



Remedial Education Of High School Students: Effects And Challenges

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Abstract

With an increasing understanding of the benefits of education, the “schooling for everyone” campaign is rapidly unfolding in every corner of the world. However, recent data have revealed a significant number of students lagging behind in the learning curve. Numerous remedial interventions have been proposed and implemented globally to mitigate the issues generated due to the learning gap among slow learners. The present review critically discusses the effects of such remedial educational interventions on the academic achievement of students, its long-term effects and the various challenges faced while implementing such interventions at a global level. Additionally, the present study reviews the effects of various interventions on the sociological and psychological behaviour of these students. The review provides a concise summary of the existing literature, which will be beneficial for the academicians, researchers, educationists, and policy makers to develop new educational paradigms.

Keywords: Remedial interventions, Slow learners, Challenges in interventions, Social-emotional learning, effective learning

1. Introduction

Education is considered as one of the vital antecedents of socio-economic status of individuals and communities (Hamad et al., 2018; Hofmarcher, 2021). Education plays a pivotal role in improving economic backgrounds by reducing poverty (Werner et al., 2022). Furthermore, attending schools and following effective pedagogical practices collectively influence individual personalities, such as risk aversion, patience, and conscientiousness and enhance overall health conditions (Ishak & Jamil, 2020; Savelyev, 2020). In light of this, the global number of out-of-school children has substantially reduced. In 2000, the number of out-of-school children was 376.1 million and the number reduced to approximately 258.4 million in 2018 (UNESCO, 2019). However, education data from around the world also indicate that millions of young children complete primary school education without acquiring basic academic skills, rendering them functionally illiterate and unable to achieve a basic educational level (Filmer et al., 2018). In order to address this issue, extensive cross-national initiatives have been implemented for extending teaching time and for providing additional academic support to slow learners, both within and outside the school environment (UNESCO, 2020). Such diverse remedial interventions have proven effective in helping slow learners reach the same educational milestones as their peers, as standard curriculum-based studies falls short of addressing children’s individual learning needs (Banerjee et al., 2007; Utama, 2018).

Remedial education is such an academic based programme that boosts the academic performance of slow learners to achieve the desired standards of their respective academic year (Yolak et al., 2019). Students who could not achieve the expected standards may enrol in this learning and teaching programme to reduce the gap in learning and achieve the same outcomes as of their peers. Such customised teaching to the needs of every child is a pedagogical shift and it can lead to dramatic improvement of slow learners (Banerjee et al., 2017; Saavedra et al., 2019). Several studies showed substantial academic benefits of remedial classes for slow learners (Maruyama & Kurosaki, 2021; Muralidharan et al., 2019). Along with this, recent literature are incorporating whether such interventions are beneficial in affecting the sociological and psychological lives of students along with academic performance (Özek, 2021; Yolak et al., 2019). While studying the effect of these courses, existing studies showed contradictory effects on students’ performance. Some of the remedial strategies showed excellent academic outcomes on students while other remedial strategies have not showed any adverse effects (Asio & Jimenez, 2020; Bessho et al., 2019; Ignacio García-Pérez & Hidalgo-Hidalgo, 2017). Further, successful remedial interventions in one place has often failed in another set-up (Duflo et al., 2020) or resulted in varying outcomes for different populations (Battaglia & Lebedinski, 2022). Mostly, challenges are encountered while implementing studied pilot remedial interventions into a regular academic course (Agostinelli et al., 2023; Banerjee et al., 2017). In order to understand the lag in the existing research, a critical analysis of previous studies is needed to be performed which will act as a catalogue of rigorous and high-quality studies. Furthermore, review studies have been conducted on college remedial

courses or specifically on conflict-affected areas (Chandrasekhar, 2021; Damon et al., 2016); however, review study has not been conducted to focus on remedial interventions for school students.

