

Civic Effects of Education Models

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September 22, 2026

Abstract

Political scientists have long argued that schools nurture active citizens by teaching civics. I provide an alternative perspective by viewing schools as a formative social experience. I distinguish two models of education. Under teacher-centered models, teachers dominate decision-making and knowledge, placing students in roles that follow decisions made by authority figures. Under student-centered models, students participate in collectively producing decisions and knowledge. I argue that those learning in student-centered models take ownership of collective matters and become more active citizens. I use survey data across 79 countries to show that those who learn in student-centered models are more likely to read the news and participate in public discussions. Using data from an original survey in a natural experiment setting in South Korea, I further find that individuals who by chance have been learning in more student-centered models are more likely to engage with social issues and sign petitions.

Why do some people engage in civic life more than others? Scholars have long argued that schools teach students to be politically engaged and more years in school means more engagement but the evidence for this is mixed. Some find that education increases political engagement (Dee 2004; Henderson 2018; Mayer 2011; Paulsen et al. 2023; Sondheimer and Green 2010) while others find that the relationship is spurious (Berinsky and Lenz 2011; Kam and Palmer 2008; Marshall 2018; Tenn 2007). Throughout the literature, scholars focus on levels of education based on the assumption that schools nurture active citizens by teaching civics. I provide an alternative perspective of education's civic relevance by viewing education as a social experience that shapes political self-conceptions. Education happens in social settings among teachers and peers, and I argue that individuals learn politically relevant self-conceptions from the nature of social interactions in school. To understand the relationship between education and civic engagement, we need to recognize that education models shape such social dynamics in classrooms and, consequently, how students engage with their political community beyond school.

I distinguish teacher-centered and student-centered education models to provide a theory of the civic effects of education as a social experience. Under teacher-centered models, with hierarchical ties between teachers and students, teachers dominate decision-making and deliver knowledge to students. Under student-centered models, with horizontal student-teacher relations, students participate in decision-making and collectively construct knowledge. These two education models place individuals in either roles that collaboratively shape class content with their peers or roles that receive knowledge from authority figures,

which matters for their political self-conceptions. I argue that by making students constructors of collective knowledge in the classroom, student-centered education models lead individuals to view themselves as efficacious members of their community who hold communal views of their interests. Consequently, those learning in student-centered education models become more engaged in civic issues than their peers.

I use data from three studies to test my theory. I first use data from the Program for International Student Assessment (PISA) to assess whether, in diverse populations around the world, individuals who learn in more student-centered education models are more engaged citizens. PISA covers nationally representative 15-year-old students in over 70 countries, a sample that allows me to investigate patterns in a large global population. A limitation of using only PISA data is that I cannot distinguish between active citizens choosing to attend student-centered schools and student-centered schools making active citizens. I use data from two other sources to address the issue of self-selection into education models. I use the Progress in International Reading Literacy (PIRLS) to compare individuals who happen to learn in varying degrees of student-centered education within the same school, and an exploratory, non-preregistered original survey in a natural experiment setting in South Korea to compare individuals who were randomly assigned to more student-centered education models with those who were not.

Civic implications of education models

Political scientists have long argued that education is the “universal solvent” for political engagement, where those with more formal education are more likely to discuss politics, pay attention to civic issues, and take part in political activities (Almond and Verba 1963; Converse 1972). Yet evidence has been mixed. One way to resolve this conflict is to move beyond the literature’s focus on levels of education and look into the content of education.¹ Along this line, scholars have examined whether educational content that varies across fields, curricula, textbooks, and educational tracks matters for civic outcomes (Green et al. 2011; Hillygus 2004; Hillygus and Holbein 2023; Holbein 2017; Hooghe et al. 2024; Langton and Jennings 1986; Lee 2023; Nelsen 2021; Neundorf et al. 2016; Nieman and Allamong 2024; Paterson 2009; Persson 2012; van de Werfhorst 2017; Weinschenk and Dawes 2022). Recent work on systematic datasets and the historical roots of what schools teach further highlight the literature’s turn to educational content (del Río et al. 2025; Neundorf et al. 2024; Paglayan 2024).

What is overlooked in this scholarship is the fact that schools shape citizens even when they are not teaching civics and civic skills. We learn self-concepts not only by being taught but also by observing and experiencing social interactions (Hernik and Shamsudheen 2017; Rote and Smetana 2015; Turiel 1983). Political science scholarship on political

¹ An alternative route researchers have taken is to examine how the political context shapes education’s effects on political engagement and attitudes. See Croke et al. (2016), Djemaï and Kevane (2023), Larreguy and Liu (2024), Nyhan et al. (2024), and Österman and Robinson (2023) for recent examples of such work.

socialization and the participatory theory of democracy have applied these perspectives to study the civic effects of social interactions in non-political settings – hierarchical relations within schools and families create submissive self-concepts and shapes political orientations, and horizontal relations within the workplace that grant individuals voice in decision-making create more politically participatory citizens (Almond and Verba 1963; Bowles and Gintis 1976; Elden 1981; Pateman 1970; Sobel 1993). I argue that political learning in schools is not an exception. Schools are a place of profound social experiences and individuals are shaped through teacher-student and peer interactions, independent of what is explicitly communicated during these interactions. To understand the relationship between education and political engagement, we need to recognize that education models shape such social dynamics and consequently, how students engage with their political community beyond school.

A handful of scholars have empirically investigated certain aspects of the social experience of education, including work on civic implications of group-focused teacher practices, disciplinary experiences with school authorities, and interactions with wealthy peers (Algan et al. 2013; Bruch and Soss 2018; Mendelberg et al 2021). Yet no work distinguishes the general nature of social interactions in school and derives civic implications. John Dewey wrote in 1916 that the kind of education where teachers lecture at passively listening students creates docile citizens who are keen to "take orders from the few set in authority" (Dewey 1916, 421). In contrast, the kind of learning where students actively participate creates engaged and independent-thinking citizens. I provide a theory of the civic

effects of such types of education models, conceptualized as teacher-centered and student-centered.²

The first extreme of the continuum is a model of learning with hierarchical ties between teachers and students, where the teacher is responsible for the delivery of knowledge to students. Teacher-centered models build on an empiricist view of knowledge: to learn is to be transmitted knowledge that exists independent of individuals, just as to perceive is to receive sensory data input from objects that exist independent of the perceiver. Consequently, learning in teacher-centered models is achieved by teachers lecturing students and students understanding and memorizing the content delivered by teachers. The other extreme of student-centered education is a model of learning with horizontal teacher-student ties, where students participate in the construction of knowledge. In student-centered models, transmission of pre-existing knowledge is not learning. Consistent with constructivist theories of cognitive development, learning entails individuals constructing their own understanding of the world. That is, knowledge cannot be simply passed on. So, student-centered models of education focus on discussion and student participation rather than lectures as the mode of instruction (Table 1).

² See Jackson (1986), Granger et al. (2012), Mascolo (2009), Sadovnik et al. (2013), Schweisfurth (2013), Vavrus et al. (2011), and Wu and Huang (2007) for examples of prior work that distinguishes student-centered and teacher-centered models of education.

Table 1. Two ideal models of education

	Teacher-centered	Student-centered
Theory of knowledge	Empiricist	Constructivist
Theory of learning	Teacher transmission	Student construction
Instructional focus	Lectures Memorization	Discussion Student participation
Student role	Receiver of knowledge	Constructor of knowledge
Teacher-student ties	Hierarchical	Horizontal

My conceptualization of education models departs from prior work on student-centered education. Student-centered education is not well defined in the literature and is invoked for various and, at times, conflicting practices (Hoidn and Klemenčič 2020; Lattmier 2015; Schweisfurth 2013). One strand of work conceptualizes student-centered education models as those that aim to increase reasoning skills rather than knowledge of facts, which is best achieved through group work and real-life applications (Bietenbeck 2014; Korbel and Paulus 2018; Lavy 2016; Zemelman et al. 2005). Another strand of work conceptualizes student-centered education as models that actively engage students in their learning (Beom et al. 2018; Bosio and Origo 2020; Cordero and Gil-Izquierdo 2018; Deslauriers et al. 2019). Both ways of conceptualizing student-centered education are consistent with the constructivist approach that learning happens when individuals “transform existing knowledge into higher-order modes of thinking” (Mascolo 2009, 4).

Here, rather than focusing on high-order thinking as the defining characteristic of student-centered education, I conceptualize student-centered education models as those where the learners take part in creating classroom discourse, as a function of horizontal

teacher-student ties. I consider any forms of discussion that does this as student-centered practices and I do not qualify student-centered practices to, for example, higher-level discussions that build reasoning skills or high levels of student engagement. Similarly, I consider group projects, presentations, and other forms of in-class student activities that shape what is learned in class as student-centered education practices, even if these activities are not necessarily cognitively complex exercises. The important qualifier for my conceptualization is that activities are only considered student-centered if they shape class content and discourse. For example, if students regularly present and take part in group activities but the nature of these activities is to summarize what has already been taught by the teacher, I consider such activities to be teacher-centered rather than student-centered.

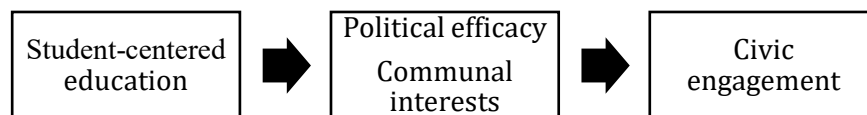
My conceptualization of student-centered education models is also distinct from the notion of open classroom climates. Open classroom climate refers to classroom settings where social and/or political issues are openly discussed in classes with civic content. Prior studies have found that open classroom climates are associated with higher levels of civic knowledge and engagement (Campbell 2008; Ehman 1980; Torney-Purta et al. 2001; Willeck and Mendelberg 2022). While student-centered education may be easier to implement for certain content or subjects than others, it can be implemented for a wide range of subjects including classes that do not deal with civics. I deliberately choose a minimalist conceptualization of student-centered education that focuses on the structure of student-teacher and peer relations because the crux of my theory is that even without high-level debate, student engagement, or civic content, the social structure of interpersonal relations itself can independently shape civic engagement.

I argue that by making students constructors of class content, the social structure of student-centered education models lead to two mechanisms that increase civic engagement: political efficacy and communal interests. First, individuals in student-centered education settings experience affecting change in their school as they fulfil and observe their roles as constructors of knowledge and as active participants in classroom discussions. I argue that repeated exposure to such practices in school leads individuals to see themselves as efficacious citizens who can shape outcomes in communities outside their school as well. If more horizontal practices in the workplace can extend to a stronger sense of efficacy in one's political community (Elden 1981), analogous practices in the classroom with enhanced student voice under student-centered education models should also strengthen political efficacy. I argue that even outside of classes dealing specifically with civics issues, student-centered education models incorporating more horizontal learning practices, such as discussion, enhance students' political efficacy and by doing so, increase levels of civic engagement.

A second mechanism through which education models affect civic engagement is by forming communal interests. In teacher-centered models, the student's role is to listen and receive knowledge transmitted by teachers with minimal peer interactions, which contrasts with student-centered models where students are tasked with using their voice to collectively construct knowledge in the classroom with their peers. I argue that by taking part in collective discussions with their peers and teachers, individuals learning in student-centered models come to identify themselves as community members and see their interests

in those of their community's more so than those learning in teacher-centered models. This mechanism is analogous to one of the main claims of the Participatory Theory of Democracy, which posits that discussion and decision-making in public life have an integrative function: individuals who participate acquire self-conceptions that they are a member of a community whose welfare is linked to that of their community's (Pateman 1970, 33). I argue that even in non-political contexts such as classrooms, taking part in collective discourse develops communal identities that link one's own interests to those of their community's. In sum, I argue that learning in student-centered education models makes individuals more likely to view themselves as efficacious members of a community that they have stakes in.

Figure 1. Theoretical framework



Testing the civic effects of student-centered education

I use data from two international studies and an original study in South Korea to test my argument. I first use the Program for International Student Assessment (PISA) 2018 to assess whether individuals who learn in more student-centered education models are more engaged citizens than their peers. PISA covers nationally representative 15-year-old students in over 70 countries, a sample that allows me to investigate patterns in a large global population. A limitation of using only PISA data is that I cannot distinguish between active citizens choosing to attend student-centered schools and student-centered schools making

active citizens. Recognizing that people may select certain types of schools, I use data from the Progress in International Reading Literacy (PIRLS) 2006 for within-school comparisons and an original study that I fielded in South Korea to compare individuals who were randomly assigned education models.

I first turn to PISA 2018 and PIRLS 2006 for broad patterns in various contexts around the world.³ Both PISA and PIRLS include information on teaching practices that reflects the distinguishing philosophies of student-centered and teacher-centered education. Student-centered education models derive from constructivist theories of knowledge whereas teacher-centered models are based on an empiricist view of knowledge. While individuals are often not aware of such philosophical underpinnings of their education, they observe teaching practices that reflect one philosophy over the other. Based on an understanding of learning as acquiring knowledge that exists outside the learner, teacher-centered education models focus on class-wide lectures and comprehension of learning materials. Conversely, student-centered education models emphasize student participation, discussion, and group work, since learning is achieved by learners constructing their knowledge.

I measure education models with these teaching practices, using student questionnaire responses from PISA 2018 and teacher questionnaire responses from PIRLS 2006 (Table 2). I use the degree of group work and student participation as measures of student-centered teaching. I use the extent to which teachers lecture, teach to the class as a whole, and focus on comprehension of class materials as teacher-centered practices. To create a measure of

³ See Appendix A for more information about PISA 2018 and PIRLS 2006.

education models ranging from teacher-centered to student-centered, I construct a Student-centered Education Index ranging from 0 to 1 where student-centered education teaching practices load positively onto the index and teacher-centered education practices load negatively onto the index.⁴ The index is positively correlated with student-centered practices while negatively correlated with teacher-centered practices (Appendix B2-B3).⁵ It is also significantly more driven by student-centered than teacher-centered practices in the sense that student-centered practices load on much more strongly to the index than teacher-centered practices. To address this issue of biased loading, I supplement my main analysis by adding a robustness check where I replace the index with measures for each education model (Table 4).

⁴ Appendix B1 shows the iterated principal factor analysis and loadings used to construct the Student-centered Education Index in each survey. The student-centered model measures map onto a single underlying factor and teacher-centered model measures onto another, indicating that these measures reflect distinct, contrasting types of teaching practices.

⁵ I plot the Student-centered Education Index values along the average of the two student-centered teaching practice measures in PISA 2018 in Appendix B2 to illustrate how the index corresponds to its component items. I do the same with the teacher-centered education measures in Appendix B3.

Table 2. Component questions of the student-centered education index

Education model	Data	Question wording
Student-centered education	PISA (2018)	How often does the following occur in your reading class? ⁶ The teacher... • encourages students to express their opinion about a text • poses questions that motivate students to participate actively
	PIRLS (2006)	In a typical school week, what percentage of your time in class with students do you devote to the following activities? ⁷ • Working with individual students or small groups After students have read something, how often do you ask them to do the following? ⁸ • Write something about or in response to what they have read • Talk with each other about what they have read • Do a project about what they have read
Teacher-centered education	PISA (2018)	How often does the following occur in your reading class? ⁹ The teacher... • tells students what they have to learn • asks questions to check whether students understand what was taught
	PIRLS (2006)	In a typical school week, what percentage of your time in class with students do you devote to the following activities? ¹⁰ • Teaching the class as a whole After students have read something, how often do you ask them to do the following? • Answer reading comprehension questions in a workbook or on a worksheet about what they have read • Answer oral questions about or orally summarize what they have read • Take a written quiz or test about what they have read

⁶ Response options include never or hardly ever, in some lessons, in most lessons, and in all lessons.

⁷ Respondents wrote a number between 0 and 100 to indicate the relevant percentage.

⁸ Response options include never or almost never, once or twice a month, once or twice a week, and every day or almost every day.

⁹ Response options include never or hardly ever, in some lessons, in most lessons, and in all lessons.

¹⁰ Respondents wrote a number between 0 and 100 to indicate the relevant percentage.

For my outcome, I measure civic engagement with news consumption and public discussion participation. Table 3 shows the question wording for each item and Appendix C shows the distribution of responses that range from ‘never or almost never’ to ‘several times a week’ for newspaper consumption in PISA 2018 and from ‘never or almost never’ to ‘at least once a day’ for the remaining three items. Summary statistics and response options for all items are also available in Appendix C. Overall, three in five participants indicate that they consume news on at least a monthly basis. The majority do not take part in public group discussions but over two in five say that they do so at least several times a month.

