

Academic Progress for Students Following a Hurricane



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Disasters, such as hurricanes, disrupt the lives of students in numerous ways. Students experience stress, are displaced from their homes and lose belongings. At the same time, schools may be closed for days and weeks, removing students from their sense of normalcy and taking time away from instruction. These combined effects make it more difficult for students to achieve in school during the aftermath of a disaster.

To what degree did Hurricane Matthew/Florence impact student learning in our school and district?

To help answer this pressing question, researchers from the University of North Carolina at Chapel Hill analyzed administrative data from the North Carolina Department of Public Instruction and survey data from school personnel that were heavily impacted by Hurricanes Matthew and Florence across the state. Through analysis, researchers identified the effect of the hurricanes on student test scores in selected schools heavily affected by the storms.

Methods

Researchers used a Comparative Interrupted Time Series (CITS) design* to examine the change in test scores in 15 districts that participated in the study. These 15 districts were either heavily affected by Hurricane Matthew, Hurricane Florence or both. The test scores examined include reading and math End of Grade (EOG) tests in grades 3-8, science EOG tests in 5th and 8th grade, and Math 1, English II, and Biology End of Course (EOC) test scores in high school. Figures 1 and 2 show the results of these analyses. Additionally, the research team administered an online survey to all school personnel across selected districts. The team collected respondents' perceptions on the extent to which Hurricanes Matthew and Florence impacted their students' academic achievement. Figures 3 and 4 illustrate the results.

* A CITS design looks at how test scores change in affected districts relative to other schools and takes into account trends in test scores that were already occurring.



FIRST CASE: Hurricane Matthew

- 2016 hurricane season
- NC Impact: Oct. 7-8
- At least 600,000 students affected
- An estimated 4,000 evacuees
- 109 shelters

SECOND CASE: Hurricane Florence

- 2018 hurricane season
- NC Impact: Sep. 12-15
- At least 1.2 million students affected
- An estimated 5,214 evacuees
- 384 shelters

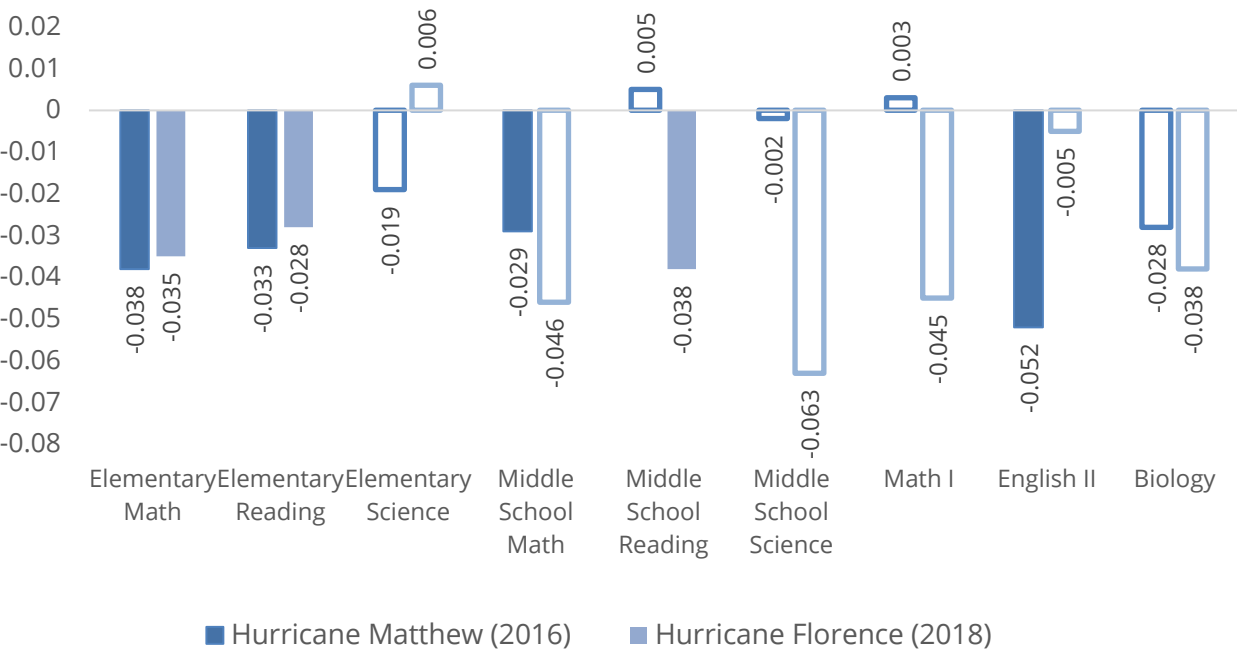
DATA COLLECTED:

- Mar. - Jun. 2019
- 15 selected districts
- Administrative data for students in all schools in selected districts
- 3,188 surveys from school & district personnel

How do the storms affect student learning?