The present research provides a critical review of previous literature based on the effects of various remedial interventions. The study explored previous research on the effect of such interventions on the academic profile of school students and attempted to review existing literature that addressed the sociological and psychological effects of such interventions. The review attempts to understand the long-term effects of such remedial courses. Along with this, researches conducted to understand the effect of remedial courses on slow learners from violence affected or conflict-affected areas are discussed. Furthermore, the study gathers and critically analyses the challenges encountered by remedial interventions addressed by previous research works. Therefore, the present review summarises the research work carried out in the past decades on remedial interventional strategies and effects, which would be beneficial for academicians, researchers, and policy makers to establish a novel educational paradigm.

2. Global scenarios of remedial education programmes

Various models were adopted and tested as pilot projects or educational interventions all over the globe for understanding whether it helped slow learners to cover their learning gap (Duflo, 2020; Naik et al., 2016). Such remedial interventions tested in various places in the world are discussed briefly.

Outside school remedial programs

In such remedial programmes, the pupils who are slow learners or under-achievers in certain subjects are provided extra care on those subjects. A widely famous model, named 'Pull out model' was implemented by NGO in Mumbai and Vadodara, India and randomized control trial on the third-grade and fourth-grade students of government schools showed that academically struggling students when taken out during school hours and are tutored by young women from the local community, showed significant academic progress (Banerjee et al., 2007). In addition, there are after school tutoring program for struggling children, such as Elimu ni Jibu ya USAID (ENJ) in Congo and where local NGOs conduct tutoring sessions per week (Louge et al., 2022).

In-school remedial programs

Public and private schools in various countries started to develop their education system considering extra instructional time for slow-learners. "Programa de Acompañamiento Escolar" or PAE is such a remedial program for school guidance where the students with special needs were provided additional support from teachers of their own schools. At least 4 hour per week additional after school session were provided to the students in small groups by educating them with strategic studying techniques and stimulating reading habits (Ignacio García-Pérez & Hidalgo-Hidalgo, 2017). Another such in-school remedial program implemented in France, named "Réseaux d'Aide aux Elèves en Difficulté" where specialist teaching professionals and psychologists help the slow-learners in the schools by providing services in various aspects (re-educational, pedagogical or psychological) (Bonnard et al., 2018).

Video-based and Satellite-based distance learning

The intervention is majorly based on the idea of distance learning which focuses on remote students in underdeveloped countries. Remote teaching has been used for rural communities through radio based teaching or pre-recorded video broadcasts (Barbour, 2007; Jumani, 2009) and interactive radio instructions have been employed by many low-income countries (Anzalone & Bosch, 2005). Video recording-based distance learning programme was implemented for secondary school students, wherein satellite and terrestrial technologies were used to conduct interactive classes in science, English and mathematics in Karnataka, India (Naik et al., 2016). Such remedial approaches help rural school students to get access to classes through animation technology and video-based learning (Johnston & Ksoll, 2022; Tang & Intai, 2018). In another approach, eLearn classrooms and eLearn tablets were implemented in government middle schools to improve student learning in mathematics and science subjects (Beg et al., 2022). Such remedial interventions are conducted with LED screens by trained teachers in classrooms. In order to provide continuation of learning at home, laptops and tablets with pre-loaded educational instructions are given to students (Beg et al., 2022). With the advent of internet and mobile network in remote areas, applications, such as Google classrooms and WhatsApp, have been widely used (Nasution, 2022). Such distance learning programmes were extensively utilised during Coronavirus disease-2019 (COVID-19) pandemic when most of the schools were closed (Choirunnisa & Mandasari, 2021; Okmawati, 2020).

3. Effect of remedial education on school students

Although majority of existing literature on remedial courses have discussed about the effects on academic achievement of students, a holistic approach has been adopted in the present review. Long-term benefits and overall progress have been reviewed along with the academic achievement of slow learners.

