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Summary of Findings from the Evaluation of iCivics' Drafting Board Intervention

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Abstract

CIRCLE, the Center for Information & Research on Civic Learning & Engagement at Tufts University, designed and conducted a randomized experimental evaluation of "Drafting Board," which is iCivics' latest teaching module. The evaluation took place in three large counties in Florida during the spring semester of 2012.

Drafting Board is a computer-based teaching module that assists students in developing skills for writing argumentative essays, as defined in the Common Core Standards for Literacy in History/Social Studies. Students were randomly assigned to use Drafting Board or the regular curriculum; 3,700 students then wrote persuasive letters on school policy that were blind-graded by trained research assistants at Tufts University. The experimental students performed better than the control students to a statistically significant degree. After accounting for race, ethnicity, gender, free or reduced-price lunch eligibility and use of outlines and drafts, we found that the intervention still had a significant and positive effect on essay scores. When differences in the students' schools and neighborhoods (e.g., student/teacher ratios, size of schools, and poverty rates) were also taken into consideration, the students who used Drafting Board still performed better. Students used Drafting Board for only 2-3 class periods, but it had a significant impact on their writing skills.

Background

iCivics is an online civic education platform founded in 2009 by Justice Sandra Day O'Connor to prepare "young Americans to become knowledgeable, engaged 21st century citizens by creating free and innovative educational materials." iCivics has already produced 16 educational video games and numerous teaching materials that have been implemented successfully throughout the United States.

With the support of the Gates and Hewlett Foundations via Educause's Next Generation Learning Challenge, iCivics commissioned an ambitious, randomized clustered-design experiment to test the effectiveness of their new, computer-based teaching module called Drafting Board. *Drafting Board* was designed to teach students to conduct research and craft arguments on key civics topics, building multi-disciplinary understandings and skills. Drafting Board modules align to the Common Core Standards in History and Social Studies for grades 6-10. They also target deeper learning competencies such as complex communication, problem solving, and self-directed learning skills. *Drafting Board* modules are available at <http://www.icivics.org/draftingboard>.

Methodology

Researchers at CIRCLE conducted all evaluation activities, with input from the iCivics team, and in accordance with the research regulations and provisions set forth by the Florida school districts that took part in this research project. The research procedures and materials were reviewed by the Tufts University Institutional Review Board (IRB) and the Research and Accountability Office at each of the participating Florida school districts.

Recruitment

iCivics program staff recruited teachers who were interested in using one Drafting Board module in their middle-school social studies class. CIRCLE staff then took over the communication to explain the research design and obtained consent to participate, with an understanding that half of the schools would be assigned to use the new module with training in spring of 2012, and the other half will be allowed to use it starting in fall of 2012.

Sample

A total of 50 teachers committed to participate in the research study. Of those, five teachers in the experimental condition and three teachers in the control condition dropped out or were unable to follow-through with their commitment. In the end, 42 teachers completed the study (84% retention). The main reason for the experimental teacher drop-off was a failure to attend the required professional training (on how to use the module) and conflicting demands on their time.

For those 42 teachers, we obtained data from a total of 3,740 students who met the inclusion criteria. The inclusion criteria were: 1) students were enrolled in a social studies class taught by teachers recruited for this study; and 2) students had the proper permission from parents/guardians to participate and agreed to participate themselves.

Procedures

Once the teacher consents were obtained, the researchers randomly assigned schools to the experimental or control conditions, so that the total number of teachers in each condition would be approximately equal (experimental $n = 22$, control $n = 20$). We randomized schools, rather than teachers, in order to minimize the spillover effects within schools.

The experimental group teachers received in-person, four-hour professional training from an iCivics staff, and the control teachers were told that they would be able to use the module the following semester but did not receive any particular intervention. Teachers in the experimental group were allowed to use the module any time during the spring semester, as long they could implement the essay test in the last two weeks of the semester. They had to schedule five class periods in their schools' computer labs to implement the program fully.

Experimental teachers implemented the module as part of a normal social studies curriculum. The control teachers taught their classes as they usually would. At the end of the semester, students in both the control and experimental groups were given an essay exam. The assignment was a persuasive letter to a school newspaper regarding a hypothetical proposal to lengthen the school year. (See Appendix A for the instructions.) Students were given at least one class period to hand-write their persuasive letter. Some teachers (in both control and experimental group) opted to require or allow students to use drafts before they submitted a final letter, and some teachers also instructed students to use an outline. Some teachers spent more than one class periods on this task. The experimental students also completed a short user-experience survey. (For specific items, see Appendix B.) Although the intervention and the essay exam were given as part of a normal Social Studies class, only the students with appropriate permission to participate in research are included in this study's data.

