RESEARCH BRIEF

Gizmos Support Student Learning, Engagement, and Motivation

Results from a teacher survey of new users in the 2022-2023 school year

STUDY OVERVIEW

ExploreLearning conducted a survey with teachers from schools that were awarded a Science Success Grant in the 2022 – 2023 school year. The grant gives schools with little or no prior usage of Gizmos free access to the program and professional development training for the teachers to support successful implementation.

The online survey was sent to all Grantees in May 2023, asking them to reflect on their experiences using Gizmos in the previous school year. Sixty-four teachers completed the survey, which included both 5 point rating scale questions and open-ended questions, on the following topics:

1) student learning
2) student engagement and motivation
3) school and/or department goal achievement

FINDINGS

In all categories, teachers provided overwhelmingly favorable feedback of Gizmos, with the highest overall agreement for the statement that "Gizmos supported improvements in student engagement and motivation." Below are the distribution of responses for questions asking teachers to agree or disagree with statements about their experience with Gizmos.

Statement	Percentage of teachers who agree	Percentage of teachers who strongly agree	Percentage of teachers who disagree
Gizmos supports improvements in student learning	84%	33%	0%
Gizmos supports opportunities for phenomena-based inquiry learning	81%	47%	3%
Gizmos supports improvements in student engagement and motivation.	88%	42%	2%
Gizmos supports the achievement of school and/or department goals.	83%	42%	5%

The first open-ended question asked teachers to describe how Gizmos supported their students' learning. Responses included the following major themes:

- **Gizmos makes abstract concepts more concrete:** Teachers responded that Gizmos reinforced in-class lecture and discussion topics by visualizing complex processes to allow for direct observation and experimentation.
- **Gizmos makes impossible tasks possible**: Teachers responded that Gizmos supported investigation and learning that was not physically or logistically possible, such as longitudinal data collection, non-visible processes, and lab activities that their school lacked materials or supplies for.
- **Gizmos supports "hands-on" investigation**: Teachers responded that Gizmos allowed students to discover insights for themselves by engaging in the experiential design process and independently performing science by manipulating and exploring variables.

GIZMOS SUPPPORTED STUDENT KNOWLEDGE GAINS

"Gizmos have been AMAZING for helping students understand concepts that are difficult to show in the real world - things like atomic structures, molecular interactions, and energy exchanges."

"They were better prepared to work through the Claim, Evidence, Reasoning process as a result of many of the Gizmos activities."

"A lot of our standards are three dimensional and we don't have the supplies to create a lab for each item. Gizmos allows for hands-on and visual learning."

The next open-ended question asked teachers to describe how Gizmos supported student engagement and motivation. Responses included the following major themes:

GIZMOS SUPPORTED STUDENT ENGAGEMENT AND MOTIVATION

"After the activity was over students would go into Gizmos and play with the data to see what would happen."

"It helped them realize science does not have cut and dry answers and you often have to experiment and research in order to find out information."

"Students who typically work slower than other students had more confidence in their science learning when they used Gizmos because they didn't have to feel rushed."

"They were allowed to 'fail' without it being seen."

- **Gizmos allows them to play the role of a 'scientist.'** Some teachers noted that their students "felt like a real scientist" when exploring Gizmos in class. Many teachers noted that interacting with Gizmos helped students see that the process of failure, feedback, and re-experimentation was all a part of the scientific method, making participation feel less threatening.
- **Gizmos reduces fear & increases confidence, leading to more intellectual curiosity.** Many teachers noted that Gizmos provided their students with the necessary knowledge, experience, and vocabulary to feel more confident. The digital, gamified format (as opposed to physical manipulations) allowed students to feel less fear around making mistakes or failing, which increased discovery and exploration. In turn, these students felt more equipped to participate in class, were asking more "what if" questions, and were more interested in learning how things worked.
- **Gizmos (verb) student-led learning.** Teachers often noted that Gizmos put students in control over their learning in a way that increased sustained engagement (and ultimately learning). Students could move at their own pace, with a goal of exploration rather than concern over proceeding down the "right" path. Additionally, some teachers noted that their traditionally reserved or introverted students were able to be as engaged as extroverted students (compared to traditional hands-on group activities). The discovery process and instant feedback supported curiosity, including students using the program "for fun" after the assignment was completed.

The last open-ended question asked teachers to describe how Gizmos supported meeting school and/or department science learning goals. Responses included the following themes:

GIZMOS SUPPORTED MEETING DISTRICT GOALS

"Gizmos provides rigor in a way that supports NGSS critical thinking, integrated topics, and SEP practice. I continue to be impressed with how Gizmos offers lessons that support opportunities to grapple with CCCs pertaining to DCIs using the SEPs…many resources lack the higher level DOK opportunities that Gizmos offers."

"There are opportunities on Gizmos that are very difficult to simulate in class. This helped me round out my learning targets this year."

"I was looking for a better way to show processes and cause-and-effect. The Gizmos I used were successful in demonstrating the concepts I wanted my students to understand, which was reflected in their answers."

- **Gizmos increased the ability to meet standards.** Teachers responded that their students were better able to meet department, district, and/or state standards and do better on related assessments, because of the higher-level opportunities provided by the program.
- **Gizmos provides opportunities that would not be otherwise possible.** Teachers responded that Gizmos supported students in obtaining experiences that were not otherwise possible due to a lack of physical labs, specialized lab equipment, and/or teacher experience. This supported teachers in meeting their goals and learning targets.
- **Gizmos supports scientific thinking.** In addition to goals related to conceptual or content knowledge, teachers responded that Gizmos helped students meet school or department goals related to creating 'scientific thinkers'.