Table 3. Civic engagement measures

Data	Civic engagement	Question wording
PISA (2018)	Newspaper consumption	How often do you read these materials because you want to? • Newspapers
	Online news consumption	How often are you involved in the following reading activities? • Reading online news
	Public group discussion	How often are you involved in the following reading activities? • Taking part in online group discussions or forums
PIRLS (2006)	Newspaper consumption	How often do you read these things outside of school? • I read newspapers

Civic effects of student-centered education across countries

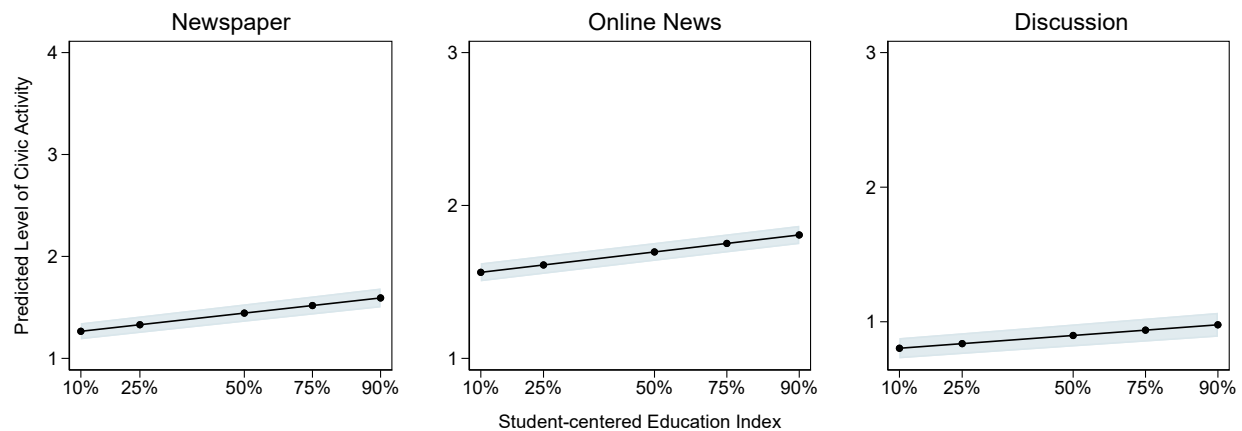
PISA’s respondents are nested in schools, which are nested in countries. To account for the fact that individuals in the same school and those in the same country are more alike, I estimate multilevel models with random intercepts. This allows levels of civic engagement to vary by schools and by countries. I predict how frequently the respondent reads newspapers, reads online news, and takes part in public group discussions with the Student-centered Education Index. I control for gender, socioeconomic status, and reading scores in

all models.

I find that student-centered education predicts higher levels of reading news and taking part in public group discussions (Appendix D1). A maximal increase in the Student-centered Education Index predicts 0.50 higher levels of reading newspapers, equivalent to a little over one-third of a standard deviation, and 0.37 higher levels of reading online news. The same change predicts 0.26 higher levels of taking part in public group discussions – a little over one-fifth of a standard deviation. Moving from the bottom quartile in the Student-centered Education Index to the top quartile is associated with an approximately 0.19 increase in reading newspapers, 0.14 increase in reading online news, and a 0.10 increase in taking part in public group discussions (Figure 2). These effect sizes are substantively large. Prior studies have found that men and adolescent boys are more likely to be politically engaged than women and adolescent girls, which I replicate in my analysis (Appendix D1).¹¹ I find that an inter-quartile increase in student-centered education boosts news consumption more than being a boy and increases discussion participation approximately two-thirds of the effect of being a boy.

¹¹ Examples of such work include Beauvais (2020), Bos et al. (2021), Coffé and Dilli (2014), Fraile and Sánchez-Vítores (2020), and Liu (2020)

Figure 2. Civic effects of student-centered education, PISA 2018



Note: Multilevel regression estimates with robust standard errors shown along percentiles of the Student-centered Education Index, which ranges from 0 to 1. 10% is at 0.23, 25% is at 0.36, 50% is at 0.59, 75% is at 0.74, and 90% is at 0.89 on the Index. Outcome is frequency of each form of civic engagement. Civic engagement level ranges from 0 (Never or almost never) to 4 (several times a week) for newspaper and to 3 (several times a day) for online news and public discussions.

Results are robust to predicting civic engagement with separate measures for student-centered education and teacher-centered education rather than a single index that combines both education models. Here, I measure student-centered education with the mean of responses to how often teachers encourage student participation and discussion in their classes and I measure teacher-centered education with the mean of responses to how often teachers lecture to students and check understanding of class material by either questioning or tests.¹² I include both student-centered education and teacher-centered education in place of the student-centered education index to predict levels of civic engagement. Consistent with Figure 5, student-centered education predicts higher levels of news

¹² Cronbach's alpha is 0.74 for student-centered education and 0.66 for teacher-centered education.

consumption and public discussion (Table 4). While teacher-centered education also predicts more civic engagement, the estimated civic effect of teacher-centered education is significantly weaker than that of student-centered education. A one-unit increase in teacher-centered education predicts 0.2-0.5 higher levels of civic engagement - approximately 14-55% of student-centered education's estimated civic effects. These differences between the coefficients on student-centered and teacher-centered education are statistically significant ($p = 0.00$) for each act of civic engagement.

Table 4. Predicting civic engagement with separate measures for each education model

	(1) Newspaper	(2) Online News	(3) Public Discussion s
Student-centered Education	0.14* (0.01)	0.09* (0.00)	0.07* (0.01)
Teacher-centered Education	0.02* (0.01)	0.05* (0.00)	0.03* (0.00)
Girl	-0.19* (0.02)	-0.04* (0.01)	-0.16* (0.01)
Socioeconomic Status	1.17* (0.12)	1.34* (0.06)	1.27* (0.09)
Reading score, logged	-0.17* (0.07)	0.37* (0.03)	-0.52* (0.03)
Constant	1.54* (0.45)	-1.69* (0.21)	3.16* (0.20)
Observations	507,377	500,814	502,324
Number of countries	72	72	72

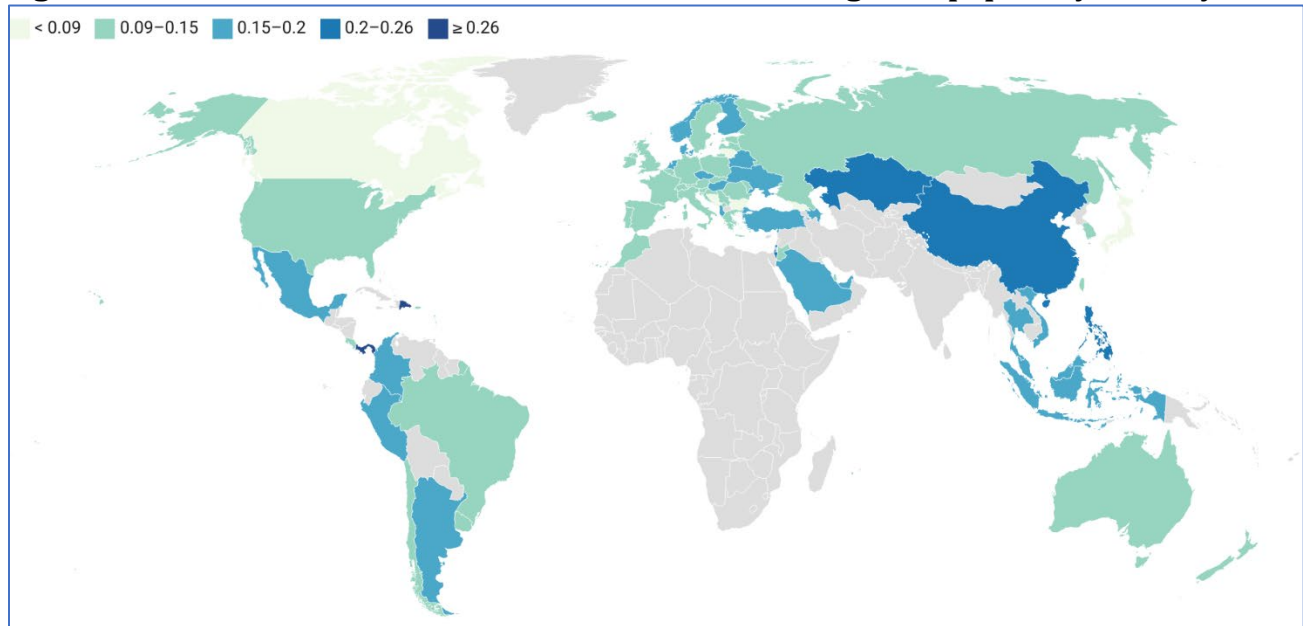
Note: Multilevel regression estimates with robust standard errors shown in parentheses. Student- and teacher-centered education ranges from 0 to 3. Outcome is frequency of each form of civic engagement. Civic engagement level ranges from 0 (Never or almost never) to 4 (several times a week) for newspaper and to 3 (several times a day) for online news and public discussions. * $p < 0.05$

These results mostly hold when looking at the civic effect of each education model within countries. Except for a handful of countries that include Bosnia and Herzegovina,

Germany, Greece, Japan, and Uruguay, individuals in each country who are learning in more student-centered models than their domestic peers are more attentive to news and public discussions. This is the case in a wide range of countries that include varying levels of democracy and income. Figures 3-5 show each country shaded according to its estimated size of the civic effect of student-centered education, with darker shades indicating larger effect sizes and gray indicating missing data. The civic effect of student-centered education ranges from 0.04 to 0.31 for newspapers, 0 to 0.20 for online news, and 0 to 0.21 for group discussions. In contrast, the estimated civic effect of teacher-centered education is modest and not as consistent (Appendix D2). While student-centered education predicts higher levels of reading news in all 73 countries except Japan and Germany, those learning in teacher-centered models are more attentive to news and public discussions in less than half of the countries.¹³ In sum, both across the board and within countries, those who are learning in student-centered models are more likely to be active citizens to a larger extent than those learning in teacher-centered models.

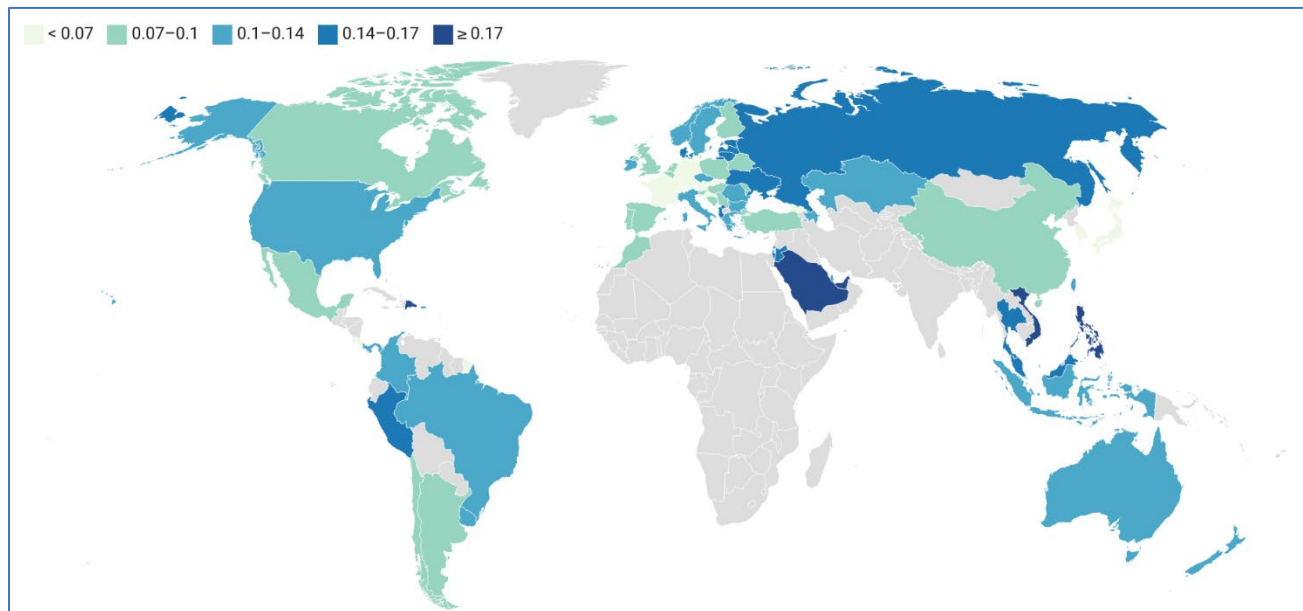
¹³ These countries are Australia, Brazil, Brunei Darussalam, China, Colombia, Croatia, Denmark, Dominican Republic, Hungary, Indonesia, Ireland, Israel, Italy, Kazakhstan, Jordan, Malaysia, Malta, Mexico, New Zealand, Peru, Philippines, Poland, Qatar, Saudi Arabia, Singapore, Slovenia, Sweden, Thailand, Taiwan, Turkey, United Arab Emirates, United Kingdom, and United States.

Figure 3. Effects of Student-centered Education on Reading Newspapers by Country



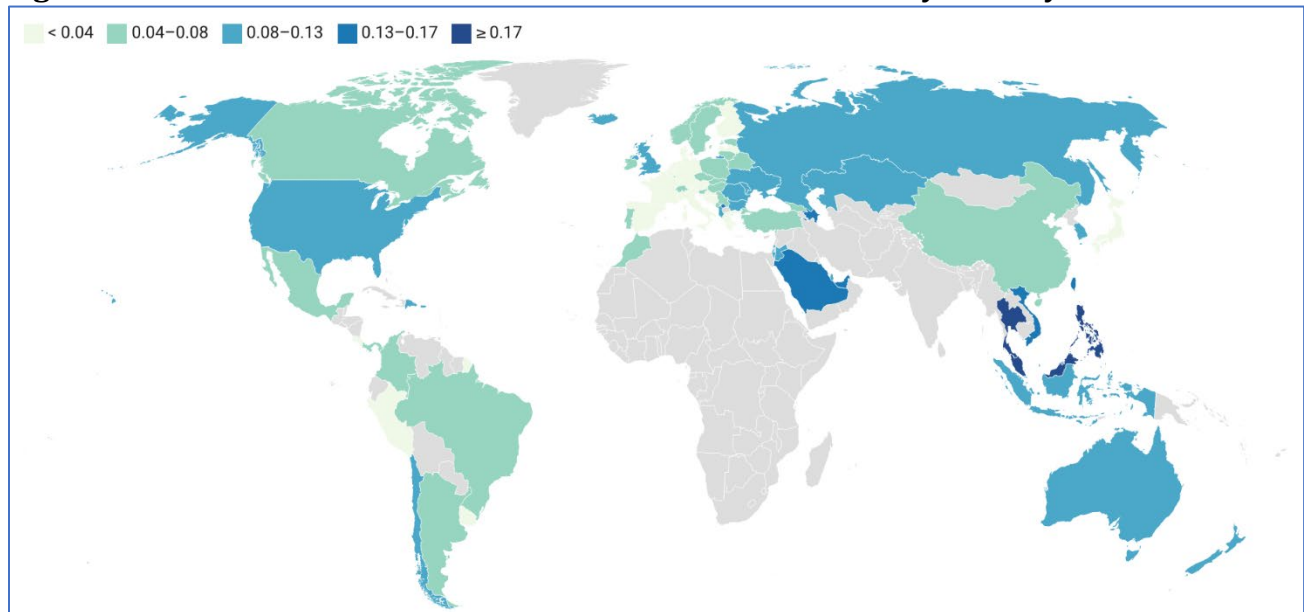
Note: Countries shaded by estimated effect sizes when predicting frequency of reading newspapers with student-centered education. Estimates for all countries except Japan are statistically significant at $p < 0.05$.

Figure 4. Effects of student-centered education on reading online news by country



Note: Countries shaded by estimated effect sizes when predicting frequency of reading online news with student-centered education. Estimates for all countries except Germany are statistically significant at $p < 0.05$.

Figure 5. Effects of student-centered education on discussion by country



Note: Countries shaded by estimated effect sizes when predicting frequency of taking part in online group discussions with student-centered education. Estimates for all countries except for Bosnia and Herzegovina, Germany, Greece, Japan, and Uruguay are statistically significant at $p < 0.05$.

Comparing classrooms within schools

Although a correlation between learning in student-centered models and engagement with civic issues is consistent with my argument, there is a potential issue: individuals who are predisposed to being active citizens may choose to go to schools that offer more voice to their students. Those who enjoy expressing their opinions in group settings may choose to attend student-centered schools where students have more voice during class and in school matters. If this were the case, then even if we observe that individuals learning in student-centered models are more engaged citizens, this correlation would be spurious. Rather than showing the civic effect of student-centered education, a positive correlation between

student-centered education and civic engagement would simply be an artifact of certain types of people choosing to go to certain schools.

I address this issue in two different ways – comparing students within the same school and comparing students who were assigned by lottery to more student-centered schools to those who were not. I use PIRLS 2006 data for the first method. While each participating school in PISA surveyed a random sample of its students, over one in three participating schools in PIRLS surveyed two randomly selected intact classrooms and administered a survey to each sampled classroom.¹⁴ With the structure of the PIRLS data, I can assess whether individuals learning in more student-centered classrooms are more engaged citizens than their peers within the same school. To do so, I restrict my analysis of the PIRLS data to a subset of participating schools that sampled two or more classrooms and fit fixed-effects regression models with school fixed effects.¹⁵ This allows me to control for school-level characteristics and estimate the causal effect of classroom-level education models on civic engagement among individuals attending the same school.¹⁶

In addition to within-school comparisons, the PIRLS data provides two important

¹⁴ 35.2% of schools participating in PIRLS 2006 sampled two or more classrooms. See Appendix A for more details on PISA 2018 and PIRLS 2006.

¹⁵ See Algan et al. (2013) for a similar application of PIRLS data.

