PERSPECTIVES OF EDUCATORS AND LEGISLATORS TOWARDS ARIZONA COLLEGE AND CAREER READY STANDARDS FOR MATHEMATICS EDUCATION

By

NATHAN DANIEL ALLEN

A Thesis Submitted to The Honors College

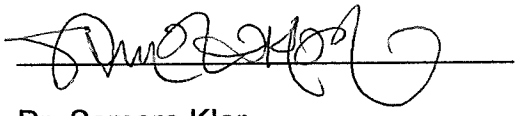
In Partial Fulfillment of the Bachelors degree
With Honors in

Political Science

THE UNIVERSITY OF ARIZONA

M A Y 2 0 1 5

Approved by:



Dr. Samara Klar
School of Government & Public Policy

Abstract

This essay examines the results of an undergraduate research project which consisted of interviewing two legislators and five teachers about the Arizona College and Career Ready Standards for mathematics education. The study focused on understanding how the populations interact especially in regards to their goals and measurement of success for the standards. Further, the project worked to summarize trends in the perspectives of both legislators and educators in order to compare those perspectives. This thesis works to satisfy the requirements to graduate with a Bachelor of Arts in Political Science with honors and, thus, focuses more on the nature of legislation than the content of math education. However, the essay does strive to suggest policy recommendations based upon teacher input, and examines the nature of how education policy is reformed.

Acknowledgements

In the process of creating an honors thesis, several people deserve acknowledgement beyond the author. First, Dr. Samara Klar, my thesis advisor, consistently provided academic support and encouragement. Certainly, I could not have found a more patient advisor who truly believed in my potential. Second, Dr. Cynthia Anhalt should also be acknowledged for her direct contributions towards my thesis as well as her continued encouragement of my math education policy studies. Third, the participants in my study provided their full support despite the fact that my thesis would likely remain unpublished outside of the University of Arizona. My project could not have existed without their dedication of time and their honesty in their responses. Fourth, all of my editors, especially those related to me, deserve appreciation for their perseverance throughout my honors career. Finally, and most importantly, I will borrow the words Johann Sebastian Bach chose to finish each of his compositions - Soli Deo Gloria.

Table of Contents

Introduction

Few studies have been conducted which study both a pool of legislators and a selection of educators. However, with the growing influence of state and federal legislatures upon public education, greater connections now exist between legislation and education. In particular, the Common Core State Standards Initiative (Common Core), adopted by 46 states and the District of Columbia, acts as a publicly familiar federal influence upon public schools (Common Core State Standards Initiative). Because of the relative infancy of Common Core, its success hinges upon the implementation of the federally created and state mandated standards in each classroom. Therefore, educators must have an accurate perception of the goals of policy makers and must be able to successfully communicate any revisions to those policy makers. With the goal of successful communication in mind, academics in the field of education policy must understand the perspectives, attitudes, and goals of legislators and educators regarding the implementation of the Common Core Initiative. This paper, then, seeks to understand the perspectives of legislators and educators regarding the goals of Common Core, the ability of the goals to improve education, the assessment of those goals, and the role of legislators and educators to implement or reform the goals.

First, this essay does not aspire to tackle the entirety of Common Core including all elements of K-12 education and the political climate caused by Common Core. Instead, this essay will focus on the state of Arizona as a case study examining the Arizona College and Career Ready (ACCR) standards, the Arizonan adoption of Common Core. Further, this essay will only investigate math standard. The restrictions to the ACCR standards for math originate from several reasonable facts. Because former governor of Arizona Janet Napolitano spearheaded the National Governors Association for Best Practices, a major developer of

Common Core, the political structure of Arizona should provide a suitable basis to study the intent and attitudes of legislators (Bidwell). Furthermore, Dr. William McCallum, a major contributor to the mathematics standards found in the Common Core initiative, worked in Arizona as a professor of Mathematics at the University of Arizona in Tucson. Additionally, many of the standards introduced in the Common Core initiate focused on making improvements in math and science education. Therefore, the restriction of this case study to math standards in Arizona public education serves as a reasonable representation of the perspectives of legislators and educators.

Literature Review

Given the rarity of recent studies which consider legislator and educator interactions, studies which observe either legislative interests or educator perspectives must be included to form a basic understanding of current attitudes of legislators and educators. However, several sources do directly relate previous interacts between legislators and educators, especially regarding funding for education. Historically, school funding debates represent a critical area in which school personal and legislatures interact (Sweetland 826). Examining federal legislators and education, Jeffrey Mervis, in discussing oversight of education in Science, Technology, Engineering, and Math (STEM) fields, discusses president Obama's movement to cut the number of STEM programs and to increase funding for the remaining programs ("Proposed Reorganization" 1274). Further, in an additional work, Mervis discussed criticism made by science educators concerning the elimination of important programs ("Wild Cards" 258). Then, at least regarding federal oversight for funding for STEM fields, critics, especially conservatives according to Mervis, question the ability of legislators to determine which elements of STEM

education deserve to be retained ("Wild Cards" 258). From the discussion of funding, educators likely will question the decisions of legislators while legislators work to balance the costs of education with the benefits to society as a whole

To understand the motivations of legislators in education, several facets of the responsibilities of legislators should be investigated. Legislators balance the motivations to create policy for the general public, to serve their specific communities of constituents, and to achieve their own ambitions as their character traits allow (Harden 176). Further, these motivations exist for state legislators as well as they remain accountable to state-level bureaucrats (Sarbaugh-Thompson et al. 59-60). Without directly assigning the title of "bureaucrats" to teachers, education administrators certainly retain a bureaucratic role indicating that state legislators also work to satisfy certain educators beyond simply including educators as part of a constituency. In addition, the career experience held by state legislators also informs their policy making experiences (Battista 177). Then, previous encounters with education through their career or experiences with educators likely constitute a significant portion of state legislator perspectives concerning Common Core. However, legislators tend to come from diverse backgrounds and likely do not hold educator experience (Battista 176). From the number of demands placed upon legislators and their potential lack of experience in education, education, especially math standards, likely occupies a small portion of their legislative concern. Yet, education certainly serves as a critically important issue to their stakeholders and states, and legislator commitment to education reform deserves study in this regard.

Beyond understanding basic goals of legislators, their goals towards Common Core need focused examination for the purposes of this study. First, Common Core represents an effort by governors to enter education. While no governors participated in this study, the

acknowledgement made by governors about the need to influence education potentially serves as a factor in legislator perspectives. Particularly, governors express a desire to enter education due to the fact that "teachers are the largest sector of government employees in every state" (Shober 572). With the responsibility to represent stakeholders and constituents, legislators should also share this desire to improve education as long as those efforts receive teacher approval. Next, policy developers use the results of research to create policy (McDonnell and Weatherford 3). Therefore, legislators should indicate perspectives consistent with examples provided from education policy researchers to develop teacher-approved reforms. As a critical potion of state enforced standards, the creation of assessments to understand the success of the standards occupies a significant portion of legislator discussion. For the previous education movement of No Child Left Behind (NCLB), legislators actively participated to dictate the goals of assessment (Kettler and Elliott 468). Since NCLB also represents state control over education, state legislators can be expected to discuss testing due to their previous involvement in setting assessment goals. Thus, legislators will likely indicate a perspective which strongly focuses on stakeholders beyond simply students and produce responses which mention the importance of both research and testing.

Also, given the need for educators to implement the standards created for them by policy makers, several studies have emerged that focus on teacher response to Common Core and their opinions about legislators. First, however, a detour should be made to examine the historical origins of public education and the ability of educators to influence education. The original writings of John Dewey deserve attention to indicate the historical role of government in public education as teachers understand it. Notably, Dewey describes "the vital and organic relation that there is between democracy and education from both sides, from the side of education, the

schools, and from the side of the very meaning of democracy" (Dewey 303). As a principal founder of modern lines of educational thought, Dewey's emphasis on the exchange between education and democracy, the production of citizens for the benefit of healthy society, should surface through the teacher interviews. Further, beginning with NCLB, nationally enforced standards have served to carry many pedagogical elements consistent with citizenship (Journell 351). While not necessarily apparent in math standards, teachers may still indicate perspectives which stress student participation in a national setting. Far from solely promoting democracy, teachers also act as participants in democracy with the potential to influence legislators. Teachers especially participate democratically through student advocacy as in a case in Kentucky where teachers challenged assessment (Raines 642). While not necessarily prevalent in teachers as a group, some teachers may express advocacy especially relating to deficits they observe through their teaching. In addition, these teacher perspectives related to democracy may target legislature specifically and the need to inform legislators of needed reforms.

After establishing the general motivations for democracy, the perspectives of teachers towards the standards should be understood from sources which specifically discuss the standards from an educator perspective. Dorothy Rich, as a teacher addressing public opinion, notes, "When standards are too low, they don't help move student forward. When standards are too high, they become barriers" (156). Expectations of student achievement inevitably rise from teaching (Rich 156). However, teachers will likely comment on whether the Arizona College and Career Ready (ACCR) standards for math require too much or too little from their students. In addition to considering the impact of the standards on students, the creation of state enforced standards also brings accountability of teachers and school (Nevi 461). Potentially, teachers may indicate that the standards create new pressures on school systems. The paradigm of standards

affecting more than solely students will likely become evident in the educator dialogue. Finally, as the nature of teaching changes to meet the standards, teachers may also express confusion over the standards or may indicate a need supplemental instruction to develop their pedagogy (Turley 144). In addition, teachers may express a greater need for collaboration to develop new practices consistent with the standards (Turley 145). Ultimately, teachers possess the experience to examine the effects of the standards on students, schools, and educators. Consequently, their perspectives on the standards will likely address those three areas.

