

# Prospectus

**Community Christian Academy Stanford 10 Analysis System**  
(Technical Topic)

**Standardized Testing and the Decisions Around It**  
(STS Topic)

By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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## **Introduction**

“A standardized test is any examination that’s administered and scored in a predetermined, standard manner” (Popham 1999 p. 1). According to a 2015 survey administered by the Washington Post, in the United States of America, “a typical student takes 112 mandated standardized tests between pre-kindergarten classes and 12<sup>th</sup> grade” (Layton 2015 p. 1). Some of these standardized tests, such as the Stanford 10, are used as end of year assessments, much to the dismay of students and some teachers. With standardized tests comes unnecessary stress for students (citation to support this claim and evidence?). In 2000, despite monetary incentives to improve students’ standardized test scores, teachers cautioned parents against letting their children take the Stanford 9 as they did not affect grades (Groves 2001). Despite teachers, students, and parents pushing against standardized testing, the government still mandates them, with many state governments ordering specific tests that only have questions related to the state educational standards.

A topic up for debate is what decisions should be made based on standardized test scores. Every year, schools receive the scores of their students and comparisons to the national average. What the schools do with this data is up to them. Kimberly Moore, the head administrator at the Community Christian Academy, a private K-8 school in Charlottesville, VA, has made staffing decisions based on Stanford 10 scores. When she noticed students were struggling, she brought in a special education expert to work with individual students. She also has switched the subjects that teachers taught based on the scores, because she believed they were not teaching certain topic well.

Meanwhile, in his article, Popham claims that Standardized tests cannot be used to evaluate the quality of an education. Sometimes the material taught in the classroom does not

align with the material tested on by the test. There are also inevitably biased questions on the exams. “Historically, white students have scored higher on standardized tests than minority students” (Thomas 2018 p. 1). Popham also references a question in which students were asked which of the following foods was a fruit. He believes the question is biased against students coming from families of a lower socioeconomic status who may not have access to the same fruits and vegetables as the students from families of a higher socioeconomic status (Popham 1999). In 2003 a study was done on students to counteract these biases. Researchers helped students fight the inner struggles and self-blame that many minority students have when taking standardized tests, but this required one on one mentoring, a resource that many schools do not have access to. Mrs. Moore wants a program that will help her analyze the Stanford 10 score data of her students so that she can make administrative decisions to better help her students. Making decisions beneficial to students based on their standardized test scores requires more research into what the scores actually demonstrate about the learning outcomes among the student body. After collecting data through standardized testing, how can data benefit the students?

### **Community Christian Academy Stanford 10 Analysis System**

#### *The Current System*

To access the score data of each student, Mrs. Moore now has to login to the website provided by the administrators of the Stanford 10 so she can view the scores of each student on a test in a given year. On each line is the student’s name, score, percentile rank, and grade equivalent for each section of the test. The grade equivalent for a student is a score calculated by the Stanford 10 producer based on the student’s test performance. A student with a grade equivalent of X.Y scored is what a typical student in the Y<sup>th</sup> month of the X<sup>th</sup> grade would have scored. She also has access to the averages for her entire school and how they compared to

schools across the nation who took the same test. What Mrs. Moore is lacking in the current system is the ability to track students over time at CCA and other important data she considers in her administrative decision-making process. She wants to be able to see how an individual student has improved over the years, as a means to identify consistent struggles. She also wants to be able to track teachers to evaluate which ones are doing a good job. Ideally, she bases her decisions off of more than just the scores from one year. She wants to be able to look at the gender, race, socioeconomic status, parental status, and disability status of the students to determine whether or not they need individual help or a staff change.

### *Proposed Solution*

For my Computer Science Capstone class, my team has been directed to produce a web application that will assist the user in the analysis of Stanford 10 test data. The application will track every student who has attended the school along with their test scores from every year. The user will be able to add student profiles and then upload data for each student. The application will store each student's name, race, gender, English as a second or other language status, socioeconomic status, disability status, parental status, and Stanford 10 test scores from their entire time at CCA. The application will automatically flag students who have scored below their current grade level. The application will also relate each subject tested by the Stanford 10 to the teacher who teaches that subject at CCA. This will enable the user to evaluate teacher performance as well as student performance. With a search functionality, the user will be able to search for and filter students by name, score data, and any of their profile flags.

