

Beyond the SAT: Leveling the Playing Field of Higher Education, Even if It's Unfair

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Abstract

This paper explores the structural fairness of games as an assessment tool. There is much research on games as a learning tool and the results are mixed. Overall, most authors do not believe that games have yet reached the point where they are more successful in achieving academic goals than other forms of instruction. The socioeconomic status (SES) variables looked at here are income, race and ethnicity, and access to educational resources. Gender is briefly touched on. There is some evidence to suggest that lower income students have an increased positive attitude towards learning after playing games. There needs to be more research on games as assessment.

Keywords: games, serious games, educational games, virtual reality, assessment, income, race, educational resources, SAT, ACT, University of California, Thomas Jefferson High School, affirmative action

Beyond the SAT: Leveling the Playing Field of Higher Education, Even if It's Unfair

As a result of the Covid-19 pandemic in 2019-2020, SAT and ACT exams across the world were canceled. This led colleges and universities to pause requirements for the exam. Even before the pandemic, there were movements in higher education to go “test-optional” and it is possible that after the pandemic, universities will not return to using the exams as an assessment. Throughout this paper, the framework of “leveling the playing field” is used to investigate one alternative to the SAT: games. Games have the potential to be less structurally biased. Although, it is patently unfair to those who have already been through the old system.

There are a number of factors that contribute to inequality in higher education access, including differences in income, race/ethnicity, and access to educational resources. It is often posited that the model of K-12 education is obsolete in preparing students for the labor market. One must consider advancing to the next step, and that the SAT and ACT, first introduced in 1926 and 1959, respectively (Gall et al., 2019, p. 2081), are an obsolete model of assessment. What could replace it? The use of interactive gaming and simulations have the potential to replace standardized college entrance exams such as the SAT and ACT since current testing assessment methodologies often correlate income, racial bias, and access to educational resources inappropriately as a means to determine potential learner performance in an academic setting.

This paper presents the point of view through a point of view of the “two-stage selection system” (Lee & Suen, 2020, p. 10). The first stage of acceptance is high school. High school affiliation has a great impact on college acceptance and falls under “access to educational resources” in this model. The high school evaluated is Thomas Jefferson High School for Science and Technology in Northern Virginia, often ranked as the number one public high school in the country. The second stage of selection (Lee & Suen, 2020, p. 10) is a university. The university utilized is the University of California system. Both TJ and UC did away with exam requirements in 2020. There is now a question of what form of assessment will replace their assessment process. Two issues are addressed in this evaluation: affirmative action, and the random practice of automatic acceptance.

General Research

According to Chan & Eyster (2003), racial minority students tend to score lower on standardized tests. For that reason, affirmative action was created to increase the racial diversity of the student body. In this goal, affirmative action was successful. Applicants were broken into cohorts according to race. Students were defined as either majority students or minority students. There were different SAT cutoffs established for each group, one higher for majority students and one lower for minority students. Using these rules, the university creates a class with the best students from each group. Spots are portioned out to ensure representation from each group. Diversity is achieved (Chan & Eyster, 2003, p. 858).

The reason that these different cutoffs are established is that race correlates with performance, which in turn affects admission. “The main reason why minority students are underrepresented at elite universities is that they score lower than majority students on standardized tests.” (Chan & Eyster, 2003, p. 868) They can be up to 400 points lower (Chan & Eyster, 2003, p. 858). Minority applicants also “tend to have lower high school grades” (Chan & Eyster, 2003, p. 858).

Chan and Eyster (2003) argue that affirmative action successfully results in two common goals: increased diversity and increased student quality (p. 859). Conversely, a ban on affirmative action, they argue, is “inefficient”, not resulting in the acceptance of the “best-qualified candidates from either group” (p. 859). A “ban” (p. 866) on affirmative action includes using metrics like high school rank, which is determined through high school GPA. In the University of California system, a “ban on affirmative action went into effect with the selection of Fall 1998 freshmen” (p. 866). Instead of using majority and minority cutoffs for test scores, they used high school rank and automatically and “randomly” (p. 866) admitted students from the top 4% of their high school class. This policy went into effect in the Fall of 2001, a few years after UC stopped using affirmative action (p. 859-866).