Methods

Any model used to examine the perspectives about the Arizona College and Career Ready Standards for math must allow both for the extensive knowledge held by math teachers and the often cursory knowledge of standards possessed by legislators. Then, to provide a comparable data set, the legislators specifically either have direct experience with math education or to vocal about their perspectives and knowledgeable about the standards especially as they apply to math education. Legislators with the necessary experience either serve on state education committees or have pushed forward a bill to either institute or remove Common Core, proving at least familiarity with the benefits or faults of Common Core. Given these restrictions and the infancy of Common Core standards, few legislators satisfy the requirements of experience or knowledge to be reasonably compared as experts alongside a teacher population. As one of the methods to draw a large amount of data from an incurably small population, interviews represent the most viable means of comparison between teachers and legislators.

For the legislator interviews, the researcher contacted five legislators using their publicly available legislature associated email address using the recruitment email presented in Appendix

A. In addition, their staff was contacted with the nature of the interview – an in-person interview using audio-recordings and handwritten notes – and received a preview of the consent form in Appendix B that the researcher brought to the interview. If the initial email failed to receive a response, the researcher sent follow-up emails, approved by their thesis advisor, over the course of several weeks. Due to the availability of legislators and the rarity of expertise in the ACCR standards, the researcher ultimately selected two legislators who had significant experience with the standards and who frequently interacted with the media to publicly express their opinions. Despite the small population size, the legislators represent both the state house and the state senate, indicate opinions consistent with both Democrat and Republican partisanship, and provided data in comparable length to that of the teacher populations. The legislator interviews followed the questions presented in Figure 1, and the researcher conducted the interviews in either a public location or the legislator's office depending upon the legislators' preferences.

For the teacher interviews, the researcher contacted a prominent person within the Tucson mathematics education community to ask for a list of math teachers in the Tucson area who would likely be willing to participate in undergraduate research focusing on Common Core. Then, using a list of fourteen math teachers who fit the criteria, the researcher randomly selected five teachers from the list and contacted them through their publicly available, school-associated email address using the recruitment email in Appendix A. In addition, teachers also received an advance copy of the consent form present in Appendix B before signing the consent form prior to the interview. Four of the teacher interviews occurred in the teacher's classroom or elsewhere within their respective schools. Due to the availability of one teacher, the fifth interview occurred at a public coffee shop. The researcher asked the teacher the identical set of questions to those presented to the legislators (see Figure 1).

For both populations, a willingness to speak about Common Core standards acted as one of the main recruitment criteria. Participants all approved the consent form presented in Appendix B and understood that their responses would be audio-recorded, transcribed, and used anonymously. Further, each population generated approximately 25 minutes of interview time for a total of 50 minutes of data. The researcher then transcribed the interviews and stored them on the personal, password protected computer of the researcher.

How do you interact with the Arizona College and Career Ready Standards for Mathematics?
How would you describe the Arizona College and Career Ready Standards to people that haven't heard of it?
What do you think the goals of the Arizona College and Career Ready Standards for math should be?
Do you think the standards will improve math education in Arizona?
How will we know if the standards are successful?
How many years do you think these standards will last in their current form?
Is there anything else you would like to add?

Figure 1. This text box represents the wording of the questions used for both the legislator and teacher interviews. In the interviews, modifications to the wording of the question were made solely for the sake of clarity when the participant expressed confusion.

Participants

To begin the interview, participants answered a question describing their interaction with the Arizona College and Career Ready Standards. The nebulous term "interact" caused confusion

among several participants, but left room for interpretation for legislators to describe their knowledge of the ACCR standards and for teachers to indicate any specific examples of the impact of the standards on their daily work as a teacher. The data produced by this question and by observations made throughout the interviews reveals several important pieces of information about the participants useful to classify their responses.

Legislator A chose to be interviewed in an upscale restaurant and market in Tucson. Legislator A acted as a persuasive member of the education committee in the Arizona Senate during the time that the Arizona College and Career Ready Standards first received approval. Additionally, Legislator A serves as a registered Democrat and frequently shares their opinions about Common Core with media sources. Legislator A described their experience with the ACCR Standards for math in terms of their experience with the standards as a whole and with their role as a senate member of needing to approve education board members appointed by the governor. In their experience with the standards, Legislator A primarily focused on measures which attempt to remove the ACCR standards based on a deficit in the standards. For instance, they described sitting in a hearing and interacting with another senator who complained that the standards require the use of letters in math to which they replied "Isn't that algebra?" (Legislator A). Based on similar experiences, Legislator A frequently indicated their position that legislators lack the ability to assess the potential of Common Core standards.

Legislator B chose to be interviewed in their office after a second round of follow-up emails. Legislator B serves as Republican within the Arizona House of Representatives and historically supports bills which intend to remove or modify the Arizona College and Career Ready Standards. Through these legislative efforts, Legislator B frequently communicates with the media about Common Core legislation. In their interview, Legislator B described that much

of their experience with standards originates from their interaction with "front line service deliver folks . . . by that, [they] mean math teachers" as well as homeschooling parents and degree seeking graduate students (Legislator B). Additionally, Legislator B indicated that the math teachers they work with dislike the ACCR standards, criticizing a tendency to confuse children in a failed attempt to promote critical thinking. From this example, Legislator B expressed concern with employing a difficult subject, such as math, for the use of promoting critical thinking. Rather, Legislator B indicated a preference for subjects such as engineering which have direct applications for professional use. Legislator B also described an encounter with a graduate student who shared their concern that the approach to math instruction in the ACCR standards teaches students to compute math similarly to the process conducted by a computer. In addition, the graduate student observed that the process fails when students reach a certain level of achievement. After relying on anecdotal evidence, Legislator B expanded their criticism of Common Core by quoting Dr. James Milgram, a creator of Common Core who did not approve the standards, saying the standards fail to be internationally benchmarked. In short, Legislator B ardently opposes the standards, especially as they relate to mathematics education, based upon experience with education experts and research.

While the researcher did not request demographic information from teachers, several teachers volunteered information useful for classifying their participation.

Teacher A indicated that they have taught high school math for less than one full year in an underprivileged school. Then, the Arizona College and Career Ready Standards act as the primary standards used for the duration of Teacher A's teaching experience. Further, Teacher A described receiving professional development centered on implementing the standards. In addition, Teacher A frequently mentioned their disapproval of calling the standards the "Arizona

College and Career Ready Standards," stating their preference to call them the Common Core standards. Here. Teacher A's criticism originated from the added expense of isolating Arizona from national tests. As a teacher, Teacher A instructs both a freshman and a junior level math course. Through the instruction of the freshman and junior populations, Teacher A interacts with students who began their high school education using Common Core and those who began their education under the old Arizona's Instrument to Measure Standards (AIMS), standards created by Arizona for No Child Left Behind.

Teacher B disclosed that they have taught high school math for fourteen years. Most of their teaching experience fell under the purview of AIMS adopted in 2004. Further, Teacher B described several extra-curricular activities that they supervise and discussed a history of finding novel and hands-on techniques they prefer to employ to teach math. Teacher B's knowledge of the ACCR Standards stems from interaction with Common Core researchers at the University of Arizona and joint curriculum discussion with fellow teachers. In addition, Teacher B mentioned working with a new textbook designed to satisfy the standards and described some difficulty with trying to figure out how students will now be assessed. Particularly, Teacher B expressed concern that their preparation of their students may not match the goals of the creators of the standards.

Teacher C did not confirm how many years they have taught math. However, they referenced the National Council of Teaching Mathematics standards which have been continuously refined since 1989. Additionally, they described working with multiple sets of standards which indicates that they have taught math for longer than a decade. Similarly to Teacher B, Teacher C expressed some confusion over what the standards require of students. Teacher C's focuses their pedagogy on trying to make the content the standards accessible to

students. Teacher C also works at a historically underprivileged school in a district which has seen frequent financial and administrative struggles.

Teacher D discussed some difficulty switching to the ACCR standards. Combined with their age, Teacher D appears to have begun teaching just prior to the institution of the ACCR Standards. A cautious estimate places Teacher D within their first five years of math instruction. Teacher D related that they attended several summer workshops to understand the language and structure of Common Core. Further, Teacher D shared that they work in tandem with other math teachers at their school to ensure that they accurately understand and follow the standards. Teacher D indicated that they teach at a high school that typically does not perform well on standardized tests and that operates within an underprivileged district.

Teacher E gave no indication of the duration of their teaching experience. Further, Teacher E presented the least amount of data due to the short length of their responses. They did indicate their interaction with University of Arizona Common Core researchers to help understand the standards. Teacher E also discussed the introduction of a new textbook based on the standards and mentioned that their lesson plans, assessments, and quizzes follow structures based on Common Core.

Description of the Standards: Assessment and Addressing Public Opinion

After the participants elaborated on their interaction with the ACCR Standards, they answered a question asking them to describe the standards to a person that had not heard of them. In all cases, their responses targeted the public at large with the assumption that teachers and legislators do not require further explanation. Through this question, participants revealed their own opinions about the actors involved in the creation of Common Core as well as assumptions

concerning elements of public opinion that require correction. Immediately, the participants' answers reveal whether or not they support the continuation of Common Core. Further, their responses show a desire to educate the public on either the merits or pitfalls of the ACCR standards.