3.1 Academic effects of remedial programmes on slow learners

In a seminal work of Banerjee et al. (2007) in association with NGO Pratham in the western India (Vadodara and Mumbai), an educational intervention was conducted for slow learners. The 'pull out model' showed a significant increase in the academic outcome of children by a 0.14 standard deviation in the first year and subsequently by 0.28 standard deviation increase by the end of the second year of intervention. Another intervention conducted by the same research group, where every fourth-grade student had an opportunity to learn computers for two hours a week, also showed significant results. The computer-assisted intervention showed an increase of math score by a 0.35 standard deviation in the first year and by a 0.47 standard deviation increment at the end of second year. Similar results were obtained by Muralidharan et al. (2019) where attending the "personalized technology-aided after-school instruction program" for 90

days resulted in higher math and language scores of students. In order to understand the effect of such remedial interventions organised by municipalities, Yolak et al. (2019) interviewed students, parents, and teachers of remedial courses conducted in İstanbul Beykoz Municipality. It was found that such courses helped students to attain better grades and they become more engaged in school activities. Another study conducted in Turkey showed similar results of remedial programmes where students obtained better marks and their academic performance was improved due to the remedial courses (Göksu & Gülcü, 2016). A randomised experiment carried out for slow learners in public elementary schools in Metropolitan Lima (named as “remedial inquiry-based science education program”) showed that after school sessions increased science achievement by three percentiles when compared to the control group (Saavedra et al., 2019). Interestingly, the direct effect of these remedial courses was observed among boys. In a similar line, research conducted on the influence of a remedial education programme in Spain for seven years (between 2005 and 2012) revealed that such programmes reduced the number of slow learners by 3.5% 6.4% and enhanced their reading scores by 8.5% 17.4% (Ignacio García-Pérez & Hidalgo-Hidalgo, 2017). Additionally, the study pointed out that long tenure (at least 3 years) of such a programme is needed to witness positive results and the impact was observed to be higher in rural schools when compared to urban schools (Ignacio García-Pérez & Hidalgo-Hidalgo, 2017). This may be because of lack of academic support in rural schools. On the other hand, a study based on evaluation of the remedial intervention “Algebra for all” in Chicago, USA pointed out that the remedial programmes for mathematics become successful where there is no grouping among the students based on their skills. Therefore, it suggests that schools which create more sorting among students, witness lower academic achievement through remedial intervention (Nomi & Raudenbush, 2015). On a similar ground, with the effect of remedial literacy program conducted on low-achieving third-grade students in public elementary schools, those who attended the program were not only benefitted but the peers who already were high achievers scored higher in academic results (Berlinski et al., 2023). This a ‘spill over effect’ on learning which was noticed among the high achieving students who did not attend remedial classes (Opper, 2019).

Among various remedial instructions, e-learning based remedial courses were identified to be effective in facilitating better academic progress when compared to traditional and blended modes of remedial measures (Dai & Huang, 2015). An empirical study conducted on remedial strategies using “Moodle-based E-Learning module” for advanced physics showed that e-learning based remedial activity significantly reduced students’ misconception of the subjects (Halim et al., 2020). Another study on junior high school students showed that e-learning based remedial course on mathematics contribute towards improvements of students’ post-remedial results (Cut & Johar, 2023). Computer assisted learning are becoming more popular in recent times specially among rural school children for providing the opportunity of remedial education online. A randomized experiment on rural and migrant school students in China showed that the online computer assisted learning program on English language did not only result in substantial academic outcome but also led to a distinct shift in the students’ attitude towards learning and aspirations towards future education (Bai et al., 2023).

A number of studies have empirically shown noticeable academic progress, such as improvement in school examinations (Triviño, 2016), significant betterment in post- remedial time compared to pre-remedial (Balinas et al., 2017; Blancia, 2023), and upliftment of students’ conceptual understanding (Radzi et al., 2017) through different remedial programmes. Regarding the effects of remedial courses, students demonstrated significant academic boost in a number of subjects, such as literature and language (Bansal & Deepika, 2017), mathematics and statistics (Capuyan et al., 2019; Pelayo, 2023), computer-assisted instructions (Chaturvedi, 2016; Naik et al., 2016), science based subjects (Lin & Liu, 2017) and reading comprehension (Hasan & Ahmad, 2019; Porras & Villocino, 2023). This indicated that remedial courses are not limited to be beneficial in any specific subject.

