“Should You Send Your Kid to High School in the U.S. or in China?”

A Comparison of the High School Education Systems of the United States and China

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Introduction

One of the greatest measures of human development is that of education: we often evaluate a country’s level of advancement by the quality of its education system, and how educated its citizens are. As the two largest political powers in the world, the United States and China are known to have very different education systems, and are often seen to have polarizing stereotypes. When asked what they know about the school life of both ends, most people would say that the U.S. focuses more on holistic learning and creativity, while Chinese schools specialize in rote learning, memorization, and exams. Though these are stereotypes, these are both tried and tested methods of teaching; what we are interested to explore is: is one method better than the other, both from the students’ perspectives and in terms of the results achieved? Does each form of teaching produce a different kind of outcome or characteristically different students, who are now ready for the real world? To what extent are these stereotypes accurate: what values are important to the different philosophies, and how does the emphasis on these values affect the growth of students?

These are all ideas that we intend to explore in this paper, with the goal of comparing and contrasting the high school education system of the United States to that of China. We frame this research topic in the perspective of current and prospective parents: if you had kids, which high school would you send them to? The reason why we limited the scope of this paper to just high schools is twofold. Firstly, it would let us limit the range of coverage so that we can investigate deeper into this topic. Secondly, in general, the high school system is the most heatedly debated level of education in both China and the U.S.

As such, while we will mention both higher and lower levels of education in passing, the focus of the paper will primarily be on the three to four years of high school.

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Student Life

Life in Chinese schools

An education system encompasses an incredibly wide range of qualities that work together to define the body as a whole, making it unique from all other education systems. One of the most important aspects is the quality of the students’ daily lives inside and outside of classes. It is widely accepted that the joy of learning is almost as important as the process of learning itself, and so we wanted to explore how American and Chinese schools divide up their students’ times.

The typical Chinese high school day begins early at 7 or 8 a.m. in the morning as Yao Zhang, a Chinese native who coordinates study abroad programs in rural China says[1], and usually lasts through too late in the evening at 8 or 9 p.m. Their classes throughout the day are all very heavily exam-focused, due to the Gaokao, (China’s National Higher Education Entrance Examination). Davey and Higgins[2] interviewed a Chinese school student who said:

“I spend my waking hours studying and even my spare time is dedicated to after-school curricula. Life is hard and all my friends worry about failing our exams. Sometimes I feel I can’t cope but I just don’t want to let my parents down.”

Students typically spend the majority of their high school life going through the pile of books containing the concepts necessary for their survival through these exceptionally tough final exams. There is a distinct difference between the ways schools in small and larger cities view the Gaokao. Higher class, elite schools in Beijing and Shanghai tend to not emphasize the Gaokao having a life-or-death consequence to the students, as smaller suburban schools do. This is because the students of these smaller schools often need to leverage the potentially life-boosting possibilities of stellar Gaokao results to propel them forward in life, giving them a leg-up in terms of employment opportunities after their schooling. Davey and Higgins say that “entry into Chinese universities is generally determined by the entrance exam”[2], and that chances of success through other methods of admission are “very small”. It is worth mentioning here that this is one good aspect of the Gaokao: it equalizes citizens’ welfare, in that it gives the poor and the rich the same chances of ‘making it’ to a good university, and consequently, a good career.

By their senior year in high school, the Gaokao preparation causes homework and revision to pile up in front of the students, both literally on their desks and figuratively on their shoulders. As a result, most students stay back in school well into the evening after dinner to receive private assistance from their teachers, and upon going home for supper, the homework continues. There is rarely any time outside of this schedule that permits any secondary activity like sports, socializing, and school-organized extracurricular activities; this leaves a lot to be desired for Chinese schools in terms of student life and welfare. Of course, this is not true for all high schools in China, but our understanding is that it is common practice for many schools to enforce restrictions like banning Art and Music classes and extracurricular activities in students’ final year, encouraging them to focus all their time on their Math and Science classes. One such
instance is as stated in the Basic Education Review Sponsor\(^3\) (translated from Chinese):

*Some schools observe that some classes are simply irrelevant to the content of the Gaokao, and so they either divert attention from them, or remove them from the curriculum altogether. The students have a similar attitude to these classes as they are too busy studying for their own exams.*

While it might be necessary to remove these ‘distractions’ from the considerations of these incredibly busy high school students in order to let them focus on the task at hand, we believe that this questions the system. The lack of balance in an adolescent student’s life is arguably unhealthy; this balance should be achieved at all times, regardless of looming pressures. Perhaps this then questions the legitimacy of the Gaokao, and whether it has damaging effects on these young adults’ lives. This is however not a topic of detailed discussion in this paper.

**Life in U.S. schools**

The typical American high school student’s day starts slightly later at 8 a.m.,\(^4\) and usually ends no later than 3 or 4 p.m., during which they only have four class periods, compared to more than 8 in a day in China. The biggest outward difference here is what students generally do after the last bell sounds in the afternoon: this is when the extracurricular activities, such as sports teams’ practices, chess club, choir practice, drama rehearsals, etc. gather and begin their sessions. The National Center for Education Statistics reported\(^4\) in 1995 that 99.8% of public high school seniors said that any extracurricular activity was available to them. The study also showed that depending on their socioeconomic status, anywhere from 73% to 88% of these students participate regularly in *at least* one extracurricular activity, with sports and performing arts groups ranking the top two most common ones. Furthermore, an interesting metric they reported\(^4\) is that of the seniors that expected to earn a bachelor’s degree or higher, 68% of them were active participants in *at least one* extracurricular activity, and similarly, three times as many participants reported a GPA of 3.0 or above as non-participants. This perhaps shows that active participation in extracurriculars, though certainly time consuming, may have a direct impact on a student’s happiness, well-being, and consequently, academic excellence. Though these statistics are from almost 10 years ago, they could only have become even more convincing now of the fact that extracurricular activities are a huge portion of American high school students’ lives.