Findings show that student achievement is hurt after experiencing a hurricane and students that are heavily affected by an event may struggle to meet achievement benchmarks. The results show clear impacts on elementary math and reading test scores, where students in sampled sites scored significantly lower than their peers who were not affected by a storm. However, the results also show impacts in middle and high schools that are less clear due to fewer schools affected, but some evidence of negative effects were revealed (Figure 1).

Figure 1. The Effect on Test Scores in 15 Heavily Affected Partner Districts



Note: Estimates in this figure come from CITS models with a rich set of student controls and school fixed effects for each district. Solid bars represent effect estimates that are statistically significant at the <.10 level. Standard errors are clustered at the school level. Effects are measured in standardized units where the statewide mean for each test and year are 0 and the standard deviation is 1.



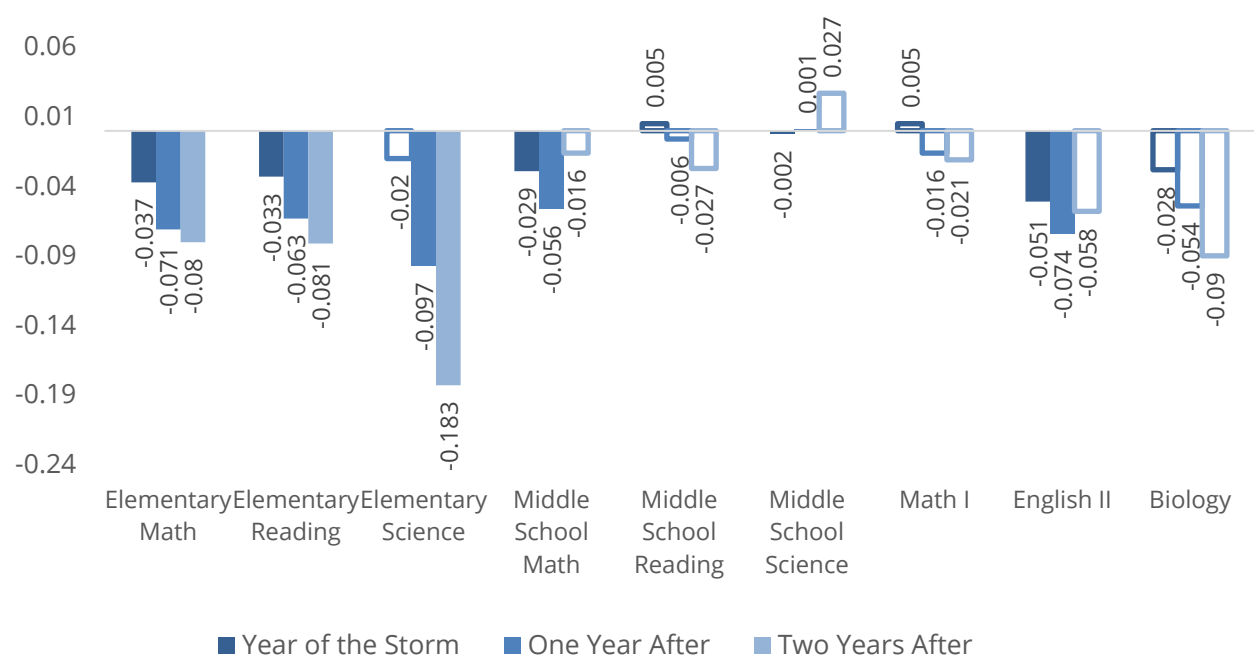
“Hurricane Matthew had an effect on the time allowed to completely cover the curriculum. Therefore students did not receive as much in-depth coverage of content, hence the test scores for exams was affected.”

-North Carolina Educator

Does student learning bounceback?

As time passes after a hurricane, student achievement may catch back up or gaps in learning may lead to long-term achievement effects. Results in Figure 2 show the results for student in the same grade levels in 15 heavily-affected partner districts. Findings suggest that students do not get back on track academically after a storm and are likely to need more help. Figure 2 also shows that elementary test score effects appear to get worse in the three years following Hurricane Matthew. The pattern is less clear in middle and high schools; however, findings suggest that some test scores became worse over time.

