



A review of Shadow Education and K-12 Students' Learning

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Abstract. Recent years, shadow education gradually becomes prevalent among K-12 students all over the world. Nowadays, many parents hope shadow education could help their children study better and get a higher score at school, so they send their children to the supplementary classes to learn knowledge related to what they have already learned or what they are going to learn in the school. Hence, this paper aims to address the question: How does shadow education influence K-12 students' learning? Previous studies proved that parents from Asian-Pacific regions are more likely to send their children to shadow education. Moreover, this could to some extent increase social equality. The review of 10 related papers highlights different studies regarding to shadow education and the impact of it to K-12 students' learning.

Keywords: Shadow education, students' learning, inequality, review

1 INTRODUCTION

This review paper is an attempt to investigate the relationship between shadow education (SE) and students' learning, especially how could shadow education influence K-12 students' learning. First of all, the definition of shadow education is of great significance because it could give you a general acknowledgement of this core concept. Shadow education, also known as educational tutoring, extracurricular tutoring or supplementary tutoring, refers to the private extracurricular tutoring that takes place outside the mainstream school education and charges fees for the subjects learned by schools. It is characterized by disciplinarity, compensatory habit and compensation. Moreover, the focus of shadow education is on major subjects in STEM, such as mathematics and science, however it doesn't include physical education, music or arts [1]. But in Asian countries, such as China, shadow education includes physical education, music and arts because these are all subjects of examination. Therefore, Chinese students need to learn them during shadow education.

To use China as an example. Instead of letting K-12 children play outside with friends in the park or entertainment areas after school or at the weekends, Chinese parents always send their children to cram institutions to study what they have already learned or what they will learn at school during after-school time and weekends. A

large number of K-12 students not only need to study at school on weekdays, but also have several supplementary tutoring on the weekends. So, they don't have much time to have a rest or have their own leisure time on weekends.

Nowadays, shadow education has become increasingly prominent in many parts of the world [2]. China is among the countries where it is most prevalent [3]. There are different kinds of shadow education, such as extracurricular classes, private tutoring and distance learning. In Korea, there are various types of shadow education for them to participate in, such as cram school, individual tutoring, correspondence courses, on-line tutoring services and Educational Broadcasting System (EBS) [4]. The aim of shadow education is to improve students' academic performance and their academic ability, thereby promoting students' better performance in schooling system [5]. Kim used the term "tiger" parenting to label this possibly distinct Chinese type of parenting [6]. Tiger parenting is a form of parenting from parents who strictly treat their children and highly invest in them to ensure their children's success. Through their studies, they found that tiger parenting is most evident in middle-class families, and tiger parenting family is more likely to send their children to shadow education [7]. They consider shadow education as a way of promoting their children's learning and a method of upward mobility.

A large number of researchers studied the relationship between shadow education and students learning to see if shadow education could help K-12 students improve themselves, thereby becoming more competitive in the both future learning and future workplace. Researches showed that students of various level of grades had different relevance to the shadow education. Loyalka and Zakharov investigated that high-achieving students could have an advantage in getting a high score than low-achieving students [8]. Also, students from different socio-economic status and different districts such as urban areas and rural areas will have different access to shadow education. Loyalka, Zakharov and Buchmann found that K-12 students from high socio-economic status or urban areas in the country are more likely to receive shadow education than that from low socio-economic status or rural areas [8,9]. All these sorts of things will finally lead to inequality. And according to shadow education, this inequality tends to be the educational inequality. Therefore, different types of K-12 students will receive different degree of shadow education, let alone some of them couldn't afford to attend shadow education. Then this will enlarge the students' achievement gap, eventually leading to social inequality. Besides, shadow education also has an impact on social inequality which will have huge influences on students' further study.

Hence, through reviewing 10 related papers, this paper aims to address the question: How does shadow education influence students' learning?

2 REVIEW METHODOLOGY

Recent five to ten years, there are increasingly number of researchers pay attention to shadow education. Moreover, shadow education is more prevalent in Asian-Pacific

regions, especially in China, and then it gradually spreads to countries all over the world.

Regarding to the review methodology, I use databases searching to find out the literatures I need in this paper. The literatures are all searched on google scholar, with the key words "shadow education", "study/learning", "influence" and "inequality". Besides, there are also three selection criteria during paper searching: (1) I limited the using language, so only English language was chosen during searching. (2) Most of the papers are empirical studies, so most of the results are concluded from them. (3) In order to keep pace with the recent studies, I specified and constrained the time span. The publication year is between 2000 and 2022, and most of them are all published in recent ten years. Then I chose 10 of them which are highly cited. Four of them are qualitative researches and six of them are quantitative researches. This can help decrease the range of the literatures and ensure the usefulness of these literatures.