It is worth noting that in studies like this, it is unfair to immediately draw a conclusion between participation in extracurricular activities and academic performance, due to the *third variable effect*; since correlation does not imply causation. Thus it is yet unclear whether extracurriculars have an unambiguously direct impact on students’ academic performance.

Another study from the Undergraduate Research Committee\(^5\) concluded from its investigation of this correlation:
“Parents have a large role in the academic development of their children, and one way of fostering strong academic performance is by encouraging their young children to become involved in some of the activities which promote academic performance. This could influence their activity choices later on in life and may set the foundation for a life of academic success and progress.”

Therefore drawing back to our research question, we feel that it is certainly beneficial to students to actively participate in extracurricular activities, in order to foster a sense of all-roundedness and balance. It appears that this is something high schools in the U.S. do very well, and Chinese high schools somewhat less so. Certainly there are data points that disagree with this, such as larger schools in Beijing or Shanghai that do actually align with this philosophy, and encourage extracurriculars, despite the Gaokao. On the other end of the spectrum, there are also American schools that have no control over students’ participation, leading to them enrolling in more activities than they can handle, thus negatively affecting their academic performance. In general however, this seems to be the right path to take, as long as it is taken in moderation.

**Education System**

After examining the surface level of the different education systems in terms of student life, we now proceed to explore the underlying administrative aspects. Here we will focus on three important topics: admissions and enrollment, curriculum, and standardization policies.

**Admissions and Enrollment**

According to the Compulsory Education Law of the People's Republic of China\(^6\), Chinese citizens are only required to receive nine years of education, meaning that high school education in China is optional. Even though the gross enrollment rate of high schools is 82.5% as of the end of 2011\(^7\), the uneven distribution of high school education resources\(^8\) still implies intense competition. As such, an independent standardized high school entrance examination system similar to the Gaokao is adopted by most provinces and regions. Students in most parts of China are tested on the core subjects of Literature, Mathematics, English, Physics, Chemistry and Physical Education. Other commonly tested subjects include Biology, History, Politics and Geography. Normally the test takes place around April and May once a year, spanning two to three days\(^9\). Students indicate their preference for schools beforehand, and all public high schools admit most students based on the standardized test scores, with the exception of student athletes, musicians, etc.

High school admissions in the U.S. is much more diverse. Due to the different legislations in different states, some students are required to finish their high school education while others are not\(^10\). We randomly selected 10 high schools from the top 100 public schools from the *U.S. News* public school rankings\(^11\), as well as 10 schools that are ranked after 2000,
and examined their admission methods (see Appendix A). The samples from the top 100 schools mostly base their admissions on a regional standardized test, GPA and teacher recommendations; some even required the students to take a special exam offered at the school. The samples from the unranked schools either indicated that enrollment is solely based on residency and lottery, or did not even indicate any enrollment information at all. A similar survey of admissions methods of top-ranked private schools in the U.S. also showed that common evaluation standards include on-campus interviews, standardized tests (ISEE), GPA, teacher recommendations and involvement in extracurricular activities.

In order to compare these admissions systems, we must first look at why high schools need a competitive enrollment system rather than one completely based on residency and randomness. We believe this is because education resources such as curriculum intensity, teacher quality, facilities, etc., are unevenly distributed. The author of Essays on World Education: The Crisis of Supply and Demand[12] (Bereday, 52) claims in the section Elitist Systems:

“No known system inherently or automatically assures equality of educational opportunity throughout a nation. Conversely, many systems that have stood for years as models for successful education...have been restrictive in the extreme...they were starkly elitist in nature.

To further support our claim, we observe that the schools which have highly competitive admissions tend to advertise the strongest curriculum they have to offer, as well as the ratio of graduates that move on to prestigious universities (see Appendix A). For example, the Thomas Jefferson High School for Science and Technology (ranked #4 in the U.S. News public schools ranking, abbreviated hereafter as TJHSST) publicly advertises the college acceptance rate of its graduating class[13] into the top 50 universities in the U.S. as being much higher than that of students from across the U.S.. Similar data can be found about arguably the most prestigious high school in Beijing, the High School Affiliated to Renmin University of China (hereafter abbreviated as HSARU). In the year 2013, 20 out of the 35 top-scoring students in Beijing’s Gaokao are from HSARU[14]. This data indicates that education resources might be highly unbalanced, as we will further discuss in a later section on government policies.

Under such imbalance of education resources, schools need a way to differentiate the likely-to-be-successful students from the large pool of applicants. The particular choices of admissions methods made by China and the U.S. are largely influenced by historical and cultural factors. However, we believe that admissions criteria is an important indication of what these high schools perceive to be the type of student that would succeed. We can see a strong pattern that Chinese high schools value students who understand the knowledge well enough to perform well under highly stressful situations, whereas schools in the U.S. tend to value consistency in performance and attitude towards their learning over the years, over quantitative results from tests.