Though several researches have pointed out that slow learners benefitted substantially in academics after going through various remedial interventions, some studies have showed contrary outcomes (Bessho et al., 2019). Applying a panel data set based on the data of public elementary schools in Japan, Bessho et al. (2019) estimated that although remedial programme participation increased the academic scores of language subjects (Japanese), it did not significantly improve the test scores of mathematics for such students. In another study in Italy, remedial strategies (compulsory remedial class along with remedial examination) showed a negative impact on female students’ test scores in vocational and technical schools (Battistin & Schizzerotto, 2019). Further studies are needed to understand the reasons behind the failure of remedial strategies in such cases.

Limited studies have attempted to understand the factors and barriers in the successful implementation of remedial strategies (Bold et al., 2018). In most cases, teachers and their abilities to lead the remedial course and their teaching methods play a large part in enhancing students’ engagement and interests in the subject (Musongole, 2019; Porozovs et al., 2019) and such attempts have consequently turned out to be successful. Therefore, remedial courses conducted by experienced teachers have resulted in improvement of students’ learning (Kaliwa, 2023). Moreover, teachers getting remedial training improve their pedagogical practice and contribute towards enhancing students’ learning (Lombardi, 2019). Year-long mentoring program after remedial course truly have great impact on the academic success of disadvantaged students. Also, group mentoring have been seen to impact more in improving personal and social competencies of the students in comparison to individual mentoring (Nielsen, 2023). Further, students’ attitude and behavioural intention to adopt remedial instruction and learning engagement play a significant role in their academic performance (Chen & Wu, 2020; Tseng et al., 2016). However, extensive research on the factors influencing success of remedial education is lacking.

3.2 The sociological and psychological effect of remedial courses on students

The remedial courses often overlook the sociological and psychological impacts on students and typically focus on the academic and cognitive skill deficits (Hale et al., 2016). By analysing detailed longitudinal students' data from urban school district in Florida (USA), Özek (2021) pointed out two possible adverse effects of remedial studies. The study anticipated that such remedial courses cause students' detachment from school-based education and motivates students' misbehaviour, absence and dropout, and these outcomes were supported by earlier studies (Jacob & Lefgren, 2009; Özek, 2015). Remedial programme can specify the study time in other subjects and reduce the probabilities of attending advanced high school courses (Özek, 2021). However, a study conducted in İstanbul Beykoz Municipality showed that remedial courses helped students to socialise and develop healthy relationships with their peers. Psychologically, the courses were considered to provide self-confidence to students and facilitate career orientation (Yolak et al., 2019). Remedial courses and associated mentoring was observed to impact the procrastinating behaviour of students where they not only learn the subject but become aware of the studying techniques, dealing with deadlines and organizing study time (De Paola & Scoppa, 2015).

Recently, such academic interventions are infused with several socio-emotional learning. Pyne et al. (2020) evaluated the effectiveness of a voluntary and unique learning programme named 'Aim High', which effectively promoted academic success of students and enhanced behavioural engagement of children who were socioeconomically disadvantaged in the San Francisco Unified School District. In this programme, additional social and emotional learning curriculum was implemented along with core academic subjects. The study indicated that this programme led to extensive falls in unexcused absences, chronic level of absenteeism and recurrent suspensions along with a gain in academic test scores. The study further demonstrated that such gains in behavioural growth increased with additional participation in learning programmes conducted during summer. It is also observed that psycho-educational intervention program (Self-Regulation Empowerment Program) which holistically try to help academically vulnerable students to overcome low motivation, learn effective strategies and enhance their knowledge, actually showed distinct positive trend in academic achievement compared to school-based academically oriented regular remedial interventions (Cleary et al., 2017). Another study was carried out in Niger to understand the effect of skill targeted SEL activities on students. It showed that SEL programming in classrooms can support students to handle unsettling emotions and unsupportive environment (Brown et al., 2022). Similarly, remedial interventions carried out in various countries with SEL have showed significant improvement in children's planning behaviour (Amod et al., 2018) and psychosocial behaviour (Inántsý Pap & Morvai, 2015). Therefore, social-emotional learning aspect should be more infused with educational remedial interventions to support slow learners in a larger extent.