¹⁶ The subset of schools with two or more classrooms has similar mean levels of student-centered education and newspaper consumption as the full PIRLS 2006 sample – 0.29 and 1.13 respectively for the subset and 0.24 and 1.19 respectively for the full sample. The main analysis results in Table 4 mostly replicate when using the full sample and fitting a multilevel regression model without school fixed effects, with the one inconsistency being that in addition to newspaper consumption, the Student-centered Education Index also predicts higher levels of reading novels rather than non-fiction (Appendix E1).

advantages. PIRLS 2006 includes measures of reading not only news but also non-civic forms of texts such as novels, non-fiction, and comic books. I estimate the effect of student-centered education on reading newspapers and compare this to these non-civic forms of reading. This allows me to assess impacts on engagement with civic issues distinct from engagement with reading in general, which was not possible with the PISA data. Secondly, PIRLS 2006 surveyed both students and teachers in each sampled classroom. This allows me to use teacher-based measures of education models for each classroom, which is important because students learning in the same classroom may perceive the same teaching practices differently. For example, it may be that individuals who enjoy speaking up in class are more attentive to teachers' questions that invite student participation. These individuals would perceive a higher level of student-centered practices than their peers in the same classroom. They may also become more active citizens not because of exposure to different education models but because they simply enjoy speaking up in various realms. The PIRLS analysis addresses this concern by using teacher-based measures of classroom-level education models to predict student-level civic engagement.

I find that consistent with the PISA 2018 analysis, the Student-centered Education Index predicts higher engagement with news – a maximal increase in the index from 0 to 1 predicts 0.16 higher levels of newspaper consumption (one-tenth of a standard deviation), which ranges from 0 “Never or almost never” to 3 “Every day or almost every day” (Table 5, model 1). That is, comparing individuals within the same school, those who are learning in more student-centered classrooms are more likely to seek out news about their community. Is this simply a byproduct of student-centered education raising interest in reading?

Student-centered education may increase news consumption because it makes individuals more likely to read in general compared to teacher-centered education. It may be that newspapers are one among a variety of things individuals read when they enjoy reading, rather than something that individuals turn to when they are interested in civic issues. I find that this is unlikely to be the case. In models 2 to 5 in Table 5, I estimate the effect of the Student-centered Education Index on the frequency of other, non-civic forms of reading such as non-fiction (model 2), stories or novels (model 3), comic books (model 4), and magazines (model 5). Student-centered education does not predict higher engagement with most of these forms of reading other than non-fiction. That is, individuals learning in student-centered models are more active citizens who seek out information about their community, rather than being more voracious readers who generally read more than their peers.

Results are robust to using separate measures for student-centered and teacher-centered education rather than a single index of education models. Here, I measure student-centered education with the percentage of time teachers spend working with groups and teacher-centered education with the percentage of time teachers spend teaching to the class as a whole.¹⁷ When I include both measures in place of the Student-centered Education Index and otherwise replicate the Table 5 analysis, results do not substantively change (Table 6).

¹⁷ I rescale these items to range from 0 to 1 rather than 0 to 100. While I also included three addition items on post-reading activities for each education model to construct the Student-centered Education Index, I omit these items here due to low internal consistency. Cronbach's alpha for all four items on student-centered education practices for PIRLS 2006 in Table 3 is 0.54 and is 0.45 for the four teacher-centered education practice items. The three items on post-reading activities also have low internal consistency – for student-centered education practices, Cronbach's alpha is 0.57 and for teacher-centered practices, it is 0.49.

Student-centered education predicts higher engagement with news – increasing the percentage of student-centered education from 0 to 100 predicts 0.17 higher levels of newspaper consumption, equivalent to approximately a tenth of a standard deviation. I do not detect a civic effect of teacher-centered education, and the coefficient on student-centered education is significantly higher than the coefficient on teacher-centered education ($p = 0.02$). Student-centered education does not predict higher levels of reading materials other than newspapers.

Why does student-centered education increase civic engagement? I argue that individual perceptions of the nature of their community partly drive the civic effect of student-centered education. While those who learn in more student-centered models are not any more connected to friends nor any more likely to view their school and teachers favorably (Table 7), they are significantly more likely to perceive that their peers at school respect, care for, and help each other (Table 8). These findings are consistent with student-centered models shaping beliefs that their community is one where individuals are invested in the welfare of others, and step in to help. Then as members of such a community, individuals learning in student-centered models are motivated to actively learn about community issues through means such as reading the news.

I observe these differences across classrooms within the same school – individuals learning in more student-centered classrooms are more likely than their peers learning in the same school to believe that their school community beyond their classroom is one where individuals help each other out. That is, when individuals are asked about the same group of

students, those who are learning in a more horizontal education model hold more communal views of their peers. It is notable that education models that vary at the classroom level shape more general perceptions of schoolmates outside the individuals' own classroom. And the fact that student-centered education predicts higher levels of interest in news about their community beyond their school implies that individuals take their experiences in class to form beliefs about not only their school community beyond the classroom, but also their political community beyond their school.

Table 5. Within-school estimates of the civic effect of education models

	(1) News	(2) Non- fiction	(3) Novels	(4) Comics	(5) Magazines
Student-centered Education Index	0.16* (0.01)	0.13* (0.02)	0.12 (0.06)	0.00 (0.97)	0.05 (0.36)
Girl	0.03* (0.01)	0.05* (0.00)	0.41* (0.00)	-0.29* (0.00)	0.32* (0.00)
Parents' education	-0.01* (0.02)	-0.01 (0.08)	0.05* (0.00)	0.01* (0.00)	-0.02* (0.00)
Reading score, logged	0.00 (0.07)	-0.00* (0.00)	0.00* (0.00)	-0.00 (0.72)	0.00 (0.12)
Class size	0.00 (0.18)	0.00 (0.21)	0.00 (0.30)	-0.00 (0.64)	0.00 (0.99)
Teacher experience	-0.00 (0.30)	0.00 (0.31)	-0.00 (0.22)	-0.00 (0.42)	0.00 (0.37)
Constant	1.07* (0.00)	1.88* (0.00)	0.47* (0.00)	1.66* (0.00)	1.26* (0.00)
Observations	72,543	73,552	73,762	74,136	73,244
Within-school R-squared	0.00	0.00	0.06	0.02	0.02

Note: Fixed-effects regression coefficients shown with school fixed effects. Outcome is how often the student reads newspapers (model 1), books that explain things (model 2), stories or novels (model 3), comic books (model 4), and magazines (model 5). Reading score is the respondent's score on the PIRLS 2006 test. Parents' education is the highest level of education attained by either/both parents (lower secondary or less, upper secondary, post-secondary, BA, or graduate degree). Class size is the number of students in the respondent's class and teacher experience is the number of years that the respondent's teacher has worked as a teacher. Robust standard errors clustered at the school level in parentheses. * p<0.05.

Table 6. Within-school estimates of the civic effect of education models using separate measures for each education model

	(1) News	(2) Non-fiction	(3) Novels	(4) Comics	(5) Magazines
Student-centered education	0.17* (0.04)	0.09 (0.23)	0.14 (0.12)	0.02 (0.81)	-0.00 (1.00)
Teacher-centered education	0.03 (0.67)	-0.02 (0.74)	0.02 (0.79)	0.03 (0.68)	-0.03 (0.67)
Girl	0.02* (0.01)	0.05* (0.00)	0.41* (0.00)	-0.29* (0.00)	0.32* (0.00)
Parents' education	-0.01* (0.03)	-0.01 (0.06)	0.05* (0.00)	0.01* (0.00)	-0.02* (0.00)
Reading score, logged	0.00 (0.09)	-0.00* (0.00)	0.00* (0.00)	-0.00 (0.64)	0.00 (0.20)
Class size	0.00 (0.38)	0.00 (0.21)	0.00 (0.39)	-0.00 (0.81)	0.00 (0.88)
Teacher experience	-0.00 (0.24)	0.00 (0.26)	-0.00 (0.19)	-0.00 (0.56)	0.00 (0.31)
Constant	1.07* (0.00)	1.90* (0.00)	0.47* (0.00)	1.63* (0.00)	1.30* (0.00)
Observations	73,921	74,947	75,160	75,540	74,623
Within-school R-squared	0.00	0.00	0.06	0.02	0.02

Note: Fixed-effects regression coefficients shown with school fixed effects. Student-centered and teacher-centered education ranges from 0 to 1. Outcome is how often the student reads newspapers (model 1), books that explain things (model 2), stories or novels (model 3), comic books (model 4), and magazines (model 5). Reading score is the respondent's score on the PIRLS 2006 test. Parents' education is the highest level of education attained by parents (lower secondary or less, upper secondary, post-secondary, BA, or graduate degree). Class size is the number of students in the respondent's class and teacher experience is the number of years that the respondent's teacher has worked as a teacher. Robust standard errors clustered at the school level in parentheses. * p<0.05.

Table 7. Education models, social connections, and perceptions of school and teacher

	(1) Talk with friends ¹⁸	(2) Chat with friends ¹⁹	(3) Perception of school ²⁰	(4) Perception of teachers ²¹
Student-centered Index	0.09 (0.16)	0.02 (0.81)	0.08 (0.22)	0.04 (0.39)
Girl	0.20* (0.00)	0.07* (0.00)	0.31* (0.00)	0.15* (0.00)
Parents' education	0.00 (0.44)	0.01 (0.06)	-0.01* (0.00)	-0.01* (0.03)
Reading score, logged	0.00* (0.01)	-0.00* (0.00)	0.00 (0.77)	0.00* (0.00)
Class size	0.00 (0.11)	0.00 (0.93)	0.00 (0.59)	-0.00 (0.55)
Teacher experience	-0.01* (0.01)	0.01* (0.04)	-0.00* (0.04)	-0.00 (0.09)
Constant	1.11* (0.00)	1.43* (0.00)	2.17* (0.00)	2.23* (0.00)
Observations	73,498	73,191	73,888	70,473
Within-school R-squared	0.01	0.00	0.03	0.01

Note: Fixed-effects regression coefficients shown with school fixed effects. Outcome is how often the student talk or chat with friends (models 1-2), perceptions of their school (model 3), and perceptions of their teachers (model 4), which all range from 0 to 3. Robust standard errors

¹⁸ I use responses to how often the individual talks with friends about what they reading. Responses include never or almost never, once or twice a month, once or twice a week, and every day or almost every day. I code these responses to range from 0 to 3.

¹⁹ I use responses to how often the individual uses the Internet to chat, e-mail, or instant message with friends. Responses include never or almost never, once or twice a month, once or twice a week, and every day or almost every day. I code these to range from 0 to 3.

²⁰ I use agreement with the statement "I like being in school." Responses include disagree a lot, disagree a little, agree a little, and agree a lot. I code these to range from 0 to 3.

²¹ Agreement with "I think that teachers in my school care about me." Responses include disagree a lot, disagree a little, agree a little, and agree a lot, coded to range from 0 to 3.

clustered at the school level in parentheses. * $p < 0.05$.

Table 8. Student-centered education and perceptions of peers

	(1) Peers are respectful ²²	(2) Peers care about each other ²³	(3) Peers help each other ²⁴
Student-centered Education Index	0.14* (0.03)	0.18* (0.01)	0.20* (0.00)
Girl	0.06* (0.00)	0.11* (0.00)	0.11* (0.00)
Parents' education	-0.02* (0.00)	-0.01* (0.01)	-0.02* (0.00)
Reading score, logged	-0.00* (0.00)	-0.00* (0.00)	-0.00* (0.00)
Class size	0.00 (0.30)	0.00 (0.15)	0.00* (0.05)
Teacher experience	-0.00 (0.13)	-0.00 (0.17)	-0.00 (0.46)
Constant	2.23* (0.00)	2.12* (0.00)	2.18* (0.00)
Observations	73,143	72,946	73,484
Within-school R-squared	0.01	0.01	0.01

²² I use agreement with the statement "Students in my school show respect to each other." Responses include disagree a lot, disagree a little, agree a little, and agree a lot. I code these responses to range from 0 to 3.

I use agreement with the statement "Students in my school care about each other." Responses include disagree a lot, disagree a little, agree a little, and agree a lot. I code responses to range from 0 to 3.

²⁴ I use agreement with the statement "Students in my school help each other with their work." Responses include disagree a lot, disagree a little, agree a little, and agree a lot. I code responses to range from 0 to 3.

Note: Fixed-effects regression coefficients shown with school fixed effects. Outcome is perception of peers at their school respecting each other (model 1), caring for each other (model 2), and helping each other (model 3). Robust standard errors clustered at the school level in parentheses. * $p < 0.05$.

Correlates of student-centered education

Within-school comparisons allow me to factor out the possibility of my estimates being an artifact of individuals selecting into certain types of schools that are either more student- or teacher-centered. Even so, I need to assume that certain types of students are not systematically sorted into different classrooms within schools that may differ in its education model. Does this assumption hold? I can test whether it does by checking for differences in student characteristics that plausibly matter for adopting one education model over the other.

It may be, for example, that high-performing and good behavior students are grouped together in elite advanced classes. Teachers may find it easier to adopt student-centered models in such classrooms and high-performing students may be more interested in civic issues because of higher levels of efficacy from their academic performance independent of the education model they are learning in. I find that contrary to this scenario, student-centered classrooms are not distinguishable in terms of such student characteristics (Table 9).²⁵ This is the case whether I measure disorderly behavior with bullying (model 1), stealing

²⁵ I use responses from the parent survey to measure their child's preschool attendance, primary language, and home resource. Preschool attendance is a binary variable of whether the student attended preschool and primary language is an indicator of whether the student engaged with various activities at home (read books, sing songs, play with toys, talk about things they did, etc.) in the test language before attending the current level of education.

(model 2), or physically harming peers (model 3). Results hold when I measure home resources with perceptions of household wealth rather than the number of books at home (Appendix E2).²⁶ In sum, I do not find evidence of certain types of students being systematically sorted into different education models within their school, consistent with my assumption that individuals within PIRLS 2006 are assigned to education models within their schools by chance.

Home resources are measured with the number of books at home – respondents chose between 0-10, 11-25, 26-100, 101-200, and more than 200. I code these responses to range from 0 to 4. Reading performance is the student's score on the PIRLS 2006 reading test. Disorderly behavior is measured with student responses to whether they were bullied, thieved, or injured by another student in the last month.

²⁶ PIRLS 2006 did not ask its respondents about income but did ask about perceptions of respondents' perceptions of their household wealth levels.

Table 9. Predicting student-centered education with student characteristics

	(1)	(2)	(3)
Preschool attendance	0.03 (0.83)	0.03 (0.82)	0.03 (0.81)
Primary language	-0.17 (0.25)	-0.16 (0.26)	-0.16 (0.27)
Home resources	0.03 (0.28)	0.04 (0.26)	0.03 (0.30)
Reading performance	-0.00 (0.58)	-0.00 (0.67)	-0.00 (0.64)
Disorder: bullying	-0.14 (0.12)		
Disorder: stealing		-0.04 (0.66)	
Disorder: violence			-0.02 (0.81)
Constant	28.87* (0.00)	28.77* (0.00)	28.78* (0.00)
Observations	74,458	74,846	74,595
Within-school R-squared	0.00	0.00	0.00

Note: Fixed-effects regression coefficients shown with school fixed effects. Outcome is the Student-centered Education Index rescaled to range from 0 to 100. Model 1 measures disorderly behavior with bullying, model 2 does so with stealing, and model 3 does so with violence. Robust standard errors clustered at the school level in parentheses. * $p < 0.05$.

If student characteristics do not shape education models, what does? I repeat the analysis in

Table 9 but this time using teacher and classroom characteristics as predictors.²⁷ I find that teachers with recent training in teaching methods are more likely to adopt student-centered education models (Table 10).²⁸ This implies that student-centered teaching is acquired practice. It is not the case that teachers with relatively fixed qualities such as gender or a college education are more likely to implement one education model over another. It is also not the case that the profile of their students, the size of their classes, or the amount of teaching time dictate which education model to adopt. Rather, teachers who are exposed to more messages and training on instructional methods are more likely to practice student-centered education.

²⁷ All items are from the teacher survey. Experience is measured as years of teaching experience (0-54). Female teacher is a binary indicator for whether the teacher chose “Female” to the question “Are you female or male?” Education level is measured with the highest level of formal education completed by the teacher. Training is measured with the number of hours the teacher spent in “in-service/professional development workshops or seminars that dealt directly with reading or teaching reading (e.g., reading theory, instructional methods)” in the past two years. Respondents could choose among none, less than 6 hours, 6-15 hours, 16-35 hours, and 35+ hours. Class size is the number of students in the classroom. Instruction time is measured with three items: the number of hours the teacher spends on language instruction and/or activities with students (0-15), the number of hours in reading instruction and/or activities with students (0-20), and how frequently students receive reading instruction. For the third item, respondents chose between fewer than three days a week, 3-4 days a week, and every day.

²⁸ Results hold when I substitute teacher experience with the teacher’s age (Appendix E3). Teachers chose between under 25, 25-29, 30-39, 40-49, 50-59, and 60+ to indicate their age. I code these responses to range from 0 to 5.