At UC Berkley, the rule used to be the weighted “Academic Index Score (AIS) a mathematical formula based on high school GPA, SAT I, and SAT II (achievement test) scores.” (Chan & Eyster, 2003, p. 866). The new ranking system ranked high school students based on non-mathematical measures, “such as the type and number of high school classes taken, grades in individual courses, and performance

relative to high school classmates” (Chan & Eyster, 2003, p. 866) It is not weighted and it is random. The results of this new ranking system were as follows: “In 1996, Berkley accepted 94 percent of the top 6 percent of candidates by AIS score; by 2001, it accepted less than 66 percent.” (Chan & Eyster, 2003, p. 868).

Geiser & Santelics created a broad study “of nearly 80,000 students entering the University of California between 1996 and 1999 [that] showed that high school grades were superior to SAT test scores in predicting 4-year graduation rates as well as cumulative GPA” (as cited in Galla, et al, 2019, p. 2079). These results have been “replicated” in other studies (p. 2079). In addition, these results are valid across different subjects taken in college and different schools within the UC system (Geiser & Santelics, 2007, p. 1).

Most tellingly Geiser & Santelics (2007), found that HSGPA (high school GPA) as a predictor is increasingly valid for college students after their freshman year (p. 1). Previous studies only looked at GPA as a predictor of freshman grades. To the point of this paper, “HSGPA has less adverse impact than standardized tests on disadvantaged and underrepresented minority students”. The reason is that HSGPA is less “correlated with students’ socioeconomic background characteristics” than SAT scores. These include, “family income, parents’ education and the academic ranking of a student’s high school” (p. 1-2).

In Galla et al., their study found that “[a]djusting for demographic characteristics, the incremental predictive validity of HSGPA for college graduation... [how many years it takes a student to graduate: 4 or 6] was stronger than the incremental predictive validity of SAT/ACT score” (p.2087-2088). The demographic characteristics acquired were “self-reported gender, race/ethnicity, parent education, and type of high school attended” (p. 2086).

In November of 2020, voters in California voted *not* to reinstate affirmative action at the University of California (Jaschik 2020).

Some universities feel pressure to create diversity, but it is not the goal of every college and university. Diversity plays a factor in students’ decision to commit to schools and schools openly compete to win these decisions. However, competition for students is not the only reason. College is supposed to

prepare young people for the world and civic duty is part of adult responsibility. Fernandez, et al. explore how on-campus diversity leads to increased voter participation among minority groups whom are historically less-likely to vote. “[I]n 2012 Latinx students’ odds of turning out to vote were approximately 1.3 higher if they attended a campus with a chief diversity officer” (Fernandez et al, 2019, p. 199).

Representation matters. “Black students who have at least one Black teacher in elementary school...are less likely to drop out of high school and more likely to attend college” (Armour 2020). High school is critical for college preparation. Since race is correlated with income, many Black and Latinx students come from underfunded schools with fewer resources. This can create a student who does not have practice in leveraging resources at the college level (Armour 2020). This transaction is compounded for differently abled students.

Diversity also affects “gaming” of admissions exams (Lee & Suen, 2020, p. 1). There are different gaming activities that students undergo to raise standardized test scores: “private tutoring...fake disability status...application coaches...leaked test questions to students” (Lee & Suen, 2020, p. 1-2). These activities vary in participation across the globe, but in the U.S., Black students “may not have done well on admissions tests because they couldn’t afford tutoring or to take the test multiple times.” (Armour 2020).

Content of instruction matters. Colleges are schools, after all, and this is one place where students can be taught about “racism and inequity” (Armour 2020). Some may disagree that diversity is important, some, perhaps, do not hold that value. But the risk is the cost of educating Black and Brown students in a system that does not serve them or see them. The election of Trump shows that not everyone values diversity. Many Black people want to see people who look like them in charge, but so do many Whites. Some liberals fear that there is a national political risk of allowing current affairs to perpetuate without mitigation and that it produces a country in which success is measured at birth.

How long ago was success decided? Birth, yes, but the real answer is high school. High school affiliation plays a determinative role in college preparedness and acceptance. I look at the top public high school in the U.S.: Thomas Jefferson High School for Science and Technology.

