

Riverview High School research summary

SMART Board® interactive whiteboards shown to be highly effective for collaborative learning

“As a classroom teacher, I know that students talking to each other to solve problems is a winning strategy. These experiments provide evidence that having students work together in small groups at a SMART Board interactive whiteboard will be able to provide a win-win situation for all students.”

Ian Fogarty, Teacher,
Riverview High School

Researchers at Riverview High School in New Brunswick, Canada, compared the performance of small groups completing learning activities on SMART Board interactive whiteboards to groups completing the same activities on laptops. They found that using an interactive whiteboard increased student performance on post-tests, which were given to students after they finished the group activities on either an interactive whiteboard or a laptop.

The study, *Small Groups of Science Students Gathered Around Interactive Whiteboards and Laptops*, shows that using an interactive whiteboard as a collaborative, student-centered tool is particularly effective for learning activities that are discussion oriented, less structured and cognitively challenging. In these situations, the interactive whiteboard contributes to an engaged group dynamic in which students actively participate in collaborative conversations to solve problems, resulting in increased student achievement.

Impact on students

This research shows that using the interactive whiteboard as a collaborative, student-centered tool can encourage discussion between students, lead to more involvement from all team members and increase student learning.

In this study, student performance varied based on the type of learning activity used:

- When the learning activity required students to solve a logic puzzle, students who used the interactive whiteboard first outperformed the students using laptops by 51 percent. When the students who had used laptops first were given the chance to use the interactive whiteboard, they performed better but did not fully catch up to the students who used the interactive whiteboard first.
- When the learning activity required students to recall information, students who used the interactive whiteboard first outperformed the students using laptops by 31.25 percent. When the students who had used laptops first were given a chance to use the interactive whiteboard, they performed equally well on the post-test.

“The success of the [interactive whiteboard] format may be caused by the positive group dynamics and the collaborative conversations that occur.”

Ian Fogarty, Teacher,
Riverview High School

- When the learning activity was accompanied by a learning game, students who used the interactive whiteboard first outperformed the students using laptops by 15.75 percent. When the students who had used laptops first were given a chance to use the interactive whiteboard, they performed equally well on the post-test.
- When the learning activity was accompanied by a detailed worksheet, there was no statistically significant difference between student performance

Students using the interactive whiteboard communicated more than students using laptops:

- In every experiment, students using the interactive whiteboard spoke more sentences. The difference between students using interactive whiteboards and those using laptops was more pronounced when the activity was cognitively challenging.
- When student groups used laptops, a single student took control of both the mouse and the conversation, leading other students to become more passive
- In groups of students using the interactive whiteboard, there was more collaboration from each member of the group and students more efficiently engaged in the debate and discussion that is crucial for social constructivism

Students using the interactive whiteboard significantly outperformed students using laptops when activities were cognitively challenging:

- When learning activities required students to talk and discuss, the students using interactive whiteboards performed better on post-tests than the students using laptops

Study background

- Research was conducted by Ian Fogarty, teacher and researcher at Riverview High School in Riverview, New Brunswick, Canada
- Three twelfth-grade chemistry and science classes from a suburban high school participated in the study. Students in the classes ranged from fifteen- to seventeen-years-old.
- The small groups comprised three or four students, with one academically high ranking, one academically middle ranking and one academically low ranking student. There was at least one student of each gender in each group.
- Four experiments were conducted, each lasting five days. The following sequence was used:
 - Day one – pre-test
 - Day two – small-group activity on the interactive whiteboard or laptop
 - Day three – post-test A
 - Day four – crossover small-group activity on the interactive whiteboard or laptop. Students who worked with a laptop on day two worked on the interactive whiteboard on day four, and vice versa.
 - Day five – post-test B
- Each of the four experiments included a different type of learning activity: a detailed worksheet with clear directions, learning activity with vague directions, learning game focused on knowledge recall and logic puzzle
- Conversations between students were recorded during the small-group activities
- Three SMART Board interactive whiteboards per classroom were used during the study

Conclusion

The study shows that using SMART Board interactive whiteboards during small-group learning activities promotes collaborative conversation, successfully engages more students in group work and improves the learning outcomes of students. The interactive whiteboard encourages every member of the team to contribute to collaborative conversations. When the interactive whiteboard is used as a student-centered tool, significant gains in student performance can be achieved, particularly for activities that are cognitively challenging and require student discussion.

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