Curriculum

The curriculum of a high school education is arguably its most important factor. In this section, we examine the respective curricula offered by Chinese and U.S. high schools.

As the high school curriculum is much more intense than that of middle school, a student in both China and the U.S. is allowed to choose academic tracks that is most suitable to their interests and talents. In China, high school students are allowed to select either the Science track or the Humanities track in their second year. Apart from the common subjects of Literature, Mathematics, and English, students in the Science track also take classes in Physics, Chemistry, and Biology, whereas students in the Humanities track can elect History, Geography, and Politics. Students are tested on the respective subjects in their track\(^{[15]}\) during the gaokao. In the U.S., all high school students have mandatory courses in the area of Sciences, Mathematics, English, Social Sciences and Physical Education. Apart from fulfilling the requirement, students are free to choose electives from a variety of subjects including computers, Foreign Languages, Performing Arts and Advanced Placement courses\(^{[16]}\).

It is very easy to see that students in the U.S. have much more flexibility than those in China. U.S. students are encouraged to pursue their own interest areas and select course difficulty levels based on their learning abilities, whereas the only choice Chinese students get to make is between the Science and Humanities tracks, after which the courses and difficulty levels are controlled by schools rather than individuals. While the U.S. education model may seem to be more advantageous on the surface because of the freedom it offers, it could be argued that such a system might loosen the standard on high school education and allow for underachievers. From an interview with a current Computer Science undergraduate at Carnegie Mellon University who attended a U.S. public school in Washington, we gathered some objections:

“U.S. public high schools are absolutely terrible. In my school, it was basically just a few serious students struggling hard to get the most out of their education, lost in the majority of people who didn’t care at all and who were going nowhere.”

Because of the relaxed standard, it could be argued that some U.S. students have the excuse to not try hard enough to achieve their full potential. Of course, a unified standard for all students with different backgrounds, different interests and different abilities, such as the one enforced by the Chinese education system, has very clear disadvantages, which we detail in the “Education Philosophy” section.

Standardization Policies

Education standardization is an ongoing effort to promote education equality, giving equal education opportunities for students coming from poorer areas or from underrepresented minorities. In 1965, the U.S. passed the Elementary and Secondary Education Act (ESEA) that “emphasizes equal access to education and establishes high standards and accountability”\(^{[17]}\).
The act authorizes federal funding for schools, especially those with high numbers or high percentages of poor children[18], and was reauthorized in 2002 under the new title No Child Left Behind (NCLB). This act enforced state-based standardized testing to improve education quality, regulate teacher qualification, and encourage parental involvement[19]. However, from the common family’s point of view, the debate of whether to pay more for a private school in order to gain access to better education resources powers on.

In China, education standardization has also been an effort since Deng Xiaoping’s Education Modernization Reform. In May 1985, the Central CCP government passed an Education System Reform Act, which describes a system that broadly covers the entire China, promising funding for poor areas and special education for students with disabilities[20]. The nationwide Gaokao also forces high schools in different areas to achieve the same academic standard. In addition, standardized textbooks published by the People’s Education Press started being widely used in most parts of China[21]. However, contrary to common belief, government sponsored education elitism in China still exists. In the 1950s, the Ministry of Education selected a few schools, called the Elite High Schools (重点高中), to receive extra resources and funding from the government. Even though the Elite High Schools no longer exist due to concerns about education inequality, alternative names were given for this group, such as Experimental High Schools Programs (实验试点)[22] and Exemplar High Schools (示范校)[23]. In our interview with Jiacheng Ye, another Computer Science undergraduate at Carnegie Mellon University who attended the No. 2 High School Attached to East China Normal University (华东师大二附) in Shanghai, China, he talked about the special funding his school received:

“The high school program I went to took up much more resources than average. In fact, the high school received more than $3 million U.S.Ds funding directly from Ministry of Education, China merely for the infrastructure of this program (Experimental Scientific Creativity Program), with only around 40 students every year in Shanghai.”

Both the U.S. and China have, on the one hand, ongoing efforts to standardize education to provide equal opportunities, and on the other hand, education elitism efforts to provide exceptional education for select people. We will explore the questions of, which effort would benefit the people from each country, or whether these efforts are contradictory, in the “Ideal Education” section.

**Education Philosophy**

The education philosophy of an education system highly influences its establishment and development. After examining the differences between the education systems of the U.S. and China, we now explore the root causes for these differences.
Textbook-centric versus holistic learning

A common stereotype of Chinese education is that it is very textbook-centric. To confirm this, we interviewed 4 Computer Science students in Carnegie Mellon University who attended high school in China (see Appendix B for the interview logs). The students are from Shanghai, Hangzhou (Zhejiang), Jinan (Shandong) and Guiyang (Guizhou), and all went to top-tier schools in their respective areas. When posed with the following question:

“Do you think this statement is accurate? ‘Chinese schools focus too much on books, and not so much on skills outside books.’”

All four interviewees answered “Yes”. Three of them indicated that this is especially true for the high school they went to, whereas one person (Jiacheng Ye from Shanghai) indicated that his school is an exception (see quote in the previous section). Some of them explained that they did not have the chance to explore subjects like computer science outside of the Gaokao, and others indicated that most subjects were taught in a dry and overly theoretical way.