On October 8, 2020 the Fairfax County Public Schools Board made major changes to TJ by discontinuing the admissions test, the \$100 application fee, and by increasing the class size (Natanson 2020). Some students were upset, saying they “spent months, if not years, preparing for the test” (Natanson 2020). The goal is to increase Black and Latinx enrollment. TJ is 70% Asian, 20% White, and Blacks and Latinx students account for percentages in the “single-digits” (Natanson 2020). This make-up is not representative of the county in which the school resides, Fairfax. How will students be selected? The superintendent proposed a lottery system to replace the test, but the Board rejected it. Parents did not support the lottery idea and thought that it would damage the academic reputation of the school (Natanson 2020). One concern was that advanced classes would be replaced with “remedial” classes, in order to suit the learning objectives of lottery-accepted, but academically less-qualified students (Natanson 2020). I do not believe there is any way to convince students who spent years studying for the exam that this is a more-fair system. But Black students at TJ report enduring “racism” (Natanson 2020) and a climate which fosters racism is not good for any students to learn.

First and foremost, colleges look for metrics with “predictive validity” (Geiser, 2017, p. 11). Right now, high school GPA is the surest predictor of “first year grades [and] 4-year graduation rates” (Geiser, 2017, p. 31). The SAT/ACT are not as strong predictors as high school GPA or SAT II subject tests (Geiser, 2017, p. 31). The reason is that they are skewed to test “opportunity to learn” instead of “individual ability” (Geiser, 2017, p. 31). Also, because the tests suffer from predictive errors. Some students are exposed to the subjects on the test and some are not exposed. Some schools require the test for graduation and some schools do not. “SAT/ACT scores systemically disadvantage applicants who have had less opportunity to learn in favor of those who have had more, even when individual ability is equal.” (Geiser, 2017, p. 31) This shows up in differences of “family income, parents’ education, and race or ethnicity” (Geiser, 2017, p. 11). Race accounts for differences in test scores that income and parental education, alone, do not account for. “Race matters as much as, if not more than, family income and parents’ education” (Geiser, 2017, p. 15)

The predictive errors are “nonrandom” and show “racial stratification” (Geiser, 2017, p. 25). “At the bottom of the pool, underrepresented minorities comprise 78% of the lowest SAT/ACT decile, compared to 51% of the lowest HSGPA [high school GPA] decile. Conversely, at the top of the pool – those most likely to be admitted – Latinx and Blacks make up 23% of the top HSGPA decile but just 5% of the top SAT/ACT decile.” (Geiser, 2017, p. 26)

Since the racial differences are well documented, the question becomes, *What is the social responsibility of public institutions?* Should they “expand opportunity for able students from disadvantaged backgrounds” (Geiser, 2017, p. 32)? Both TJ and UC are public institutions.

If not affirmative action and rankings, what could colleges use to assess students? This brings me to the point of my paper: games. Games could replace both the entrance exams and affirmative action. Games could be more-fair on the basis race, income, and educational resources. Not everyone has reliable access to the Internet to practice and prepare. Not everyone plays games the same way (Westera, 2014, p. 696). However, games have the potential to provide a global opportunity, in which assessment can be personalized and customized. They could foster the interaction with technology at an earlier age, which helps prepare students for the workforce. The “two-stage selection system”, the test prep industry, and college rankings would be disrupted.

Strength

The strengths of games in assessment are many. First, a look at Serious Educational Games (SEGs). SEGs offer “continuous feedback” the way individual tutoring does and large in-person classrooms do not (Annetta & Bronack, 2011, p. 76). SEGs provide clear goals, progressive challenges, and “increasing complexity” (Annetta & Bronack 75, 79). SEGs enforce rules and consequences (Annetta & Bronack, 2011, p. 79-80). Most importantly, “SEGs are replicable. That is one can play and play again until a skill and/or content is mastered.” (Annetta & Bronack, 2011, p. 80) And SEGs can teach “concepts that are difficult and/or impossible to teach in the real world.” (Annetta & Bronack, 2011, p. 80)

SEGs are made successful through “informed learning”, which is “back end data collection” (Annetta & Bronack, 2011, p. 80). Data is collected through all the different ways students/players are

assessed in the game: “multiple choice, short answer, click stream, etc.” (Annetta & Bronack, 2011, p. 80). This data provides personalized and customized feedback to the student, “programming the environment to inform the player based on the data collected” (Annetta & Bronack, 2011, p. 80). Assessment is a natural application of learning data.