Table 10. Predicting student-centered education with teacher and class characteristics

	(1)	(2)	(3)
Teacher experience	-0.03 (0.42)	-0.03 (0.27)	-0.02 (0.45)
Female teacher	0.65 (0.49)	0.76 (0.41)	0.69 (0.44)
Teacher education level	0.39 (0.36)	0.13 (0.76)	0.24 (0.55)
Teacher training	0.67* (0.01)	0.76* (0.00)	0.70* (0.01)
Class size	-0.16 (0.11)	-0.14 (0.13)	-0.14 (0.15)
Instruction time for language (duration)	-0.18 (0.33)		
Instruction time for reading (duration)		0.04 (0.71)	
Instruction time for reading (frequency)			0.05 (0.92)
Constant	31.65* (0.00)	30.04* (0.00)	29.84* (0.00)
Observations	81,105	83,998	86,915
Within-school R-squared	0.01	0.01	0.01

Note: Fixed-effects regression coefficients shown with school fixed effects. Outcome is the Student-centered Education Index rescaled to range from 0 to 100. Robust standard errors clustered at the school level in parentheses. * $p < 0.05$.

Overall, those who are learning in student-centered models are more engaged citizens who

are attentive to news and public discourse. I find this to be the case across countries, within countries, and within schools. I next address the issue of students selecting into education models in a second way, with data from an original survey that I fielded in a natural experiment setting in South Korea.

A Natural Experiment in South Korea

In 1969, the South Korean government implemented a lottery system to randomly assign students to middle school. The lottery system has since been modified to accommodate regional circumstances and citizens' demand for more choice in schools, but it still dictates school assignment in some parts of the country. When it so happens that schools also vary in levels of student-centered education, a natural experiment setting arises where some students are randomly assigned a more student-centered education model than their peers.²⁹ I identified four such middle school districts and in June-July 2023, I fielded a self-administered online survey to assess the civic effects of student-centered education.³⁰ While this survey analysis was exploratory rather than preregistered, it provides a critical test of causal effects in a randomized setting.

Identifying the natural experiment setting

²⁹ See Appendix F for more information on recent student-centered education reforms and the lottery school assignment policy in Korea.

³⁰ The study was approved by Vanderbilt University's IRB (#220254) and the Korean Public IRB (#P01-202207-01-024) and supported by the American Political Science Association and Vanderbilt University.

At the time of my study, most school districts in Gyeonggi Province, the largest province in South Korea, enforced the ‘post-application lottery assignment policy’ where prospective middle school students first apply to a school in their district. Those who apply to a school with enough vacancies bypass the lottery and are admitted to that school. However, those who apply to an overly popular school that cannot accommodate all applicants are entered into a lottery. Winners of the lottery are admitted and losers are assigned to another school in the district that has vacancies. In the simplest case of a two-school district subject to the post-application lottery assignment policy, those who apply to an overly popular school are chosen by lottery to either attend that school or attend the one other school in their district.³¹

Table 11 shows four such districts where at least one in six students were randomly assigned to their school as of 2023.³² Each of the grouped rows with two schools represents

³¹ A potential issue in random assignment compliance in such situations for many parts of the world is the availability of exiting to a private school of an individual’s choice. In the South Korean context, however, middle school (7th-9th grade) students do not typically have the option of going to a private school of their choice if they are not assigned a school of their preference. Regardless of the school’s private or public status, the application period for middle schools is between October and early November, and the lottery results for schools in the public education system are notified in January so students can start their school year in March. Further, both public and private schools in the country are subject to local school assignment policies such as the lottery system (Kim et al. 2008). At the middle school level, opting out would entail going to a “Specialized Middle School,” where admission rules are not dictated by the local education policy. Specialized Middle Schools – those specialized in an international curriculum, an arts curriculum, a physical ed curriculum, or an alternative education curriculum make up 1.4% of 3,305 middle schools in the country as of 2022, so only a very small proportion South Korean students are not subject to the local education office’s school admission rules (Korean Educational Statistics Service 2022; Korean Ministry of Education 2022). In effect, most students in Korea applying to middle school are subject to the local education office’s school assignments even when the school is not their preference.

³² I identified these middle school districts using publicly available notices and a petition system. I first used publicly available notices published by the Gyeonggi Local Offices of

the middle school district, with the columns showing how many individuals applied to each school, how many students were assigned to each school for the year that their cohort applied to middle school, and how many of those assigned were randomly assigned the school they ended up attending. I show this information for cohorts that were in the 8th and 9th grade (2nd and 3rd year in middle school) when I fielded my survey in the summer of 2023. I omit the district and school names for privacy.³³

Table 11. Random assignment across districts

District	School	8 th Graders			9 th Graders		
		Number of applicants	Number of admits	Number of randomly assigned admits	Number of applicants	Number of admits	Number of randomly assigned admits
A	A1	328	231	231	334	231	231
	A2	125	222	97	128	231	103
B	B1	324	230	230	371	284	284
	B2	134	228	94	132	219	87
C	C1	456	351	351	452	326	326
	C2	189	294	105	178	304	126
D	D1	388	330	330	482	441	441
	D2	219	277	58	199	240	41

Education to create a list of middle school districts that included only two schools and are subject to the post-application lottery assignment policy. Since this policy simply means that schools will be randomly assigned if and only if there are overly popular schools, it was necessary to identify which school districts in my list included schools that received a surplus of applicants. In 2022-2023, I petitioned local education offices to request this information using the Ministry of Interior and Safety's Information Disclosure Portal. Most districts did not have overly popular schools, so students were in reality not often randomly assigned to schools.

³³ Since there are only two schools in each district and Table 9 shows the popularity for each school, revealing the district names could also potentially reveal the anonymized schools.

On average, schools A1, B1, C1, and D1 are more student-centered than schools A2, B2, C2, and D2 (Table 12).³⁴ Students attending schools A1-D1 report a higher degree of sharing opinions in class than those attending A2-D2. These schools are also significantly more likely to have avenues for students to express their opinions to their school through means such as bulletin boards and suggestion boxes. That is, schools A1-D1 are more student-centered in the aspect of giving students more voice both in and outside the classroom. Table 12 also shows the aspects in which the schools do not significantly differ – I do not find any significant differences in means for opportunities for students to express their opinions in class, the degree of group work, nor student input when deciding on school rules. Importantly, I also do not find any statistically significant differences between students of A1-D1 and those of A2-D2 in attributes that might shape preferences for progressive education such as gender, income, or parental education. Parents’ education level, monthly household income, and the proportion of girls are not statistically different between individuals attending both groups of schools (Table 13). That is, assignment of student-centered versus teacher-centered schools is balanced on these covariates, lending support to my assumption that assignment to education models was in fact random. Appendix L shows more information about the items used in Tables 12-13.

³⁴ The data here is from my survey, which I explain in the next section. There were not enough respondents to compare differences within each district.

Table 12. Comparison of means in student-centered education model practices

	Mean of schools A1-D1	Mean of schools A2-D2	Difference	p-value
Students share opinions in class	2.77	2.26	0.51	0.03
School has avenues for students to express opinions	3.01	2.61	0.40	0.04
Students express opinions in class	3.33	3.11	0.22	0.06
Students work together in groups in class	2.60	2.65	0.05	0.80
School considers student opinions when making rules	2.67	2.71	0.04	0.86

Note: Estimates from two-tailed t-tests shown

Table 13. Balance across household income, parental education, and gender

	Mean of schools A1-D1	Mean of schools A2-D2	Difference	p-value
Household monthly income	3.63	3.96	-0.34	0.36
Parent's education level	2.25	2.66	-0.41	0.06
Girls	0.59	0.59	0.01	0.96

Note: Estimates from two-tailed t-tests shown

Schools A1-D1 are on average more student-centered than schools A2-D2. They are also the schools in their respective districts that received a surplus of applicants (Table 11). In effect, all applicants of schools A1-D1 were entered into a lottery and those who by chance won were assigned schools A1-D1 to receive more student-centered education. All applicants of these schools who lost the lottery by random chance were assigned to the other, less student-centered school in their respective districts. In the summer of 2023, I fielded a survey in this natural experiment setting to compare civic engagement levels of

individuals who were either learning in more student-centered or less student-centered schools by random chance.

Recruitment

Recruitment was a crucial and labor-intensive step in my fieldwork. Since my study targeted middle school students, recruitment entailed reaching out to both potential participants as well as their parents. I trained and worked alongside a team of research assistants to run recruitment stalls, post recruitment flyers, and hand out recruitment flyers in my target schools' neighborhoods, which are all common ways to advertise products and services in Korea. For recruitment stalls, we set up a canopied folding table at locations near my target schools that displayed a large flyer advertising the study and handed out recruitment flyers to pedestrians walking past the stall. During preliminary fieldwork, some individuals expressed concern that people would be hesitant to enter personal information and opinions in an online form that is not affiliated with the government or a large institution known to the local population. In response, we used recruitment stalls to put a face to the research and create more interest and trust in taking the survey.

To advertise the study to parents of potential participants, we also posted recruitment flyers in large high-rise apartment complexes in the target school districts. As of 2022, three in four young Korean families live in high-rise apartments (Ministry of Land, Infrastructure and Transport 2023). Apartment complexes in Korea typically have notice boards near the main elevators, which display internal notices from the apartment management and external

advertisement flyers by individuals or companies that pay to display their advertisement for a pre-determined period. We posted the recruitment flyer for approximately two to four weeks in apartment buildings in the immediate vicinity of my target schools.

While these recruitment methods helped expose my study to potential participants and their parents, the most effective recruitment method by far was handing out recruitment flyers outside school gates to students. We visited each target school two or three times, depending on how effective the recruitment was. I called or visited the target school prior to recruiting at the school gates and asked when students would be leaving school after classes so that we would start the recruitment at that time. We visited schools when students were leaving school after classes finished, because this is when students are more likely to accept flyers.

We handed out recruitment flyer packets during these school gate recruitments. Each flyer packet included a Haribo (candy, for the student) and a washcloth (for the parent); my research assistants and I packaged the set in plastic wrappers so that they were easy to hand out, weather-resistant, and less likely to be stripped of just the Haribo and trashed in the streets. In total, we handed out approximately 10,000 flyers. Handing out flyers is a common method of advertising in Korea, and it is also common practice to attach a small gift on the flyers as it greatly helps the odds of people accepting the flyers.

I used the recruitment flyer in Appendix G for all recruitment methods. The title of the flyer read “School culture and citizenship survey.” The remaining text lists information about the research: research title, research purpose, who is eligible to participate, how to

participate, and my contact information.³⁵ Figure 6 shows the translation of the text. Under this text was a QR code that participants could scan with their mobile phones to access the study landing page, consent forms, and survey.³⁶

³⁵ The local IRB required that the recruitment materials explicitly state the research purpose as “To assess the effect of student-centered education on citizenship,” rather than using broader terms such as “To understand the effects of education” or “To explore teaching practices in the classroom.” This explicit framing may have introduced demand characteristics, potentially prompting participants who perceived their education as student-centered to overreport civic engagement behaviors to align with what the researcher seems to want to find. While this could partly account for my findings, the bias is mitigated by the fact that all surveys were self-administered online, anonymous surveys. Because participants never interacted directly with the researcher, the social pressure to conform to perceived investigator expectations was substantially lower.

³⁶ See Appendix H for a description of the consent and survey process. Appendix I shows the consent form for student participants translated into English, Appendix J shows the consent form for their parents or legal guardians, and Appendix K shows the student survey.

Figure 6. Translation of recruitment flyer text

School Culture and Citizenship Survey We are recruiting middle school students and their parents to take part in an online survey. All eligible participants will receive a mobile gift certificate within 48 hours of submitting the survey. Research title: Student-centered culture and citizenship Research purpose: To assess the effect of student-centered education on citizenship Who is eligible to participate: Pyeongnae, Jangnae, Hopyeong, Joogok, Poongyang, Keumleung, and Keumchon middle school students and their parents Participation period: June 20th ~ August 31st 2023 How to participate: Scan the QR code below to submit an online survey (approximately 5-10 minutes) Principal Investigator: Eui Young Noh (Vanderbilt University PhD candidate / eui.young.noh@vanderbilt.edu) Your responses may help assess education policies. You may skip any questions in the survey. Your responses will be confidential in accordance with the Personal Information Protection Act.

I provided compensation for participation in the form of virtual gift certificates, which I sent to the mobile phone number that participants provided for this purpose within 48 hours of survey completion. The gift certificates were worth approximately \$3.7 and could be redeemed at locations such as a convenience store, a supermarket, or a café. Compensation was a crucial part of the recruitment process – during recruitment, students often asked whether they would really receive the gift certificate upon completing the survey and were excited to hear that they would.

165 students participated in the survey. There were a number of participants attempting to re-take the survey, most likely to receive more gift cards. For these participants,

I only retained their earliest submission. There were also several instances where multiple submissions shared the same number at which to receive the gift card. I assume these to be re-takers as well and analyze only their first submission. I also exclude respondents who sped through the survey faster than they would be able to if they had read through survey.³⁷ This drops 13 respondents. Among the remaining 152 respondents, I only retain the 101 who were randomly assigned to their school six months to two and a half years prior to the survey date, depending on their current grade.³⁸

Measurements and analysis

I measure civic engagement with attention to news, signing petitions, and social media activity. I also included a 'school request' item as a behavioral measure for a civic activity. I asked about attention to news with how much the respondent agrees that they "pay attention to news on social issues." One in two individuals in my sample either agreed or strongly agreed to this statement (Appendix L). For petition participation, I asked if they have ever signed a petition. Signing petitions are a common form of civic activity in Korea, popularized

³⁷ I assume that middle school students on average read slower than adults. Given that the average silent reading rate for adults is 238 words per minute (Brysbaert 2019) and that my student survey questions included 382 words, I assume that respondents who took the student survey faster than $238/60 * 382 = 96.2$ seconds did not read through the survey.

³⁸ These were individuals who applied for the popular school in their district (schools A1-D1 in Table 9) when they applied for middle school. To identify individuals who applied to A1-D1, I included a question in my survey on whether the respondent had applied to their school. Since I know from my information requests that A1-D1 were the popular schools in each district, I am able to use responses to this question to identify those who were randomly assigned their school – students attending A1-D1 who answered that they had applied to their school and those attending A2-D2 who said that they had not applied to their school.

by a national petition system run by the Blue House (that is, the executive branch, equivalent to the White House in the United States) from 2017 to 2022. The Blue House petition system was widely used and known to the Korean public – over nine in ten citizens knew about Blue House petitions and over two in three had participated as of 2022 (Jung 2022). In my sample of middle school students, a little over four in five knew what petitions were and one in ten responded that they have signed a petition (Appendix L). This accounts for only ten individuals because of my small sample size, so for the analysis in the subsequent section, I combine categories to create an indicator for whether the respondent has either signed a petition before or is open to signing one in the future against the baseline of either not knowing what petitions are or not being open to signing petitions in the future.

My second measure of civic outcomes is engagement with social issues online and on social media. One item asks respondents if they have uploaded a post, comment, photo, or video on the internet or on social media to express their opinions about a social issue. Another asks if they have supported a social cause by ‘liking’ or ‘following’ something online. A significant percentage of my respondents indicated that they have engaged with social issues online in these ways at some point – one in five said they have uploaded posts or media to express their opinions on a social issue either in the past year or over a year ago, and two in five said they have used social media tools such as ‘liking’ or ‘following’ to express support for an issue (Appendix L).

Lastly, my survey included a behavioral measure of civic activity. I asked respondents if they had anything to suggest or request to their school regarding issues such as school

lunch, clothing regulations, facilities, and classes. Respondents could respond either yes or no to this question and for those who chose yes, the survey directed respondents to an open-ended question that asked them to briefly write their suggestions or requests. Respondents also read on this page that their suggestions or requests would be anonymized and delivered to their school. This aspect of the question was added so that the task would feel as an actual civic act would, with real world consequences and a real, relevant entity to which they would express their opinions to.³⁹ A high percentage of respondents responded yes to this question – nearly one in three (29.7%) volunteered a suggestion or request to their school, most of which concerned issues related to better lunch options and regulations on dress.

The 101 respondents I retain were randomly assigned to either more student-centered schools (schools A1-D1 in Table 11) or less student-centered schools (schools A2-D2). I use this property of my sample to assess the civic effect of student-centered education, by comparing levels of civic engagement of those who were assigned to schools A1-D1 to the levels among those that were assigned schools A2-D2. In line with my finding in Table 10 that schools A1-D1 are more student-centered than schools A2-D2, I refer to these two groups of schools as student-centered and teacher-centered schools. I use t-tests to compare means between the two groups.

I find that student-centered education makes more active citizens – individuals who were by chance assigned a student-centered school are significantly more likely to sign

³⁹ This was not deception – I mailed the anonymized suggestions and requests to each school that I recruited from.

petitions and use social media to weigh in on social issues (Table 14).⁴⁰ Those who are learning in student-centered models are, on average, slightly short of one-half of a standard deviation higher in their tendency to support social issues on social media platforms and either sign or be open to signing petitions. While I do not find that student-centered education makes individuals more likely to pay attention to the news or post about social issues on social media, the difference in means is in the expected direction. School requests are an exception. Individuals learning in more student-centered schools were less likely to express requests to their school compared to their peers in less student-centered schools, although the difference in means is again not statistically significant.