Indeed, “high scores, poor abilities” (高分低能) has been a saying among many educators in China who were unsatisfied with the fact that schools focus too much on books and tests. In response to the apparent problems, in 2001, the Ministry of Education published the Basic Education Curriculum Reform Program, which provides guidelines to introduce Su Zhi (quality, or holistic) education in China[24]. The program criticized passive learning, rote learning and textbook-centric teaching, and instead emphasizes creativity, critical thinking, problem solving, communication, collaboration, social works, and social awareness. These new points of emphasis incorporate very well what holistic learning should encompass, leading to clear observations of improvements after the program was published. In Beijing No. 8 High School (where the author Yuyang Guo received her education), students are explicitly encouraged to ask questions and discuss during class, and even challenge the material taught by the teacher or written in the textbook. A relatively large amount of class time for Humanities subjects were dedicated to student presentations, and a new course that teaches students how to build circuit boards and design their own gadgets was introduced for students in their second year. One free elective per semester (except for the final year) was added to the students’ schedules, where they could choose from more than a hundred subjects to learn about or projects to work on. However, since this is a rather prestigious and open-minded high school in one of the biggest cities in China, it is certainly not representative of the result of reformation in Chinese high schools in general. As can be seen from the interview results, even the best schools in specific regions still tend to set Gaokao and test-taking skills as their highest priorities, consequently ignoring some of these requirements for change.

U.S. high schools do a much better job when it comes to holistic learning. We also interviewed a current Electrical and Computer Engineering student at Carnegie Mellon University who went to high school in Shenzhen, China, but also did one year of exchange in a U.S. public high school in Brattleboro, Vermont. He explained to us the difference in the styles
of learning:

“In Brattleboro, doing exercises together in class is very common. Since the class size is small, everyone has the opportunity to practice in class and get feedback from the teacher. Whereas in China, since there are about 40 students in class, there is no time to practice in class what we learned. It turned out to be a more passive style of learning.”

He also explained how, because of the Gaokao, teachers in China have the pressure to go over a lot of material in very limited time, and thus don’t have the time to allow for student participation. Huajun Zhang also noted that “exam-oriented education dominates practice in most schools even though it is criticized for ignoring students’ diversity and restricting students’ creativity.”[25] Such dominance comes from the chain reaction where unequal urban rural development causes intense job competitions, job markets highly value university names, yet university admissions remain solely based on exam scores. Therefore, high schools must focus on helping students to get a good score. To examine how we might change the status quo, we must look at what each education system defines to be a ‘good’ student, and whether that definition conforms to the education philosophy of holistic learning.

What is a good student?

Here we pose the interesting question: does each education system have a stereotypical ‘good’ student? In the Chinese education system, the answer is unambiguously ‘yes’. For more than forty years, Chinese schools have had a standard award for “Student of Merit” (三好学生, literally translated to “three-goods student”). The three good qualities are: good morals, good academics and good health. This is a very well-defined standard within the Chinese education system, and gives teachers and schools the ability to very quickly and precisely identify who the ‘good’ or ‘best’ students are. Of course, this phenomenon has its pros and cons; the pros being that academic recognitions are very easily awarded, while the cons being that each student has a metaphorical label attached to them.

The U.S. education system strongly believes against labeling students by their academic results, and instead rewards effort, even in the face of failure. Progress is highly respected in U.S. high schools, even if it lacks in deliverables, as long as there is promise that results will eventually surface. However because of this, it is much more challenging for schools to be able to identify which students are ‘good’. Of course, they also have test scores with which to grade students by, but these numbers carry much lower weight in the presence of other qualitative factors. It is very interesting to see the stark difference between how these two education systems define a ‘good’ student, leading to the possible creation of students that adhere to these standards.
Education Outcome

One of the main metrics that parents care most about when it comes to their children’s education, is results, no matter whether they are a Western family or a Chinese family. The term ‘academic performance’ is more often than not measured quantitatively: Grade Point Averages, test percentages, attendance, project grades, oral presentation scores, etc. It can also be measured qualitatively: are they better able to speak publicly and more fluently about their views on a subject matter? Do they better express their opinions when it comes to an argumentative situation? Are they good citizens of their class, their family, and their country? These are all outcomes that parents hope for their children to get out of an education system, starting from the early years, all the way up to high school and further studies.

China’s education system is most well-known for its ability to maintain high quantitative figures across the board, both on the axis of number of students, and on the axis of the various subjects they take. The 2012 Program for International Student Assessment (PISA), a leading survey of education organized by the Organization for Economic Cooperation and Development (OECD), showed\(^\text{[26]}\) that Shanghai’s teens come at the top of world, second to none. The two-hour standardized exam focused on the subject area of Mathematics in 2012, and was taken by 2 million 15-year-olds from 65 countries around the world, representing 80% of the global economy. Though only represented by Shanghai (in first place) and Hong Kong (in fourth place), it is clear that Chinese students are highly consistent when it comes to reproducing test results in the Sciences. In contrast, the U.S. ranked 36th, performing below the OECD average in Mathematics, Reading, and Science. Of course, these numbers alone cannot fairly and accurately represent the quality of a nation’s education system, because these numbers do not tell the complete story. First of all, a weakness of this test is that China only submitted scores from within Shanghai, whereas all other participating countries, the U.S. included, submitted scores nationwide. It is undoubtedly true that Shanghai’s test results cannot fairly represent those of the entire country, either in the positive of the negative direction. Secondly, as mentioned in previous sections, correlation does not imply causality, and so this correlation must be kept in mind. Thirdly, these are just quantitative results: what about the qualitative factors?