SEGs also teach life skills beyond the content of the course, most importantly rules and consequences. In design, “SEGs need to have explicit rules and clear consequences when those rules are broken...Not unlike the real world.” (Annetta & Bronack, 2011, p. 80). The consequences affect the play of the game and allow students to “turn failures into learning moments” (Annetta & Bronack, 2011, p. 77). This allows students to develop grit and perseverance in a game, on a lesson they might have quit in a classroom because they are in the “Flow” or immersion of playing the game (Annetta & Bronack, 2011, p. 77-79). Additionally, SEGs offer a way for special needs and non-native English speakers to accumulate vocabulary in a realistic way (Annetta & Bronack, 2011, p. 81).

Another type of game is virtual reality, or VR. VR provides the ability to teach lessons virtually that may be “too dangerous, expensive, or impossible to train in the real world” (Makransky, et al., 2019, p. 701). Makransky, et al (2019) performed a study researching the impacts of VR training in a laboratory setting vs. text-based learning and found mixed results. They looked at “motivational outcomes” and “learning outcomes”. For motivational outcomes, such as “enjoyment, intrinsic motivation, and self-efficacy”, VR was more productive and successful. Students are more motivated to learn in VR, and therefore input more effort into learning. However, for learning outcomes, such as “measures of retention and transfer”, the differences in learning delivery were “not significant”. These elements were measured based on comparing pretest and posttest scores. One strength of VR-based learning is that there is no evidence of gender imbalance. Males and females and others demonstrated no structural deficiencies that were repeatable. The biggest weakness was student “unfamiliarity” with the technology. The authors predict that VR will continue to be used in classrooms and will be greatly present in most schools within a few years. (Makransky, et al., 2019, pp. 691-707)

A study by Willingham, Pollack, & Lewis (2002) showed that students who use their personal time to study get higher grades than those who watch television and play videogames (as cited in Gall et al, 2019, p. 2080). Educational videogames are a way to meet students where they are and engage with them in a way they would enjoy and have them learn new things. Instead of marketing games to new students, market to old students through a different slice of their time: their downtime. Wong and Csikszentmihalyi (1991) wrote that students of every gender and grade level have a similar enjoyment level of doing schoolwork, which is not as high as doing other things (as cited in Gall et al, 2019, p. 2080) But games are fun and games can teach other skills important to scholastic success, like “self-regulation...self-control and grit” (Gall et al, 2019, p. 2080)

According to De Craemer et al. (2018), the most determinative socioeconomic status (SES) factor is children’s screen use (television and computers) is parental education (p. 2). Race, by contrast, “was only associated with computer time” and income had an insignificant correlation (p. 2). The research showed an inverse relationship: “a higher SES was associated with less time spent in screen-based activities” (p. 8).

A study by Ke and Grabowski (2007) introduced two types of math games to Pennsylvania fifth graders. Cooperative games, competitive games, and a control group playing no-games were studied. The students were categorized on different SES variables: race, gender, and economic circumstances. The study measured performance on pretests and posttests and the general attitude towards math students held as an academic subject. The results were mixed, but “gameplaying did promote test-based cognitive learning achievement” (p. 256) and students from low-income backgrounds showed more positivity in attitude towards math. Students from middle to high-income backgrounds did not show a significant improvement in attitude.

Young et al. produced a comprehensive study of video games in educational settings in 2012. It is a meta-study looking at other papers and the results for *learning* (not *assessment*) were very mixed. In mathematics games, some results were promising. Students who played the games increased their math “learning outcomes” by 7.2% as compared to students who learned by lecture, “but there were no

significant improvements found in relation to students' motivation" (p. 67). In the Ke & Grabowski study reviewed by Young et al., they found that "students with low socioeconomic status (SES) saw the greatest affective gains in cooperative contexts" (p. 68). But other studies by the same author, showed results that were replicated sometimes and not others (p. 68). The science game *Quest Atlantis* showed that "middle school students (Grades 6-8) in the game-based version of the course [science] performed significantly better on related standardized tests than did their peers in expository textbook and descriptive framing versions of the class" (p. 70).

