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Shadow Education and Academic Achievement: A Systematic Review of Global Efficacy and Educational Equity

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Abstract

The phenomenon of global spread of shadow education, as the concept of private additional tutoring beyond official schooling, has raised the question of its academic effectiveness and contribution to educational stratification. Synthesizing findings from 18 empirical studies sourced from high impact, Scopus indexed journals diverse geographical contexts, this systematic review evaluates the impact of shadow education on student academic achievement. Thematic analysis indicates the reveal of diverse effects mediated by the instructional modality, the quality of baseline school and the Socioeconomic Status (SES). Although researchers with large-scale data like Programme for International Student Assessment (PISA) 2022 and China Education Panel Survey (CEPS) have observed positive short-term outcomes in standardized test scores in the East Asian setting, such outcomes tend to be a stratified version of cultural capital. Although subsequent studies provide evidence of a "remedial paradox," a higher marginal academic benefit of tutoring is received by disadvantaged students. Inequality at the macro level is reinforced by unequal access and differences in the resources available to different families. On the other hand, the European studies and the analysis of the international tests such as Trends in International Mathematics and Science Study (TIMSS) and PISA demonstrate either insignificant or small effects, which refute the belief that one of the main factors of the success of academic achievements is shadow education. Our conclusion is that shadow education does not always lead to academic improvement. Since this industry is currently entering the markets in Southeast Asia, next-generation research ought not to focus on quantifying the participation rates but on assessing the local nature of instructional quality and the effectiveness of these institutions.

Keywords: Shadow Education, Private Tutoring, Academic Achievement, Educational Inequality, Cultural Capital, Systematic Review, Prisma

Introduction

Shadow education (also known as fee-based, after-school academic tutoring) has evolved from a small, localized East Asian phenomenon to a ubiquitous international business. The early researchers, such as Stevenson and Baker (1992) and Bray (1999), highlighted that the privacy tutoring is an imitation of the mainstream curriculum and grows with the mainstream curriculum. Parents around the world today spend a significant amount of money in this industry in a bid to provide their children with a competitive edge in high-stakes learning institutions.

Theorizations of increasing shadow education are both as an additional academic instrument and a fundamental means of social reproduction. Shadow education is a common strategic resource used in the early-tracking education system, which aims to overcome highly consequential institutional gateways in order to ensure admission to an elite university (Šťastný, 2023). Nevertheless, the supposition that shadow education is the way to ensure better academic performance is still under a lot of debate. Although its advocates claim that personalized teaching, accumulation of human capital and required academic redressing, opponents caution that its effectiveness is being overrated tremendously and that it is mainly being used to increase socioeconomic disparities by enabling rich families to buy academic success.

While existing literature has extensively documented the rising participation rates and financial expenditures associated with shadow education, a significant empirical tension remains unresolved. Most research treats shadow education as a monolithic entity, yet its academic impact appears highly fragmented across different educational systems and socioeconomic strata.