A study conducted by Yuan Xianwei of Illinois State University\(^\text{[27]}\) aimed to determine in terms of mathematical question-posing, are students in Chinese high schools or American high schools more mathematically creative? He did this by selecting 3 groups of students from the U.S., Shanghai, and Jiaozhou, with similar and relatively strong math background, and asked them to pose questions given some mathematical setup (such as when given a figure). He then removed trivial and poor questions from the dataset and counted the number of flexible and original questions output by each group. The following chart plots these results, where the vertical axis measures the number of ‘good’ questions obtained.
While the students in Shanghai did slightly worse than those in the U.S., the group in Jiaozhou by far outproduced the most mathematically creative questions. When asked to detail their thought process for coming up with these questions, a student in the U.S. explained how he let the ideas come naturally to him:

“Some of the ideas came and I kind of took them and sat back for a second just stared up the space and looked down again and then something else appeared.”

A student from Jiaozhou told Yuan that she started off from the basis of a mathematical problem, then worked her way up.

“It’s like, when I saw the circle, I thought of radius, area, circumference, etc. Then when I saw the triangle, I immediately thought of area, perimeter, altitude, etc. Then I just tried to connect all of them to make the problems harder.”

This very interestingly shows the difference in the methodologies that American and Chinese students approach these problem-solving situations, arguably from both polarizing ends: top-down and bottom-up. Here it can be said that the thought processes of the students reflect the core teaching philosophies that they received very well. Perhaps what dictates the success of an education system is not quantitative figures or qualitative results, but rather the adherence of the students to the philosophy and vision set out for them from the start of their learning careers, in which case both the U.S. and China seem to deliver equally well.
The “Ideal” Education System

So far in this paper, we’ve discussed what the good aspects of both the education systems in the U.S. and in China are, and how they help a middle school student grow into adolescence and into adulthood, both in terms of academic maturity and breadth. We’ve also laid out each system’s weaknesses: what do the high schools in both countries do or not do that may repress or hinder the academic growth of these young minds? Unsurprisingly, both the U.S. and China have their own strengths and weaknesses when it comes to educating these high school students.

Standardization

In China, the focus on standardized tests and standardized class material allows the Chinese Ministry of Education to better control the overall teaching quality throughout the nation, so as to reduce the statistical variance between schools. In the U.S., although traditionally the administration of a school is the primary organization responsible for regulating its own curriculum, as we’ve previously alluded to, recent efforts have been made to move the U.S. in the direction of standardized testing too. Thus in this aspect, it is clear that the “ideal” education system should also adopt similar standardization efforts, in order to properly regulate the quality of teaching and of the material covered.

Allocation of time

In terms of focus, comparing the various first-hand views of the Gaokao and its ability to consume a Chinese high school student’s life, to the benefits of devoting time and immersing oneself into extracurricular activities, leads us to believe that the life of a student of the “ideal” education system should not be focused on achieving the best possible scores for a single monolithic examination. As previously discussed, the returns of growing a high school student breadth-wise by having them participate in diverse activities far outweigh those spent rote-learning mathematical theorems. Of course, exams are still required, but we feel that taking the American stance on testing in moderation and balance yields the greatest benefits for students.

Balance of Creativity and Concrete Knowledge

Shifting focus to education philosophy, we set out to answer the very difficult question: which country’s overarching philosophy achieves the best results? We found no concrete answer, as expected. However, the general pattern that we observed is that out of all the values that teachers can teach to their students, creativity seems to be the one that is the most emphasized. American high schools often state their mission in the lines of “... a combination of fundamental knowledge, individual creativity and curiosity”[13]. Although U.S. high schools’ focus on developing creativity is well-known, the study we referred to in the “Education Outcome” section brings to light a new, interesting perspective: that Chinese students are on
average more mathematically creative than their American counterparts. Why is this the case? Our explanation here is that, in order to achieve true creativity, there must be a balance between ‘concrete knowledge’ and ‘thinking out of the box’. This kind of balance was proposed two thousand years ago by the well-acclaimed Chinese pedagologist Confucius, who said, “Learning without thought is labor lost, thought without learning is perilous” (学而不思则罔，思而不学则殆). Furthermore, Terence Tao, the famous mathematician and 2006 Field Medalist, also has some similar ideas about creativity and problem solving in Mathematics[28]:

“When I was a kid, I had a romanticized notion of mathematics, that hard problems were solved in ‘Eureka’ moments of inspiration. [But] with me, it’s always, let’s try this. That gets me part of the way…you work on it long enough and you happen to make progress towards a hard problem...”

The thinking process of the Chinese students in the previous study resembles Tao’s, indicating that laying a solid foundation of concrete knowledge is just as important, if not even more so, than inspiring creativity. Thus, we believe that an “ideal” education system is definitely not one that just focuses on memorization or exam taking, because the advancement of knowledge of humankind relies on original thinking. However, it is also not one that solely prioritizes creativity and not the knowledge itself, which has the risk of degenerating a system that falsely rewards ‘reinventing the wheel’. An ideal education system should be able to balance concrete knowledge and creative thinking well.