The primary way the application will let the user analyze the data will be through graphs. The user will be able to select the data they want on both axes and the graph will be displayed. The application will graph student, teacher, and subject performance over the years on both an

individual and class basis. For example, the user can view a graph of a student's grade equivalent versus current grade. The user can also graph on the same graph the grade equivalent of the entire class over the same years.

### *Intended Use*

With the web application created, Mrs. Moore plans on analyzing student scores and personal data to best determine how to help every student. After she inputs all the student data, Mrs. Moore will more easily identify what areas of the school need improvement based on the Stanford 10 scores. She will be able to quickly find the students who are performing below grade level. If a whole class is struggling in a certain subject, she will evaluate the teacher. If a student is far behind their class according to the grade equivalent, she will provide the student with extra help depending on their needs. If the student has a disability, she will send them to a special education expert. By knowing more about the students and having all of their data readily available in one place, Mrs. Moore will be able to make more informed decisions on how to run her school.

### **Standardized Testing and the Decisions Around It**

In 2001, Martha Groves and Jessica Garrison, reporters for the *Los Angeles Times*, interviewed parents, teachers, and students in California whose schools made them take the Stanford 9, the predecessor of the Stanford 10. "At the tiny Santa Monica Alternative School House, parents of more than 60% of students in 2nd to 8th grades chose not to let their children take the test this month, saying they considered it a waste of time, and in affluent Marin County, north of San Francisco, enough students asked to be exempted from testing earlier this spring to render their two high schools ineligible for state rewards for at least two years" (Groves 2001 p. 1). There are many more stories that are mentioned of students and parents fighting against

standardized testing. Eighth graders boycotted tests in New York, parents gathered in Boston to protest, and some high schools in Michigan risked losing state accreditation because many students simply did not come to school to take the tests. The problem in California, according to Michael W. Kirst, a Stanford professor, was that the test did not match the curriculum. (Groves 2001)

Despite the monetary incentives placed on improving standardized test scores, students, teachers, and parents still disapproved of standardized testing. Kirst claims that test questions fail to test on the topics listed in the educational standards of the state, but in his piece from 2000 for the *New York Times*, Jim Yardley says that the test writers working for the Psychological Corporation, the company that makes the Stanford 9, consult state standards before writing questions. After questions are written, they are then passed through committees who debate whether or not the questions are biased. From there, the questions are tested on students of different backgrounds to make sure students are not favored to do better than others based on race, gender, or any other factors that the CCA web application will track. (Yardley 2000)

Another problem with standardized tests that teachers point to is teaching to the test. In their classes, teachers teach more than the subject material. Teachers are also focused on the social development of their students (Salmon-Cox 1981). Teachers in California also feared this, especially when they claimed the tests did not align with the standards (Groves 2001). In a study from 2000, Bukendahl et al. (2000) interviewed teachers and publishers and exposed a divide in the belief of the validity of standardized tests. On one hand, publishers advocate for the validity of their because they are created in a professional environment that seeks to eliminate bias and create absolutely fair tests. The results when teachers were asked if the tests aligned with the standards showed that teachers did not agree with the publishers. They believed that the tests did

not completely align with the standards (ibid). When learning material is not standard across the nation, we cannot compare students from different states based on their standardized test scores, therefore, we cannot use standardized tests to measure educational quality (Popham 1999).

The most applicable framework to standardized tests and their relation to educational decisions is soft technological determinism. Soft technological determinism “claims that the presence of a particular communication technology is an enabling or facilitating factor leading to potential opportunities which may or may not be taken up in particular societies or periods” (Chandler 1995 p. 13). Students take the standardized tests, and their scores are reported to the schools. No decisions have to be made by the schools or government regarding scores, as the data collected only allows for action without forcing any. As Marx states, “technological change drives social change but at the same time responds discriminatingly to social pressures” (Marx 1994 p. 2). Standardized tests were still administered, but due to pressures from parents, teachers, and students, they simply were not used. Standardized test scores cannot be used if students do not take them. With this technology comes a choice to make change or deny it. Humans are in control of the use. Looking at standardized testing as a tool through the lens of soft technological determinism allows us to see an imperfect technology with great potential. From here I will do my research on how to unlock this potential.