Legislator A began by clarifying the difference between standards and curriculum. Later, Legislator A expressed their understanding that his constituents firmly believe "that [Common Core] is very proscriptive . . . in terms of curriculum" despite the fact that "one can get . . . to the standards in different ways via different curriculum" (Legislator A). Legislator A briefly mentioned that constituents hold the notion that as a federal initiative Common Core works as part of Obama's agenda to homogenize the nation despite Common Core's origin from the National Governors Association. As a whole, Legislator A chose to correct what they saw as a deficit in the public's understanding of the purpose of the ACCR standards, commenting on their role as basic guidelines for educators.

Legislator B immediately described the standards as "substandard," indicating that the standards expect less of students than the old AIMS standards (Legislator B). Further, similarly to Teacher A, Legislator B noted the danger of using multiple programs with new acronyms since they produce a visceral response in the population. Legislator B additionally stated that "teachers and parents have actually been pushed out the equation," expressing frustration at the immutability of the National Governor's Association's standards (Legislator B). Finally, Legislator B described the standards "as an unfulfilled deliverable . . . [the government] made a promise for one thing [and they] didn't deliver it" (Legislator). From their response, Legislator B indicates a strong desire to sway public opinion away from supporting the ACCR standards.

Additionally, Legislator B directed much of their response to criticizing federal influence on state legislation.

Legislator A and Legislator B both described a negative perspective held by their constituents. However, Legislator A directly stated that the standards still provide freedom while Legislator B focused on the inability to modify the standards. While both legislators mentioned the National Governors Association, Legislator A approached the NGA's creation of the standards as a positive alternative to a federally imposed mandate, but Legislator B criticized the NGA's oversight and the inability of the standards to provide a promised service. In short, both legislators discussed an overall negative perspective held by the public towards Common Core, but Legislator A sought to modify that perspective whereas Legislator B shared and promoted it.

Teacher A provided examples of their experience confronting those with misunderstandings concerning Common Core, stating "[w]hatever you have heard is wrong" and criticizing any "Common Core fear-mongering" (Teacher A). Teacher A describes Common Core as "a different way of thinking . . . that [is] more conceptual" and helps students understand math by helping them understand how smart people think about math (Teacher A). Also, Teacher A noted that the previous system of math instruction failed, indicating that the new Common Core standards implement a new system of constructing student thought concerning math. Certainly, Teacher A favors the standards and even challenges any negative perception of the standards held by the public.

Teacher B chose to describe the standards as "a set of information that they've decided is . . . important for the kids to . . . learn" (Teacher B). In particular, Teacher B discussed the necessary structural element of preparing students for the continuation of their math education. Teacher B did not mention any specific population involved in creating the standards and rather

focused on the purpose of standards. Teacher B's response reveals a practicality for establishing a cohesive structure of student education, but did not comment on the novelty of Common Core's nationally implemented approach or mention any specific political or academic agenda. Therefore, Teacher B focused on explaining the value of establishing set standards in education, assuming that the public at large fails to understand that standards assist education but do not dictate education.

Teacher C chose to compare the ACCR standards to the AIMS standards, describing them as a body of knowledge which focuses on broader goals than AIMS. Here, Teacher C utilized a publicly well-known structure, AIMS, to explain a new structure. While nothing in Teacher C's response indicates approval or disapproval, Teacher C does note through their response that the new standards take a focused approach to conceptualizing math education. In explaining Common Core, Teacher C decided to build upon the current opinion of AIMS without taking a more subjective approach.

Teacher D referenced previous conversations with the public in which Teacher D elaborated on Common Core's emphasis on critical thinking skills and the process of understanding mathematics. Further, Teacher D included anecdotal evidence of observing students improve in their problem solving skills with the ability to find answers and discuss the meaning of the answers. Through these examples, Teacher D discussed existing improvements that Common Core brought in helping students understand multiple representations of mathematical problems and finding the best solutions for those problems. Additionally, Teacher D briefly mentioned the old standards noting their "plug and chug" nature of modeling a mathematical process without teaching the conceptual underpinnings. From their response, Teacher D indicated a desire to share a positive attitude towards Common Core and explained

the need for critical thinking in math instruction, a need currently being satisfied through the standards.

Teacher E discussed the standards from an entirely different perspective than the other teachers. The anecdotal evidence that Teacher E employed centered on working with students from the Midwest prior to the institution of the new standards. Then, Teacher E compared the advanced math ability of students from the Midwest to the lesser ability of students in Arizona. After this example, Teacher E recommended using Common Core because their origin as national standards allows students to more easily travel between states without falling behind or being ahead of their peers in the same grade level. The support that Teacher E provided worked to improve public opinion of the standards by mentioning benefits which might otherwise go unnoticed.

As a whole, the teacher population indicated either apathetic or positive responses concerning the ACCR standards for math. Particularly, the optimism for Common Core increased as the age and experience of the teachers decreased, leading to a more enthusiastic younger population. In addition, the younger teachers also stressed an improvement in critical thinking and conceptual math skills. The older and more experienced teachers explained the practicality of agreeing on standards with Teacher E noting the practicality of national standards as well. In the process of explaining the new standards, teachers certainly utilized the old standards as a measure of comparison while adding anecdotal evidence as they saw fit.

Although Teacher A discussed a negative perspective held by the public, none of the other teachers discussed existing public opinion to the same extent as the legislators. Of course, legislators do work to satisfy public opinion to a greater extent than educators. More interestingly, Legislator A discussed the national effort of the standards which occupied the

concern of only one teacher, Teacher E. Further, Legislator B discussed a deficiency of the standards to include teacher approval and to improve conceptual understanding, whereas two-thirds of the teachers expressed an opposite opinion. In their explanations, each legislator took a position on Common Core relating to their past voting behavior while the teacher explanations arose out of personal or professional experience. In conclusion, the descriptions of Common Core certainly point to greater teacher approval than assumed by legislators and a desire of the teachers to help the public understand the need for the standards.

Goals of the Standards: Motivations of Educators and Legislators

A primary component of legislation rests in the goals of legislation. Obviously, government exists to provide solutions to problems affecting the public which would otherwise fall to an unequipped private sector. Thus, understanding the intent of legislation, the goals, acts as an important element to understanding the legislation itself. Regarding the goals, legislators and service providers implementing legislation should come to an agreement over what problems the legislation seeks to overcome. Therefore, for the ACCR Standards, the perspectives of legislators and educators need to be compared to understand how the populations view the goals and purpose of the standards. In their interviews, the participants answered what they thought the goals of the ACCR Standards for math should be.

Legislator A began by noting an overall purpose of "education to produce good citizens, first and foremost" (Legislator A). In particular, Legislator A stressed the importance of teaching students how to work cooperatively with other citizens and also to encourage students to find an eagerness to learn skills which add value to their future personal and professional relationships. After their discussion of citizenship, Legislator A directed their focus specifically to math skills,

noting that all citizens require a basic understanding of math to operate within most communities. Beyond the basic skills, Legislator A indicated the need for an education system that provides opportunities for students to advance their education to the highest level they wish to achieve. Further, Legislator A stressed the importance of providing rewards for that individual drive as well as a curriculum that encourages a thirst for knowledge. From their answer, Legislator A perceives the goals of the ACCR standards as an effort to provide students with shared skills to provide unity in communities as well as encourage flexibility and facilitation in curriculum to help students towards higher education.

Initially, Legislator B focused on the goal of creating capable graduates. Refining their answer, Legislator B narrowed the goal to meeting expectations in specific classes, in particular math classes. Legislator B indicated that "the standard[s] [need] to be very careful to . . . reflect . . . the expectations of once you've actually done through a course of instruction" (Legislator B). In their answer, Legislator B included that there must be set objectives that students should be able to meet after completing a math course such as algebra or geometry. Additionally, Legislator B provided a brief distinction between the difference between setting a standard and testing a standard, especially as it relates to the idea of "teaching to a test." Legislator's B answer indicates the purpose of instruction should focus on assisting students to achieve the standard, not to solely pass the test based on the standard. Finally, Legislator B's answer focuses on a thorough education of all math students who can accurately show their mathematical competency after leaving a math class.

From their answers, Legislator A and Legislator B indicate that an overarching goal of the ACCR standards rests on the ability to produce capable students and citizens. Legislator A's answer indicates an ideal baseline for math skills for all students while Legislator B's answer

targets achievement in specific classes. Legislator A's perspective encompasses the entire path of student education. However, Legislator B targets completion of goals centered on specific classes. The legislators depart in their perspectives to examine different aspects of the structure of education. Legislator A discusses the aggregate effects of education on student ability to enter society. Contrarily, Legislator B focuses on meeting expectations within classes. Specifically, Legislator B's answer focuses on secondary education, the focus of this study. Further, the specificity of a focus on secondary education also reveals a focus on collegiate or career preparation. Then, the legislators also differ in that Legislator A examines citizenship while Legislator B stresses an ability to satisfy professional goals. Overall, the legislators agree that the goals should contain clear expectations that students should meet in order to achieve a societal purpose.

Teacher A asserts that the goals of the standards should be to provide "math literacy and math comfort" (Teacher A). To explain this idea, Teacher A dismantles the idea that kids need to learn a specific set of math skills and shares that students will likely not need to write linear functions or factor quadratic equations in their personal or professional lives. Instead, Teacher A affirms that the goals should focus on ridding students of the fear of math. As an example, Teacher A presents a boss who requires their employee to "run some numbers" or to "do [a task] regarding math" to which the employee replies "I don't do math" or "I'm not a math person" (Teacher A). Teacher A desires their students to remove any self-deprecating perspective relating to their math ability. Further, Teacher A comments on Common Core and its intent to create an intuitive and contextual approach to problem-solving in a linear fashion. As a whole, Teacher A explains that the goals of the ACCR Standards should be to prepare students for future careers while enhancing student self-concept.

