Ministry of Education, Youth and Sport

Department of Policy

Article

On the Relationship between Resource Allocation and Student Study Performance at Secondary Resource Schools (SRSs) in Cambodia

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Abstract

The present study aims to investigate the relationship between resource allocation and student performance at Secondary Resource Schools (SRSs) during the time period of the last five academic years, from 2015 to 2019. To date, no studies have examined the relationship or impact of budgets, infrastructures and human resource allocation on student performance at SRS in Cambodia. All secondary schools in Cambodia, a total of 1788, were included in the study. The five-year unbalanced panel data of 1788 secondary schools were extracted from the database of Education Management Information System (EMIS) of the Ministry of Education, Youth and Sport (MoEYS) for the analyses. Descriptive statistics and Pearson's Correlation were employed for the analyses. The analyses included 32 variables related to the allocation of budget, infrastructures, human resource and student performance in SRS. The findings showed that increasing schools with concrete structures, wooden structures and separate office space had significant correlation with student performance gains. Moreover, increasing teachers with lower secondary education, high school education, and post-graduate education strongly correlated with student performance gains over the five-year period. The results support the claim that resource allocation to SRS has been effective in the context of SRS in Cambodia.

***Keywords*:** Resource allocation; student performance; secondary resource school; Cambodia

1. Introduction

The Secondary Resource Schools (SRSs) are highly anticipated by the Ministry of Education Youth and Sport (MoEYS), development partners, communities, and students to fulfill their role as a model schools which build human resources with knowledge, skill, and attitude. Quality of education will be essential in driving Cambodia from a lower-middle-income to an upper-middle-income country by 2030. The SRS is one of the vital strategic component for MoEYS in raising the quality of Cambodian secondary education. MoEYS (2008, p. 2) defines 'SRSs as schools that are equipped or provided with infrastructure and facilities, including buildings, meeting rooms, laboratories, libraries, computer room, audio-visual rooms, a source of electricity and water, and so on, and especially the provision of training to staff on how to use those infrastructure and facilities' (p.2). According to the Secondary Resource Schools Policy set out in 2008 and Secondary Resource School Monitoring and Evaluation Framework (MoEYS, 2018a), the management board, teachers, and students of the SRS shall act as role models for their communities and the surrounding areas. SRSs should function as network hubs in building cooperation, sharing experiences, and provoking solidarity among and between schools in their broader communities. The establishment of SRSs helps to: promote professional development for teachers; share best practices and experiences in teaching, learning, and management to network schools; introduce and implement school improvement plans; and, improve teacher competency through professional development and mentoring (MoEYS, 2008). Through the establishment of SRSs, it is only a prerequisite to achieving the actual expected outcome, which is the improvement of student learning outcomes in secondary education. A better student learning outcome is a primary endeavor of MoEYS as it is essential or augmenting human resources in order or the country to achieve its development ambitions by 2030 and 2050.

In supporting SRSs in Cambodia, investment in technical and financial support has occurred over the course of a decade. To date, many SRSs has been recognized for their rapid progress in teaching and learning development, especially with regard to student learning outcomes which clearly distinguishes SRSs from other types of secondary schools across the country.

The achievement of SRS has been observed to be a reflection of efforts in mobilizing infrastructure, budget, and human resources to raise student performance. Although this effort has been implemented for a decade, there has been no study on the impact of resources mobilization on school performance, the effectiveness of the resource allocation on student performance or learning outcomes, or the influence of resources allocation on other aspects of school-related improvement.

Therefore, this study aims to investigate the relationship between resource allocation and student performance over the past five years. This research seeks to explain if resources (including the development of infrastructure, human resources, and budget) have a positive and significant link with student performance. The study is guided by a research question, "What is the relationship between resources, including infrastructure, budget and human resource, and student performance at SRS in Cambodia for the last five academic years?"

