

## Literature Review

The following Literature Review examined the CC and CPM and was an exhausting overview of 16 different articles. Of these 16 articles, four were pro-CC/CPM, five were anti-CC/CPM, and seven were pure factual and non-opinionated articles. One example of a pro-CC/CPM article that was reviewed was “Why We Support the Common Core” by Eva Arevuo. An example of an anti-CC/CPM article was “Common Core Standards for Mathematics: The Real Issues” by Edward Frenkel and Hung-His Wu. A factual article about the CC was “ABCs of the Common Core in Ohio” by StateImpact.

For starters, clarification is needed between the CC and CPM. CPM is an instruction technique in which students work in groups with their peers. Group work can be used for discussion, help in learning new concepts, teaching each other, and in taking tests. By comparison, the CC is the actual curriculum, the textbook, the assessments, and other materials used in a CC-classroom (StateImpact). The CC can be used and implemented without the CPM approach; however, the two often go hand-in-hand (Bloom “Core Questions”).

The new CC mathematics curriculum has changed the way students learn math. In the old classroom, math used to focus primarily on skills. Now, the math curriculum focuses on understanding what (and why) a student is learning instead of just going through the motions and memorizing how to do it. Because of this, the tests are more challenging, which should, in theory, coordinate with rising grades as everyone adjusts to the CC (Riley). Prior to the implementation of the CC in districts across the U.S., less than half of students were performing at a “minimally proficient” level in math. Some scholars are cautiously optimistic that the proficiency of students should increase with the CC since the CC aims at getting students to

“understand” math rather than “memorize it”. The old curriculum centered on skills and plugging in formulas rather than thinking and getting to a deeper understanding (Felt).

The new tests that students are taking are of higher quality than the ones before. “In general, the Common Core will upgrade the quality of reasoning expected of students across all subjects” (Arevuo). Many teachers were complaining that the old assessments were not of high quality. “The Common Core is designed to raise achievement levels in public schools across the country” (Riley). This is because they are clearer and more demanding than what over 30 states had as their standards. It will also upgrade the quality of reasoning in students, especially in math. Time in math class will be spent on fewer topics so as to allow students to master what they are being taught. Clearly, the CC is resurrecting the depth versus breadth argument (Arevuo).

Before the CC standards were implemented, every state developed and adhered to its own standards. For example, second graders might learn addition and subtraction in Ohio by mid-December, but in Michigan, they might be learning multiplication. This resulted in students in the same grade learning at a different rate based solely upon where they lived. There was no consistency (Wray). With the CC, students (and teachers) can move to a different state and pick right up where they left off. This is because the CC is a *national* movement. So, whether you graduate from Ohio, Michigan, or California, you should, in theory, have followed a fairly uniform math curriculum. “Now with Common Core standards, we will all be on the same page, so teachers, parents, and students across the country can discuss and share ideas to help each other teach and learn better” (Wray).

The new curriculum also puts students in real life situations in order to better prepare them for life after school. “The developers took what was deemed necessary for success in

college and careers beyond high school and back-mapped those skills into standards all the way down through the K-12 mathematics curriculum to primary school” (Felt).

The CC is supposed to end the “math wars” that pits parents against teachers concerning which method of instruction is better (Chang). Parents especially have noticed a big difference in the amount of homework their children now have under the CC compared to in the past. Homework questions used to be more challenging and complex; CC homework problems are shorter and more straight-forward (Gallagher). In a study of parent e-mails most frequently received by administrators concerning the CC and CPM, the biggest area of concern centered on the “dumbing down” of math skills that was lowering proficiency rather than raising it (Garelick). “Some parents saw that the Common Core was actually lowering the standards in their school” (Gallagher). Garelick’s study found that “instead of simply teaching students multiplication tables, schools are adopting an inquiry method of learning in which children are supposed to discover the knowledge for themselves”. Handing over the keys to the car for self-discovery, many feel, is just asking for a natural delay in development.