Teacher B initially stated a goal to look at the entire scope of education. Elaborating, Teacher B discussed future practical applications for math in their students' math careers which includes the duration of both their learning and use of mathematical skills. Teacher B countered the mindset of developing compartmentalized standards. For example, from a mathematical perspective, little geometry exists in the beginning stages of calculus. In fact, most calculus instruction begins with the abstract concept of limits and infinity whereas geometry focuses on concrete objects with properties such as area and volume. Yet, Teacher B indicates that the goals of the standards should be to look at how calculus and geometry benefit students and unify pedagogy around that central benefit. Teacher B's response sets a goal for the ACCR standards to enable to students to look beyond the individual skills they acquire and to look towards an eventual accumulation of applicable skills.

Teacher C kept their answer short indicating that "[t]he goals of the standards for math . . . [are] to build a common body of knowledge . . . that's taught across the country" (Teacher C). Teacher C's response requires little further explanation expect to indicate an inherent goal for a basic unity in the funds of knowledge for all citizens. Further, Teacher C incorporates a national identity and, thus, implies that a goal should be to establish one unified set of standards.

Teacher D answered using the context of the particular school in which they teach. Due to the low-performing status of the school, Teacher D recommended a goal for the standards to prepare potential college students for entry level college math courses. At its core, Teacher D's response points to a need for equality in math education to support all students into the next level of education with sufficient math ability to succeed. While potentially ambitious, Teacher D's ideal goal raises the expectation for the math standards to encourage students into collegiate level mathematics.

Teacher E's answer resembles Teacher C's answer in length and content. Teacher E stated that goals for the standards for math should be "to try to get everybody on the same page . . . get the same types of material being taught in the same grade levels across the board" (Teacher E). Teacher E does not discuss a national identity in this response like Teacher C did, but did discuss national regions (ex. Midwest) in their prior response. More importantly, Teacher E adds a perspective of grade levels which focuses on school structures rather than individual classes. Specifically, Teacher E's goal for the standards should focuses on encouraging similar sequencing of math classes across the nation.

Two main goals arise from the teacher interviews. First, students should be prepared for the next level of their career or collegiate goals. Obviously, the Arizona College and Career Readiness Standards retain these goals in their title. The three teachers who focused on professional goals nuanced their goals by looking at student self-esteem, the overall accumulation of student math skills, or the basic ability to enter college. Second, teachers discussed the need for unity in the standards to provide uniformity of education across the nation. Here, a national identity acts as a goal, but the teachers differed in looking at school structure. Teacher C chooses to pursue unity by looking at standards within each math content area. Similarly, Teacher E examines individual grade levels, looking at bringing all students up to a standard by age. Overall, the teachers focused on creating standards with real life applications and enabling as many students as possible to achieve those standards.

The themes of the teacher goals act similarly to the goals of the two legislators. The encouragement of practical applications ties in closely to the skills that Legislator A indicates should be found in all citizens. In addition, the preparation of students towards professional or collegiate goal pairs well with the facilitation of natural student drive for math that Legislator A

describes and the need to meet expectations that Legislator B implies. Teachers C and E emphasize the importance of creating unified expectations similarly to Legislator B's ideal goals of standardizing expectations by content area. The goals of enabling student success and creating a unified system of math instruction act as central tenants of Common Core. As a whole, the goals of the legislators and educators matched closely. But, the teachers emphasize certain elements of the goals based upon the needs they observe in their experiences.

Math Education in Arizona: Measure of Optimism for the Improvement of Math Education

As a study specific to the Arizona Common and Career Ready Standards, optimism for the improvement of math education in Arizona needs to be measured. Through commenting on the potential for the standards to improve math education in Arizona, participants reveal perspectives on previous systems of education while also analyzing the ACCR standards to provide either optimism or pessimism for Common Core. Note that the question regarding the ability to improve math education in Arizona follows the question concerning the goals of the standards. With the placement of this question, participants could frame their responses to examine whether the ACCR standards hold the potential to achieve their ideal goals.

Legislator A cautiously replied that the standards would improve math education in Arizona. In particular, Legislator A referenced a recent exercise created by a math teacher using the standards where the teacher took their students to a baseball field and worked with the students to identify aspects of baseball which require math. From this example, Legislator A posited that the standards promote understanding math using real-life applications. Legislator A relied on current successes to direct their optimism for the improvement of math education.

Moreover, the inclusion of an example of an innovative teaching technique supports Legislator A's goal for the standards to encourage a lasting enthusiasm for learning. Thus, Legislator A's optimism for Arizonan math education also relates to the ability of the ACCR standards to satisfy an established goal.

Legislator B enthusiastically began his answer by saying "Absolutely . . . [e]specially when we include teachers who are on the front line who actually understand how kids learn" (Legislator B). In other words, Legislator B addressed the potential for the standards to succeed after the standards receive revisions determined by a group Legislator B identified as the Arizona Education Standards Development Improvement Committee. The committee would contain teachers, parents, private sector representatives, a superintendent, a representative from a charter school, and an IT expert. Ultimately, the goal of the proposed committee centers on raising the bar of the standards. Recall, Legislator B described the standards as substandard. The committee would work to rectify any existing deficits in the standards by looking at the demands upon students as they move into the future. Legislator B builds upon the goal they identified of meeting expectations and satisfying needs for professional careers by indicating that the expectations should be modified and improved before seriously pursuing them.

Both legislators indicated their optimism for the ACCR standards for math and framed their optimism in terms of the ability of the standards to meet the respective goals of the legislators. Legislator A's optimism originates from current examples of the standards succeeding to encourage learning among math students. Legislator B shows optimism for the standards to eventually improve math education if changes can be made to improve the standards using the input of a variety of education stakeholders. The optimism of the legislators differs based upon the population the legislator considers. For example, Legislator A produced a

student-oriented example with student motivation serving as a key element in the promotion of math improvement. Conversely, Legislator B discussed the expectations of adults and the need for consensus among stakeholders as to what skills students should obtain. Certainly, legislators should focus on public well-being which includes aspects of student improvement and the benefits of professional experience. However, the different target populations seem to produce different opinions about the ability of the ACCR standards, as they exist now, to improve math education.

Teacher A immediately replied that the standards will improve math education in Arizona. To support their answer, Teacher A compared freshmen, who only have received Common Core instruction as high school students, and juniors who received several years of instruction under AIMS. Teacher A dramatically described the juniors as "dumb as bricks" (Teacher A). From Teacher A's comparison, the students receiving full Common Core instruction apprehend math skills more easily than the students who began their education under different standards. Teacher A also credits professional development based on Common Core as an important element to improving math education. The inclusion of professional development indicates that Teacher A believes that understanding the new standards acts as an integral part of their success. In their response, Teacher A addresses the potential of the ACCR Standards to improve student ability as well as the perception of their ability. Therefore, Teacher A framed the success of the new standards through an example which satisfies their described goal of helping students understand math and display math capability.

Teacher B also agreed that math education in Arizona will improve as a result of the standards. To defend their response, Teacher B discussed professional learning communities (PLC's), groups of teachers in the same content area who determine a course of instruction based

upon an understanding of essential topics. Because of the change to a new set of standards, math teachers in the same content area now work together at Teacher B's school to standardize their pedagogical approach. Teacher B's support of their optimism only partially relates to their prescribed goal of creating a cohesive mathematical pedagogy. To help students understand the widespread implications of math, a PLC works to construct the key portions of each subject and ensure that teachers emphasize those critical concepts. Further, Teacher B introduces the notion of the standards helping to encourage collaboration among teachers. Instead of solely providing unity across topics, PLC's also create an atmosphere of cooperation used to improve upon the baselines set in the standards. Thus, the cooperation that PLC's encourage operates to support the goals of the standards without being mentioned as a goal itself.

Teacher C briefly answered the question positively by saying "hopefully, yes" (Teacher C). Teacher C did not elaborate on their reasoning, but by the inclusion of the word "hopefully" they displayed an unsurprising interest to see students improve in their math ability. In addition, the word hopefully could also indicate that factors exist which challenge the ability of the standards to succeed. However, Teacher C's answer, in its brevity, fails to directly address any of the goals mentioned and any analysis could lead to misconstruing Teacher C's perspective.

Teacher D prefaced their response by warning about their passion over the issue of improvement. Remarking on the ability of the standards to improve math education, Teacher D stated, "I think they should" (Teacher D). Continuing, Teacher D explained their answer starting with the mathematical richness of the standards and a personal desire to see kids become excited about math, the content area of Teacher D's college degree. Altogether, Teacher D liked the ability of the standards to engage students on a conceptual level and to teach the difficult ability of critical thinking. However, the core of the emotion of Teacher D's response originated from

their perspective of public opinion. Teacher D described a climate of turmoil, confusion, and negative connotations associated with math education and the ACCR standards. In addition, Teacher D expressed concern that the negative atmosphere inhibits potential teachers from entering math education. Finally, Teacher D ends with the answer of "I think it should. I don't know if it will," remarking on the effectiveness of the standards (Teacher D). Therefore, Teacher D hesitantly shows optimism on the ability of standards to improve math education in Arizona despite obvious optimism for the potential of the standards to achieve the goal Teacher D emphasized of greater math competency.