The results of the present study can serve as empirical information for MoEYS and related stakeholders to more deeply understand the impact of their efforts in supporting SRSs for the last decade. It enables MoEYS to find the immediate and appropriate intervention to ensure the suitable development and improvement of SRSs. The findings will clearly reveal the effectiveness and efficiency of resource usage at SRSs so that network schools and other secondary schools can learn from the experience and best practices developed.

2. Literature review

Although the studies on separate student performance-related aspects are limited, several studies have investigated the relationship or effects of school resources on student performance (see Akey, 2006b; MacNeil, Prater, & Busch, 2009; Mortimore, 2001; Pov, Kawai, & Matsumiya, 2020; Uline & Tschannen-Moran, 2008) and drop-out (see Aaronson, Barrow, & Sander, 2007; Christle, Jolivette, Nelson, & education, 2007; Quinn, 2013; World Bank, 2005). In addition, many studies have shown a well-established connection between school climate and student achievement (see Hoy & Sabo, 1998; Uline & Tschannen-Moran, 2008). A positive school climate is a crucial factor in improving student achievement and attitude. Uline and Tschannen-Moran's (2008) studied the impact of quality facilities and school climate on student achievement. They showed that the school climate index had a significant link to student achievement. The findings also showed that school facilities had a significant and positive correlation with student achievement, while school climate itself was also linked to the quality of school facilities. Essentially, a healthy learning environment is a vital school-

climate is a vital variable for a healthy learning environment. MacNeil, Prater and Busch (2009) suggested that students would reach high achievement on standardized tests where healthy learning environments were maintained. Teaching methods and school atmosphere, which refers to school responsiveness and supportive environment, were the most significant predictors of student achievement.

On the other hand, school resources such as facilities and books also play a vital role in assisting students in learning, and studies over the past decades have revealed that resources have correlations with student achievement at school (see Coleman, 1966; Hanushek, 1981, 1986, 1989, 1991; Pov et al., 2020). There is also substantial evidence in the literature to strongly suggest how diverse school-climate variables affect student achievement (see Leithwood, Louis, Anderson, & Wahlstrom, 2004; Mortimore, 2001). Some other studies have found correlation between student achievement and other school-related variables such as teacher, school context, school resources, and principal leadership (see Akey, 2006b; Ma & Klinger, 2000; Schreiber, 2002; Stewart, 2007). However, according to a study in Cambodia on the impact of student-, family and school-related factors on student achievement, Pov et al. (2020) found that school-related factors had no significant impact on student achievement in the two-level Hierarchical Linear Model (HLM) models.

3. Methodology

This study investigated all secondary schools in Cambodia. The total number of schools was 1788. The unbalanced five-year panel data of SRS schools were extracted from Education Management Information System (EMIS) from 2016 to 2020. EMIS is responsible for collecting statistics related to educational indicators nationwide to document into its system annually. A report of statistics and indicators is published annually including MoEYS's raw data sources. The researchers decided to make a request to EMIS to provide data which consist of 32 indicators or variables related to four constructs of school progress and student performance, including a budget, infrastructure, human resources (teacher education/training), and student performance. All variables were in number and percentage (rate). Since the data in the current study are collected from the five-year unbalanced data, the average of each variable of each year was computed to represent each variable of each year for five years.

The study utilized Pearson's Correlation to analyze the data for examining the relationship between budgets, infrastructures, human resources, and student performance. Pearson's Correlation coefficient (r) was used to measure and explain the strength of the association

between variables, and the P-value (*p*) was presented to show the significant level of the coefficient (r). The data were divided into four constructs: budget, infrastructure, human resources, and student performance.