3 RESULTS

From the selected papers, especially those six empirical research, shadow education has a deep impact on K-12 students' learning and the influence of shadow education to K-12 students are concluded into following five specific results.

3.1 Driving Force to Enter Shadow Education

There are two main driving forces for K-12 students to participate in shadow education. On the one hand, it is a positive one. The K-12 students and their mothers have the willing to improve study scores, which is an initiative of learning. We couldn't deny that the decisions for shadow education are always made within family contexts, with huge influence of mothers instead of fathers [1]. So, mothers always send their children to enter shadow education so that their children could have an improvement in learning or they could learn some extended knowledge they could use at school to help them promote. This driving force is better for students' learning for the reason that it may stimulate students' motivation in learning and help them study better. Of course, there are some exceptions. For example, some students are born with not good at learning. So, shadow education may not have impact on them. Therefore, even if they enter the shadow education and study very hard, they couldn't get a higher score. On the other hand, it is a negative one. Due to peer pressure and the stress of schooling examinations, some K-12 students and their parents consider shadow education as a temporary method to their psychological unease [2]. Some of these parents ask their children to enter shadow education only for the reason that they see their friends or colleagues send their children to shadow education. Therefore, they follow their steps in order to find psychological comfort. As a result, even if these K-12 students participate in shadow education, they may not concentrate on their studies and it could only be a waste of time and money. Also, this contraries to the goal and intention of formal education and shadow education.

However, Entrich's research investigated that even though K-12 students' parents' aspirations have a strongly influence with the decision for an investment in shadow education, students' own influence on the decision increases with age when they have made up their mind about their future path [1]. That is to say, with the rise in grade, K-12 students tend to have their future goals or plans. Therefore, they are more conscious to attend shadow education in order to improve themselves so that they will finally achieve goals or plans through learning hard.

3.2 Popular Subjects in Shadow Education

Shadow education could provide all subjects taught in schooling system for K-12 students who want to take extra lessons. However, as I mentioned before, the subjects here are the major ones in the STEM, such as mathematics and science, but I wouldn't conclude arts, physical education or music here.

For most of the time, K-12 students and their parents prefer to choose the major subjects that students don't do well in or the ones that could help them make an improvement in the short time. Therefore, there will be some popular subjects among shadow education. To use China as a simple example. Generally, English and mathematics are among the most popular subjects for private tutoring in China and mathematics plays an important role in K-12 students' total final scores [2]. If K-12 students could do well in the two subjects, especially math, then this could help them make a great progress and they would have an obvious improvement in the total scores during the final examinations.

Through the paper review, I find that one third of the papers all focus on the most significant subject, mathematics. Park et al. found that mathematic had a greater impact than other subjects during shadow education [10]. Also, Mullis et al. investigated that having a better math skill in students' lower secondary education is a foundation for their future learning, not to mention it is also an important basis and foundation for their future jobs [11]. Entrich's research found that only those high academic standing subjects are the most popular among all kinds of subjects in shadow education and there also have been an increasing trend [1]. However, Byun found that cram school made a small difference in students' achievement improvement in mathematics and other forms of shadow education also have little difference [4].

3.3 Shadow Education Leads to Different Learners' Outcomes Regarding Individual Characteristics

Researchers have already identified that the impact of shadow education is different between different types of K-12 students, which called K-12 students with different individual characteristics. Regarding to the types which I mention before, there are two standards of classification. The first one is performance and final score of K-12 students, including high-achieving students and low-achieving students. Then, the second one is racial attributes and in this paper it included the blacks and the whites.

Firstly, it is the performance and final score of K-12 students. Regardless of K-12 students' potential abilities and competence, we always use the final scores to meas-

ure and judge their performance and their learning. Shadow education gives high-achieving students an additional advantage over low-achieving students that are competing to enter college and elite colleges [8]. So, there are no doubt that high-achieving students learn better than low-achieving students.

In addition, it is K-12 students' racial attributes and it tends to be the cultural differences in students' learning or study performance. Racial attributes are not so obvious in some Asian countries, but actually it is really obvious in European and American countries. Buchmann found that the blacks are much more likely than whites to utilize three of the four test preparation strategies [9]. He also found that black adolescents and their families are well aware of the history/visibility of the SAT as a gate-keeping tool in the production of racial/ethnic educational stratification and respond accordingly by engaging in test preparation activities [9]. Obviously, shadow education could provide them test preparation activities.

3.4 Opportunities For Higher and Further Study

Several studies verified that students who receive shadow education are more likely to enter better schools in the future. For example, a senior high school student who receives shadow education have more chances than his or her peer students who never receive shadow education to enter a university even a better university.

