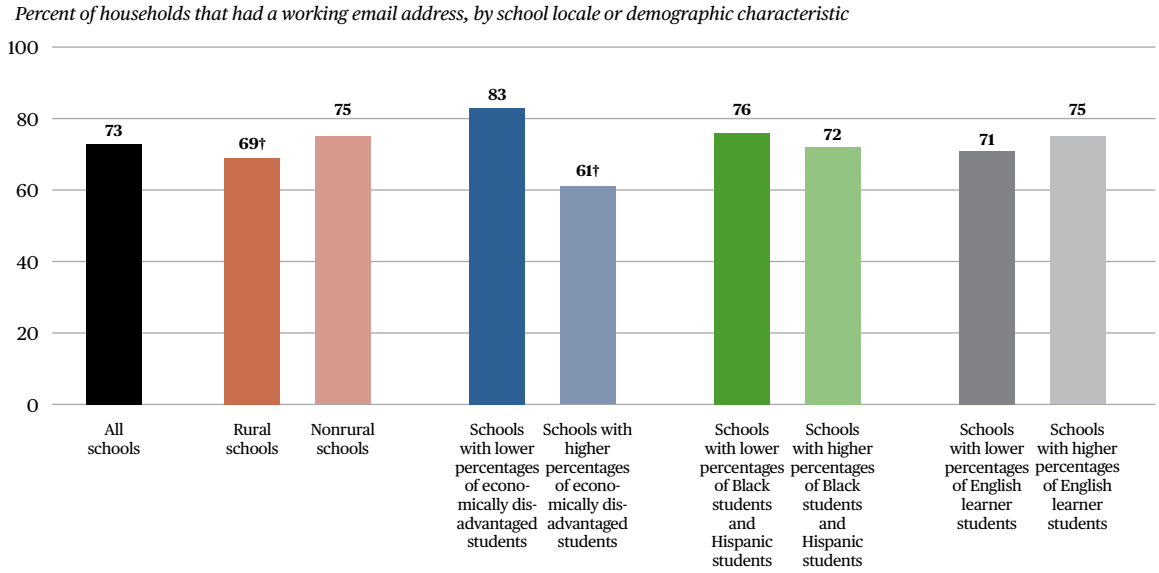
Source: Authors' analysis of data provided by the Arkansas Department of Education and the email and text message vendor.

Households with children in rural schools or schools with higher percentages of economically disadvantaged students were less likely than other households to have a working email address

The percentage of households that had a working email address varied based on school locale and the percentage of economically disadvantaged students in the school (see tables C2–C5 in appendix C). Overall, 73.1 percent of households had a working email address (figure 3). About 69.2 percent of households with children in rural schools had a working email address compared with 75.3 percent of households with children in nonrural schools. About 60.7 percent of households with children in schools with higher percentages of economically disadvantaged students had a working email address compared with 82.9 percent of households with children in schools with lower percentages of economically disadvantaged students. The percentage of households that had a working email address did not vary substantially between households with children in schools with higher percentages of Black students and Hispanic students and households with children in schools with lower percentages or between households with children in schools with higher percentages of English learner students and households with children in schools with lower percentages.

The percentage of households that had a working cell phone number was high for all schools in the sample, ranging from 87.8 percent to 91.1 percent and did not vary by school locale or demographic composition.

Figure 3. Households with children in Arkansas public elementary schools in rural areas or with higher percentages of economically disadvantaged students were less likely than other households to have a working email address, November 2021



† Difference between categories is 5 percentage points or more, which was considered meaningful.

Note: The sample included 180,531 households with children in kindergarten-grade 6 in Arkansas public schools in November 2021. Schools with lower percentages of economically disadvantaged students are those where the percentage of students eligible for the National School Lunch Program was below 71.6 percent, the 50th percentile for the state; schools with higher percentages of economically disadvantaged students are those where the percentage of students eligible for the National School Lunch Program exceeded 71.6 percent. Schools with lower percentages of Black students and Hispanic students are those where the percentage of both groups combined did not exceed 22.7 percent, the 50th percentile for the state; schools with higher percentages of Black students and Hispanic students are those where the percentage of both groups combined exceeded 22.7 percent. Schools with lower percentages of English learner students are those where the percentage was below 3.4 percent, the 50th percentile for the state; schools with higher percentages of English learner students are those where the percentage exceeded 3.4 percent. See tables C1-C5 in appendix C for full results.

Source: Authors' analysis of data provided by the Arkansas Department of Education and the email and text message vendor.