Table 14. Comparison of means in civic engagement

	Mean of student-centered schools	Mean of teacher-centered schools	Difference	p-value
Signs petitions	0.67	0.45	0.22	0.04
Supports social issue on social media	0.49	0.23	0.26	0.01
Posts about social issues on social media	0.24	0.13	0.11	0.20
Attentive to news	2.51	2.19	0.32	0.13
School request	0.26	0.39	-0.13	0.19

In Closing

What we currently know about education model effects is mostly restricted to academic performance. Consequently, debates on which education model to promote revolve around

⁴⁰ When I instead compare means for an indicator of whether the respondent supported a social issue online in the past year, the means are only significantly different in a one-tailed test ($p = 0.04$).

assessments of academic learning.⁴¹ But if the *way* students learn also matter for civic orientations, policy choices on education models as well as individual choices on which school to attend (or send their children to) should be based on assessments of both academic and civic merits. This paper contributes to making such considerations valid by theorizing and showing strong empirical support for the civic effects of education models.

Across countries, within schools, and among those who were randomly assigned to education models, I find that individuals learning in student-centered settings are more engaged citizens who are more likely to consume news, take part in public discourse on civic issues, and sign petitions. What is notable about the persistent link between education models and civic engagement is that it operates independent of what is taught. Much prior work that investigates the civic effects of education duration or that of civics-related curricula assumes that schools make active, engaged citizens because they teach them to be so. I find that schools shape citizens even when they are not teaching civics and civic skills. The social structure of teacher-student and peer relations in school, independent of what is communicated during these interactions, shapes civic outcomes. To this point, I tested my theory throughout the paper with data on classes that typically lack civics content, such as reading, math, and science classes. The fact that more horizontal models of education in such

⁴¹ While some show that those who learn in student-centered models outperform those who learn in teacher-centered models, others find that student-centered education either negatively impacts or does not matter for academic performance (Andersen and Andersen 2017; Belfi et al. 2015; Beom et al. 2018; Deslauriers et al. 2019; Granger et al. 2012; He et al. 2019; Lee and Boo 2022; Liebert et al. 2015; Olivian Blazquez et al. 2019; Rui et al. 2017).

classes make more active citizens highlights the civic relevance of the nature of social interactions that we experience and observe.

What is not so clear is why. I argue that student-centered education makes more active citizens by shaping self-perceptions of being efficacious members of a community that they have stakes in. However, I do not find that individuals learning in more student-centered settings by chance have significantly higher levels of political efficacy than their peers.⁴² On the other hand, individuals who are learning in more student-centered classrooms are significantly more likely to perceive that their peers at school respect, care for, and help each other. The latter implies that the civic effects of education models are at least in part driven by individuals' perceptions of their community members, in particular their peers. This may be due the fact that I use data on adolescents. Adolescence is a period of hypersensitivity to social exclusion and a critical period for self- and other-oriented identity development (Blakemore and Mills 2014; Crone and Fuligni 2020; Nardour et al. 2019). It may be that the collaborative nature of student-centered education is particularly impactful for adolescents' civic development because it powerfully shapes how they view fellow community members.

⁴² My survey included an item on political efficacy adopted from the Korean Education Longitudinal Study (To what extent do you agree that a good society can be made through citizen effort?) along with measures of internal and external efficacy, as shown in Appendix M. I find that for all political efficacy items, the means across schools are not significantly different from each other. That is, I do not find any evidence of political efficacy driving the civic effects of student-centered education. I hesitate to conclude from these results that we should discount the political efficacy mechanism given the small sample size of my survey. Small sample sizes heighten chances of failing to detect differences between groups, implying that I may simply be underpowered to find differences in political efficacy that, in reality, exist between education models.

Then perhaps education models shape civic outcomes specifically for adolescents and not younger children or adults.

While the mechanisms and scope conditions for relevant age groups are an area for future research, my findings on the civic effects of education models has broad implications. Many areas around the world are shifting from conventional, teacher-centered education models to more student-centered models of schooling (Bell and Kozlowski 2008; Bremner 2019; Kim 2019; Schweisfurth 2013). In sub-Saharan Africa, student-centered education has been the “driving pedagogical ideal for contemporary curriculum reform” at the national level (Chisholm and Leyendecker 2009; See also Lattimer 2015, Mtika and Gates 2010, and Vavrus et al. 2011). In the Middle Eastern and Arab-speaking world, pedagogical reforms have emphasized students’ active roles and participation in class, as opposed to a pedagogy focused on repetition and memorization, where the students’ role is more passive (Kim et al. 2019). The findings here imply that such global shifts may strengthen the role schools play in creating active citizens. An important caveat is that while I use the most comprehensive global data available to empirically test my theory, most of Africa, the Middle East, and South Asia are not accounted for in my analysis because they are missing from the data. Countries that have weak political rights and civil liberties are concentrated in these regions. In such contexts, it may be more costly to be engaged citizens so that education models do not provide enough push to increase civic engagement. What is published as news and what is available as forms of civic engagement will also significantly differ in areas with weak civil liberties. So although I provide the most comprehensive test of the civic effect of education

models to date, the civic role of education models in authoritarian countries is outside the scope of my study and should be an area for future research.

This study has practical implications. I find that whether teachers adopt a student-centered model or not is strongly associated with professional training they receive after starting their teaching career rather than fixed factors such as student characteristics, class structure, or the teacher's age and gender. This implies that the civic effect of education models can be realized by providing teachers with professional development workshops, seminars, and other training that equip them with the skills and motivation to adopt student-centered education models. My findings suggest that adopting more student-centered education models will nurture more active citizens, and policymakers can achieve that through means such as increasing access to professional training for teachers and incentivizing educators to attend training sessions.

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A. Information on PISA 2018 and PIRLS 2006

PISA 2018

PISA 2018 was administered to 600,000 15-year-old students in 79 countries and economies. Schools were randomly sampled within each country and each school randomly sampled 35-42 students who took a two-hour test on reading, science, mathematics, global competence, and financial literacy. Along with these tests, PISA 2018 also administered background questionnaires on participating students, their parents, teachers, and schools.

I exclude non-country territories such as Hong Kong and Macao, and also exclude North Macedonia which did not ask about student-centered education. Remaining 74 countries in PISA are: Albania, Baku (Azerbaijan), Argentina, Australia, Austria, Belgium, Bosnia and Herzegovina, Brazil, Brunei Darussalam, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Croatia, Czech Republic, Denmark, Dominican Republic, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Indonesia, Ireland, Israel, Italy, Kosovo, Japan, Kazakhstan, Jordan, Latvia, Lithuania, Luxembourg, Malaysia, Malta, Mexico, Moldova, Montenegro, Morocco, Netherlands, New Zealand, Norway, Panama, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Serbia, Singapore, Slovak Republic, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Ukraine, United Arab Emirates, Ukraine, United Kingdom, United States, Uruguay, and Vietnam.

Within these countries, 85% of sampled schools (with replacements) participated in PISA 2018 except for the United States (76%) and at least 80% of sampled students participated except for Portugal (76%).

	Mean	Range
Number of schools per country	280.38	44 – 1,089
Number of students per school	26.31	1 – 483
Total number of students	542,051	

PIRLS 2006

Approximately 215,000 4th grade students in 40 countries took part in PIRLS 2006. Along with assessing participants' reading skills, PIRLS also administered student, teacher, parent, and school questionnaires as with PISA 2018. In PIRLS 2006, at least 130 schools were randomly sampled within countries in the first stage of sampling, and then one or more intact classrooms (4,100+ students in each country) were sampled within schools. At least 86% of sampled schools participated (with replacements) and 99-100% of sampled

classrooms participated in PIRLS 2006. 89% or more of sampled students in selected schools participated in each country.

I restrict the analysis to a subset of participating schools that sampled two or more classrooms. 35.2% of schools participating in PIRLS 2006 sampled two or more classrooms. 50.1% of students in PIRLS 2006 were included in these schools. Participating schools were not required to sample more than one classroom. However, in cases where the country's average class size was sufficiently small so that sampling one classroom from each sampled school would not satisfy the target national student sample of 4,000 students, two or more classrooms were sampled. Even when this were not the case, some countries chose to sample more than one classroom in participating schools to include more students or better understand school-level differences. The 33 countries I analyze include: Austria, Belgium, Bulgaria, Canada, Denmark, England, France, Georgia, Hungary, Iceland, Italy, Kuwait, Latvia, Lithuania, Luxembourg, Moldova, Netherlands, New Zealand, Norway, Poland, Qatar, Romania, Scotland, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Taiwan, Trinidad and Tobago, North Macedonia, and United States.

	Mean	Range
Number of schools per country	67.6	1 – 177
Number of classrooms per school	2.2	2 – 7
Number of students per classroom	19.4	1 – 49
Total number of students	107,104	

B. Information on Student-centered Education Index

B1. Factor Analysis Results

1) PISA 2018

Factor analysis using iterated principal factors

Factor	Variance	Difference	Proportion
Factor 1	1.16	0.15	0.53
Factor 2	1.02	1.00	0.46
Factor 3	0.01	-	0.01

Rotated factor loadings (varimax)

Education model	Item	Factor		Uniqueness
		1	2	
Student-centered	The teacher encourages students to express their opinion about a text	0.73	0.20	0.43
	The teacher poses questions that motivate students to participate actively	0.73	0.26	0.40
Teacher-centered	The teacher tells students what they have to learn	0.21	0.78	0.62
	The teacher asks questions to check whether students understand what was taught	0.21	0.58	0.35

Scoring coefficients for education model index based on rotated factors (Factor 1)

Education model	Item	Coefficients
Student-centered	The teacher encourages students to express their opinion about a text	0.48
	The teacher poses questions that motivate students to participate actively	0.49
Teacher-centered	The teacher tells students what they have to learn	-0.02
	The teacher asks questions to check whether students understand what was taught	-0.11

2) PIRLS 2006

Factor analysis using iterated principal factors

Factor	Variance	Difference	Proportion
Factor 1	1.69	0.13	0.52
Factor 2	1.56	1.33	0.48
Factor 3	0.23	0.16	0.07

Rotated factor loadings (varimax)

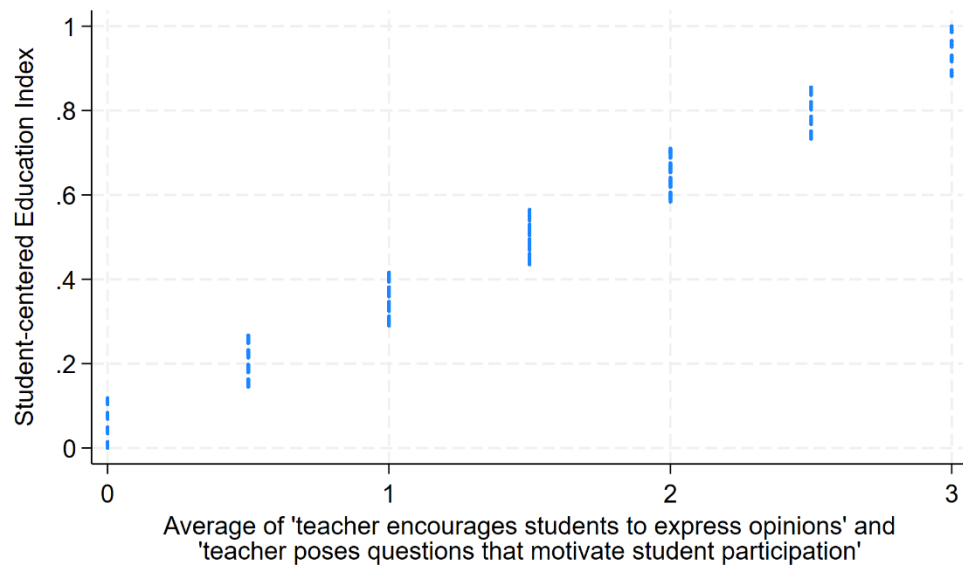
Education model	Item	Factor		Uniqueness
		1	2	
Student-centered	Percentage of time teacher works with individual students or small groups	0.02	0.94	0.11
	Students write something about what they read	0.63	0.06	0.60
	Students talk with each other about what they read	0.52	0.10	0.72
	Students do a project about what they read	0.47	0.08	0.78
Teacher-centered	Percentage of time teacher teaches class as a whole	0.01	-0.81	0.35
	Students answer reading comprehension questions about what they read	0.52	-0.07	0.73
	Students orally summarize what they read	0.60	-0.03	0.64
	Students take a test about what they read	0.42	-0.12	0.81

Scoring coefficients for education model index based on rotated factors (Factor 2)

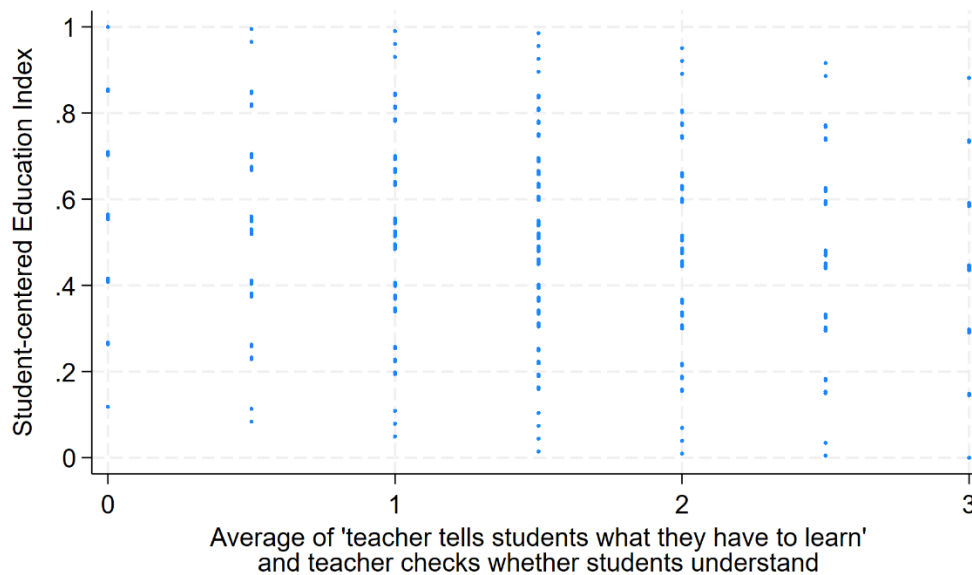
Education model	Item	Coefficients
Student-centered	Percentage of time teacher works with individual students or small groups	0.78
	Students write something about what they read	0.01
	Students talk with each other about what they read	0.01
	Students do a project about what they read	0.01
Teacher-centered	Percentage of time teacher teaches class as a whole	-0.21
	Students answer reading comprehension questions about what they read	-0.02
	Students orally summarize what they read	-0.02
	Students take a test about what they read	-0.02

B2. Student-centered Education Index along Averages of Classroom Practices

Along averages of student-centered practices

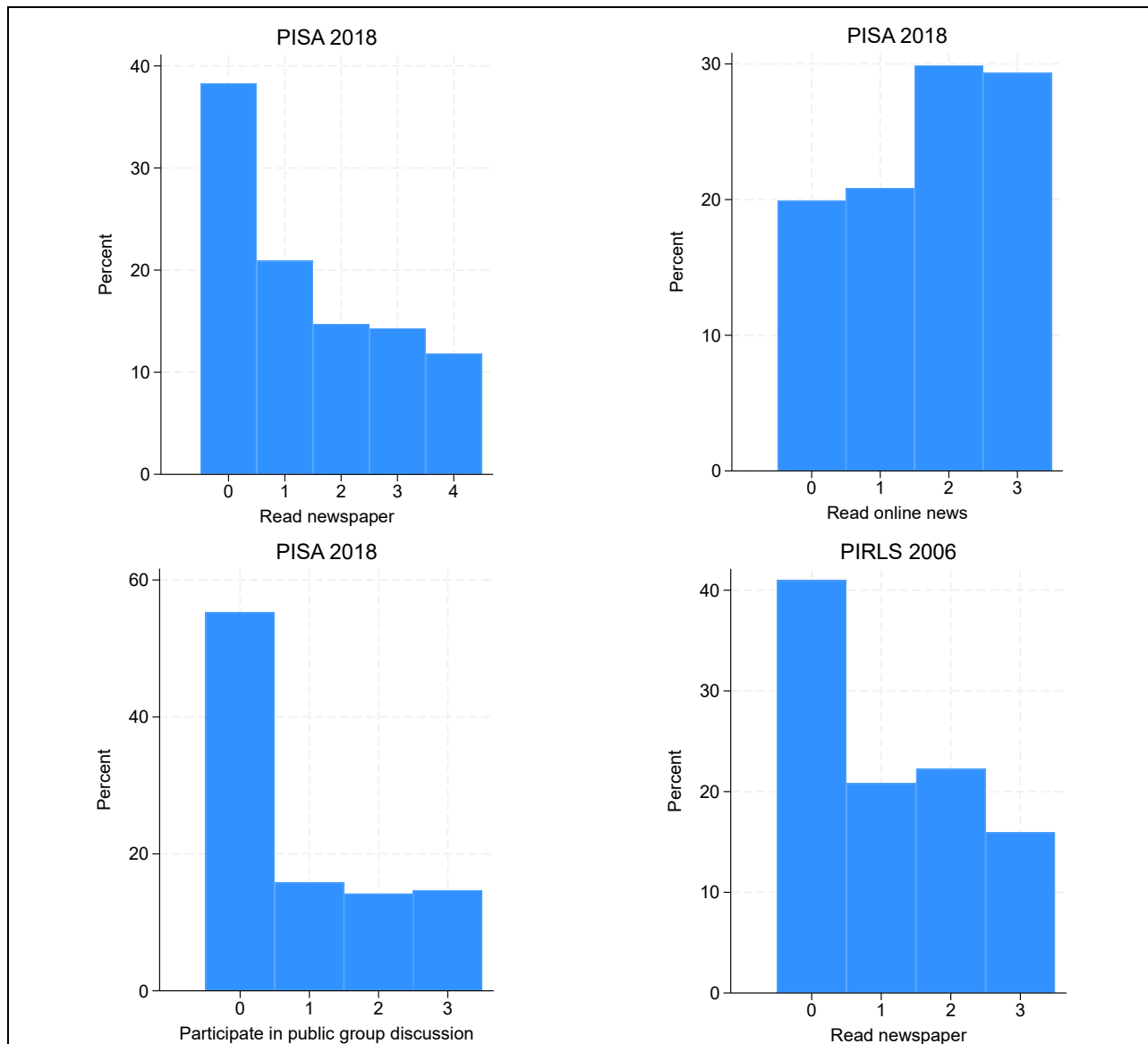


Along averages of teacher-centered practices



C. Summary statistics and distributions for PISA and PIRLS items

1) Distribution of civic engagement items



2) Summary statistics for PISA 2018

Variable	Mean	s.d.	Range	N	Notes
Student-centered Education Index	0.55	0.24	0-1	516,956	
Newspaper consumption	1.41	1.42	0-4	537,313	0 = Never / Almost never 1 = Few times a year 2 = About once a month 3 = Several times a month 4 = Several times a week
Online news consumption	1.69	1.10	0-3	530,215	0 = Never or almost never 1 = Several times a month 2 = Several times a week 3 = Several times a day
Public group discussion	0.88	1.13	0-3	531,836	
Girl	0.51	0.50	0/1	542,051	0 = boy
Household socioeconomic status	0.65	0.09	0-1	542,051	PISA 2018 Economic, Social, and Cultural Status (ESCS) index rescaled to range from 0-1. ESCS is a composite score based on the respondent's highest parental occupation, parental education, and possessions at home (desk, books, computer, art, etc.)
Reading score	461.89	105.41	54.674 - 887.692	536,701	Score on PISA 2018 reading test