There were five variables of the budget construct, which focused on the sources of budget allocation to SRSs, including: schools with funds from the school; the schools with funds from the community; schools with funds from government; school with funds from abroad; and, schools with funds from NGOs. For infrastructure, there were nine variables utilized in the correlation models, such as: a school with concrete structure; the schools with wooden structure; schools without water; schools with a latrine; schools without a good floor; schools without a good roof; schools without good walls; schools with a separate office; and, schools with a separate library. For the human resource construct, the variables focused on the qualification of teachers working in SRS. Those variables were: teachers with primary education; teachers with lower secondary education; teachers with upper secondary education; teachers with post-graduate education; teacher with Ph.D.; and, teacher with pedagogical training. Lastly, student performance constructs consisted of 12 variables: number of students; repetition rate at lower secondary schools; repetition rate upper secondary schools; transition rate at upper secondary schools; net enrollment at lower secondary schools; net enrollment at upper secondary schools; the drop-out rate at lower secondary schools; the drop-out rate at upper secondary schools; the success of candidates in grade 9; successful candidate in grade 12, students completed lower secondary education and students completed upper secondary education. Variables related to infrastructure, budgets and human resources were utilized as independent variables, while variables related to student performance were used as dependent variables for analysis and interpretation.

4. Findings

The findings from using a Pearson's Correlation technique showed that there were some significant relationships between student performance and development of infrastructure and human resources as shown in the Table 1.

Correlation analysis found that the increased total number of students had the strongest positive correlation, which would be considered as a large effect size (see Abrami, Cohen, & d'Apollonia, 1988), with increased schools with a concrete structure ($r=91$, $p<0.05$), with teachers with a lower secondary education ($r=99$, $p<0.01$) and teacher with post-graduate education ($r=92$, $p<0.05$). This means that the number of students tends to increase in schools

with good infrastructures and teachers with at least lower secondary education. However, schools with wooden structures (r=-97, p<0.01) and teachers with high school education (r=-96, p<0.01) had a strong negative correlation with the increased total number of students. This means that student performance seems to decrease in schools with poor infrastructure although most teachers have a high school education. The repetition rate at lower secondary level was found to have a strong positive relationship with teachers with lower secondary education (r=92, p<0.05). On the other hand, the repetition rate at the upper secondary level was found to have a strong and positive correlation with schools with wooden structures (r=96, p<0.01) and teachers with upper secondary education (r=95, p<0.05). And, it had a strongly negative correlation with schools with concrete structures (r=-95, p<0.05), teachers with a lower secondary education (r=-91, p<0.05), and teachers with a post-graduate education (r=-99, p<0.01). It can be inferred that an increase in schools with wooden structures and teachers with upper secondary education will likely raise the repetition rate at the upper secondary level.

Moreover, an increase in schools with concrete structures, teachers with lower secondary education, and teachers with post-graduate education, will likely decrease the repetition rate at the upper secondary level. Furthermore, net enrollment at lower secondary schools had strong positive correlations with schools with a separate office (r=88, p<0.05), and with teachers with a lower secondary education (r=99, p<0.01). At the same time a strong negative relationship was found between net enrollment and schools with a wooden structure (r=-91, p<0.05) and teachers with an upper secondary education (r=-92, p<0.05). This means that an increase in schools with separate office and teachers with lower secondary education seems to escalate net enrolment at lower secondary level, but also that a decrease of school with wooden structure and teachers with upper secondary education seems to significantly foment net enrolment. Similarly, net enrolment at upper secondary schools had strong positive correlations with schools with a concrete structure (r=93, p<0.05), schools with a separate office (r=90, p<0.05), and teachers with lower secondary education (r=94, p<0.01). A strong negative relationship was found between net enrollment and schools with a wooden structure (r=-98, p<0.01), teachers with an upper secondary education (r=-97, p<0.01), and teachers with a post-graduate education.