**Individuality**

Recognizing individuality, we believe, is also an important part of education. People are born with different abilities and gifts, therefore it is definitely not ideal if an education system evaluates different students using the same standard. In this aspect, the U.S. does much better than China. Many reports have shown that Chinese students tend to be less confident, and even feel that lose their own identity under the evaluation system[29]. The U.S. education system, on the other hand, respects individual students and help each student build their confidence regardless of their achievement. Some Chinese educators have recognized this huge disadvantage and decided to experiment with complimenting students who wouldn’t be recognized as ‘good student’ in the traditional evaluation system. Such method made a very positive impact on the students involved. Parents and teachers reported that these students gained more confidence and were more positive towards school studies after being recognized[30]. Therefore, we also believe that an ideal education system should recognize individuality.

**Learning to learn**

Lastly, also in the realm of education philosophy, is the dichotomy between the importance of gaining knowledge versus the importance of developing learning skills. A
common saying heard around classrooms in the U.S. is “learning how to learn”, meaning improving one’s understanding of how knowledge is acquired, and developing a higher-order ability to better and more quickly learn new concepts in the future. Again, this is a common value core to the missions of many American high schools, as they subscribe strongly to this belief that the knowledge itself is oftentimes less important than the learning of the knowledge. This is considerably less so in Chinese schools, since the heavy emphasis on the Sciences leads to a potentially skewed view that content is paramount; a textbook-centric philosophy, as mentioned in previous sections. In this respect, we believe that in the ideal situation, “learning to learn” should be a standalone subject matter by itself, due to its presence in every other area of study. This class would focus on honing skills such as problem solving, pattern recognition, planning, concentration, adapting to different circumstances, etc., and would approach teaching these skills through application. Only through application can students truly learn how these skills can be applied in real life (just as taking a Physical Education class while behind a desk would not be very effective). From the analysis in this paper about how students learn best, we strongly believe that the “ideal” education system should incorporate ideas such as this.

Exploring Other Education Systems

So far in this paper, we have only touched on education systems in the U.S. and in China. It is also interesting however to capture very briefly in this concluding section what education is like in other countries. Sweden is world-renown for its educational standards, where “efforts to promote equality have been central”[31] to their education policies, as stated in the book The Market Comes to Education in Sweden by Anders Bjorklund, et al. Schooling is compulsory for all children between the ages of 7 and 16, and has a firmly established national test system that echoes the goals of the Chinese Gaokao. Bjorklund, et al. did a study on the predictive power of the Swedish National Tests:

“Test scores and grades are particularly strong predictors of educational attainment, but they also predict earnings even conditional on education attainment... This indicates that the tests have additional predictive information that is not contained in grades.”

With these tests in mind, it seems that Swedish students are also high-achievers, ranking “near the top of all upper-secondary students in both mathematics and science scores” in the 1995 TIMSS (Third International Mathematics and Science Study). Also interesting to note is that Sweden had the lowest between-school variance of all the OECD countries, as compared to the U.S., which had a long tail of poor performers. This could perhaps very well reflect the Swedish effort to standardize and equalize education throughout the nation.

Conclusion

Education is one of man’s proudest achievements, and one of man’s greatest proofs of self-advancement. As technology continues to make its rapid advancement, an inevitable effect on
almost every aspect in our life is globalization; of which education is certainly not resistant. While different countries may have started out with their own black-box ideologies of what constitutes education, what makes a ‘good’ student, what knowledge is important, and how academic excellence should be recognized, these days, we can very clearly observe the convergence of the different education systems. Be it high schools in the U.S., China, Sweden, or any other country in the world, each with its own pros and cons, strengths and weaknesses, praises and criticisms, the most important thing that any parent should keep in mind when asked the question “should you send your kid to high school in the U.S. or in China?” is this: the family unit should be the deciding factor. Wherever a child of a family is educated, their family’s presence to make up for missteps in the education system, or to reward their effort where reward is due, has the utmost impact on their growth, both academically and socially.

Students Advisor’s Comments

Zhongxin Sun

Yuyang and Issac’s paper is their joint research project for the class 82-333-Introduction to Chinese Language and Culture: Modern Chinese Culture (Spring 2014).

Both Yuyang and Issac major in computer science at Carnegie Mellon University, and both of them are very interested in Chinese Studies. For the final research paper, they are free to work indendently or work as a team.

As part of the course design, the research project for this course is subdivided into four steps stimulating a real-life progression of doing research. The first step is read one book and write a book review, as a first step towards finding a research project. According to the syllabus, the book review should introduce students to a topic of Chinese culture in greater depth and, more importantly, train students how to read academic literature and write from critical perspectives. Students are free to pick the topics/books they are interested in by themselves. For Yuyang and Issac, they picked a book on Chinese education.

The second step is to narrow down their research and write a research proposal based on the book review and any additional research they have done. This is the very important step for undergraduate students because many of them tend to have very broad topic to start. I often tell students a good research should be narrowed down in order to be meaningful and manageable. One way to narrow down the topic is to design the research project to address one specific question or problem.

Instead of analyzing the very broad topic on “the strength of limits of Chinese education”, Yuyang and Issac’s research questions is well-defined as “Should you send your kid to high school in the U.S. or in China? A comparison of the high school education systems of the United States and China.”

The third step is in class presentation which is base on their book review, their research proposal and any further research students have done. Students’ presentations are followed by a few minutes “question and answer” session in which the other students, and I will participate. After receiving feedback or questions, the final deliverable is the final research paper writing—the fourth step.

For the paper writing, we strongly encourage students to use both primary sources and
secondary sources. Yuyang and Isaac conducted interviews by themselves in the campus when conducting interviews are encouraged in this class for students to understand China.