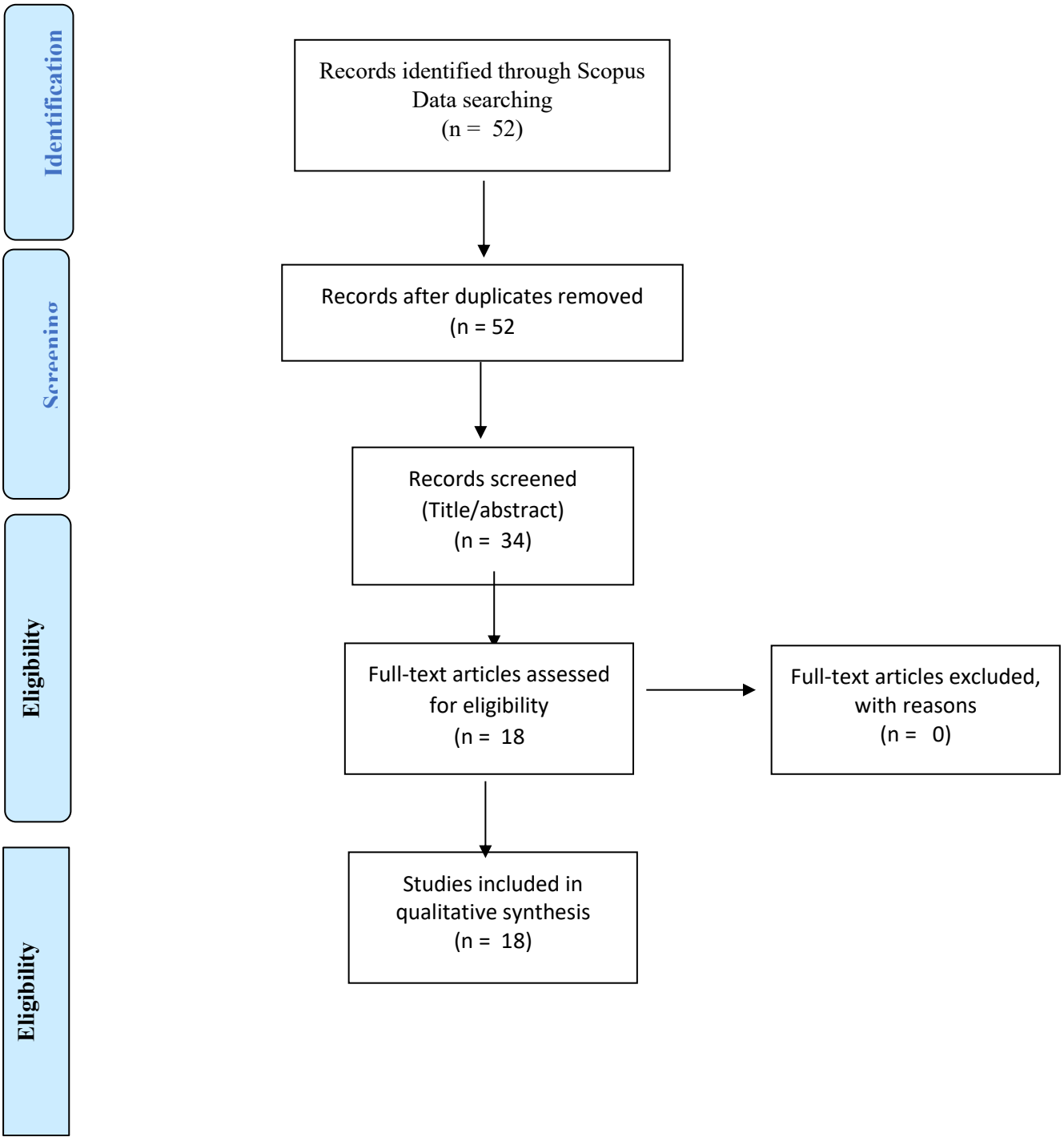
There is a critical lack of systematic synthesis that uncouples the “efficacy narrative” where the cultural assumptions that more tutoring equals better grades from actual measurable academic outcomes particularly in the wake of the global shift toward digital instructional modalities and systemic crises like COVID-19. This systematic review is significant because it moves beyond mere participation metrics to evaluate the instructional quality and localized efficacy of private tutoring. As shadow education matures into a normalized global practice, understanding these nuances is vital for policymakers to determine if the sector is a genuine tool for human capital accumulation or a primary driver of social reproduction and educational inequality.

In order to unravel these competing accounts, this systematic review fills a critical void in the literature by posing: *What is the empirical impact of shadow education on the academic achievement of primary and secondary school students across different global contexts?* Incorporating the latest empirical findings, the present paper aims to decouple the perceived advantages of shadow education and its actual quantifiable results.

Methodology

This systematic review was planned and carried out following the Preferred Reporting Items of Systematic Review and meta-analysis (PRISMA) to ensure transparency, replicability, and analytical rigor.

PRISMA Flow Diagram



Search Strategy and Initial Identification

An extensive and systematic literature search took place through the Scopus database to obtain high-quality and peer-reviewed international research. The search strategy used a focused Boolean operator that was a combination of terms that are related to the main intervention ("shadow education," "private tutoring," "supplementary education," "cram school," "juku") along with terms that identified the desired outcome ("academic achievement," "test score," "academic performance," "grades"). The total number of records obtained in this first search of a database was **52**.