Once students completed the essays, they were all sent back to CIRCLE research office at Tufts University. We advertised the grader position through on-campus media and hired 16 paid research assistants to do blind grading over a three-day period (eight hours a day). The first four hours were dedicated to rater training. The focus of the training was to make sure that blind raters come to the same rating conclusions given the same essay using the rubric established for the California Writing Standards Test (Appendix C). The training was structured so that the raters first team-graded and then individually graded a total of five essay responses, each followed by a group discussion. At the end of the training, the raters were able to come to the same rating (range 1-4) on their own. At that point, they proceeded to grade their assignments of approximately 250 essays each. Graders were unaware of the experimental condition of each essay writer, and the essay booklet had no such marking so they remained blind throughout. They entered their grading and notes into an online database.

Intervention

Drafting Board is a series of computer-based teaching modules that support argumentation skills, as described in the Common Core Standards for Literacy in History/Social Studies for grades 6-10. The modules target mastery of skills such as comparing texts, analyzing information, using evidentiary support for a claim, and structuring written arguments.

iCivics was selected as a winner of a Next Generation Learning Challenge (NGLC) grant and with that funding, iCivics and Filament Games developed a new tool for learning how to write persuasive essays. The goal of the tool is to help students learn to research and produce arguments about important civics topics.

The tool, called *Drafting Board*, is implemented on a computer connected to the Internet. It is actually composed of six more specific tools, used sequentially over the course of three class periods.

The first tool is called *Issue Analyzer*, in which students are introduced first to background information about the controversy.

The second tool is called *the Claim Creator*, in which students pick a side or form an opinion on the controversy, identify reasons, and match evidence that supports their argument. Here, they also have an opportunity to free-write their reasoning (and teachers can then review their work).

The third tool is called the *Paragraph Constructor*, which helps students to construct grammatically correct and sequentially logical paragraphs that match their argument.

The fourth tool is called *the Critic Crusher*. Through this tool, students learn to understand, evaluate, and find weakness in the opposing side to further strengthen their own argument.

The fifth and sixth tools are introduced on the final day. The fifth tool is called the *Introduction Introducer*: students craft an introductory paragraph to pull the reader into the controversy. This tool also shows the students a variety of methods to introduce a persuasive essay. After a quick drill on the type of methods available to them, they select

the best bridge sentence for each option, then choose the one they like best for their essay.

Finally, *the Conclusion Crafter* helps students write a concluding paragraph and review their arguments up to that point.

The students return to core evidence tool ("*the Evidence Analyzer*") throughout to review and evaluate that supporting evidence for their argument.

Teachers can monitor individual students' progress throughout and view what they wrote and how they did on various learning activities such as evidence matching and how much time they took on each tool.

Results

Sample characteristics

A total of 3,740 students participated in the research study. Two of the three participating counties provided demographic information, which was thus available for 1,526 students of the 3,740. Although schools were randomly assigned to treatment and control group condition, the sample characteristics differed significantly between the experimental and control groups, with the control group tending to be more White and less likely to receive reduced or free school lunch. These are important difference because in general, White students and middle-class students (i.e., those not eligible for reduced or free lunch) perform better on various measures of academic achievement than non-White and poor students, respectively. We will examine the effect of these demographic factors on the outcomes later on.

All of the students were enrolled in an 8th grade Social Studies class and 99% of the students were between ages of 12 and 15. More than half (53.8%) were 13 years old with a mean age of 13.26.

Demographic factor	Drafting Board (n=938)	Control (n = 588)	Total (n =1,526)
Male %	47.7%	46.1%	47.1%
White %*	51.1%	67.9%	57.5%
Black%*	8.5%	19.4%	15.2%
Latino %	16.4%	14.3%	15.6%
Asian %	6.9%	5.1%	6.2%
Native American %	1.4%	0.7%	1.1%
Multiracial %	4.8%	3.6%	4.3%
Free or reduced lunch*	55.8%	38.6%	50.9%

*Denotes that there is a significant difference in the proportion between the experimental and control groups at alpha < 0.05 level.

Effect of Drafting Board on Essay Performance

All students

Condition	Mean Essay Score	Standard Deviation	95% CI band for mean
Experimental	2.73	.754	2.69-2.76
Control	2.54	.725	2.51-2.57

On average, the experimental students performed statistically significantly better on the essays than the control students. Experimental students scored 2.73 (out of 4) and Controls scored 2.54 ($p < .001$).