Buchmann investigated that students from the higher parental income and education categories are less likely to use no preparation or only the most affordable types of prep (books/video/software) compared to their counterparts from more disadvantaged socio-economic backgrounds, and they are more likely to use more expensive types of preparation [9]. The preparation here includes various methods for advantaged socio-economic backgrounds families to help their K-12 students become more competitive and shadow education is the most effective among it.

Also, we could combine this result with the third one. Different K-12 students individual characteristics will lead to different outcomes to shadow education and this will give them different opportunities (more about higher or lower opportunities) to receive future learning.

Buchmann surveyed an adverse outcome according to shadow education in K-12 students of different gender. He found that women are significantly more likely to enroll in less than four-year and non-selective four-year colleges than men, but they are only more likely than men to enroll in selective and highly-selective four-year colleges when SAT scores are added to the equation [9].

3.5 Resulting In Educational And Social Inequality

Inequality exists widely in our life and when it comes to learning, we could see various kinds of inequality in our daily life, such as different access to shadow education, different family background or different learning opportunities. All these kinds of inequality will lead to educational inequality, which means K-12 students from different countries or families will receive different qualities of shadow education and some of them may not have chance to receive shadow education. Through review papers, I

investigate that shadow education will easily result in educational inequality, which could also be called learning inequality. Furthermore, such educational inequality would eventually result in social inequality. From these papers, inequality could be concluded in following two aspects.

Firstly, it is the inequality in K-12 students' living districts and this could to some extent reflect their family background. The inevitable phenomenon in shadow education is that students who come from different districts of the country have different money and chances to take part in the shadow education. A number of studies suggest that students residing in urban areas and those from higher socio-economic status are more likely to receive shadow education [2]. Families that live in these areas have a better family context and household income, these could give parents more opportunities to pay for the high fees of shadow education. Also, Zwier's research shows that students from high socio-economic status (SES) backgrounds participate more in shadow education than students from disadvantaged SES backgrounds [12]. While more students of all backgrounds may be using some form of test preparation now, it is also likely that students from advantaged families are engaging in ever more rigorous, longer-term, and more expensive forms of test preparation in the hope of staying ahead in the competition for admission to selective colleges and universities [9].

In addition, it is the inequality in K-12 students' gender. However, actually I could only find that there has been gender inequality in shadow education, but through papers, different researchers have adverse outcomes. Southgate also investigated that girls still lag behind boys in certain subjects, especially mathematics [13]. Comparing to boys, girls seem to have lower talent on science subjects, like mathematics. So, girls need more concentration on learning, especially on math. Entrich's research investigated that girls are more likely to enter shadow education than boys [1]. However, Byun found that girls were less likely than boys to attend a cram school, but girls were more likely to attend other forms of shadow education, such as correspondence courses and on-line tutoring services [4].

All the inequality will enlarge the performance and academic scores among students because when part of students has the chance to receive shadow education, then they may have more opportunities than other K-12 students to consolidate knowledge and learn something new or useful that others couldn't hear of in the schooling system.

4 CONCLUSION

These years, shadow education is growing rapidly and becomes prevalent all over the world. In some areas, learning centers alone have experienced more than a 40 percent annual increase in franchises, expanding to every continent on earth [13]. That is to say, in many countries, the families demand more shadow education for their children, so the family costs of shadow education are larger than before. Furthermore, shadow education has already become an industry in the worldwide.

The goal of this review was to find out the relationship between shadow education and K-12 students' learning, especially how shadow education could influence K-12

students' learning. Through the picked 10 literatures, we could find that actually shadow education has a deep influence on K-12 students' learning and it could be summarized in five main aspects. All the five results are not independent, some of them have a cross relationship with others.

The five results could be concluded as following review conclusions or findings. There are two main driving force for K-12 students to participate in shadow education and each K-12 student has their own driving force to enter shadow education. However, different forces will have different outcomes to their learning. During their shadow education, students tend to choose the high academic standing subjects instead of the less significant ones. Thus, those high academic standing subjects are easily become popular subjects in shadow education, such as mathematics. Also, students have their own individual characteristics, so there are different types of K-12 students according to disparate classification standards. But what the same is that all the standard will have an influence with K-12 students' learning performance, final scores and learning outcomes. Besides, such outcomes could also become the opportunities or obstacles for students to participate in further learning. Ultimately, all these results will finally result in educational inequality among K-12 students and the inequality will be shown in districts of the countries, socio-economic status and gender, etc. Finally, all the results I mention before will lead to social inequality which could become negative to the whole society.

However, there are also some defects in this paper. First of all, the number of review papers are limited. So, if I would like to do the further review or research, I need to review more papers. In addition, I use K-12 students to represent students from secondary school to senior high school, but maybe there could be some differences between different learning stages that I don't take them into consideration.

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