Inclusion and Exclusion Criteria

Research papers were incorporated provided that they fulfilled the following criteria: (1) Primary empirical studies providing original quantitative, qualitative, or mixed-methods data; (2) Population of primary or secondary school students (K-12); (3) Active participation in fee-based shadow education; and (4) A direct, measurable evaluation of academic achievement (e.g., standardized test scores, national entrance exams, or formal school grades). An exclusion criterion was used to **filter out** records that were non-empirical materials (such as bibliometric reviews, theoretical essays), were about adult learners or university undergraduates, used the term "shadow" metaphorically, or quantified market demand without quantifying the resulting student test scores.

Screening Process and Data Extraction

In the title and abstract screening stage, 34 records were filtered out due to not complying with the above criteria. The rest of the 18 articles proceeded to the full-text review. Methodological frameworks of these 18 studies (and their use of Hierarchical Linear Modeling (HLM), fixed-effects model, and large-scale data like PISA and CEPS) were carefully evaluated in terms of eligibility and quality of data. Each and every one of the 18 studies managed to pass the criteria and was incorporated into the end synthesis.

Results

The literature synthesized demonstrates that there are three different themes in the effects of shadow education on academic performance: the heterogeneity of academic benefits, the "null effects" of comparative and European evidence, and the variable academic effectiveness of digital and traditional modes.

Theme 1: Positive Academic Gains and the Remedial Paradox

Many of the studies examined indicate positive relationships between shadow education and academic performance, though such benefits are very subtle. Ku, Lee, and Kim (2024) discovered that in South Korea, private tutoring had a strong positive effect on the College Scholastic Aptitude Test (CSAT) scores of 10th and 12th graders.

A strict analysis of this dynamic can be observed in the analysis of Tan and Liu (2023) of the China Education Panel Survey (CEPS). They validated a positive overall effect on academic performance in mathematics and English using HLM on a nationally representative sample of 19,487 eighth graders. Nevertheless, they emphasized a key "remedial paradox" that disadvantaged students due to their lower prior knowledge or lower-ranked school actually enjoyed a *higher* marginal benefit of supplementary tutoring, compared to their advantaged peers.

Although this redemptive potential exists, the capacity to transform shadow education to real academic achievement is strongly determined by the family affairs and Socioeconomic Status (SES). Using the Korean Youth Panel Survey, Jarvis et al. (2022) established that students in non-traditional families tend to use shadow education less often due to resource limitations. The study also revealed that the capability of the students to transfer the tutoring that they *do* get into success in college entrance exams is much lower than it is in traditional two-parent families. Likewise, in a Russian setting, Loyalka and Zakharov (2016) observed that shadow education had a beneficial effect *only* on students

who were already high-achieving. In comparison, low-achieving students participated in lower-quality tutoring that yielded no academic benefit, effectively widening the achievement gap.

Theme 2: "Null Effects" and the Disruption of the Efficacy Narrative

Most importantly, the supposition that shadow education universally positively influences grades is debunked by a number of strong studies that claim that it has a null or very small effect. Based on the Carroll model of school learning, Guill, Ömeroğulları, and Köller (2022) performed extensive regression analyses in a sample of 8,510 eighth-grade students in Germany. They also discovered that there is no significant overall effect of attending private tutoring on academic performance. Moreover, even in the tutored subsample, the differences in length of tutoring, intensity and particular content did not cause any quantifiable positive effect on the grades of students. This was echoed by a comparative study of Ireland and Germany by Benz, Darmody, and Smyth (2025), who asserted that shadow education was only effective in boosting the performance of lower-achieving students, and it served as a remedial intervention, not an enrichment strategy.

This “null effect” can also be used to undermine the current international discourse about the dominance of East Asian education. Rappleye and Komatsu (2020) critically reviewed the supposition that the main cause of Japan's leading in the PISA and TIMSS is massive cram school (*juku*) attendance. Using the data on the achievement of fourth-grade students, they were able to highlight that Japanese students have rather high levels of academic achievement even *prior to* juku attendance, having a statistically significant impact. This indicates that the quality of baseline mainstream schooling plays an immense role in academic success.