As mentioned earlier, we found significant differences in demographic characteristics between the experimental and control groups. We analyzed the difference in essay performance by race and free/reduced lunch eligibility to see if the essay scores differed by these characteristics, regardless of the experimental conditions.

We found that White students generally scored higher than Black and Hispanic students, and students who were not eligible for free or reduced lunch scored higher than those who were eligible.

Groups	Mean Essay Score	Standard Deviation	95% CI band for mean
Race			
White	2.79	.700	2.75-2.84
Black*	2.47	.702	2.38-2.56
Hispanic*	2.61	.696	2.52-2.69
Asian	2.88	.770	2.73-3.04
Lunch Eligibility			
Free or reduced Lunch eligible*	2.60	.718	2.54-2.65
Not eligible	2.84	.702	2.79-2.89

Note: * denotes the groups that scored significantly lower than the other group(s).

As we expected, the demographic variables predicted essay performance, where White students outperformed Black and Hispanic students, and students who are not eligible for free or reduced lunch (a proxy for general socioeconomic status) outperformed the students who qualified for at least reduced lunch program.

Therefore, our finding thus far suggests that Drafting Board students scored higher on the essay exam than the control group, despite the fact that their demographic composition would otherwise predict a lower performance.

In the next step, we used a linear regression analysis to account for individual demographic factors and use of outline and drafts to see what remaining effect the intervention had on essay performance.

This statistical model confirmed and strengthened our finding that Drafting Board had a positive effect on the argumentation skills. After accounting for race, ethnicity, gender, lunch eligibility and use of outlines and drafts, we found that the intervention still had a significant and positive effect on the essay score. The final model that includes all the individual predictors, and teacher-specific factors, which are use of drafts and outline, (highlighted in gray) explains 11% of the variance in essay scores, and after accounting for all the other demographic and classroom factors, the students who received the intervention, on average, scored 0.22 points higher on their essays than the students who did not. Furthermore, we found that other factors did affect performance. Female students did significantly better than male students, while the students whose teachers required an outline before the final submission did marginally better. The students who are eligible for free/reduced lunch and Black students scored significantly lower than others.

Predictors in the model	Model 1 (draft and outline)		Model 2 (student demographics)		Model 3 (intervention effect)	
	Raw coefficient	Beta	Raw coefficient	Beta	Raw coefficient	Beta
(Constant)	2.669		2.652		2.557	
Draft required	0.021	0.012	-0.07	-	0.011	0.006
Outline required	0.125**	0.086	0.199***	0.137	0.097+	0.066
Black student			-0.207***	-	-0.236***	-
White student			0.014	0.109	0.013	0.125
Hispanic student			-0.087	-	-0.089	-
female student			0.28***	0.045	0.277***	0.046
Lunch eligible			-0.207***	-	-0.227***	-
Used Drafting Board				0.144	0.217***	0.146

*** Denotes predictors that are significant, at $p < .001$ level.

* denotes that predictor was marginally significant, at $p < .10$ level

We further looked at whether experimental group students were more likely to write "excellent" essays (i.e., scoring four out of four). The students who were in the experimental condition were 38% more likely than the control students to score 4. On the other hand, students whose teachers allowed them to use outlines before the final essay were 17% more likely to score 4, and use of drafts was non-significant. Older students were significantly less likely to score 4. All these findings control for the effect of race, lunch eligibility and gender.

We tested whether the experimental group students who felt highly engaged in the program performed better on the essay test than other students in the experimental group who did not feel as engaged in the program. In a follow-up regression analysis that accounted for demographic factors, we found that the students who felt engaged in the program activities were likely to score higher than their peers who also received Drafting Board. The score was further boosted by .14 points. The student questionnaire is

attached to this report (Appendix B). On the other hand, students' overall assessment or liking of the program (whether they hoped to use the program again) did not have a significant effect on the essay scores in this analysis.

Summary of basic analysis

Our analysis shows that, despite the fact that experimental group students were more likely to come from minority and economically disadvantaged backgrounds (both of which otherwise predict lower scores), the experimental students, on average, scored higher on the argumentation essay. Furthermore, the students who reported feeling more engaged in the Drafting Board activities than they did in other types of class activities were likely to score even higher.