Weaknesses

The biggest weakness of not using the SAT is that some students who did poorly on the test will be admitted to schools that they would not otherwise get into (Geiser & Santelics, 2007, p. 4). Although the Young (2012) study was written many years ago, the authors found that "there is limited evidence to suggest how educational games can be used to solve the problems inherent in the structure of traditional K-12 schooling and academia" (p. 62) One weakness is that games are highly "individualized", and it is not possible to play the same game "exactly the same way twice" (p. 62).

Another weakness of using games as an assessment tool is the factor of random guessing. Students may guess either because they do not know the answer *or* when they "deliberately make unfavorable decisions simply because they want to try things out in the game and see what happens." (Westera, 2014, p. 695) Westera finds that randomness plays a big role in the validity of games as assessment. "The main conclusion based on these observations is that indicators of player performance and progression as derived from the players actions and decisions in the game may be highly inaccurate and unreliable as a result of randomness." (Westera, 2014, p. 695) That is a striking flaw, but colleges in search of holistic admissions processes can learn something from game play.

Grades are generally based on "skills and knowledge" (Galla et al., 2019, p. 2081) which is good because KSAs (knowledge, skills, and abilities) are what recruiters look at when hiring. But Brookhart (1991, 1994) and Parsons (1959) argue that teachers also grade based on "attitudes, behavior, and effort" (as cited in Galla et al., 2019, p. 2082), which is generally what managers look at on the job for

promotions or raises. Teachers use participation, attendance, and diligence with completing outside assignments to determine deportment (Galla et al., 2019, p. 2082).

Students with high knowledge, who might struggle building relationships with their teachers, might show their true strength with standardized tests. Apart from countenance, this could help students who experience micro-aggressions in the classroom based on their socioeconomic standing.

Representation in commercial, consumer video games (Nintendo, Sega Genesis), however, is another big weakness. For gender, females are rarely represented and in 1998, Dietz looked at 33 video games and found that there were zero female characters in 40% of those games (as cited in Williams et al., 2009, p. 817). When female characters were included, Heintz-Knowles et al. (2001) found that of 874 characters, only 12% were female (as cited in Williams et al., 2009, p. 817). Other studies have found females represented as 10-31% of the total characters in games (Williams et al., 2009, p. 817). More males than females play commercial, consumer video games, but as shown above, in serious games there is no difference in performance.

As far as racial participation, according to Rideout et al. (2005) most young video game players are Black and Latinx (as cited in Williams et al., 2009, p. 820). As far as racial representation, whites and Asians are overrepresented with regard to census data concerning their “actual population” for all characters. But whites make up “84.95 percent of all primary characters, black 9.67 percent, biracial 3.69 percent and Asian 1.69 percent” (Williams et al., 2009, p. 825). Overall, most commercial, consumer video game characters are male, white and adult (age 20-64) (Williams et al., 2009, p. 828).

Opportunity

Westera (2014) writes that there is a tension in game play between players who play to win and players who play to learn. If this could be teased out by the game, it would provide great insight into the personality of the student and be an excellent predictor of how they will approach school. Players’ attitude impacts their decision making, their strategy, the level of risk they take on, and the grit they display when they fail. Players who play for “performance”, “are afraid of making mistakes, and tend to avoid or withdraw from complex tasks” (Westera, 2014, p. 696). They are also much more concerned

with how they look in front of other people, which can be why they do not want to fail or make mistakes. Grit players, who play to learn, “show persistence in the face of failure, and display readiness of using more complex learning strategies to master the task.” (Westera, 2014, p. 696) Some students care about scores and grades and some students don’t. Some students do not even believe that grades should exist at all (me!). When discussing the value of “grit” in admissions, nothing is quite so valuable as the transcript of a transfer (or adult) student, who may have transferred two or three times, but never gave up.

There are many different types of games: serious games, VR, immersion, jeopardy, logic games, IQ tests, strategy games, and more. Serious games and VR are described above, but let’s discuss something that is already in use in admissions: Logic Games on the LSAT.

“[T]he Logic Games section is the most teachable part of the test”, to pass you need to know “formal logic”, not taught in most high schools and offered to, but not taken by all college students (Kitchener 2016). Logic is a mathematical version of philosophy and is often registered as a Philosophy class. In logic problems, students break apart written verbose arguments and transform them into equations in which each element of the argument is a variable. They are “visual” (Kitchener 2016) and the easiest way to learn how to do them is in-person with a tutor or a class (Kitchener 2016). The Logic Games section of the LSAT has high attrition rates for its complexity and unfamiliarity and there are enough Logic Games questions on the LSAT to torpedo your overall score.