3) Summary statistics for PIRLS 2006

Variable	Mean	s.d.	Range	Observations	Notes
Student-centered Education Index	0.29	0.16	0-1	91,797	
Newspaper consumption	1.13	1.12	0-3	103,05	0 = Never / Almost never 1 = Monthly 2 = Weekly 3 = Daily
Students respect	1.87	0.96	0-3	103,626	0 = Disagree a lot 1 = Disagree a little 2 = Agree a little 3 = Agree a lot
Students care	1.85	0.95	0-3	103,316	
Students help	2.02	0.92	0-3	104,196	
Girl	0.50	0.50	0/1	107,095	0 = boy
Parent's highest education level	1.73	1.05	0-3	87,111	0 = Lower secondary or less 1 = Upper secondary 2 = Post-secondary 3 = University or more
Reading score	519.703	90.34	5-813.14	107,104	Score on PIRLS 2006 reading test
Class size	24.34	6.40	1-71	100,479	Number of students in class
Teacher experience	16.99	10.90	0-54	100,894	Teacher's years of teaching

D. Additional analyses for PISA 2018

D1. Full Model Results for Figure 2

	(1) Newspaper	(2) Online News	(3) Group Discussions
Student-centered Education Index	0.50* (0.02)	0.37* (0.01)	0.26* (0.02)
Girl	-0.19* (0.02)	-0.04* (0.01)	-0.16* (0.01)
Socioeconomic Status	1.16* (0.12)	1.32* (0.06)	1.26* (0.09)
Reading score, logged	-0.17* (0.07)	0.37* (0.03)	-0.53* (0.03)
Constant	1.55* (0.45)	-1.59* (0.21)	3.23* (0.20)
Observations	507,377	500,814	502,324
Number of countries	72	72	72

Note: Multilevel regression estimates with robust standard errors shown in parentheses. Individuals are nested in schools in countries. The Student-centered Education Index ranges from 0 to 1. Outcome is frequency of each form of civic engagement. Civic engagement level ranges from 0 (Never or almost never) to 4 (several times a week) for newspaper and to 3 (several times a day) for online news and public discussions.

D2. Estimated Civic Effect of Teacher-centered Education by Country

	Newspaper	Online News	Group Discussions
Albania	0.05 (0.03)	0.06 (0.02)	0.04 (0.03)
Azerbaijan	0.01 (0.03)	0.06* (0.02)	0.04 (0.02)
Argentina	0.03 (0.02)	0.06* (0.01)	0.02 (0.01)
Australia	0.04* (0.01)	0.07* (0.01)	0.07* (0.01)
Austria	0.06* (0.02)	0.04* (0.02)	0.01 (0.01)
Belgium	0.00 (0.02)	0.04* (0.02)	0.00 (0.01)
Bosnia and Herzegovina	-0.01 (0.02)	0.03 (0.02)	0.01 (0.02)
Brazil	0.04* (0.02)	0.04* (0.01)	0.03* (0.01)
Brunei Darussalem	0.05* (0.02)	0.06* (0.02)	0.08* (0.02)
Bulgaria	-0.03 (0.02)	0.08* (0.02)	0.03 (0.02)
Chile	0.03 (0.02)	0.08* (0.02)	0.04* (0.01)
China	0.14* (0.02)	0.09* (0.01)	0.06* (0.01)
Colombia	0.07* (0.02)	0.07* (0.01)	0.05* (0.01)
Costa Rica	0.01 (0.02)	0.05* (0.02)	0.03* (0.01)

Croatia	0.05* (0.02)	0.06* (0.02)	0.04* (0.01)
Czech Republic	0.06* (0.02)	0.07* (0.01)	0.02 (0.02)
Denmark	0.06* (0.02)	0.07* (0.01)	0.03* (0.01)
Dominican Republic	0.12* (0.03)	0.14* (0.02)	0.10* (0.02)
Estonia	0.04 (0.02)	0.09* (0.02)	0.03 (0.02)
Finland	0.04 (0.02)	0.05* (0.01)	0.04 (0.01)
France	0.03 (0.02)	0.04 (0.02)	-0.02 (0.01)
Georgia	-0.04 (0.02)	0.06* (0.02)	-0.01 (0.02)
Germany	-0.01 (0.02)	0.02 (0.02)	-0.00 (0.01)
Greece	0.03 (0.02)	0.06* (0.01)	-0.00 (0.01)
Hungary	0.12* (0.02)	0.04* (0.02)	0.06* (0.02)
Iceland	0.01 (0.03)	0.05 (0.03)	0.00 (0.03)
Indonesia	0.05* (0.02)	0.07* (0.01)	0.03* (0.02)
Ireland	0.05* (0.02)	0.09* (0.02)	0.07* (0.02)
Israel	0.07* (0.02)	0.10* (0.02)	0.06* (0.02)
Italy	0.03* (0.01)	0.07* (0.01)	0.02* (0.01)

Kosovo	0.03 (0.03)	0.07* (0.02)	0.07* (0.03)
Japan	0.04 (0.02)	0.04* (0.02)	-0.01 (0.01)
Kazakhstan	0.08* (0.01)	0.10* (0.01)	0.03* (0.01)
Jordan	0.03* (0.02)	0.06* (0.01)	0.05* (0.02)
Korea, Republic of	0.01 (0.02)	0.03 (0.02)	0.03* (0.01)
Latvia	0.05 (0.02)	0.07* (0.02)	0.02 (0.02)
Lithuania	0.02 (0.02)	0.10* (0.02)	0.06* (0.02)
Luxembourg	0.00 (0.02)	0.03 (0.02)	-0.02 (0.02)
Malaysia	0.11* (0.02)	0.06* (0.02)	0.10* (0.02)
Malta	0.06* (0.02)	0.06* (0.02)	0.09* (0.02)
Mexico	0.11* (0.02)	0.07* (0.01)	0.06* (0.02)
Moldova	0.04 (0.02)	0.06* (0.02)	0.04 (0.02)
Montenegro	0.00 (0.02)	0.04* (0.01)	0.03 (0.02)
Morocco	0.05* (0.02)	0.03 (0.01)	0.00 (0.02)
Netherlands	0.00 (0.03)	0.05* (0.02)	0.01 (0.02)
New Zealand	0.06* (0.02)	0.06* (0.02)	0.07* (0.02)

Norway	0.04 (0.02)	0.06* (0.02)	0.04* (0.02)
Panama	0.05* (0.02)	0.05* (0.02)	0.02 (0.02)
Peru	0.05* (0.02)	0.08* (0.02)	0.03* (0.02)
Philippines	0.09* (0.02)	0.14* (0.02)	0.13* (0.02)
Poland	0.05* (0.02)	0.04* (0.02)	0.05* (0.02)
Portugal	0.04 (0.02)	0.07* (0.02)	0.03* (0.02)
Qatar	0.05* (0.02)	0.08* (0.01)	0.06* (0.01)
Romania	-0.00 (0.02)	0.04 (0.02)	0.04* (0.02)
Russia	0.04 (0.02)	0.07* (0.02)	0.07* (0.02)
Saudi Araia	0.04 (0.02)	0.08* (0.02)	0.09* (0.02)
Serbia	0.02 (0.02)	0.06* (0.02)	0.03 (0.02)
Singapore	0.09* (0.02)	0.09* (0.01)	0.06* (0.02)
Slovak Republic	0.03 (0.02)	0.05* (0.02)	0.04* (0.02)
Slovenia	0.06* (0.02)	0.05* (0.02)	0.03* (0.01)
Spain	0.01 (0.01)	0.03* (0.01)	0.02* (0.01)
Sweden	0.08* (0.02)	0.06* (0.02)	0.04* (0.02)

Switzerland	0.02 (0.02)	0.04* (0.02)	0.02 (0.01)
Taiwan	0.08* (0.02)	0.08* (0.01)	0.07* (0.01)
Thailand	0.06* (0.02)	0.06* (0.01)	0.08* (0.02)
United Arab Emirates	0.04* (0.01)	0.09* (0.01)	0.05* (0.01)
Turkey	0.09* (0.02)	0.05* (0.02)	0.04* (0.02)
Ukraine	0.05 (0.02)	0.10* (0.02)	0.04* (0.02)
United Kingdom	0.05* (0.01)	0.07* (0.01)	0.07* (0.01)
United States	0.04* (0.02)	0.08* (0.02)	0.08* (0.02)
Uruguay	0.03 (0.02)	0.06* (0.02)	0.02 (0.02)
Vietnam	0.07* (0.03)	0.10* (0.02)	0.03 (0.02)

Note: Multilevel regression estimates with robust standard errors shown in parentheses. Each cell shows estimates for the coefficient on teacher-centered education when predicting the column's form of civic engagement within each country. I control for gender, socioeconomic background, and reading scores. Teacher-centered education ranges from 0 to 3. Outcome is frequency of each form of civic engagement, ranging from 0 (Never/almost never) to 3, which corresponds to several times a week for newspapers and several times a day for online news and group discussion.

E. Additional Analyses for PIRLS 2006

E1. Table 5 with full PIRLS 2006 sample

	(1) Newspaper	(2) Non- fiction	(3) Novels	(4) Comics	(5) Magazines
Student-centered Education Index	0.07* (0.03)	0.05 (0.03)	0.11* (0.03)	-0.00 (0.03)	-0.03 (0.03)
Girl	0.02 (0.02)	0.05* (0.01)	0.36* (0.02)	-0.26* (0.03)	0.29* (0.02)
Parents' education	-0.01 (0.01)	0.00 (0.01)	0.05* (0.01)	0.01* (0.01)	-0.00 (0.01)
Reading score, logged	-0.00 (0.00)	-0.00* (0.00)	0.00* (0.00)	-0.00* (0.00)	-0.00 (0.00)
Class size	0.00* (0.00)	0.00* (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)
Teacher experience	-0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00 (0.00)	0.00* (0.00)
Constant	1.14* (0.08)	1.78* (0.07)	0.74* (0.15)	1.75* (0.07)	1.30* (0.08)
Observations	144,685	146,849	147,311	148,197	146,261
Number of countries	46	46	46	46	46

Note: Multilevel regression estimates with robust standard errors shown in parentheses. Individuals are nested in schools in countries. Student-centered Education Index ranges from 0 to 1. Outcome is frequency of reading the respective form of text. Frequency of reading ranges from 0 (Never or almost never) to 3 (daily).

E2. Predicting student-centered education with student characteristics

-Using perceptions of wealth to measure home resources, rather than book ownership

	(1)	(2)	(3)
Preschool attendance	0.05 (0.75)	0.05 (0.73)	0.05 (0.72)
Primary language	-0.12 (0.40)	-0.12 (0.43)	-0.12 (0.43)
Home resources	-0.04 (0.43)	-0.03 (0.52)	-0.03 (0.53)
Reading performance	-0.00 (0.66)	-0.00 (0.70)	-0.00 (0.68)
Disorder: bullying	-0.10 (0.28)		
Disorder: stealing		-0.08 (0.45)	
Disorder: violence			-0.01 (0.91)
Constant	29.11* (0.00)	29.05* (0.00)	29.04* (0.00)
Observations	70,806	71,172	70,944
Within-school R-squared	0.00	0.00	0.00

Note: Fixed-effects regression coefficients shown with school fixed effects. Outcome is the Student-centered Education Index rescaled to range from 0 to 100. Model 1 measures disorderly behavior with bullying, model 2 does so with stealing, and model 3 does so with violence. In all models, I measure Home resources with responses to the question: “Compared with other families, how well-off do you think your family is financially?” Respondents could choose between not at all well-off, not very well-off, average, somewhat well-off, and very well-off, which I code to range from 0 to 4. Robust standard errors clustered at the school level in parentheses. * $p < 0.05$.

E3. Predicting student-centered education with teacher and class characteristics

-Using teacher age in place of years of teaching experience

	(1)	(2)	(3)
Teacher age	-0.14 (0.62)	-0.17 (0.53)	-0.03 (0.92)
Female teacher	0.65 (0.48)	0.78 (0.40)	0.69 (0.44)
Teacher education level	0.47 (0.26)	0.23 (0.58)	0.36 (0.37)
Teacher training	0.67* (0.01)	0.76** (0.00)	0.70** (0.00)
Class size	-0.15 (0.13)	-0.14 (0.13)	-0.13 (0.15)
Instruction time for language (duration)	-0.20 (0.27)		
Instruction time for reading (duration)		0.05 (0.66)	
Instruction time for reading (frequency)			0.16 (0.76)
Constant	31.49* (0.00)	29.80* (0.00)	29.06* (0.00)
Observations	81,495	84,308	87,383
Within-school R-squared	0.01	0.01	0.01

Note: Fixed-effects regression coefficients shown with school fixed effects. Outcome is the Student-centered Education Index rescaled to range from 0 to 100. Model 1 measures instruction time with the number of hours teachers meet with students for language instruction. Model 2 does so with the number of hours for reading instruction, and model 3 does so with the number of days per week teachers meet with students for reading instruction. Robust standard errors clustered at the school level in parentheses. * p<0.05.

F. Lottery school assignments and student-centered education reforms in South Korea

A few years after the Korean war in the late 1950s, the South Korean government made primary education mandatory for all citizens. This created a surge in Koreans attending primary school and in turn, demand for secondary education. But the number of secondary schools in the country stayed stagnant, driving up competition for admission to middle schools and high schools (Han 2013). During this period, the Korean government and schools administered nation-wide standardized exams to select which students would be admitted to middle schools (Kang 2004; Park 1999). Korean society revolved around elites who graduated from a short list of prestigious schools and the competition to perform for middle school entrance exams led to high levels of stress among children and their parents, stunted physical growth among children, child suicides, and financial burden for families paying for private tutoring lessons (Han 2013; Hwang 2013)

Against this backdrop, several incidents ignited public outcry and paved the road to the elimination of middle school entrance exams (Lee 2013). In one widely covered incident coined the “radish juice scandal,” a question on the science exam for entrance into elite middle schools in Seoul listed the steps to make rice taffy and asked what you could substitute for one of the steps. The Ministry of Education declared that the answer was ‘diastase’, a digestive enzyme. This caused strong pushback from parents of children who instead answered ‘radish juice’ (which contains diastase), and did not make the cut to elite middle schools. At one point, indignant parents rushed to government offices and politicians with a pot of rice taffy made with radish juice to make their point. Eventually, the Seoul High Court declared that both diastase and radish juice were correct and students who were originally below the cut for their middle schools of choice because they answered radish juice were allowed admission into elite middle schools (Lee 2013). Several high-level politicians and other elites arranged for their children to also receive admission during the chaos of this incident, which caused even more public uproar and forced the Presidential Secretary, Ministry of Education’s Deputy Minister, and the Seoul education superintendent to step down.