3.3 Long-term effect

The long-term effects of such remedial interventions need a thorough research as fading out of such programmes is commonly observed. Majority of the interventions targeting children's social, cognitive or emotional development have failed to cause a long-term effect (Clements et al., 2013; Durlak et al., 2011; Puma et al., 2012). While studying the effect of remedial courses for Roma populations, Battaglia and Lebedinski (2022) demonstrated that the effect of such programmes is effective when students per teaching assistant in remedial classes do not exceed a certain number (almost 40). Another study based on data from Florida, USA, examined the long-term impact of another remedial intervention, i.e., grade retention policy (Schwerdt et al., 2017). Retention policy based on assessment helped students to achieve higher academic levels and enter high schools; however, this was not eventually advantageous because a high number of cohorts were impacted by the grade retention policy. Although a positive impact of grade retention on the academic results was observed, its effect dissipated after some years and it left no significant influence on high school graduation rate, advanced study in the future, or enrolment into the college. A study from France based on a French remedial program "Réseaux d'Aide aux Elèves en Difficultés" for primary students also revealed that students who took this remedial course had a high probability of getting lower scores in later grades or can experience grade repetitions (Bonnard et al., 2018). Another study on grade retention policy showed a similar result on students on a long-term basis. The study was based on data from Statistics Netherlands and showed adequate differences between grade retainers and promoted students in terms of university enrolment. Further, the study demonstrated that those who were retained for the remedial study earned almost 8.5% less in their future and this was due to the delay in academic progression resulting in a delay in entering the labour market (Meulen, 2023). Furthermore, a recent research shows an adverse influence of grade retention policies on adult crime behaviour. A model-based study indicated that grade retention occurring during eighth grade could generate adult criminal behaviour or chances of being convicted (Eren et al., 2022).

On the other hand, Özek (2021) conducted a research to understand the effect of remediation policy in the schools of Florida, USA and found that taking a remedial course can be significantly beneficial for college enrolment, persisting in college and degree attainment. Therefore, this research confirmed that the long-term effect of remedial education resulted in post-secondary effects. Similarly, Lavy et al. (2022) analysed the long-term consequence of remedial education on high school students in Israel. Based on the administrative data for high school students who went through remedial education programmes between 1999 and 2001, the research demonstrated that such remedial programmes helped students to gain employment, increase their earnings, and increased the colleges' completion rate. The study also showed that the government benefitted from such remedial education programmes. However, other remedial interventions which do not cause any delay in students' academic career are considered more efficient in learning deficiencies (Pyne et al., 2020).

3.4 Impact of remedial courses on slow learners from conflict-affected areas

Students from conflict-affected areas majorly face substantial challenges due to limited or interrupted school settings, refuted conditions in foreign language-speaking countries, and unpleasant experiences of adversity, which collectively results in impairment in cognitive, emotional, and social skills (Dryden-Peterson et al., 2019; Kim et al., 2020). Few researches have attempted to understand the effectiveness of remedial programming in such low-income and conflict-affected contexts. Brown et al. (2022) assessed the impact of an NGO-provided remedial tutoring programme in sub-Saharan Africa. The research suggested a significant improvement in academic performance of elementary grade students after they received a remedial tutoring programme where 23% of the students belonged to refugee families. Another study researched one of the most disadvantaged groups in Europe, which is the Roma ethnic minority. The research examined the effect of the remedial education programme known as the 'Roma Teaching Assistant Program' on slow learning Roma minor students (Battaglia & Lebedinski, 2022). The study showed that remedial programmes do not exert any significant transformative effect on the Roma pupils' standard test scores or schooling marks. However, the study showed that Roma students exhibited some borderline improvements in academic skills based on the programme intensity. Similar results have been observed in a remedial program, named "Young Potential Development program" carried out by municipal schools in Ecuador for the at-risk youths where the remediation program did not show any substantial effect on students' socio-emotional skills and other outcomes (Borelli et al., 2023). However, another short-term NGO-provided remedial support programme embedded with social and emotional learning principles and activities conducted on refugee children studying in Lebanese public schools displayed that remedial programmes positively influenced the academic skills of students and enhanced their perception regarding public schools (Dolan et al., 2022).