This paper designed a good research question and the question was expressed well in the paper. The paper provide sound arguments to answer the research questions based on various evidence and expressed in the structure of the paper. Counter-arguments are discussed and refuted. They conducted interviews by themselves and collected first-hand data and second-hand data to support their arguments on Chinese education.

There are still some weakness in this paper, for example, the student researchers should be sensitive to the ways in which and respondents’ and interviewer’s attributes affect data collection. Besides, protecting your research subjects is guarding their privacy even though the research topic may not be too sensitive. It is important to make sure the identity of the respondents will not be disclosed to anyone. I would strongly suggest the authors keep the respondents’ identities hidden by using fictional names or trying to disguise other identifying information.

In conclusion, this is one of the best undergraduate students papers from the class of “Modern Chinese Culture”(Spring 2014) and I am glad to recommend this paper to your journal.
References


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http://www.cnn.com/2013/12/03/world/asia/pisa--education--study/.


Appendix A: Schools Used for Admission Survey

Some Top-100 U.S. Public High Schools

- Thomas Jefferson High School for Science and Technology
  - 6560 BRADDOCK RD ALEXANDRIA, VA 22312
  - [http://www.tjhsst.edu/aboutj/admission/index.html](http://www.tjhsst.edu/aboutj/admission/index.html)
  - GPA, school administered test, a comprehensive, holistic evaluation
  - test, essay, teacher recommendation verbal score
- Lake Washington School District
  - 11133 N.E. 65th St., Kirkland, WA 98033
  - International Community School
  - lottery, long wait list
- Whitney High School
  - 16800 SHOEMAKER AVE CERRITOS, CA 90703
  - Standardized test, writing test, GPA at school
- The High School of American Studies at Lehman College
  - 2925 GOULDEN AVE BRONX, NY 10468
  - Standardized written test (SHSAT)
- Staten Island Technical High School
  - 485 CLAISON ST STATEN ISLAND, NY 10306
  - standardized written test (SHSAT)
- Hume-Fogg Academic High School
  - 700 BROADWAY NASHVILLE, TN 37203
  - GPA and standardized test (TCAP)
  - [http://www.humefogghs.mnps.org/Page1406.aspx](http://www.humefogghs.mnps.org/Page1406.aspx)
- KIPP Austin Col
  - 8509 FM 969 BLDG 513 A.U.S.TIN, TX 78724
  - Admissions information not found
- City Honors School at Fosdick-Masten Park
  - 186 EAST NORTH ST BUFFALO, NY 14204
  - [http://www.cityhonors.org/page/admissions--process/](http://www.cityhonors.org/page/admissions--process/)
  - teacher recommendation, GPA
- MAST Academy
  - 3979 RICKENBACKER CAU.S.EWAY KEY BISCAYNE, FL 33149
  - GPA, effort indicators, attendance, teacher recommendation
- Langley High School
  - 6520 GEORGETOWN PK MCLEAN, VA 22101
  - Admissions information not found
Other U.S. Public High Schools

- Harmony School of Advancement
  - Houston, TX
  - residency and lottery
  - http://hsadvancement.org/?midframe=/Admission/how%20to%20enroll%20HSAA.htm
- MOTT Hall high school
  - Manhattan, NY
- Shaw High School
  - 214 DEAN BLVD SHAW, MS 38773
- South Pittsburg High School
  - 717 ELM SOUTH PITTSBURG, TN 37380
- Southeastern Sr. High School
  - 195 EAST JAMESTOWN ST SOUTH CHARLESTON, OH 45368
- Mount Ayr High School
  - 1001 EAST COLUMBUS.U. S. ST MOUNT AYR, IA 50854
- North Baltimore High School
  - 124 SOUTH 2ND ST NORTH BALTIMORE, OH 45872
- Triton Jr-Sr High Sch
  - 300 TRITON DR BOURBON, IN 46504
- Vassar Senior High School
  - 220 ATHLETIC ST VASSAR, MI 48768
- Waitsburg High School
  - 420 COPPEI AVE WAITSBURG, WA 99361

Some U.S. Private High Schools

- http://www.andover.edu/Admission/HowToApply/Pages/default.aspx
Appendix B: Interviews with Carnegie Mellon Undergraduates

Interview Questions:
Here are the interview questions we asked to each student who attended Chinese high school:

1. What type of school did you go to in China?

2. Are you in general satisfied with the education you received?

3. How heavy was the work load? (compared to college workload in CMU?)

4. Do you think this statement is accurate? "Chinese schools (not the school you went to, but in general) focus too much on books, not so much on skills outside books." (what about for the school you went to?)

5. What is your impression of U.S. high schools? If you had the choice, would you have gone to an U.S. high school or a Chinese High School?

Interview Answers:
Below are the answers we collected from four students who are all currently studying in Carnegie Mellon University, majoring in Computer Science:

J. YE, Shanghai

1. I went to a public school. (华东师范大学第二附属中学，if want to more details you can grab them from Wikipedia, use Chinese Wiki since it has more details) I was in 科技创新实验班 of Class 2013. 科技创新班 is an experimental education program in several high schools in in Shanghai. (See [http://baike.baidu.com/view/3475068.htm#](http://baike.baidu.com/view/3475068.htm#) for what it is)

2. Yes, I am satisfied.

3. It was not that bad. I would say only half of the work amount (or even 1/3) compared to CMU. For Grade 10 and 11, we typically have no class after 3:40 p.m. and we have in average 2-3 hour work every day (and it has been a trend for students not to hand in their hw).