Threat

Many students take test-prep classes for the LSAT in hopes of raising their score. These are cost-prohibitive and average about \$1300 a class (Kitchener 2016). Some students study full-time and do not work, while their parents support them (Kitchener 2016). Again, this is unavailable to many students. What is the real risk of a low score on the LSAT? “The vast majority – 180 – of the 200 accredited U.S. law schools can’t find jobs for 80 percent of their graduates.” (Kitchener 2016). It pays to go to a top school, which means you need a high score. Should Logic Games be removed from the LSAT to increase equity or do they do their job of predicting success by testing “reasoning skills” (Kitchener 2016)?

Similar to the SAT and ACT, the LSAT is not the best predictor of passing the bar (Austin, 2017, p. 758). Law school GPA is a better predictor of bar passage than the LSAT score, but “LSAT score and law school GPA *in combination* are a better predictor of bar exam success than either in isolation.” (Austin, 2017, p. 758). Other relevant factors in bar passage prediction are class rank, which is also used in job searches (Austin, 2017, p. 758). Undergraduate GPA seemed to have no effect on bar passage and first year law school GPA was not as important as the third year (Austin, 2017, p. 766-768).

There are other uses for the LSAT. LSAT scores are used by *U.S. News & World Report* to create law school rankings (Austin, 2017, p. 756), which is not something they were originally designed to do. If the LSAT were to be discontinued, it would surely disrupt the concept of rankings. The importance of rankings is described above.

As far as undergraduate school rankings, test scores are paramount: “even small annual fluctuations in average test scores as indicators of changing institutional quality and prestige.” (Geiser & Santelics, 2007, p. 4) The College Board itself, which has a vested interest in the use of the test that it facilitates, argues that HSGPA cannot be consistently valid because different schools and different courses within the same school use different grading practices and metrics (Geiser & Santelics, 2007, p. 4). In addition, the College Board has argued that too many students with the same high, near-perfect GPA cannot be differentiated and test scores set them apart (Geiser & Santelics, 2007, p. 4).

Here, the College Board might have a point. In recent years, according to Inside Higher Ed, Harvard has averaged 35,000 applicants annually. Two thousand acceptance letters are sent out and there are only 1,600 spots. Roughly 8,000 of those students have perfect 4.0 GPAs. SAT scores are used for differentiation and offer a smaller pool: roughly 3,400 have perfect math scores and roughly 2,700 missed no questions on the verbal. The result is that athletes, legacies, and those with connections to the school jump from comprising 5% of applicants to 30% of the small 1,600-person class (Morrison 2019). Perhaps the exams are useful for some schools and not for others, and there will never be a national strategy.

Conclusion

The results of my research are mixed, and I did not find one bulletproof source to prove my hypothesis that games are more equitable and fair than tests. There is more research available on games as *learning* tools than on games as *assessment* tools, with the LSAT Logic Games section being a major exception. I think the implementation of VR is very promising and it shows an inventive way to simulate lessons that could not occur in real life. But this does not solve the problem of structural socioeconomic inequality. As mentioned, the SAT was introduced in 1926. Something will replace it. There are problems with only using high school GPA, problems of equivalency and rigor. Transfer students can be left behind. I think there is more research to be done on this topic. It is encouraging that low-income students were reported to have increased motivation for learning after playing games, but I also stated that parental education is the most decisive factor in screen-time for kids, not income. Meaning that low-income students do not necessarily spend more time with screens. Children of uneducated parents do. It may have made more sense to choose gender as one of my variables, since games research almost always addresses differences in gender representation and participation. However, gender is not an issue in college admissions the way I framed it. Overall, I think that games teach something that lecture classes do not: grit, persistence, and determination. I think games will continue to be used in classroom settings. I think if the tipping point has not been reached yet, it will. It is important to engage with students using media because it allows teachers to teach to them during slices of their time when they would not ordinarily be studying. Computer familiarity is essential for the job market and should be taught explicitly. I think the success of even *one* popular game can turn all the research around and educators will never go back to not using them, but that does not seem to have happened yet.

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