4. Challenges encountered for remedial education programmes in schools

While focusing on the barriers in the implementation of successful remedial interventions, a number of studies have addressed scalability as a significant issue (Agostinelli et al., 2023; Banerjee et al., 2017). Implementation of large scale pilot remedial projects is considered as a challenge (Banerjee et al., 2017). Integration of the core concept of remedial programmes with school's day to day workflow and proper assessment of school children are the obstacles faced by organisations while scaling up such interventions (Duflo, 2020). Agostinelli et al. (2023) encountered the challenge in scalability of educational interventions during the implementation of mentoring programmes in Chiapas, Mexico. Another study from Niger identified several challenges that cause hindrance in the implementation of remedial courses in low and middle income countries. The study pointed out that district based educational offices in Niger lack a sufficient number of staffs and logistical resources (Maruyama & Kurosaki, 2021). The limited knowledge possessed by the existing faculty was a challenge (World Bank, 2017). Delay in study materials to reach the schools, absenteeism of teachers and staffs (30% of the time), non-payment of teachers, etc. were the significant challenges identified in Ghanaian schools during the implementation of remedial courses in schools (Duflo, 2020). Similar findings were observed in a Kenyan study where remedial interventions that were successful in India under NGO operations were implemented at a larger scale by the Kenyan government (Bold et al., 2018). However, no significant effects were observed in schools that received on-contract teachers from the Ministry of Education. The study identified that the monitoring body, i.e., Quality Assurance and Standards Directorate, was not adequate to monitor the teaching in schools. It showed that teachers appointed by the government were high in absenteeism (25%). There was a lack of motivation in the permanent teaching staff when compared to the NGO employed teachers. Further, unionising of the government contract teachers can pose a significant challenge in the implementation. The questionable government initiative and effectiveness was identified as a major issue. The fall in the quality of teachers may be due to the fact that when NGO volunteers started working in schools, they got absorbed as regular government teachers, resulting in a cessation of remedial training (Banerjee et al., 2017). In remedial training, the "coach effect" or in other terms, the one-to-one instructional coaching is very important. Therefore, the success of the remedial interventions are often dependant on the individual trainer's characteristics (Fleisch et al., 2017). Apart from government initiatives, parents and community play a major role in implementing remedial courses in schools (Silberstein, 2023; Agostinelli et al., 2023). Abrupt and sudden closures are a challenge in some community-based schools (Agostinelli et al., 2023). Parents' lack of information on students' academic achievement, incapability of understanding proper engagement with teachers, low educational record, and lack of material to support children's learning at home, etc. could pose threats in the scaling up of remedial interventions in public schools, especially in low and middle income countries (Maruyama et al., 2021).

While studying a low-income and conflict-affected area, Brown et al. (2022) identified a few challenges during the implementation of remedial interventions through a 'Healing Classrooms' set-up with social and emotional learning programming for government school students in Niger. The study pointed out that low attendance and an inadequate intervention time reduced the effectiveness of remedial programmes. Unpredictable security situations, seasonal migration, population mobility, and public-school teacher strikes were some of the barriers that limit students' attendance in low-income areas and crisis affected contexts. In addition, slow learners experienced difficult situations, such as life-threatening poverty and violence or abuse, which could affected their cerebral and social-emotional development. Therefore, such situations may necessitate advanced support to slow learners to enable their focusing and gaining of knowledge at par with their peers.

5. Conclusions and future scope

The present review accumulated and discussed the various perspectives of remedial courses that are specially designed for students to learn subjects effectively. It can be inferred that educational interventions significantly improved the

students' academic performance. Therefore, skill-based interventions, which enhance the cognitive behaviour of individuals, should be introduced in the curriculum. Remedial interventions designed with SEL have a significant impact in conflict-affected regions. However, such interventions are lacking at a global level among regular schools. However, implication of SEL along with academic remedial courses may benefit slow learners in the long term. The focus of a majority of the research was on studying the short-term effects of remedial interventions. However, long term effects of such remedial interventions must be understood. Therefore, adequate analysis is required to understand the long-term effects on the labour market and income level of slow learners. More interventions should be evaluated worldwide and more studies are required to address the challenges faced by these interventions.

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