Tutoring on a large scale does not often result in real academic increases, even in cultures where tutoring is made the norm. Nguyen and Vu (2024) underscored a lifetime enrolment of 78% to English Private Tutoring (EPT) in Vietnam. The effect on communicative competencies and academic achievement, however, was exceptionally small, mostly due to the fact that EPT pedagogies were strictly oriented towards rote learning grammar, though not towards actual language learning.

Theme 3: The Academic Impact of Instructional Modality and Crises

Instructional modality is very critical to the academic effectiveness of shadow education. An analysis of PISA 2022 data in 55 countries, Karakus et al. (2024), revealed that *asynchronous* video-recorded instruction represented the only type of shadow education, which was associated with better math performance at the between-school level. This was supported by Tlessov, Courtney, and Leckie (2025), who noted that, although small- and large-group tutoring were positively correlated with math achievement in South Korea and Chinese Taipei, one-on-one tutoring tended to correlate with lower academic outcomes across East Asia, reinforcing its role as a last-resort remedial intervention.

Moreover, the literature has demonstrated that, in times of systemic crises, the assumed relationship between the use of shadow education and academic achievement usually fails. A panel study by Yoo (2024) of South Korea in the COVID-19 pandemic concluded that parental spending on shadow education was not significantly associated with student

performance in Korean, English, or mathematics. Rather, the only significant factor in academic success in disrupted traditional classrooms was the intrinsic Self-Directed Learning (SDL) ability of a student. Although these modest or null effects occurred during crises, Al Khalili and Troudi (2025) discovered that parents still spend a lot of money on private tutoring as a result of sociological *hysteresis*, persistent extreme financial expenditure to sustain perceived "academic capital" irrespective of the actual pedagogical benefit of investment.

Discussion

The results of the given systematic review indicate that shadow education is a two-edged sword. Although it may offer explicit academic benefits that will translate to improved test scores, it is not a certain educational investment and has far-reaching consequences on global social fairness.

With mainstream education that is highly standardized and exam-focused, shadow education effectively "teaches to the test," to ensure that wealthy families can legally buy their way to academic success. Although Tan and Liu (2023) proved that tutoring can be a very effective remedial measure to benefit disadvantaged students, the fact is that the privatization of this field contributes to the further enhancement of the current benefits. The families with lower-SES that do participate tend to devote unequal proportions of their income to lower-quality and rote-based tutoring, which can produce scarce quantifiable academic outcomes (Loyalka & Zakharov, 2016). Moreover, the results of Jarvis et al. (2022) depicted that mere access to tutoring is not enough; students need effective family support systems to transform additional learning into practical academic achievements.

The high academic outcomes in East Asia and the null outcomes in Europe (Guill et al., 2022) and the comparative data (Rappleye & Komatsu, 2020) indicate strongly that the success of the shadow education system is extremely mediated by the mainstream educational setting. The academic value of shadow education declines very quickly in systems where there is no explicit reward for rote learning and violent test preparation.

Conclusion and Future Directions

Shadow education is a very heterogeneous occurrence. Although there are short-term academic benefits in certain situations, private tutoring often does not provide the generalized boost of grades and test scores that parents have been led to believe. In most cases, it transforms into a normalized cultural norm of societal anxiety and social reproduction as opposed to established pedagogical effectiveness.

With the development of the shadow sector of education, the scale is growing at a faster rate than the national hubs to regional and localized educational districts in Southeast Asia. Therefore, the scholastic boundary has to change. In response, further studies should no longer focus on macro-level measures of country participation and spending. Additionally, there is a pressing need to conduct empirical studies to critically assess the localized quality of instruction, pedagogical models and actual academic effectiveness of shadow education facilities that exist in particular, new regional settings. It is only through an examination of the exact quality of teaching provided in such localized shadows that the educators and policymakers will be able to see whether the private tutoring is indeed making a positive impact on academic performance or is simply increasing the gap in education.

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