Incidents like the radish juice scandal brought to light problems in administering exams for school admissions as well as the extent of public tension, stress, and dissatisfaction with competition for school admissions. In response, the Ministry of Education declared in 1968 that entrance exams would be eliminated for all middle schools, and that admissions would instead be decided by lottery (Paik 2001). This was a radical change in education in Korea and was considered an education revolution that freed children and parents from ‘admission hell’ (Lee 2013; Park 1999). The lottery system has since been softened to accommodate regional circumstances and citizen demands to have more choice in schools but still dictates school assignment in parts of the country (Kim et al. 2008; Park 1999). In parts of South Korea’s largest state, for example, if a middle school has too many applicants than it can admit,

students are randomly chosen by lottery to either attend the school or be assigned another school in the district that does not have enough applicants.

Independent of lottery school assignments, local governments in Korea have pushed for student-centered education in its schools in the past decade. One key way that this was done was by funding pre-existing schools to become “Innovation schools” that adopt a participatory model of education focused on “voluntary, creative, autonomous, and democratic schooling” (KEDI 2018). Although there were regional differences in the specific implementation of Innovation Schools, one common theme running through all local variations of the Innovation School policy is their focus on building a school culture focused on democratic norms. Pitted against the nation’s traditional authoritarian culture and rote memorization in schools, innovation schools emphasize participation and self-initiative of its students (SMOE 2018, 8).

The Innovation school policy and, more broadly, Korea’s recent education reforms towards student-centered education, has bottom-up origins in the New School movement (Jung 2015, 37-9; GOE 2017, 5). In the late 1990s and 2000s, teachers and parents from schools at threat of closures worked together to revive their schools. Many of the parents in this movement were activists who moved to districts in rural areas where schools faced closures because there were not enough students in the area. To keep the schools running, parent-activists transferred their children into these rural schools and teamed up with teachers who wanted to change how children in the country learn. Because these teachers were working in schools with a small number of students, they were free of burdensome administrative work, and were able to use this time and administrative leeway to innovate the curriculum in their schools (GOE 2013, 26-27). With innovations such as the inclusion of more hands-on activities, flexible curricula, and project (rather than subject) centered classes, the movement evolved from one that focused on preserving debilitating schools to one that focused on reforming school models – the New School movement (Kang 119-120; Song 2018, 25-26).

The New School movement was accompanied by institutional and political developments. To facilitate schools around the country taking part in these education model reforms, the Small School Education Association was founded to build networks across schools in the New School movement (Song 2018, 25). The movement, however, was inherently confined to small schools facing closures and was irrelevant for the vast majority of schools in the country. Then, in 2007, this was no longer the case with the institution of direct elections for local education superintendents.

Education governance in South Korea is administered by the Ministry of Education at the national level, Metropolitan and Provincial Offices of Education at the province level, and Local Offices of Education at the district level (Kim et al. 2014; Korean Ministry of Education 2023). Education superintendents serve as the head of one of 17 Metropolitan and Provincial Offices in the country, and therefore are heavily influential in both province and district level education policies (Jun and Min 2017). In 2007, following periods of presidential and education board appointments, direct elections were institutionalized to select education

superintendents for all 17 province-level regions in South Korea (Huang et al. 2024). In 2009 in Gyeonggi province, the largest and most populous province in the country, a liberal candidate for office successfully campaigned on progressive education policies. One of his main policy platforms was to expand the New School movement to a province-wide policy and create student-centered Innovation Schools, which he delivered on during his tenure as one of his key contributions (Hong 2019). The policy was well received by citizens and this started a nationwide movement towards Innovation Schools, as education superintendents in other areas of the country also started to endorse more student-centered education (Yoo 2017).

During preliminary fieldwork in Korea in 2022, I interviewed local teachers to understand their experiences and roles in this shift to student-centered education. I also met with administrators at the Gyeonggi Provincial Education office to ask about the local Innovation School policy. What I heard commonly from both teachers and education office administrators was that despite such policy-level push towards student-centered education, schools and teachers are the ones who have the final say in the extent of student-centered education that they practice, and that they vary in their willingness and capacity to implement more student-centered practices. That is, while local governments have pushed towards more student-centered education and student-centered education is now practiced more on average, there is still a great degree of variation in education models regardless of whether a school is a designated 'Innovation school' or not.

The presence of both random school assignments and varying degrees of student-centered education implementation in South Korea creates a unique natural experiment setting where if a school district randomly assigns their students to schools and some schools are more student-centered than others, students are effectively being randomly assigned education models.

G. Recruitment Flyer

학교문화와 시민성 설문조사



중학생 및 중학생 자녀를 둔 학부모님을 대상으로 온라인 설문 참여자를 모집합니다. 참여자 전원에게 48 시간 내로 모바일금액권이 지급됩니다.

연구제목: 학생중심문화 및 시민성 비교 연구
연구목적: 학생중심교육이 시민성에 미치는 영향을 평가할 수 있는 자료 수집
참여대상: [redacted] 중학교 학생 및 학부모
참여기간: 2023 년 6 월 20 일 ~ 8 월 31 일
참여방법: 아래 QR 코드 스캔 후 설문(5-10 분 소요) 온라인 제출
연구책임자: [redacted]

응답해주신 내용은 국내외 교육정책 수립에 도움이 될 수 있습니다. 설문 중 언제든지 질문을 건넬 수 있습니다. 개인정보보호법에 따라 개인의 응답내용은 철저히 비밀이 보장됩니다.

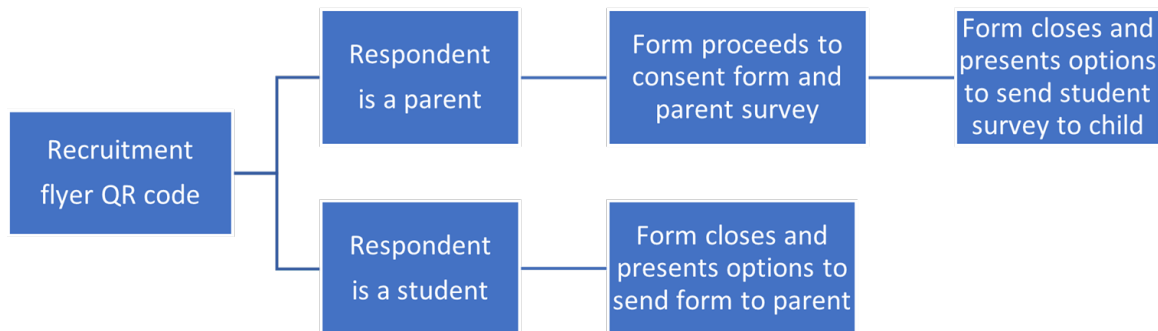


설문 접속 QR 코드

H. Consent and survey process

I recruited both middle school students and their parents to take part in the study. I programmed the online study information, consent, and survey forms so that student participants would not be able to access the consent and survey forms prior to submitting parental consent. That is, only those whose parents approved of their child's participation could access the student consent and survey forms. This was programmed via Qualtrics' survey flow and survey end options.

The recruitment flyer's QR code was linked to a landing page that introduced the study and listed the schools whose students (and parents) are eligible to participate. It then asked, "Are you a student or a parent?" For students, the page automatically closed and provided options to share the page with their parents so that parents could give consent for the child prior to the child's consent and participation. For parents, the survey proceeded to the parent consent and parent questionnaire items.⁴³ At the end of this survey, the parent could share the student consent and questionnaire with their child, either by putting in their child's phone number or by manually sharing a QR code displayed on this page. When a parent submits their child's phone number, a pre-written text was immediately sent to that number. The text included the link to the student consent and survey form. A little over two thirds of my respondents chose to share via text. The figure below illustrates the order of the consent and survey forms.



⁴³ I collected parent surveys for 93 out of my 101 student respondents.

I. Consent form for student participants

Research Project Title: Comparative Study of Student-Centered Culture and Citizenship

This research focuses on the student-centered culture and citizenship in Korea. Before deciding to participate in this study, please carefully read the information and consent form. Participation in this study is voluntary and will only be conducted with those who express their willingness to participate. After reading the following information carefully, please indicate your intention to participate, and feel free to discuss it with your family or others if necessary. If you have any questions, please contact the principal investigator, Eui Young Noh, at 010-5171-0739. Your signature indicates that you understand the explanation of this study and that you wish to participate in it.

Background and Purpose of the Research

This research focuses on the student-centered culture and citizenship in Korea. The purpose of the study is to contribute to educational policies by understanding the student-centered culture and citizenship experienced by students in various environments, both domestically and internationally. This study examines the impact of student-centered education, as emphasized in the 7th National Curriculum, on domestic citizenship.

Research Participants

The participants of this study include 500 students and their guardians from the following schools: [Redacted] Middle School, [Redacted] Middle School, [Redacted] Middle School, [Redacted] Middle School, [Redacted] Middle School, Jugok Middle School, [Redacted] Middle School, [Redacted] Middle School, [Redacted] Middle School, and [Redacted] Middle School.

Research Participation Method

Participants will take part in an online survey that takes about 5-10 minutes to complete. The student survey page will be accessible upon submission of this consent form. Within 48 hours of completing the survey and submitting the consent form, the principal investigator will confirm the submission and send a 5,000 KRW mobile gift certificate to the provided contact information. The survey includes questions about class affiliation, school classes, school management, citizenship (qualities of a good citizen, political and social efficacy, social behavior, etc.), and relationships with parents.

Duration of Research Participation

Participants will complete an online survey taking about 5-10 minutes, conducted once between the research approval date and December 2023.

Benefits of Research Participation

Participants will help enhance understanding of public education and citizenship in Korea, contributing to educational policies based on this understanding. While compensation is provided, no direct benefits from participation in the research are guaranteed.

Side Effects or Risks of Research

There are no medications or other procedures applied for the purpose of this research. Although no adverse reactions are expected, any unexpected psychological discomfort or displeasure will be reported to the Institutional Review Board immediately. Participants showing adverse reactions will be excluded from the study. If any discomfort or displeasure arises during the survey, participants may leave the survey at any time.

Compensation or Costs for Research Participation

There are no costs for participating in this study. Participants will receive a 5,000 KRW mobile gift certificate within 48 hours of survey completion. Available certificates include GS25, CU, 7-Eleven, and KakaoPay.

Privacy and Confidentiality

The following personal information will be collected: name, school affiliation, gender, and contact information. This information is used for consent, participant identification, statistical analysis, and compensation, stored and used for three years for research purposes. Information is managed according to the Personal Information Protection Act and stored securely on the principal investigator's institution server, accessible only to the principal investigator. Responses will be anonymized by assigning unique numbers and discarding names immediately after collection. Data will be used for research purposes and published without revealing personal information. If legally required, personal information may be provided. Monitoring agents, inspectors, and the Institutional Review Board may access research-related materials to verify the reliability and procedures. Signing this consent form indicates acknowledgment and acceptance of these terms. Research-related materials will be kept for three years after the study ends, as required by the Bioethics and Safety Act, and then permanently deleted.

Voluntary Participation and Withdrawal

Participation in this study is voluntary, and non-participation will not result in any disadvantage. Participants may withdraw from the study at any time. Upon withdrawal, data will no longer be used and will be deleted. Contact the principal investigator, Eui Young Noh (010-5171-0739), to withdraw from the study.

For questions or issues during the survey, contact the principal investigator, Eui Young Noh:

Eui Young Noh (PhD Candidate, Vanderbilt University)

010-5171-0739

eui.young.noh@vanderbilt.edu

For questions about your rights as a research participant, contact the Ministry of Health and Welfare-designated Institutional Review Board at 02-737-8990.

Consent Form

Research Title: Comparative Study of Student-Centered Education and Citizenship in Korea

I have read the explanation of this study and have had my questions answered by the principal investigator.

I understand the risks and benefits and have received satisfactory answers to my questions.

I agree to participate in this study.

I consent to the collection and processing of my information as per current laws and Institutional Review Board regulations.

I agree that the principal investigator or their designee may access my personal information during the research process.

I understand that I can withdraw from the study at any time without any penalty.

I will keep a copy of this consent form until the end of the research.

Name: _____

Year of Birth:

School:

Signature:

Date: _____

Thank you for agreeing to participate in the survey. The survey takes approximately 5-10 minutes, and a 5,000 KRW mobile gift certificate will be sent to your contact information within 48 hours after completion. Your responses will be anonymized and kept confidential. Please click the arrow to proceed with the survey.

Principal Investigator: Eui Young Noh (Vanderbilt University)

Contact Information: 010-5171-0739

J. Consent form for parents or guardians

Hello!

Welcome to the School Culture and Citizenship Survey.

Any students attending [Redacted], [Redacted], [Redacted], [Redacted], [Redacted], [Redacted], [Redacted], and [Redacted] Middle Schools and their parents are eligible to participate in the survey.

Parents can participate after submitting the consent form on the next page.

Students can participate after receiving parental consent.

Parents will take a 5-minute survey, and students will take a 5-10 minute survey. Both will receive a 5,000 KRW mobile gift card upon completion.

Both parents and students must participate in the survey to receive the gift cards.

Principal Investigator: Eui-Young Noh
(Vanderbilt University PhD Candidate)
eui.young.noh@vanderbilt.edu
010-5171-0739

Are you a student or a parent?

- ☐ Student
- ☐ Parent

[Proceed if parent, redirect to form for sharing link or QR code]

Research Project Title: Comparative Study on Student-Centered Culture and Citizenship

This study examines student-centered culture and citizenship in South Korea. Before agreeing to participate with your child, please carefully read the explanation and consent form. This study is conducted only for those who voluntarily agree to participate. Please read the following carefully and decide whether you and your child will participate. If necessary, discuss it with your family or others around you. If you have any questions, contact the research director, Eui-Young Noh, at 010-5171-0739. Your signature indicates that you have understood the explanation of this study and that you agree to participate with your child.

Background and Purpose of the Study

This study focuses on student-centered culture and citizenship in South Korea. By understanding the student-centered culture and citizenship experienced by students in public education, the study aims to contribute to educational policies in various environments both domestically and internationally. It investigates the impact of student-centered education on citizenship in the 7th national curriculum, which emphasizes student-centered education.

Participants

The study involves 500 students and their parents from [Redacted], [Redacted], [Redacted], [Redacted], [Redacted], [Redacted], [Redacted], and [Redacted] Middle Schools.

Method of Participation

You and your child will participate in a one-time online survey that takes about 5-10 minutes each. You will first complete the parent's consent form, which will automatically open the parent's survey page. After completing the parent's survey, you will receive a QR code for your child to access their consent form and survey. After completing the survey, the research director will verify the submission within 48 hours, and both you and your child will receive a 5,000 KRW mobile gift card. The student survey includes questions on demographic information, student-centered culture at school, citizenship, relationships with parents, and household income. The parent's survey includes questions on demographic information, middle school choice, education level, household income, citizenship, and relationships with the child.

Duration of Participation

The online survey will take approximately 5-10 minutes and will be conducted once from the research approval date to December 2023.

Benefits of Participation

Participants will contribute to the understanding of public education and citizenship in South Korea, aiding in the development of educational policies. While a reward is provided, direct benefits from participation are not guaranteed.

Potential Risks and Discomforts

No pharmaceuticals or procedures are applied for this study's purpose. Although no adverse reactions are expected, any unexpected psychological discomfort will be reported to the Institutional Review Board immediately, and the affected participants will be excluded from the study. If you or your child feel uncomfortable with any questions or information, you can exit the survey at any time.

Compensation

There are no costs associated with participation. Both you and your child will receive a 5,000 KRW mobile gift card upon completion of the survey, which will be confirmed and sent within 48 hours. Available gift card options include GS25, CU, 7-Eleven, and Kakao Pay.

Confidentiality and Data Protection

The personal information collected includes your name and contact information and your child's name, contact information, school affiliation, and gender. This data will be used for consent, participant assessment, statistical analysis, and reward distribution, stored for three years. The collected data will be managed according to the Personal Information Protection Act. Responses will be anonymized by assigning unique numbers to each participant, and names will be deleted immediately after assigning numbers. Research findings published in journals or conferences will not disclose personal information. Personal information may be provided if legally required. Monitors, inspectors, and the Institutional Review Board can access research-related materials to verify the study's reliability without violating confidentiality. Signed consent indicates understanding and agreement with these terms. Research-related documents will be stored for three years after the study concludes and then permanently deleted.

Voluntary Participation and Withdrawal

Participation is voluntary, and there will be no disadvantage for not participating. You can withdraw at any time without any penalty. Notify the principal investigator Eui-Young Noh (010-5171-0739) if you wish to withdraw. Upon withdrawal, your data will be deleted and not used in the study.

Inquiries

For questions or issues during the survey, contact the principal investigator:

Eui-Young Noh (Vanderbilt University PhD Candidate)

010-5171-0739

eui.young.noh@vanderbilt.edu

For questions about your rights as a research participant, contact the Ministry of Health and Welfare designated Institutional Review Board at 02-737-8990.

Consent Form:

Research Title: Comparative Study on Student-Centered Education and Citizenship in Korea

I have read the study explanation and received answers to my questions from the research director.

I understand the risks and benefits and am satisfied with the answers to my questions.

I voluntarily agree for myself and my child to participate in this study.

I consent to the collection and processing of my and my child's information according to current laws and Institutional Review Board regulations.

I consent to the research director or their delegate accessing my and my child's personal information directly when conducting or managing the study, and to research institutions, funding organizations, and the Ministry of Health and Welfare designated Institutional Review Board conducting investigations while maintaining confidentiality.