Teacher E responded confidently that the standards would improve math education. Building upon their previous answers, Teacher E noted that Arizona tends to perform lower than other states in education. In the setting of national standards, Teacher E believes that students in Arizona will be expected to be more competitive with other states in math. Clearly, Teacher E provides an answer consistent with the goal of establishing unified standards and defines success in the sense that the unified standards expect higher performance from students in Arizona.

All five teachers indicated their optimism for the ACCR standards to improve math education in Arizona. For the teachers who elaborated upon their answers, they expressed that the new standards already have produced improved results. Notably, professional development and PLC's surfaced as support structures to the standards that assist teachers to accomplishing the goals of the standards. The hesitancy sensed in some of the teacher response seems to arise from unexplained and somewhat nebulous factors outside of the educational sphere. Most of the teachers note the potential benefit of the standards and express no specific concerns threatening the improvement of Arizonan math education.

Unanimously, the teachers and legislators indicate optimism for the ACCR standards to improve math education. Legislator A and several teachers provided current examples of the success of the standards. Legislator B expressed a slightly different perspective, basing their optimism on the potential of the standards after further modifications. Strangely, Legislator B discusses the absence of teachers in the creation of the standards, yet two teachers indicated the collaboration of members within schools to improve upon the standards. Therefore, teachers reveal efforts to support the standards regardless of their involvement in the standards' creation. The need for improvement and the deficit-oriented language present in Legislator B's opinion may fall into the negative association with the standards that Teacher D identifies. Certainly, the selected math teacher population expresses only optimism for the new standards. Unfortunately, public opinion and extra-academic stakeholder interviews do not form part of the interview data set. Therefore, the stake-holder attitudes described by Legislator B cannot be thoroughly analyzed or justly discarded in this paper as inaccurate.

The Success of the Standards: Perspectives of Measurement and Assessment

Beyond working to solve a problem, legislation should have a measurable effect. Certainly, quantifying success relates to the goals of the legislation by measuring whether or not the legislation achieves the desired purpose. Given the goals of support of education and national unity, both legislators and educators set partially qualitative goals as parts of the standards. By answering with their perspectives on how to measure success, legislators and educators also reveal which goals act as key portions of the legislation and which areas fail to clearly articulate their goals. Further, as a question which posits a potential success, the discussion over measuring success also stands to confirms trends of optimism in the participants.

Legislator A defined assessment through its Latin roots of standing by students and then discusses the role of testing to support student achievement. In essence, Legislator A advocated for testing, but in a way which supports student achievement instead of implementing competition. Legislator A recognized the potential of testing to label students as unintelligent, but noted that testing should be a tool to accurately measure competency so that students can be further supported through the highest level available to them. Here, Legislator A directly pointed to testing as a system to assist students to fully embrace the extent of their natural drives, a goal presented earlier in the interview. In addition to focusing specifically on student achievement, Legislator A cautiously indicated that schools should also be able to use testing as an assessment of school success. However, Legislator A continued that the labeling of schools and the distribution of resources away from failing schools act as poor consequences of using standardized testing as a measure of school success. Therefore, Legislator A firmly indicated that analysis of assessment should only be applied to the extent where students benefit. In his discussion of understanding the success of the standards, Legislator A presented a testing oriented approach, but modified testing to quantifiably measure student success instead of being used as a method of school comparison.

Legislator B began with a direct restatement of their set goals for the standards indicating that the standards achieve success if they meet multiple expectations. Then, Legislator B discussed the ability of the standards to satisfy professional and societal needs. Ultimately, Legislator B discussed the potential to nurture all students' emotional and psychological well-beings by avoiding testing fatigue and by helping kids learn in an applied manner. Self-reflecting on their own education, Legislator B described a collegiate schooling experience where a professor taught the legislator math by using an applied example of a fire fighter on a ladder, an

area of expertise for the legislator. Of particular importance, Legislator B highly stressed the need to rely on student individual interests and the promotion of unique talents to teach students creatively and to encourage their education. Here, Legislator B revealed information which clarifies some of their mixed levels of optimism for the ACCR standards. Legislator B implied that the notion of standards, while needed in education, automatically implements rigidity in a way that industry professionals typically do not utilize. Then, the standards need greater collaboration with all stake-holders within education and greater flexibility to encourage students. This paradigm certainly reflects the lack of optimism for the ACCR standards Legislator B occasionally indicates while also providing an explanation for the potential improvement in math education that Legislator B also confessed. In other words, Legislator B's unifying thought focuses on the apparent need for expectations and the need to refine those expectations to provide stronger professionals. Regarding assessment of success, Legislator B did not provide a specific mindset of assessment but rather stressed an additional goal to help graduates satisfy needs in whatever industries they enter.

Similarly to their statements of education improvement, Legislator A focused on a schooling population whereas Legislator B focused on society. However, Legislator A's answer indicates concrete assessment measures (i.e. testing) while Legislator B presents an abstract measure of success, success after leaving college. Although neither legislator deviated from the goals they set for the standards, they also added goals to their previous responses. Legislator A stressed the goal of encouraging student drive and talent yet took a concrete approach to testing and changing the usefulness of testing to focus more on students. From this answer, Legislator B added the goal of the standards to create a system which supports students in assessment. Legislator B provided a measurable goal of meeting expectations of the standards in each course

but then expanded their answer to the less quantifiable goal of meeting expectations in business by providing student-relevant education. By looking at both the goals and measures of success, the legislators reveal a unifying theme to have education be flexible with student interests. The main difference between Legislator A and Legislator B stems from their level of optimism for the current standards to meet their goals.

Teacher A indicated that success could be measured by observation of student comprehension. In particular, Teacher A noted a desire to see students become "more fluid in their thinking . . . [to understand] a bigger picture" (Teacher A). Teacher A expresses the idea of enabling students to understand connections within mathematics and to become more critical in their thinking beyond simply knowing how to use equations. In measuring success, Teacher A presented a current situation where they teach linear functions by using graphical, numeric, tabular, and algebraic forms. All forms require a separate understanding, but they all interrelate. For assessment, students should be able to describe the forms and their relations. The fluidity of mathematical thinking that Teacher A described reflects their earlier goal of math literacy and comfort. The results of student literacy and comfort reveal themselves through student ability to describe mathematical relations.

Teacher B provided a hesitant response relating to testing. "Success on an exam," Teacher B posed, "means that the . . . teacher was successful in getting those [concepts] across, but I . . . don't know . . . if those were the right things that they should be teaching" (Teacher B). Thus, Teacher B indicated that assessment accurately displays content knowledge, but content knowledge does not automatically indicate successful standards. From this answer, Teacher B displays a confident view on testing but a hesitant view on content. With the goals of enabling students with an understanding of practical math applications, Teacher B doubted the ability of

testing to measure whether or not the content knowledge will lead to positive results later in the ability of students to apply math.

Teacher C immediately noted the difficulty of measuring the success of the standards. In particular, Teacher C described the crux of the problem in that testing often tests school performance rather than student performance. The diversity among student ability cannot accurately be measured by one test, according to Teacher C, and Teacher C doubted testing based on the standards and its ability to help understand individual student achievement. In the discussion of the goals of the standards, Teacher C's goal stemmed from the need to meet a unified goal. Using that response as a lens, Teacher C seemed to question standardized testing to look specifically at a class to observe its success. Instead, Teacher C's concern operated under the notion that testing assesses overall school performance and cannot look closely enough at a class to be useful for teachers. Although the goal of unity serves as an integral part of the standards, Teacher C's response indicates that testing a unified standard fails to assist individual students. Rather, testing around the idea of unification assesses larger populations of districts and schools.

Teacher D's suggestion of measuring standards directly relates to their goal of assisting more students into college. In particular, Teacher D recommended looking at enrollment data in college math classes to observe whether or not more students need pre-college math. Teacher D recognized that they did not address the ability to measure whether or not the standards assist students to enter a career. From Teacher D's answer, an obvious ability to assess academic success exists, yet a deficit exists in measuring the success of preparing students for future professions. Here, potentially, Teacher D posits a question of whether the approach of the standards to teach math critically helps students become better members of the work-force.

Additionally, Teacher D's response requires a dedication to the ACCR standards for several years in order to assess their success. Overall, Teacher D's suggestion provides a clear method of assessing the goals of the standards (i.e. enrollment data), but also presents obvious flaws of a narrow focus on a specific goal and on the need for the ACCR standards to endure long enough to produce results.

Teacher E responded by indicating assessments as the main source of measuring success. Further, Teacher E presented assessments based on Common Core as useful to compare students across the country. Then, Teacher E focused on national assessment, similar to the goal of national unity presented early. In their answer, Teacher E chose to focus on the overall picture instead of solely looking at their classroom. Because of the national focus, Teacher E avoided the skepticism that Teacher C acknowledged relating to the inability to examine individual student achievement.

The measures of success presented by the teacher population largely worked to assess their respective goals. Discussing testing, many of the teachers doubted the ability of testing to provide an accurate measure of success. In particular, teachers, especially the older teachers, questioned the ability of testing to test the potential for professional success and to specifically help a small student population. Two of the teachers pointed to measures outside of testing, including discussions with students and looking at college enrollment data, as more accurate measures. But, testing serves as the best way to compare achievement on a national level as observed by Teacher E. As a unifying theme, testing served as the most readily available system to measure the success of the goals of the ACCR standards, but teachers doubted the usefulness of testing as a support mechanism to assist students.