Nearly one in five households opened at least one email, and nearly 80 percent of households were delivered at least one text message

Overall, 18.9 percent of households opened at least one of the three emails sent. There was some variation across study conditions; open rates ranged from 16.8 percent to 22.5 percent (see table C6 in appendix C).[3] Open rates were lower for households with children in schools with higher percentages of economically disadvantaged students than for households with children in schools with lower percentages of economically disadvantaged students (12.8 percent compared with 24.0 percent) but did not vary by 5 percentage points or more for other school characteristics.

About 78.0 percent of households assigned to receive text messages were delivered at least one of the three text messages sent.[4] There was little variation in the percentage of households that were delivered text messages across study conditions or by school locale or demographic composition (see tables C7-C10 in appendix C).

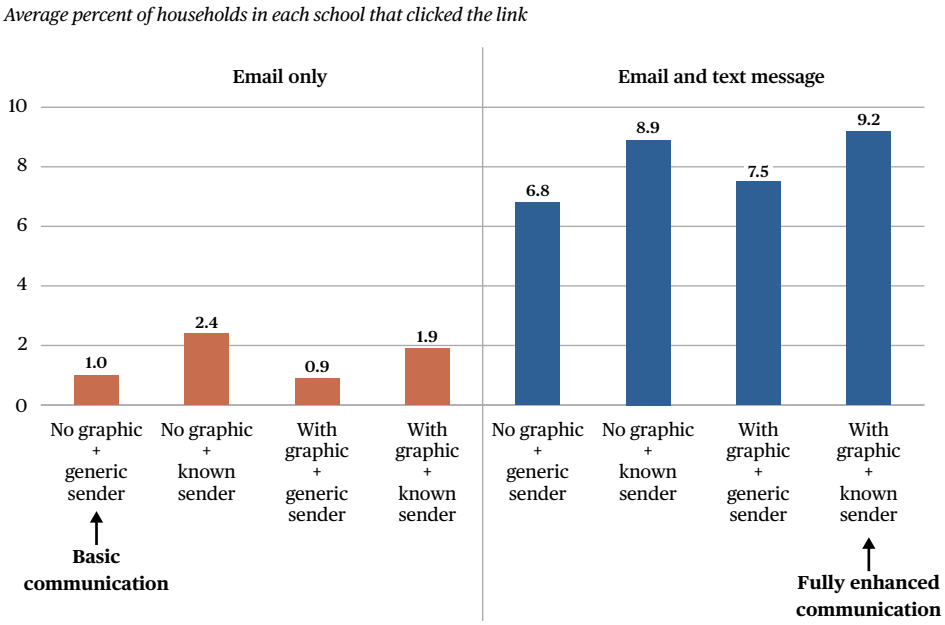
3. These rates are similar to the average email open rate of 21.3 percent in 2019, though rates varied by industry; open rates for education and training-related emails averaged 23.4 percent (Mailchimp, 2019).
4. Information was not available on whether recipients opened or read the text message.

The click rate to the Reading Initiative for Student Excellence website was highest for households assigned to receive fully enhanced communications; the higher click rate can be attributed to adding text messages and to sending communications from a known sender

Across the eight study conditions 0.9–9.2 percent of households in each school clicked the link to the R.I.S.E. website (figure 4; see also table C12 in appendix C).[5] Households assigned to receive the fully enhanced communications were the most likely to click the link. These households had a click rate of 9.2 percent compared with 1.0 percent for households assigned to receive the basic communication.[6]

The higher click rate for the fully enhanced communication can be attributed to adding text messages and to sending communications from a known sender (the school principal). After school characteristics were taken into account, adding text messages to the email only condition increased the click rate by 6.5 percentage points, and sending communications from a known sender increased the click rate by 1.5 percentage points (figure 5; see also tables C13 and C18 in appendix C). Adding a graphic did not affect the click rate.[7] The results were similar for supplementary analyses to test the validity and sensitivity of the methodology (see tables D1–D7 in appendix D).

Figure 4. The click rate to the Reading Initiative for Student Excellence website among households with children in Arkansas public elementary schools was highest for those that were assigned to receive the fully enhanced communication, January 2022