4. I would say this statement might be true for some of the high schools which always press their students to work all day. I heard there are high schools in China that push their students to work from 5:30 a.m. to 10:00 p.m. (probably not in Shanghai).

However, for the high school education I got, it is definitely false. For the first two years in my high school (especially in 科技创新实验班), students are very encouraged to explore their interests (in most of the case, do some small research in the field one feels interested in) and have plenty of time to pursue things they want. With the
appropriate amount of work we get every day as described above, students in 科技创新班 got chances to have an afternoon off every week for their interested area and do their own research. They finally bring their work to 英特尔青少年科技创新大赛 (the U.S. counterpart is ISEF). From this long process of going to 创新大赛 for about 3-6 months, students refined their skills for information searching, executive power, help-asking, self-learning, writing and presentation.

So I will not agree with this statement.

5. My impression about U.S. high school is that a lot of students feel too reluctant to school. Sometimes I get an impression from them that schools are just things to ‘应付’. I get an impression that they think school work has nothing to do with cool things.

6. However, this may not be the case for the high school education I got. Here, coursework is not the priority for the first two years and there are myriad opportunities and contests for students to pursue their aspirations and develop their interests.

In other words, If I get the chance to choose again, I would say I never regret my choice 4 years ago, even if I got the chance to study in a U.S. High School, considering the quality of education.

However, please note that this environment is definitely not the general case for an average high school in China. The high school program I went to took up much more resources than average. In fact, the high school received more than $3 million U.S.Ds funding directly from Ministry of Education, China merely for the infrastructure of this program (with only around 40 students every year in Shanghai).

K. MAO, Hangzhou

1. Hangzhou Foreign Language High School (we just have more language classes than other normal high schools but have same classes otherwise)

2. It's okay. Could be more enlightening and creative

3. Similar to CMU (to some extent less)

4. I agree. Like it's too much theory and not enough practical skills or practice. Like in computer science classes in my high school, they just didn't know how to teach students fun of programming at all…. But my high school offers a lot of opportunities for extra curriculum. That part is good.
5. U.S. high school…um…. quite polarized. Top students receive pretty good education but weak students learned nothing from school. If given one more chance, um I'm actually not sure…

**Q. JIA, Jinan**

1. Just a normal high school. They call it experimental high school but there really isn't much difference. Not an international school. (authors note: Shandong Experimental High School)

2. Well. In general, yes. Given the fact that it was the best school I could go to. But on the other hand, I do feel like I didn't get the chance of exploring different fields much, like, computer science haha

3. It was like about 70% of the workload I have now.

4. Yes. And in particular my school. This is part of what I said for question 2.

5. Hmmm. I don't know much about U.S. high schools, actually. So I can't really say much about which one is better... sorry if this is not particularly helpful

**A. WU, Guiyang**

1. Normal high school that’s for Chinese universities. (author’s note:

2. Yes

3. About the same as CMU. On weekdays we have 6 hours of class time and 2-3 hours of homework time every day. Weekend schedule varies depending on whether one “bu ke” or not.

4. I agree. I think most Asian (Japan, China, maybe Korea) high schools education are aimed toward their competitive college entrance exam. Thus most of them focus on books and exam skills instead of skills outside books. My high school is the same.

5. U.S. high schools? I think students play every day! :D. Not sure how they teach students about “skills outside books”, but I think the development of those skills depend on the support from parents a lot.

Well I will still choose to go to Chinese High School because I learnt a lot there, and had a memorable experience.
Special Interview with Jiaxin Yu, Shenzhen

Because J. YU went to high school in China, and did one year of exchange program in a U.S. public high school. We asked him a different set of questions:

Q: What type of Chinese High school did you go to, and roughly when? What type of U.S. High school did you do your exchange program in, and roughly when?

A: I went to a public high school in Shenzhen, China from September 2008 to June 2010. I went to a U.S. public high school as an exchange student in Brattleboro, Vermont from September 2010 to June 2011.

Q: What do you think is the biggest difference between the two schools?

A: There are many differences between these schools. I would say there are two biggest differences. a) Students in Vermont are not as focused on academics as students in China. I would say about 20%~30% students in the Brattleboro school don't go to colleges. b) The teaching style in Brattleboro is much different from the one in China. In Brattleboro, doing exercises together in class is very common. Since the class size is small, everyone has the opportunity to practice in class and get feedback from the teacher. Whereas in China, since there are about 40 students in class, there is no time to practice in class what we learned. It turned out to be a more passive style of learning.

Q: Do you think there is a difference between the two in terms of educational goal and ideology? If so, what? if not, what is the common goal/ideology?

A: I think their goals are slightly different. In the U.S. (at least in the school that I stayed at in Brattleboro), there is no pressure to go over many materials in a semester.

Coupled with the fact that their class size is about a third of what's in China, I think it allowed them to have more active participation and active learning during class.

Q: Assuming that you are going to have three kids, would you send them to U.S. or Chinese High Schools? Why? (you can send different kid to different schools, and ignore factors like language/culture or preparedness)

A: There are many many many factors that would influence my decision to where I would send my kids to school. Academic-wise I don't really have a preference. I am confident in providing additional guidance that either school system lacks. For example, if they go to a Chinese high school, I wouldn't worry about the learning aspect of school, and I would provide support for my kids to develop creativity or team work skills. But other factors like bullying/safety at school, other kids that my kids will interact with, etc. will also influence my decision.