The legislators and educators defined success by the ability of the ACCR standards to achieve their titular goal, college and career readiness. However, both legislators and educators questioned the ability of standardized testing to effectively measure the success of those goals. Legislator A described a needed mindset to use testing as a tool to help students, a quality that Teacher C directly identifies as lacking through the current methods of testing. Legislator B, then, focused on the ability of the standards to encourage students towards positions in industry, a sentiment that Teacher B shares and utilizes to express his doubt at the ability of testing to measure that goal. Teacher A's response neglected a national comparison aspect and instead focused on whether standards succeeded in her class. On the contrary, Teacher E took a wholly national approach, stressing the need for testing to measure student performance across state lines. Then, testing serves a practical purpose of being able to test nationally, but fails in a classroom setting. But, the populations almost achieve a consensus that the current nature of testing lacks the ability to measure college and career readiness. This consensus arguably prompted Teacher D to advocate for looking at enrollment data. Here, perhaps the responsibility of indicating whether standards succeed rests on the hands of colleges and employers. Certainly, some agreement exists that state or national testing provides little help to measuring the success of the standards.

Duration of the Standards: Political Influences and Education

As an additional gauge of optimism, participants speculated at the number of years the standards would last in their current form. Also, the question of duration works to understand how teachers view legislators by allowing them to predict legislator behavior to modify the standards. Through their responses, participants comment on the ability of the standards to

satisfy a lasting need. Further, since states possess the freedom to either adopt or remove the standards, the question works to specifically examine the political nature of Arizonan education. The question, while specific to Arizona, also offers the ability to the populations to assess the standards as a whole without focusing on math. The concept of duration also serves to indicate whether the participants trust the standards to successfully meet their goals.

Legislator A failed to provide a specific timeframe for the duration of the standards. Instead, Legislator A discussed the relationship between teachers and politicians, advocating for teachers to take control of the profession and dictate future legislation. Further, Legislator A criticized legislators for often using their limited and anecdotal experience to create policy. Legislator A then noted the existing professional and practice standards utilized by teachers to indicate the ability of teachers to provide their own standards. Regarding the ACCR standards specifically, Legislator A expressed a desire for teachers to fully incorporate and embrace the standards to indicate their approval. Without the teacher involvement, Legislator A indicates that politicians likely will modify the standards in a relatively short period of time, a short period of years. Clearly, Legislator A's response reveals a negative perspective towards legislator ability to produce success reforms and indicates an understanding of the nature of legislature to produce changes in education legislation regardless of teacher approval.

After confirming that the question referred to the current standards, Legislator A confidently stated that the standards would last for one year. Legislator A provided one of the most specific answers of either population. However, Legislator A also explained their current involvement to advocate for a bill which would modify the standards. Their confidence can be seen through the lens of optimism to pass their piece of legislation. In addition, Legislator re-explained the importance of providing curriculum which prepares students for a host of careers

based on student interest. Legislator B also exhibited strong emotions indicating that school systems should support students with no desire to pursue college to find suitable careers and that education should contain input from parents and teachers. Further, Legislator B reflected on their commitment as a legislator to ensure that education received greater reform based on the interests of stakeholders. Through the response, Legislator B reveals their motivations to modify the ACCR standards. However, Legislator B does stress the need to include teachers and professionals in future education reforms.

The legislators both expressed a strong desire for teacher involvement in the standards. However, they provided drastically different expectations for the duration of the current standards. Legislator A expressed a desire for teachers to embrace the standards and expand the intent of the standards to their fullest potential. Yet, Legislator A also revealed concern that the political climate would hinder efforts by teachers to gain momentum using the current standards. Legislator B certainly embraced politics as a means to legitimize teacher input as part of the legislation. While not removing the necessity of standards, Legislator B promoted changing the standards as soon as possible to give teachers and parents more control over the content taught in schools. Although both legislators sought greater teacher interaction with the standards, Legislator A saw politician interference as potentially damaging while Legislator B viewed adding legislation as a necessary step to empowering teachers further.

Teacher A provided no indication of the potential duration of the standards citing their lack of experience as a teacher. However, the length of Teacher A's response still reveals a perspective. Despite noting the already apparent benefits of the standards, Teacher A refused to comment further on their duration, indicating that Teacher A recognizes an inability to comment on political nature of the standards. Also, the inability to speculate on the duration of the

standards speaks to a feeling of instability. Then, the success of the standards, which Teacher A described through their experience, failed to provide Teacher A confidence regarding the continued use of the standards.

While not providing a specific number of years, Teacher B provided several useful time frames. Using the old AIMS revisions as a basis, Teacher B estimated that the ACCR standards would likely last for 15 years, even more likely to last for at least 10 years. However, Teacher B also produced an estimate of 5 years before significant changes in the standards occur. Teacher B utilized their past experience with legislation to inform their decision. The answer Teacher B gave in no way refers to the strength of the standards or the ability of the standards to meet their goals. Rather, the estimates Teacher B delivered originated solely from experience with mandated standards and politics.

Teacher C provided no specific numbers relating the potential duration for the ACCR standards. Referencing the "hoo-hah" of the current politic climate, Teacher C's doubts originated from a hesitance to speculate given legislator behavior. However, Teacher C referenced the National Council of Teaching Mathematics (NCTM) standards of several decades ago stating that the ACCR standards resemble the NCTM standards in the promotion of critical thinking. The ACCR standards, according to Teacher C, reflect less specific goals but retain the overall idea towards improving problem solving. Using their long-term experience, Teacher C referenced the political climate that adjusts standards while also revealing that the standards also stabilize around similar lines of thought. While the legislation frequently adjusts standards, Teacher C noted the overall stability of thought concerning the standards irrespective of any political influences. Then, Teacher C's answer reveals a perspective that legislators will likely

adjust the standards. However, the state of education may not change drastically because of those adjustments.

Teacher D also referenced the current climate of political instability regarding the future of the standards. However, Teacher D expressed a desire "to see [the standards] given a chance . . . carried out for . . . five, six, seven years" (Teacher D). Particularly, Teacher D expressed the need to see the standards affect an entire class of students beginning in their kindergarten years to examine the ability of the standards to provide a cohesive education all the way through twelfth grade. Specifically regarding secondary education, Teacher D also offered that many secondary students experience gaps in their education from changing standards in their secondary education. Elementary education, according to Teacher D, more easily enables students to overcome these gaps. The endurance of the ACCR standards over several years would produce students who experienced the full depth of the standards. Teacher D desires to examine the standards by looking at the whole of a student's education. In their answer, Teacher D provides an ideal duration of the standards, thirteen years so that an entire class of students can begin using Common Core in kindergarten and end with Common Core during high school. Yet, Teacher D clearly indicates that the standards will likely receive modification before thirteen years because of the political climate surrounding the standards.

Teacher E provided two answers separating education and political factors in their response. Teacher E clearly indicated the promise of the standards to last for a long duration in education yet honestly doubted the ability of the standards to remain due to political factors. Because of the political factors, Teacher E placed the duration of the standards only at a couple of years. Teacher E clearly presents a positive attitude towards the standards but also reveals a negative perspective of the legislature and their ability to create educational instability.

All teachers indicated uncertainty concerning the duration of the standards. In fact, most of the teachers directly framed their responses in the context of political instability, even after praising the usefulness of the standards. Some variation existed given the extent of teacher experience with previous reforms. However, as a group, optimism for the potential success of the standards did not inhibit a pessimistic estimation of the duration of the standards at five years or less. The teachers concurred that the ACCR standards would likely experience significant changes in the near future directly because of political influences.

Both populations, legislators and educators, indicated that the standards would likely be reformed within one to five years due to political factors. However, not all participants viewed change pessimistically. Legislator B offered the greatest promotion of changes to the standards, placing quick reforms as an integral part to ensuring the success of the standards. Teacher B and Teacher C offered their estimates with discernable optimism or pessimism and based their responses on past reforms. Through their attitudes, they revealed that changes in reforms need to be understood but not necessarily viewed as innately causing instability. The remaining teachers and Legislator A either discussed their desire to see the standards implemented over a long period of time before implementing major changes or failed to provide an estimate as in the case of Teacher A. Their responses also carried a negative perspective towards legislator involvement. Yet, the consistent prediction of the duration of the ACCR standards at around a couple of years acted as the main unifying factor across all of the participants along with the attribution of the short duration to the political nature of the standards .

Volunteered Perspectives: Summary of Opinions and Conclusion

At the end of the interview, participants received the opportunity to comment on anything related to a topic presented in the interview or in their responses. The opportunity to construct their own responses offered participants the freedom to reinforce what they viewed as their most central thought. Further, the placement of this question at the end of the interview provided participants with the ability to summarize the main themes of their discourse. Through the volunteered information, the analysis presented throughout this paper on participant perspectives can be compared against the participants' self-reflections and their areas of added emphasis. Finally, the information emphasized by the participants can be employed as a lens for a final analysis of their perspectives.

Legislator A chose to reiterate their answer to the question regarding the duration of the standards. In particular, Legislator A described education as part of the welfare system and related that the public relies too much on the limited experience of legislators to dictate the standards of a profession. For education, Legislator A once again questioned the wisdom of seeking a political solution to problem areas in the teaching profession and expressed a desire to see teachers seek greater decision making powers. Legislator A's answer reveals a desire for less legislative power in education because Legislator A recognizes the inability of legislators to become experts in the field of education. Legislator A's emphasis of this fact certainly reflects their desire for the promotion of the goal of encouraging student success by determining that existing measures, instigated by the legislature, fail to sufficiently support students. This attitude can also be observed through Legislator A's hesitance to promote greater testing and by their overall hope for the success of the standards. Following the successful implemention of the ACCR standards, Legislator A would now prefer the Arizona government to back down from

greater educational involvement to allow the standards a chance at success in the hands of educators.