### **Research Question and Methods**

The question I seek to answer with my research is: How are standardized tests being used to benefit the students who take them? If we are requiring students to take standardized tests, we should use the data to benefit the students. According to a survey from 1981, “teachers in the schools studied rarely used test information to mold their instruction or curricular content” (Salmon-Cox 1981 p. 4). This was almost 40 years ago. I want to explore whether or not this has

changed. To answer this question, I will survey teachers and school administrators from around the country.

I aim to find out what standardized tests schools are using, and how they use the data generated from these tests. I will also ask what the students and teachers like and do not like about the standardized tests and what they would change about them. From the teachers and administrators that I survey, I will further interview those who act on the results of standardized tests. I will ask them what decisions have they made based on standardized test scores and whether they have benefited students. Standardized test questions are susceptible to bias (Yardley 2000; Popham 1999; Good 2003). I must ask how teachers and administrators account for these biases and help students to overcome them. With a comprehensive survey and interview of teachers and administrators across the United States, I will determine the role of standardized tests in schools around the United States and whether or not students should be taking them.

Secondly, I will do research on the standardized testing in other nations to determine how other countries are using standardized testing. To do this I will read news articles and studies on standardized tests from countries other than the United States and determine how teachers, administrators, parents, students, and government officials view and use them. I specifically want to research France and China as they have standardized end of year tests. France uses these tests to determine whether a student passes to the next grade.

### **Project Timeline and Closing Thoughts**

For the CCA web application, my team follows the Scrum development method, an agile method of software development. We expect to present Mrs. Moore a working product by the end of February. From there we will add and change features based on her specifications. We



have listed all base requirements and work in two-week sprints. If we finish before February, we will add even more features that make data input easier for Mrs. Moore.

I will start my research in January by formulating the survey and targeting teachers and administrators I can send it to. Before the end of January, I hope to have sent out the survey to everyone. While waiting on responses, I will begin research into the standardized testing practices of other countries. If they have a system similar to the system in the United States, I will send teachers from those countries the same survey and attempt to interview them as well. My research in total should be finished by the end of February barring any interviews that are scheduled late. From there I will write my results and submit my thesis.

## Works Cited

- Buckendahl, C. W., Plake, B. S., Impara, J. C., & Irwin, P. M. (2000). Alignment of Standardized Achievement Tests To State Content Standards: A Comparison of Publishers' and Teachers' Perspectives. *Journal?*
- Chandler, D. (1995). Technological or media determinism[ SOURCE]
- Good, C., Aronson, J., & Inzlicht, M. (2003). Improving adolescents' standardized test performance: An intervention to reduce the effects of stereotype threat. *Journal of Applied Developmental Psychology*, 24(6), 645-662.
- Groves, Martha and Garrison, Jessica. (2001, May 24). State's Standardized Test Spurs Scattered Backlash. *The Los Angeles Times*. <https://www.latimes.com/archives/la-xpm-2001-may-24-mn-2056-story.html>
- Layton, Lindsey. (2015, October 24). Study says standardized testing is overwhelming nation's public schools. *The Washington Post*. [https://www.washingtonpost.com/local/education/study-says-standardized-testing-is-overwhelming-nations-public-schools/2015/10/24/8a22092c-79ae-11e5-a958-d889faf561dc\\_story.html](https://www.washingtonpost.com/local/education/study-says-standardized-testing-is-overwhelming-nations-public-schools/2015/10/24/8a22092c-79ae-11e5-a958-d889faf561dc_story.html)
- Marx, M. R. S. L. (1994). *Does technology drive history?: The dilemma of technological determinism*. Mit Press, Cambridge MA.
- Phelps, R. P. (2006). Characteristics of an effective student testing system. *Educational Horizons*, 85(1), 19-29.
- Popham, W. J. (1999). Why standardized tests don't measure educational quality. *Educational Leadership*, 56, 8-16.
- Salmon-Cox, L. (1981). Teachers and standardized achievement tests: What's really happening?. *The Phi Delta Kappan*, 62(9), 631-634.
- Yardley, Jim. (2000, April 9). A Test is Born. *The New York Times*. p. A4.