I understand I can withdraw from the study at any time without any penalty.

I will keep a copy of this consent form until the study ends.

Name: _____

Relationship with participant (Child)

☐ Mother

☐ Father

☐ Other: _____

Participant (Child) Name: _____

Participant (Child) Birth Year

☐ 2007

☐ 2008

☐ 2009

☐ 2010

o 2011

Participant (Child) School

- o [Redacted for privacy] Middle School
- o [Redacted for privacy] Middle School
- o [Redacted for privacy] Middle School
- o [Redacted for privacy] Middle School
- o [Redacted for privacy] Middle School
- o [Redacted for privacy] Middle School
- o [Redacted for privacy] Middle School
- o [Redacted for privacy] Middle School
- o Other

Signature: _____

Date: _____

Thank you for agreeing to participate in the survey.

The parent's survey takes about 5 minutes. After completion, follow the instructions to access the student survey. Upon confirming the submission of both surveys, a 5,000 KRW mobile gift card will be sent to each of you within 48 hours.

Your responses will be anonymized and kept confidential. Please proceed to the parent's survey by clicking the arrow below.

Principal investigator: Eui-Young Noh (Vanderbilt University PhD Candidate)

Mobile: 010-5171-0739

K. Student questionnaire

What grade are you in middle school?

- 1st year
- 2nd year
- 3rd year

Which class are you in?

- 1
- 2
- 3
- ...
- 12

Gender

- Female
- Male

When applying to middle school, was *{name of school}* your first choice?

- Yes
- No
- I don't know

The following are situations that may occur during a class. Please answer while thinking your reading classes this semester.

The teacher's explanations and instructions take up most of the class time.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

Classes revolve around the teacher and students asking and answering questions to each other.

- Strongly disagree
- Disagree

- Neither disagree nor agree
- Agree
- Strongly agree

During class, the teacher helps students solve problems on their own.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

The teacher gives students the opportunity to express their opinions.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

Continuing with this semester's reading classes:

Students exchange their own opinions about the learning content.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

Students form groups to work on assignments together during class.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

Students collect and research materials on their own to work on assignments.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree

- Strongly agree

I often ask questions during reading class.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

I enjoy being called on and presenting during reading class.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

I actively participate in group assignments during reading class.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

I am keeping up well with reading classes.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

The following are questions about decision-making at school. How much do you agree with each statement?

Our school reflects students' opinions when making or changing school rules.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree

- Strongly agree

Our school plans events (field trips/festivals/sports days, etc.) based on students' opinions.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

Students' opinions are well reflected in the management of the school cafeteria (menu, etc.).

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

Students' opinions are well reflected in elective courses and after-school classes.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

There are channels (suggestion boxes/boards, etc.) to gather students' opinions at our school.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

Student participation in school government makes the school better.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

Do you have any suggestions or requests regarding school meals, attire, facilities, classes, etc.?

- Yes
- No

Please write down any suggestions or requests you have for the school. Your responses will be anonymized and compiled to be delivered to your teachers at {*name of school*}.

The following are questions about citizenship. How much do you agree or disagree with each statement?

A good society can be made by citizens' efforts.

- Strongly agree
- Agree
- Neither disagree nor agree
- Disagree
- Strongly disagree

It is desirable for a leader to make all decisions if they are capable.

- Strongly agree
- Agree
- Neither disagree nor agree
- Disagree
- Strongly disagree

The most important policy decisions should be left to the people rather than politicians.

- Strongly agree
- Agree
- Neither disagree nor agree
- Disagree
- Strongly disagree

How much do you agree or disagree with the following statements?

People like me have little influence on what the government does.

- Strongly agree
- Agree

- Neither disagree nor agree
- Disagree
- Strongly disagree

The government is not interested what people like me think.

- Strongly agree
- Agree
- Neither disagree nor agree
- Disagree
- Strongly disagree

I know more about social issues in Korea than my friends.

- Strongly agree
- Agree
- Neither disagree nor agree
- Disagree
- Strongly disagree

The following questions are about the qualities of a good citizen. How important do you think each of the following is?

Always voting in elections

- Very important
- Important
- Neither important nor not important
- Not important
- Not important at all

Obeying laws and rules

- Very important
- Important
- Neither important nor not important
- Not important
- Not important at all

Actively participating in activities to solve local and social issues

- Very important
- Important

- Neither important nor not important
- Not important
- Not important at all

Helping those who are less well-off

- Very important
- Important
- Neither important nor not important
- Not important
- Not important at all

Sacrificing personal rights or freedoms for the public good (e.g., preventing the spread of COVID-19)

- Very important
- Important
- Neither important nor not important
- Not important
- Not important at all

People engage in various forms of social actions. Have you ever done the following?

Signed a petition

- I have done it
- I haven't done it, but might in the future
- I haven't done it and don't think I will
- I don't know what a petition is

Paying attention to news about social issues

- Strongly agree
- Agree
- Neither disagree nor agree
- Disagree
- Strongly disagree

Posting writings, comments, photos, or videos online or on social media to express opinions about social issues

- I have done it in the past year
- I have done it more than a year ago

- I haven't done it, but might in the future
- I haven't done it and don't think I will

Showing support for social issues online through likes, comments, follows, etc.

- I have done it in the past year
- I have done it more than a year ago
- I haven't done it, but might in the future
- I haven't done it and don't think I will

The following are questions about your family. To what extent do you agree or disagree?

My parents interfere even in small matters.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

My parents allow me to make my own choices.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

My parents make me follow their decisions unconditionally.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

My parents respect my opinions and allow me to express them freely.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

My family is well-off.

- Strongly disagree
- Disagree
- Neither disagree nor agree
- Agree
- Strongly agree

Lastly, the following are questions to confirm your eligibility in the study and send you your gift card. Please select the school information you provided earlier.

School

- [Redacted for privacy] Middle School
- [Redacted for privacy] Middle School
- [Redacted for privacy] Middle School
- [Redacted for privacy] Middle School
- [Redacted for privacy] Middle School
- [Redacted for privacy] Middle School
- [Redacted for privacy] Middle School
- [Redacted for privacy] Middle School

Grade

- 1st year
- 2nd year
- 3rd year

Class

- 1
- 2
- 3
- ...
- 12

As a token of our appreciation for participating in the survey, we would like to send you a 5,000 KRW mobile gift card.

Please enter a mobile number where you would like to receive the gift card and select your preferred type of gift card.

Contact Information for Receiving Voucher:

Gift card type: GS25 / CU / Seven Eleven / Kakaopay

Thank you for completing the survey.

Please double-check your contact information to ensure there are no delays in receiving your gift card. If there are any mistakes, please correct them in the input field below.

If you have any questions about participating in the research, please contact the principal investigator Noh Eui Young at 010-5171-0739.

Mobile phone number to receive the gift card: _____

Type of gift card: _____

L. Summary statistics for South Korea survey

1) Student-centered education measures

Variable	Mean	Standard Deviation	Range	N
Share opinion in class ⁴⁴	2.61	1.09	0–4	101
School has avenues for student voice ⁴⁵	2.89	0.93	0–4	101
Express opinion in class ⁴⁶	3.28	0.74	0–4	100
Group work in class ⁴⁷	2.57	1.23	0–4	101
School considers student opinions when making rules ⁴⁸	2.68	1.01	0–4	101

2) Political efficacy

Variable	Mean	Standard Deviation	Range	N
Good society made by citizen effort ⁴⁹	2.92	1.07	0–4	101
People like me can't influence government ⁵⁰	2.02	1.09	0–4	101
Government doesn't care about what people like me think ⁵¹	2.19	1.06	0–4	101
Knowledge of social issues ⁵²	2.16	1.00	0–4	101

⁴⁴ “How much do you agree or disagree: There are channels (suggestion boxes/boards, etc.) to gather students' opinions at our school.” Respondents could strongly disagree, disagree, neither disagree nor agree, agree, or strongly agree.

⁴⁵ “How much do you agree or disagree about your reading class: Students share their opinions about class content with each other.” Response options are the same as above.

⁴⁶ “How much do you agree or disagree: The teacher gives students the opportunity to express their opinions.” Response options are the same as above.

⁴⁷ “How much do you agree or disagree: Students form groups to work on assignments together during class.” Response options are the same as above.

⁴⁸ “How much do you agree or disagree: Our school reflects students' opinions when making or changing school rules.” Response options are the same as above.

⁴⁹ “To what extent do you believe that a good society can be made by citizen effort?” Response options are the same as above.

⁵⁰ The question asks agreement with the statement “People like me have little influence on what the government does?” Response options are the same as above.

⁵¹ The question asks agreement with the statement “The government doesn't care about the opinions of people like me.” Response options are the same as above.

⁵² The question asks agreement with the statement: “I know more about social issues in Korea than my friends.” Respondents could answer strongly disagree, disagree, neither disagree nor agree, agree, or strongly agree.

3) Control variables

Variable	Mean	Standard Deviation	Range	N
Girl	0.58	0.50	0/1	101
Household income ⁵³	3.73	1.63	0–8	92
Parents' highest level of education ⁵⁴	2.38	0.98	0–4	93

4) Civic outcomes

Variable	Mean	Standard Deviation	Range	N
Attention to news ⁵⁵	2.42	0.98	0–4	101
Signs petitions ⁵⁶	0.60	0.49	0/1	101
Supports social issues online ⁵⁷	0.41	0.49	0/1	101
Posts about social issues online ⁵⁸	0.21	0.41	0/1	101
School request ⁵⁹	0.30	0.46	0/1	101

⁵³ The question was included in the parent survey and asks “How much is your household income before taxes?” There were 7 response options to choose from, ranging from “less than 2 million KRW” to “more than 7 million KRW”. I code these responses to range from 0 to 6.

⁵⁴ The question was included in the parent survey and asks “What is your highest level of education?” Response options were: middle school, high school, 2-year college, 4-year college, and graduate school. I code these responses to range from 0 to 4.

⁵⁵ The question asks respondents how much they agree with the statement that they pay attention to news on social issues. Respondents could strongly disagree, disagree, neither disagree nor agree, agree, and strongly agree. I code these responses to range from 0 to 4.

⁵⁶ The question asks “Have you ever signed a petition?” Respondents could answer “yes,” “no, but I may in the future,” “no, and I don’t think I will in the future,” and “I don’t know what petitions are.” I recode responses to create an indicator of whether the respondent either chose “yes” or “no, but I may in the future” against the baseline of those who were closed to the possibility of signing petitions and those who did not know what petitions are.

⁵⁷ “Have you ever expressed your support for a social issue by liking or following something on social media?” Respondents could answer “yes, in the past year,” “yes, more than a year ago,” “no, but I may in the future,” and “no, and I don’t think I will in the future.” I create an indicator for whether the respondent said that they have done so either in the past year or more than a year ago, against the baseline of choosing either of the two “no” options.

⁵⁸ “Have you ever posted or commented on social media to express your opinion on a social issue?” Respondents could answer “yes, in the past year,” “yes, more than a year ago,” “no, but I may in the future,” and “no, and I don’t think I will in the future.” I recode responses to create an indicator for whether the respondent said that they have done so either in the past year or more than a year ago, against the baseline of choosing either of the two “no” options.

⁵⁹ This question asks, “Do you have any suggestions or requests to your school related to issues such as school lunch, clothing regulations, facilities, or classes?” Respondents could choose yes or no.

Figure L1. Distribution of agreement with: I pay attention to news on social issues

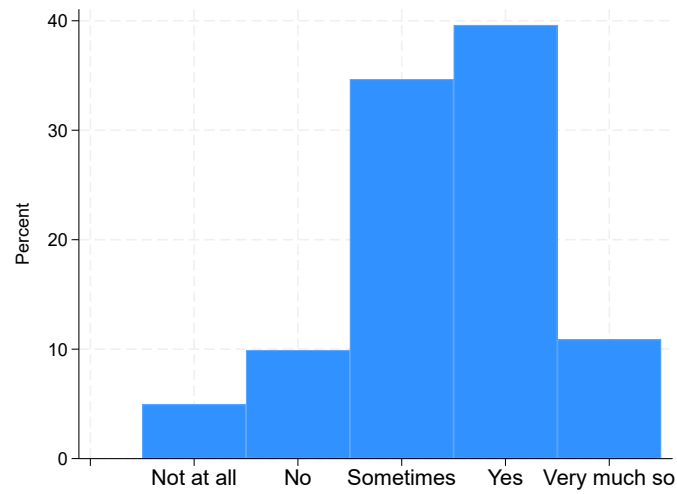


Figure L2. Distribution of responses to: Have you ever signed petitions?

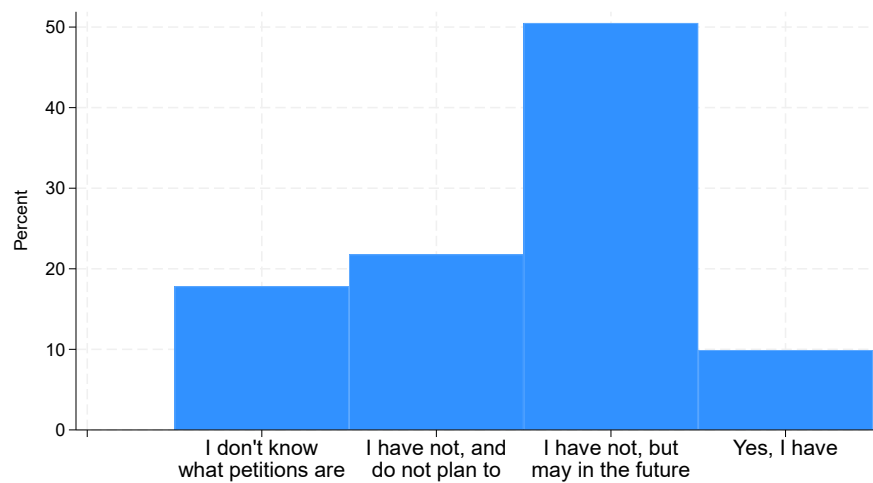


Figure L3. Distribution of responses to: Have you ever uploaded a post online to express your opinion on a social issue?

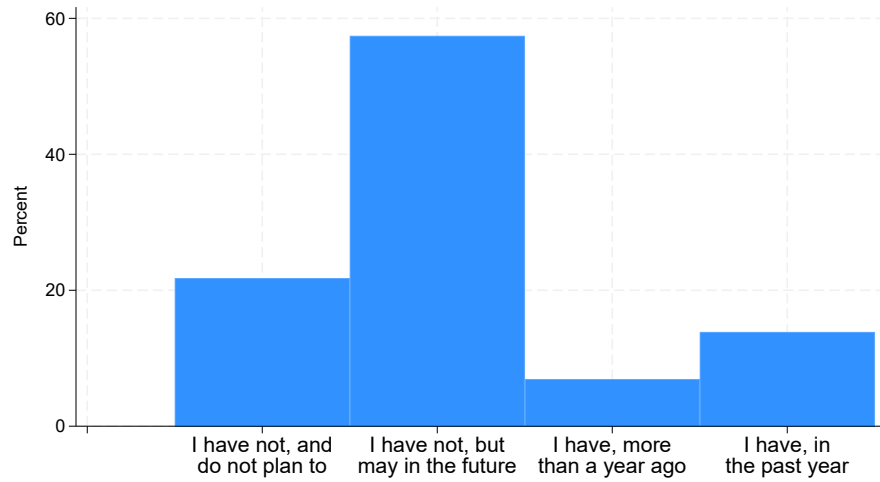
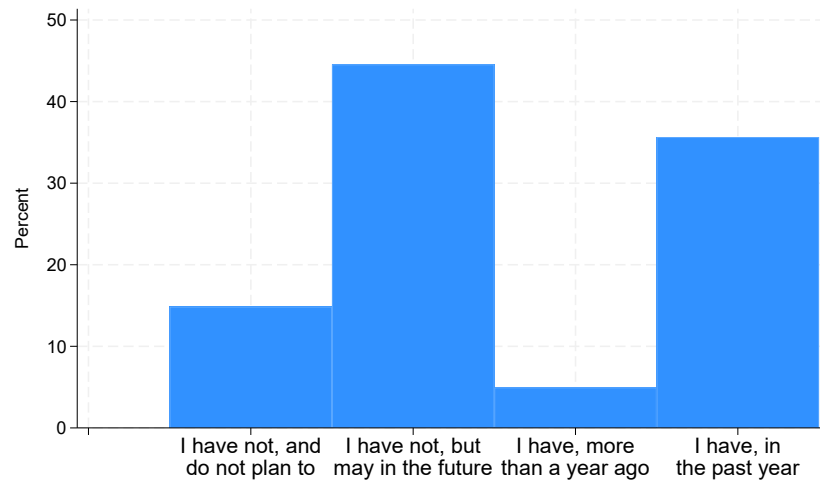


Figure L4. Distribution of responses to: Have you ever expressed your support for a social issue online by 'liking' or 'following'?



M. Comparison of means in political efficacy

	Mean of student-centered schools	Mean of teacher-centered schools	Difference	p-value
Good society through citizen effort	2.91	2.94	-0.02	0.93
People like me can't influence government	1.97	2.13	-0.16	0.50
Government doesn't care about the opinions of people like me	2.10	2.39	-0.29	0.21
Knowledgeable about important social issues	2.16	2.16	-0.00	0.99