In response to the question, Legislator B graciously provided a copy of a press release they intended to deliver later that day. Immediately, Legislator B's adherence to a political platform surfaces through the emphasis on a current bill. The press release itself contains information useful for reiterating Legislator B's positions throughout their interview. The release begins by employing Legislator B's definition of an unfulfilled deliverable before criticizing structural aspects of the standards including a failure of testing to provide useful and privacy protected information about students. Further, the release posits that the standards fail to encourage the critical thinking necessary to successfully enter the job market. Legislator B ends their release by stressing the necessity of including teachers and parents in the next round of reform as the Arizona Education Standards Development and Improvement Committee works to reclaim local control over Arizonan education, citing the success of similar efforts in other states. In the beginning of the release, Legislator B did indicate approval of the ability of the standards to unify education across the country. However, their discussion of national unification represented a proportionally miniscule part of the media release. Through the media release, Legislator B confirms much of the analysis presented in this essay. Specifically, Legislator B indicates approval of the idea of standards, yet questions the ability of the standards to deliver its goals to Arizonan stakeholders. Then, Legislator B employs that position to advocate for greater decentralization of education, allowing Arizona to develop a state-specific approach through the participation of service delivery persons and stakeholders. Ultimately, Legislator expressed the idea that the standards could provide success but require significant work to deliver their promises.

Similar to their explanations for the duration of the standards, the legislators express optimism at the potential of the unified standards to improve education, in this case as a whole, in Arizona. Further, they both repeat an emphasis on teacher involvement to improve the standards. Yet, Legislator A heavily criticizes legislators to help improve education while Legislator B actively works as a legislator to implement teacher involvement through the legislative refinement of the standards. However, both legislators criticized the inability of legislators to create and approve education standards. The main source of disagreement originates from the ability to rely on educators to implement the standards innovatively and to advocate for necessary changes in the standards without the assistance of legislators.

Teacher A, when offered the opportunity, launched into a critical speech indicating that referring to the standards as the Arizona College and Career Ready Standards lacks usefulness because the standards essentially follow the exact Common Core guidelines. Further, Arizona's efforts to create their own test acts as an expensive endeavor, according to Teacher A, which should be avoided. Enthusiastically, Teacher A praised the standards for their approach to math education, specifically indicating optimism. Teacher A also indicated that their optimism lies partially in their position as a new teacher who did not need to adjust to a new set of standards. Following this statement, Teacher A noted that several more experienced teachers struggle with transitioning to the ACCR standards. Teacher A's response mirrors their discussion throughout the interview – optimism for the standards and criticism for Arizonan politics. More specifically, Teacher A questions the ACCR standards and subsequent testing arrangements from a budgetary perspective and notes that isolating changes to the standards to Arizona works counterproductively because of the added financial costs.

Teacher B commented on the balance between achieving standards and allowing teacher creativity. Despite recognizing the compartmentalized objectives of the standards, Teacher B noted that teachers still hold significant freedom in the actual teaching. Teacher B also attributes their perspective to their experience using multiple sets of standards. Throughout the interview, Teacher B expressed concern over how to best achieve the goals of the standards, especially noting that testing fails to assess professional readiness and an understanding of the breadth of math understanding. Teacher B's response indicates a perspective that the goals of the standards should be pursued; however, teachers should work creatively with the standards to assist students towards those goals. Teacher B's perspective allows legislators to form the goals of education legislation while leaving discretion up to the teachers to achieve those goals, especially given that legislators lack sufficient tools (i.e. testing) to measure the success of the standards.

Teacher C re-emphasized the inability of testing to support individual students. Further, Teacher C specifically targeted the legislature in their use of testing to compare schools against each other. Teacher C's common theme throughout the interview centered around the goal of the standards to organize the teaching of a body of knowledge and then the inability of standardized testing to help students towards understanding that knowledge. Here, Teacher C adds criticism against the legislature despite the apathetic stance towards the legislature found throughout the rest of their interview. Overall, Teacher C indicates a perspective that standards for math across the previous decades have followed the same lines of thought and that a greater concern rests on the ability of testing to measure the effectiveness of those standards.

Teacher D quickly affirmed their approval of Common Core standards. Further, Teacher D revealed that they would choose to use similar standards unless absolutely required to use separate standards. Teacher D supported their assertion by praising the focus on critical thinking

and the mathematical processes that Common Core encourages. Teacher D's rigid approval of the standards indicates a perspective of holding onto them despite legislative interference. From their other responses in the interview, Teacher D consistently praised the standards indicating that, once they understood them, they appreciated their mathematically rich content and disliked the negative associations with the standards. Teacher D never mentioned the legislature, only referring to education leadership in a brief comment. Thus, most of Teacher D's responses focus on praise for the standards and advocacy for their continued use.

Teacher E partially departed from their consistent focus on the ability of the standards to provide national unity to introduce the notion of a gap between education and politics. In particular, Teacher E stated that legislators attempt to remove Common Core from education. Further, Teacher E commented on public opinion towards Common Core stating that the public views the standards as an "assault against our students . . . making our kids feel dumb" because of poor results on standardized tests (Teacher E). Teacher E utilizes these perceived flaws of the standards to observe a lack of vision held by the public for the potential of the standards to create a unified understanding among students. In their perspective, Teacher E summarizes their opinion of public behavior as a collection of political opinions that works to undermine the standards' goal of unity.

Several common themes in the teacher perspectives arose through their ability to volunteer information. Three of the five teacher indicate disapproval of either legislators or the political nature of the ACCR standards or Common Core. Further, three teachers clearly indicate their optimism for the standards with the other two more experienced teachers indicating that standards certainly do not restrict teachers. Throughout the teacher interviews, the themes of optimism towards the standards and a critical perspective towards political factors occupies

much of educator perspectives. Additionally, in the volunteered responses, four of the educators either emphasize or introduce criticism of national testing, questioning both its purpose and usefulness towards individual student achievement. As a whole, the teachers agree that the standards for math and the overall goals of the standards require little improvement, but assessment needs to be reformed to further assist teachers in helping individual students. Yet, due to the political climate, the educators also agree that the standards may be reformed in the near future, potentially at the students' harm.

In conclusion, the overall perspectives of legislators and educators do not substantially differ on the goals of the standards, but disagreement arises over the ability of the ACCR standards for math to achieve those goals as they currently exist. All the educators and legislators approved of the focus of the ACCR standards for math to prepare students for their post-secondary education pursuits (i.e. higher education or professional careers) or to create a level of national unity. Legislator B and Teacher B represented at least some level of concern to the ability of the standards to achieve the goal of professional preparation with Legislator B consistently challenging the structure of the standards. In addition, Teacher C provided neither optimism nor pessimism about the ability of the ACCR standards to achieve their titular goal only noting a lack of originality of the standards' goals for math. However, the remaining legislator and three educators all showed optimism for ability of the standards to promote more effective math instruction in Arizona, often utilizing current examples in their reasoning. Yet, no participant could confidently articulate a quantifiable method to measure the success of the standards, with both legislators and all but one teacher directly mentioning testing in a negative context. Despite the criticism of testing, neither Legislator A nor most of the educators provided recommendations of how to reform testing, with only Teacher D offering the use of enrollment

data for the assessment of the ACCR standards' success. Legislator B offered a perspective of reform utilizing the experience of Arizonan stakeholders to tinker with all aspects of the ACCR standards, presumably including testing. However, the need to reform the content of the standards themselves did not become apparent through the teacher interviews. Using Legislator A's recommendation of teachers dictating future reforms, perhaps testing reforms should now occupy most of the debate concerning education as testing occupies the most salient negative aspect of the standards revealed by the interviews.

Notably, both legislators to some extent criticized the legislature's ability to dictate education reform through the ACCR standards. Further, the math teachers focused on their content area in analyzing the ACCR standards' effectiveness and criticized an often nebulous negative perception of Common Core based on political factors. Regarding national unity, the populations expressed approval of the idea of creating a common body of knowledge. Differences in optimism originated from the application of the standards and their potential usefulness instead of from the standards content and goalss. Certainly, none of the participants displayed an entirely negative perspective towards the ACCR standards. Ultimately, any concern related to the standards focused on assisting students to achieve their full potential in math and supporting them towards their professional or academic endeavors. With the agreed upon lack of educational expertise found in legislators, the ability of teachers to dictate further reforms remains the crucial factor to ensuring that the ubiquitous optimism for the potential of the Arizona College and Career Ready Standards for math translates into success for the improvement of mathematics education in Arizona.

Recommendations for Future Study

Obviously, future study could be improved with a larger population. Legislators failed to respond to the request for interviews in part because of the nature of the research to promote undergraduate research. Graduate or professorial research may generate greater enthusiasm for participation since the data would likely receive greater publication. Further, due to the limited ability of the student to contact and collect data from a large teacher population, the study could be improved by a system which either interviews more educators or negates the need to schedule interviews with teachers. For example, teachers typically provided shorter answers to the interview questions and organized their responses around a theme central to their pedagogical experiences. Surveys could represent a more viable means to measure teacher perspectives. Certainly, interviews should still be considered for the measuring of legislator perspectives since a large population of knowledgeable legislators cannot be generated as evidenced by the criticism of both legislators and educators on legislator experience.