This CC also shuffles around the grade in which a student learns certain math skills. Instead of learning long division in the third grade, a student might not be exposed to it until their sixth grade year (Garelick). Kindergarteners originally used to learn a lot of patterns and numbers, but now most of their time is spent on numbers (Chang). Recently, Indiana became the first state to retreat from the CC when Governor Mike Pence signed a bill suspending its implementation. He was driven to act because of complaints that the standards were written at too low a level and failed to show how they were going to help students more than the old state standards (Gallagher). Michigan has also pushed the pause button on its implementation of the CC (Bloom “See How Quickly”). Professor James Milgram of Stanford University refused to

endorse the CC and dubbed it “investigative math” (Gallagher). He felt that the CC’s goal is to get students all over the country to reach the same *minimum* level of learning and, in order to achieve this, the CC intentionally made the standards as non-challenging as possible. “There are now no truths, 3 plus 4 can now equal 11 so as long as the student can explain how they got that answer” (Chiaromonte). Milgram said the CC standards “do not adequately reflect our current understanding of why the math programs in the high-achieving countries give dramatically better results” (Gallagher). The CC does not do a good job of making individual thinkers out of children. If the new standards adopted by New York and 44 other states work as intended, students will learn less this year” (Chang). In short, the CC is putting American students behind the rest of the world (Garelick).

Dayton Public Schools in Ohio released a statement that the CC is an attempt to link mathematical ways of thinking to real world issues by emphasizing in the early grades the development of number concepts (“Common Core Standard”). An expectation of fluency with operations, a progression of learning of algebraic thinking, number operations and systems, geometry and statistics, and an emphasis at higher grades on mathematical modeling will seek to address the question of “When will I use this in life?” that is uttered by disgruntled and frustrated students (Bloom “The Common Core Will Change”). Dayton Public is optimistic that the CC’s focus on specific goals will show students how math applies to real world issues. Still, students and parents will probably not come to the realization they are part of a new system of learning until they experience the CC’s positive effects. Bloom interviewed Ohio Federation Teachers President Melissa Cropper, who expressed that her kids “probably do not know or care about the Common Core” but they really like the new changes (Bloom “Core Questions”). Superintendent

Steve Barret said, “I think kids only realize what Common Core is because their teachers are using words like Common Core Problem” (Bloom “Core Questions”).

The CC is trying to set country-wide goals for the subject areas of math and English (Bloom “Eight Must-Read Posts”). This includes new tests to replace Ohio’s previous standardized tests like the Ohio Achievement Assessment (OAA) and the Ohio Graduation Test (OGT). These tests will also be given on computers instead of “paper and pencil”. The CC was developed by teachers and math and language experts and included district superintendents and state governors (“ABCs of the Common Core”). The overall goal of CC is to have consistency across the U.S. that also includes common testing (Felt).

Without a doubt, the CC brings a lot of changes to the math curriculum. *Ohio.gov* says that CC standards began implementation during the 2013-2014 school year with the hope of full immersion to the CC by 2015-2016. The idea behind slowly introducing the new curriculum is to acclimate students to the CC standards (ODE “Mathematics”). However, the CC does mean that Ohio students will now take a lot more standardized tests (Bloom “Eight Must-Read Posts”). In addition, math courses will be completely renamed. Gone are the days of Algebra, Geometry, and Algebra 2. Instead, students will take such courses as CCSS Integrated Math 1, 2, and 3 (Bloom “The Common Core Will Change”).

Others argue that the CC is being implemented in somewhat of a rush. Researchers Edward Frenkel and Hung-His Wu said there are three main issues with the implementation of the CC, which include the allocation of math textbooks, the assessments associated with the CC, and, more importantly, teacher preparation. Frenkel and Wu fear that the rapid changing curriculum does not leave teachers enough time to master the concepts and change their instruction in time to teach it appropriately to the students. Throw in a lack of essential supplies –

like textbooks – and it can plainly be asked, “How does a teacher teach a class without the class having enough books?” (Frenkel and Wu). The CC-aligned assessments given to students are inheritably unfair since they are being administered to students with limited exposure to the CC. Bad scores are often quickly pinned on the teachers, who are also learning along with their students (Frenkel and Wu).

Overall, the CC is facing a lot of scrutiny. Because it brings with it a wave of changes to the basic idea (and purpose) of math – some for the better and some for the worse – it faces an uncertain future. There is a lack of a lot of research on this topic because it is still being implemented in most states.