Group	Mean Essay Score after accounting for demographic factors	Added Score
Control Group	2.557	
Experimental Group baseline	2.774	+0.22
Experimental Group, felt engaged	2.914	+0.14

Multi-level analysis

We further validated our findings by conducting a multi-level modeling. Multi-level analysis is considered a gold standard in educational research because it accounts for the fact that characteristics that are shared among students attending the same school in a specific community explain at least some of the variance in the outcome. This Drafting Board study merited multi-level analysis because students attended different schools in diverse range of communities. The school characteristics, such as overall student-to-teacher ratio, lunch eligibility, ethnic diversity, and size of the school, and community characteristics, such as median income, unemployment rates, community-wide poverty rate, portion of residents holding college degrees, and managerial jobs, were all entered into the equation.

Again, in the final model, the Drafting Board intervention was found to have a positive and significant effect on the argumentation essay score ($t = 2.29$, $p = 0.04$). In this analysis, the school-wide free/reduced lunch eligibility rate had a negative relationship to the essay score, suggesting that students attending the schools with predominantly poor students were likely to perform at a lower level. However, the ethnic diversity of the school and school size were not significant predictors of outcome in this model.

Conclusion

The Drafting Board is an effective intervention that has a significant and positive impact on students' argumentative skills development. The finding is especially promising as the experimental group students tended to be non-White and poor, which were both predictors of lower performance in general. However, Drafting Board students overall performed at a higher level than the control students, after accounting for both individual and school- and community-level demographic factors. Drafting Board is offered free of cost to the public, and it engages students in challenging tasks of researching an issue and constructing a logical argument in an engaging and relevant way. We conclude that the benefit of Drafting Board far outweigh any cost.

Appendix A: Student Writing Task

Source: California Department of Education (2008). *Teacher guide for the 2008 California writing standards test in grade seven*. Available at: <http://www.cde.ca.gov/ta/tg/sr/resources.asp>

Directions:

- In this writing test, you will write a persuasive letter in response to the writing task on the following pages.
- You will have time to plan your letter and write a first draft with edits.
- Only what you write on the lined pages in this booklet will be scored.
- Use only a No. 2 pencil to write your response.

Scoring:

Your writing will be scored on how well you

- state your position on the topic
- describe the points in support of your position, including examples and other evidence
- address possible arguments against your position
- use correct grammar, spelling, punctuation, and capitalization. You may include a salutation and closing, but the format of the letter will not count as part of your score.

Read the following writing task. You must write a persuasive letter about this topic.

Writing the Persuasive Letter

Your school district is thinking about lengthening the school year by starting two weeks earlier. Do you think adding extra days to the school year will improve education? Write a letter to the editor of your school newspaper that will persuade others to accept your viewpoint. Be sure to address opposing viewpoints in your letter.

Appendix B: Student Feedback Form

Student Feedback Form

Dear Student:

Your classroom was chosen as one of more than 30 classrooms across Florida to use a new learning tool called *Drafting Board*. By now, you have had a chance to use it in your social studies class. This feedback form is designed to help the researchers understand students' experience with using *Drafting Board* so that the designers can improve it in the future. Thank you for your help!

As you begin, there are a few important points to keep in mind:

- 1) This is **not a test**. There are no right or wrong answers. It is important that you answer these questions honestly. Your answers to these questions will not affect your grades in any way.
- 2) This survey is confidential. Your answers will be combined with other surveys and will never be looked at individually or used to evaluate your performance in school.

Instructions:

For each question below, please fill in the appropriate bubbles completely.

First five letters of your FIRST name _ _ _ _ _
 First five letter of your LAST name _ _ _ _ _
 The month you were born _ _
 The day you were born _ _

School Code _____
 Teacher Code _____

Question 1:

How often did you experience each of the following in the lessons when you used Drafting Board, compared to lessons without Drafting Board in the same subject? Please answer the following questions by filling in the bubble that's closest to your opinion:

	1	2	3	4	5
	A lot less than usual	A little less than usual	About the same	A little more than usual	A lot more than the usual
Felt engaged in the lesson					
Felt that you were learning a lot					
Used data to make decisions					
Evaluated different solutions to a problem					
Wrote about different solutions to a problem					

Continue to the next page

Question 2:

Thinking about your experience with Drafting Board, how true does each of these statements seem to you?

	1	2	3	4	5
	Not true at all	Not very true	Neutral /I don't know	Sort of true	Very true
<i>Drafting Board</i> was easy to use.					
I hope we get to use <i>Drafting Board</i> again in my class					
The activities in the <i>Drafting Board</i> were challenging but not too hard					
The activities in <i>Drafting Board</i> helped me connect what we learn in classrooms to the real world					
I think the skills I learned using <i>Drafting Board</i> will be useful for me in the future					

Please respond to these questions by writing your opinions clearly.