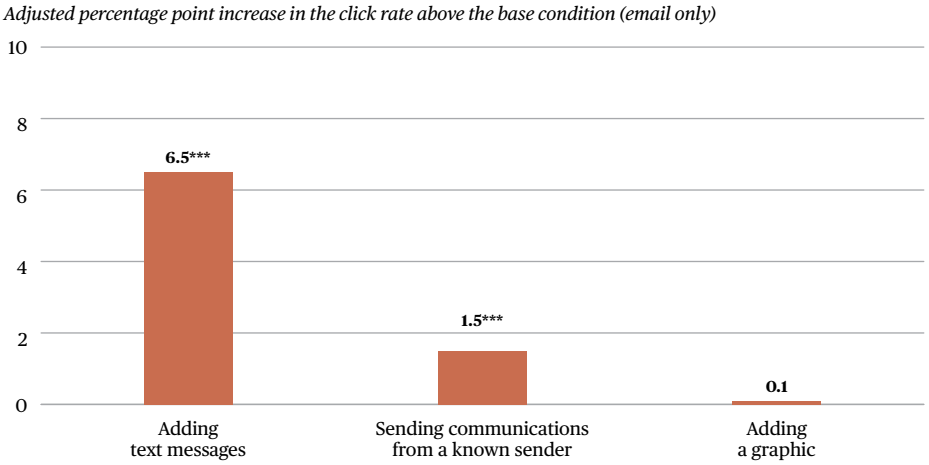


Note: The sample included 168,747 households with children in kindergarten–grade 6 in 700 Arkansas public schools in January 2022. See table C12 in appendix C for full results.

Source: Authors' analysis of data provided by the Arkansas Department of Education, the email and text message vendor, and website analytics.

5. These click rates are higher than the average click rate of 2.6 percent in 2019 for email marketing campaigns, though rates varied by industry. The highest click rate was 5.0 percent for emails in the "hobbies" category (Mailchimp, 2019).
6. Results presented in the report include English and Spanish communications. The study team analyzed data from households that were assigned to receive the communications in Spanish separately and found similar patterns, with an average click rate of 12.7 percent in the fully enhanced communication condition compared with 1.0 percent in the basic communication condition.
7. It is possible that some email providers blocked graphics from being shown, which could explain this finding. This information was not reported in the platform used to send the messages, and thus it was not possible to test whether or to what extent email providers blocked graphics from being shown.

Figure 5. Among households with children in Arkansas public elementary schools, adding text messages and sending communications from a known sender had a positive impact on the click rate, whereas adding a graphic did not have an impact, January 2022



*** Significantly different from sending only an email at $p < .001$.

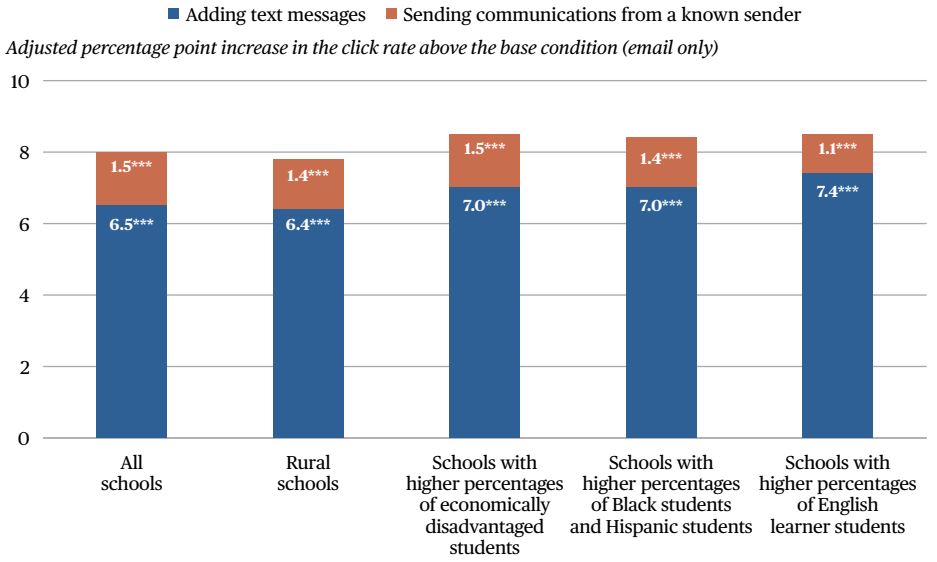
Note: The sample included 165,933 households with children in kindergarten-grade 6 in 681 Arkansas public schools in January 2022; 19 schools were excluded from estimation models due to a lack of information on school characteristics. See table C13 in appendix C for full results.

Source: Authors' analysis of data provided by the Arkansas Department of Education, the email and text message vendor, and website analytics.

The impacts of adding text messages and sending communications from a known sender on the click rate to the Reading Initiative for Student Excellence website were similar for schools with different characteristics

In rural schools, schools with higher percentages of economically disadvantaged students, schools with higher percentages of Black students and Hispanic students, and schools with higher percentages of English learner students the impact on the click rate to the R.I.S.E. website from adding text messages to the email only condition was similar to the impact from sending communications from a known sender compared with all schools in the sample (figure 6; see also tables C13–C17 in appendix C).