Irrespective of the population size, this study could also have been reformed by collecting greater demographic information. Obviously, little more demographic information about the legislators could have been produced without infringing upon their anonymity. However, since teachers enjoy greater privacy from the public, their demographic information should have been collected. In particular, the duration of teaching experience should have been confirmed and partisan information should have been collected. While most teachers provided information useful to speculating their experience, the added ability to relate teacher responses to their experience could have nuanced the teacher opinions beyond their indication of working with multiple standards. Further, since many teachers expressed opinions consistent with either legislator, an indication of partisanship could have helped align the populations utilizing existent ideologies measured by partisanship analysts. The garnering of more extensive demographic

information for the teacher population would likely not infringe upon teacher privacy while providing a greater understanding of their perspectives.

After confirming the perspectives of legislators and educators through a more intensive study, an inclusion of public perception should also be considered. Any assumption of public opinion made by the participants often resulted in an unsubstantiated indication of a lack of approval and an overarching hostile environment, specifically for the math standards. An inclusion of public opinion could also nuance legislator perspectives since legislators ultimately attempt to satisfy their constituents for the purpose of re-election. In addition, the overall public includes all stakeholders including professionals and parents. Since the goals of the standards work to appease these stakeholders, the stakeholders should be included for recommendations regarding education reform and for comments on the ability of teachers and legislators to reform education.

In addition, future studies should include questions specific to measuring perceptions relating to testing. Perhaps, after several years the recommendation to examine enrollment and employment data could be realized. However, in the interim testing represents the most readily available means to measure the success of the standards. Additionally, testing works as a separate yet directly related function to the standards and, thus, requires a separate discourse dedicated to its use in relation to the pedagogy resulting from the standards. In addition, regardless of the population size, the varied experience and perspectives of the educators and legislators all criticized the current state of testing. If the unity of the standards truly acts as a means to enable debates in education to focus on other issues, then testing reform should be considered as a major focus for the future of educational reform in Arizonan math education.

Appendix A: Recruitment Emails

Legislator Recruitment Email

Dear _____,

My name is Nathan Allen, and I am an undergraduate at the University of Arizona studying political science. As part of my senior honors thesis, I am interviewing educators and legislators about Arizona's College and Career Readiness Standards for Mathematics Education. The goal of my research is to further understand the relationship between education legislation and policy implementation within schools.

From my research, you have been identified as a legislator who has worked with the standards and has made a comment to a media source. As such, I would like to request to interview you at your convenience.

If you are willing to participate in my study, please contact me so we can schedule a time to meet. For your reference, I have attached a copy of a consent form which I will bring to our meeting. If you have any questions, please feel free to contact me at [university associated email address of the principal investigator]. Also, you may contact my thesis advisor _____ at [university associated email of the advisor] you have any concerns regarding my conduct.

Thank you,

Nathan Allen

[Restatement of investigator email address]

Teacher Recruitment Email

Dear _____,

My name is Nathan Allen, and I am an undergraduate at the University of Arizona studying political science. As part of my senior honors thesis, I am interviewing educators and legislators about Arizona's College and Career Readiness Standards for Mathematics Education. The goal of my research is to further understand the relationship between education legislation and policy implementation within schools.

I received your name and contact info from [name of mathematics education professor at the university] who I have done research with in the past. She identified you as a teacher who would likely be willing to work with me. As such, I would like to request an opportunity to interview you at your convenience for my project. I believe your contribution will be invaluable to my thesis.

If you are willing to participate in my study, please contact me so we can schedule a time to meet. For your reference, I have attached a copy of a consent form which I will bring to our meeting. If you have any questions, please feel free to contact me at [university associated email address of the investigator]. Also, you may contact my thesis advisor _____ at [university associated email of the advisor] you have any concerns regarding my conduct.

Thank you,

Nathan Allen

[Restatement of investigator email address]

Appendix B: Consent Form

University of Arizona
School of Government and Public Policy
Consent Form

Project Title: Perspectives of Educators and Legislators towards Arizona College and Career Ready Standards for Mathematics Education
Principal Investigator: Nathan Allen, Undergraduate, University of Arizona

You are being asked to participate in an interview regarding perspectives of legislators and educators toward Arizona College and Career Ready Standards for mathematics to better understand the relationship between legislators and educators. There will be approximately 10 people interviewed in this study.

Your participation is voluntary and you are free to withdraw at any time. You are free to choose not to answer any questions you wish.

Unless you provide consent to be quoted, your statements are completely confidential. The recordings and transcriptions will be kept on a password protected computer until May 16, 2015. Afterwards, original recordings and all identifying information about the subjects will be deleted.

Your comments will be recorded and stored on the private computers of the investigator.

If you consent to having this interview recorded, please check the box below:

☐ Yes ☐ No

If you consent to having your comments quoted, please check the box below:

☐ Yes ☐ No

If you wish to not be recorded, please let us know. Persons other than the investigator(s) might view your study records, but your answers are completely anonymous. Unless required by law, only the study investigators, members of the investigator's staff, and the University of Arizona Institutional Review Board, will have the authority to review your study records. They are required to maintain confidentiality regarding your identity.

This research poses no risks to you. The benefits of your participation include contributing to our collective knowledge of how we understand the implementation of education policy.

If you have any questions about this study, you may contact the principle investigator Nathan Allen at ndallen@email.arizona.edu or Samara Klar at klar@email.arizona.edu.

If you have questions about yours rights as a research subjects, please contact the University of Arizona's Human Subject Protection (phone: 520-626-6721; email: orcr.arizona.edu/hspp)

By taking part in this interview, you are allowing your responses to be used as part of research.

Name: _____ Date:_____

Works Cited

Battista, James C. "Financial Interests and Economic Diversity in State Legislatures." *Social Science Quarterly* 94.1 (2013): 175-199. *Wiley Online Library*. Web. 3 May 2015.

Bidwell, Abigail. "The History of Common Core State Standards." *U.S. News & World Report*. U.S. News & World Report, 27 Feb. 2014. Web. 3 May 2015.

Common Core State Standards Initiative. National Governors Association for Best Practices and Council of Chief State School Officers, 3 May 2015. Web. 3 May 2015.

Dewey, John. "Education and Democracy in the World of Today (1938)." *Studies in Education* 9.1 (2012): 96-100. *Journal Storage (JSTOR)*. Web. 3 May 2015.

Harden, Jeffrey J. "Multidimensional Responsiveness: The Determinants of Legislators' Representational Priorities." *Legislative Studies Quarterly* 38.2 (2013): 155-184. *Wiley Online Library*. Web. 3 May 2015.

Journell, Wayne. "Standardizing Citizenship: The Potential Influence of State Curriculum Standards on Civic Development of Adolescents." *PS: Political Science and Politics* 43.2 (2010): 351-358. *Journal Storage (JSTOR)*. Web. 3 May 2015.

Kettler, Ryan J., Stephan N. Elliott. "Introduction to the Special Issue on Alternative Assessments Based on Modified Academic Achievement Standards: New Policy, New Practices, and Persistent Challenges." *Peabody Journal of Education* 84.4 (2009): 467-477. *Taylor & Francis Online*. Web. 3 May 2015.

Legislator A. Personal Interview. 26 Feb. 2015.

Legislator B. Personal Interview. 12 Mar. 2015.

McDonnell, Lorraine M., M. Stephen Weatherford. "Evidence Use and the Common Core State Standards Movement: From Problem Definition to Policy Adoption." *American Journal of Eduation* 120.1 (2013): 1-25. *Journal Storage (JSTOR)*. Web. 3 May 2015.

Mervis, Jeffrey. "Educator, Lawmakers Question Proposed Reorganization." *Science Magazine*. 340.6138 (2013): 1274-1275. Web. 3 May 2015.

Nevi, Charles. "Saving Standards." *The Phi Delta Kappan* 82.6 (2001): 460-461. *Journal Storage (JSTOR)*. Web. 3 May 2015.

Raines, Shirley C. "Commentary: Educators Influencing Legislators: Commentary and the Kentucky Case." *The Reading Teacher* 53.8 (2000): 642-643. *Journal Storage (JSTOR)*. Web. 3 May 2015.

Rich, Dorothy. "What Educators Need to Explain to the Public." *The Phi Delta Kappan* 87.2 (2005): 154-158. *Journal Storage (JSTOR)*. Web. 3 May 2015.

Mervis, Jeffrey. "Wild Cards Remain After Proposed Reshuffle of STEM Education." *Science Magazine* 340.6130 (2013): 258-259. Web. 3 May 2015.

Sarbaugh-Thompson, Majorie, John Strate, Kelly Leroux, Richard C. Elling, Lyke Thompson, Charles D. Elder. "Legislators and Administrators: Complex Relationships Complicated by Term Limits." *Legislative Studies Quarterly* 35.1 (2010): 57-89. *Wiley Online Library*. Web. 3 May 2015.

Shober, Arnold F. "Governors Make the Grade: Growing Gubernatorial Influence in State Education Policy." *Peabody Journal of Education* 87.5 (2012): 559-575. *Taylor & Francis Online*. Web. 3 May 2015.

Sweetland, Scott R. "School Finance Reform: Legality Turned Polity." *Journal of Education Finance* 27.3 (2002): 817-832. *Journal Storage (JSTOR)*. Web. 3 May 2015.

Turley, Steve. “Professional Lives of Teacher Educators in an Era of Mandated Reform.” *Teacher Education Quarterly* 32.4 (2005): 137-156. *Journal Storage (JSTOR)*. Web. 3 May 2015.

Teacher A. Personal Interview. 3 Mar. 2015.

Teacher B. Personal Interview. 4 Mar. 2015.

Teacher C. Personal Interview. 6 Mar. 2015.

Teacher D. Personal Interview. 9 Mar. 2015.

Teacher E. Personal Interview. 13. Mar. 2015.