Question 3:

What did you like the **most** about using Drafting Board?

Question 4:

What did you like the **least** about using Drafting Board?

Appendix C: Student Essay Grading Rubric

2008 Grade Seven Scoring Rubric: Persuasive Writing

	<i>Genre (Persuasive Writing)</i>	<i>Organization and Focus</i>	<i>Sentence Structure</i>	<i>Conventions</i>
4	<input type="checkbox"/> Authoritatively defends a clear position with precise and relevant evidence and convincingly addresses the reader's concerns, biases, and expectations. (Gr. 7 WA 2.4 a, b, c)	<input type="checkbox"/> Clearly addresses the writing task.* <input type="checkbox"/> Demonstrates a clear understanding of purpose and audience. [†] <input type="checkbox"/> Maintains a consistent point of view, focus, and organizational structure, including the effective use of transitions. (Gr. 7 WS 1.1) <input type="checkbox"/> Includes a clearly presented central idea with relevant facts, details, and/or explanations. (Gr. 7 WS 1.2)	<input type="checkbox"/> Includes sentence variety. (Gr. 6 WC 1.1)	<input type="checkbox"/> Contains some errors in the conventions of the English language (grammar, punctuation, capitalization, spelling). These errors do not interfere with the reader's understanding of the writing. (Gr. 7 WC 1.1; 1.2; 1.4–1.7)
3	<input type="checkbox"/> Generally defends a position with relevant evidence and addresses the reader's concerns, biases, and expectations.	<input type="checkbox"/> Addresses most of the writing task. <input type="checkbox"/> Demonstrates a general understanding of purpose and audience. <input type="checkbox"/> Maintains a mostly consistent point of view, focus, and organizational structure, including use of isolated and/or single word transitions. <input type="checkbox"/> Presents a central idea with mostly relevant facts, details, and/or explanations.	<input type="checkbox"/> Includes some sentence variety.	<input type="checkbox"/> Contains errors in the conventions of the English language (grammar, punctuation, capitalization, spelling). These errors do not interfere with the reader's understanding of the writing.
2	<input type="checkbox"/> Defends a position with little, if any, evidence and may address the reader's concerns, biases, and expectations.	<input type="checkbox"/> Addresses some of the writing task. <input type="checkbox"/> Demonstrates little understanding of purpose and audience. <input type="checkbox"/> Maintains an inconsistent point of view, focus, and/or organizational structure, which may include ineffective or awkward transitions that do not unify important ideas. <input type="checkbox"/> Suggests a central idea with limited facts, details, and/or explanations.	<input type="checkbox"/> Includes little sentence variety.	<input type="checkbox"/> Contains many errors in the conventions of the English language (grammar, punctuation, capitalization, spelling). These errors may interfere with the reader's understanding of the writing.

* Because this criterion addresses requirements of the writing test rather than a content standard, it does not include a standards reference.

[†] This criterion is based on content standards for previous grade levels that students must learn in order to write more complex responses required in grade seven.

WA: Writing Applications standards

WS: Writing Strategies standards

WC: Written Conventions standards

Genre (Persuasive Writing)	Organization and Focus	Sentence Structure	Conventions
1 <input type="checkbox"/> Fails to defend a position with any evidence and fails to address the reader's concerns, biases, and expectations.	<input type="checkbox"/> Addresses only one part, if any, of the writing task. <input type="checkbox"/> Demonstrates no understanding of purpose and audience. <input type="checkbox"/> Lacks a point of view, focus, organizational structure, and transitions that unify important ideas. <input type="checkbox"/> Lacks a central idea but may contain marginally related facts, details, and/or explanations.	<input type="checkbox"/> Includes no sentence variety.	<input type="checkbox"/> Contains serious errors in the conventions of the English language (grammar, punctuation, capitalization, spelling). These errors interfere with the reader's understanding of the writing.

Source: California Department of Education (2008). *Teacher guide for the 2008 California writing standards test in grade seven*. Available at: <http://www.cde.ca.gov/ta/tg/sr/resources.asp>

CIRCLE (The Center for Information and Research on Civic Learning and Engagement) conducts research on the civic and political engagement of Americans between the ages of 15 and 25.

CIRCLE was founded in 2001 with a generous grant from The Pew Charitable Trusts and is now also funded by Carnegie Corporation of New York, the Ford Foundation, the Spencer Foundation, and several others. It is based at the Jonathan M. Tisch College of Citizenship and Public Service at Tufts University.