Figure 6. Among households with children in Arkansas public elementary schools, the impacts of adding text messages to the email only condition and sending communications from a known sender on the click rate for schools with different characteristics were similar to the impacts for all schools in the sample, January 2022



*** Significantly different from sending only an email at $p < .001$.

Note: The sample for all schools included 165,933 households with children in kindergarten–grade 6 in 681 Arkansas public schools in January 2022; 19 schools were excluded from estimation models due to a lack of information on school characteristics. The analysis of rural schools included 295 schools. The analysis of schools with higher percentages of economically disadvantaged students included 341 schools. The analysis of schools with higher percentages of Black students and Hispanic students included 341 schools. The analysis of schools with higher percentages of English learner students included 350 schools. Schools with higher percentages of economically disadvantaged students are those where the percentage of students eligible for the National School Lunch Program exceeded 71.6 percent, the 50th percentile for the state. Schools with higher percentages of Black students and Hispanic students are those where the percentage of both groups combined exceeded 22.7 percent, the 50th percentile for the state. Schools with higher percentages of English learner students are those where the percentage exceeded 3.4 percent, the 50th percentile for the state. See tables C13–C17 in appendix C for full results.

Source: Authors' analysis of data provided by the Arkansas Department of Education, the email and text message vendor, and website analytics.

Among households that clicked a link in one of the communications, the average time spent on the R.I.S.E. website was similar for those assigned to receive both an email and a text message and for those assigned to receive only an email

Households assigned to receive both an email and a text message spent a similar amount of time (an average of 35.5 seconds) on the R.I.S.E. website once they clicked the link as households assigned to receive only an email (37.2 seconds; see table C19 in appendix C).[8] The median time spent on the website was 0.0 seconds for households assigned to receive only an email and 11.0 seconds for households assigned to receive both an email and a text message, indicating that most households that clicked on the link spent little or no time exploring the page. The maximum time spent on the website was about 15 minutes.[9]

8. The average time spent on a webpage in 2021 across 14 different industries was 55 seconds (Contentsquare, 2022).
9. Household-level information regarding time spent on the website was not available, and thus the study team could not calculate how many households spent a substantial amount of time on the website.

Implications

The findings from this study have several implications for the Arkansas Department of Education, other practitioners, and researchers.

The click rate was low overall, only 9.2 percent for households that were assigned to receive the fully enhanced communication. These types of communication interventions often have a low impact, but with the low cost of implementation, they may still be a cost-effective communication strategy. The Arkansas Department of Education could consider using email and text messages alongside other approaches in a more comprehensive communication plan to encourage families to access and use available resources. For example, the department might leverage existing district family outreach programs or partner with other organizations such as Head Start to share R.I.S.E. resources.

When sharing information with families through electronic communications, the Arkansas Department of Education could consider sending both emails and text messages and sending communications from a known sender, such as a school principal. The study found that adding text messages to the email only condition increased the click rate by 6.5 percentage points. The click rate increased by an additional 1.5 percentage points when the communications were sent from a known sender. Notably, increases in the click rate associated with these features were observed overall and for schools with different characteristics. These design features are low cost and can be easily implemented in a communication campaign.

Further, sending both emails and text messages can help ensure equitable communication. The study found that more households had a working cell phone number than had a working email address, especially households with children in schools with higher percentages of economically disadvantaged students. In contrast, the percentage of households that had a working cell phone number was similar for all schools, suggesting that the most equitable way to contact families is by text message.

Finally, additional research is needed to better understand how households interact with the R.I.S.E. resources when they click the link. Most parents and guardians in this study spent little time on the site: an average of 37.2 seconds for those assigned to receive email communications and 35.5 seconds for those assigned to receive both email and text communications. The Arkansas Department of Education might consider conducting focus groups or surveys with families to understand their experiences accessing and using the resources. Specifically, focus groups or surveys could provide information about which resources are most useful and which features of the resources contribute to their usefulness, as well as whether there are ways to improve the usability, understanding, and satisfaction with the website and its resources. This type of information might also inform the department's decisions about future investments in education resources targeted toward families.

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December 2022

This report was prepared for the Institute of Education Sciences (IES) under Contract 91990018C0002 by the Regional Educational Laboratory Southwest administered by American Institutes for Research. The content of the publication does not necessarily reflect the views or policies of IES or the U.S. Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

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This report is available on the Regional Educational Laboratory website at https://ies.ed.gov/ncee/rel/.