Figure 2. Changes in the Effect of Hurricane Matthew on Test Scores Over Time

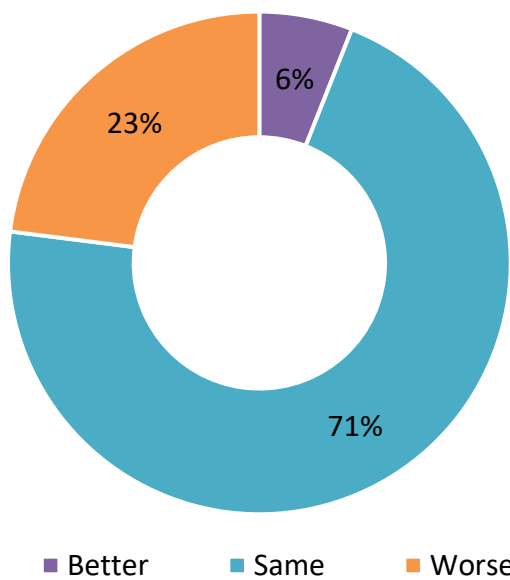


Note: Estimates in this figure come from CITS models with a rich set of student controls and school fixed effects for each district. Solid bars represent effect estimates that are statistically significant at the <.10 level. Standard errors are clustered at the school level. Effects are measured in standardized units where the statewide mean for each test and year are 0 and the standard deviation is 1.

What do educators think?

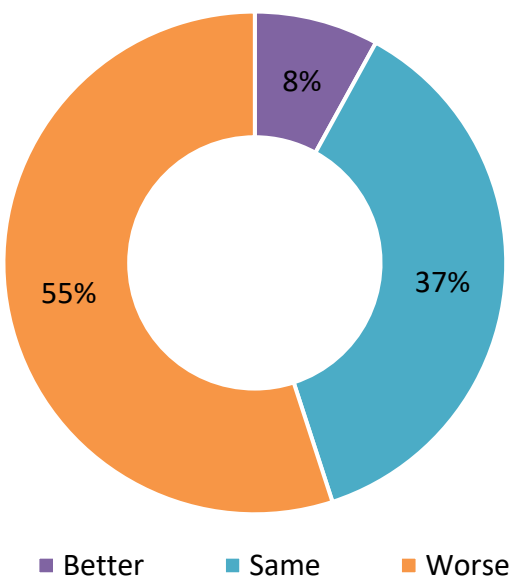
North Carolina educators were asked to compare their students’ academic achievement from before and after Hurricanes Matthew and Florence. Respondents provided open-ended responses regarding the extent to which students’ achievement improved, remained the same or worsened. One hundred and ninety-one educators addressed Hurricane Matthew and 764 educators addressed Hurricane Florence. Roughly, 71% of respondents (n=137) stated seeing no change in students’ academic performance following Hurricane Matthew (Figure 3). Comparatively, over half of educators (55%) indicated seeing a regression in students academic achievement following Hurricane Florence (Figure 4). It is important to note that educators responded two years after Hurricane Matthew and eight months after Hurricane Florence. These differences in responses could also be a reflection of timing.

Figure 3. After Hurricane Matthew



Note: Responses that reflected “don’t know”, “n/a”, or did not align to the question and deemed other, were not included in the count above. This represented 43 responses.

Figure 4. After Hurricane Florence



Note: Responses that reflected “don’t know”, “n/a”, or did not align to the question and deemed other, were not included in the count above. This represented 322 responses.

“[Students] have been very resilient. They are not where they need to be according to state stipulations, but they made tremendous gains since the beginning of the storm.”

-North Carolina Educator

Implications for Policy and Practice

After a hurricane, students experience a range of disruptions to their lives and miss school while the school building is closed. Even once students return to school, they are under stress and are attempting to catch up with the material they missed. Given the severe impacts in many communities, it is not surprising to find that student learning is affected and students in heavily-impacted schools have lower test scores after the storms.

- **Reconsider accountability requirements.** After a hurricane, schools face numerous challenges that prevent them from fully focusing on student academic achievement. Policymakers should recognize that drops in achievement are likely after a major hurricane and accountability systems may need to be adjusted to avoid punishing schools and educators for events outside of their control.
- **Support curriculum adaptation.** Following a hurricane, many schools are closed for days to weeks. Often this lost instructional time is not fully made up. Policymakers can assist schools in getting students back on track by providing resources to teachers on how best to pace the curriculum to make up for lost time.
- **Support the whole child.** The disruption to schooling created by hurricanes represents a challenge to the state reaching its mission to provide a high-quality education for all students. By supporting schools and local communities to meet students' needs following a disaster, policymakers can promote better academic achievement in recovering communities.



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The authors are solely responsible for any remaining errors.

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