In addition, the dropout rate at the lower secondary level was not found to have a significant correlation with any budget, infrastructure or human resource variables, but dropout rates at the upper secondary level were found to have a strong negative correlation with teachers with lower secondary education (r=-92, p<0.05). It means that at an upper secondary level, dropout rate tends to increase to the extent that a school has more teachers with only lower secondary education. Success of candidates in grade 9 had a significant positive relationship with schools with a concrete structure (r=99, p<0.01), and with teachers with a post-graduate education (r=96, p<0.05). Success of grade 9 candidates was found to have a negative relationship with schools with a wooden structure (r=-96, p<0.01), and with teachers with an upper secondary education (r=-91, p<0.05). This means that more students seem to pass the grade-9 exam when, compared to other schools, their schools have a concrete structure and more of their teachers have a post-graduate education. In a similar fashion, completion rates at lower secondary schools had positive correlations with school with a concrete structure (r=99, p<0.01) and teachers with post-graduate education (r=95, p<0.05), whereas it had negative correlations with schools with a wooden structure (r=-95, p<0.05) and teachers with an upper secondary education (r=-90, p<0.05). The completion rate was high for schools with a concrete structure and more teachers with post-graduate education, but it was low for schools with a wooden structure and more teachers with only an upper secondary education. Lastly, the results indicated that the completion rate at upper secondary schools had a strong positive correlation with teachers with lower secondary education (r=95, p<0.05), while had a negative correlation with schools with a wooden structure (r=-94, p<0.05) and teachers with upper secondary education (r=-91, p<0.05).

Table 1
Correlations of variables related to student performance with variables related to development of infrastructure and human resources for the last five years

N	Variables	School with concrete structure	School with wooden structure	School with separate office	Teachers with lower secondary education	Teachers with upper secondary education	Teachers with post-graduate education
1	Number of students	**.91***	**-.97****	0.83	**.99****	**-.96****	**.92***
2	Repetition rate at lower secondary schools	0.73	-0.80	0.75	**.92***	-0.81	0.87
3	Repetition rate upper secondary schools	**-.95***	**.96****	-0.72	**-.91***	**.95***	**-.99****
4	Net enrollment at lower secondary schools	0.81	**-.91***	**.88***	**.99****	**-.92***	0.83
5	Net enrollment at upper secondary schools	**.93***	**-.98****	0.80	**.97****	**-.97****	**.94***

6	Dropout rate at upper secondary schools	-0.85	0.84	-0.49	**-.92***	0.73	-0.83
7	Success of candidates in grade 9	**.99***	**-.96***	0.58	0.81	**-.91***	**.96***
8	Completion rate at lower secondary schools	**.99***	**-.95***	0.56	0.78	**-.90***	**.95***
9	Completion rate at upper secondary schools	0.87	**-.94***	0.80	**.95***	**-.91***	0.79

* p < 0.05; ** p < 0.01

5. Discussion

The results provide an in-depth understanding of the progress of student learning outcomes in line with the process of investment in resources at SRSs in Cambodia. It has been found that student performance had a strong and significant relationship with the facilities and the teacher qualifications at SRSs, during the time period of the past five academic years. The improvement and development of resources tend to significantly impact several student learning outcomes at SRSs. When schools are equipped with good buildings and have teachers with high qualifications, students tend to have a lower repetition rate, a higher net enrollment, a lower dropout rate, a higher number of successful candidacies in grade 9, and a higher completion rate in secondary education. The findings of the current study are also in line with several of previous studies (see Akey, 2006b; MacNeil et al., 2009; Mortimore, 2001; Uline & Tschannen-Moran, 2008), but they also contrast with some studies on the impact of resources on student achievement (see Coleman, 1966; Hanushek, 1981; Hanushek, 1986, 1989, 1991; Pov et al., 2020). This means that the implementation and support from MoEYS and other related stakeholders to SRS are effective and efficient in ensuring SRSs become a model secondary schools for network schools, schools in the community, and other secondary schools across the country. These laudable results would not have happened without the strong action and attention of the MoEYS, SRSs, and other related stakeholders for the past decade.

It has been observed that the positive outcomes for student performance at SRSs might derive from various efforts and reforms at the national and sub-national level, such as:

(1) Examination reform in the academic year 2013-2014: grade 12 examination reform has made a major impact on student learning outcomes through the notion of "you study, you pass". The examination reform agenda created a foundation of strict regulation, justice, and transparency which encourages students to study harder without thinking that advancement and success follow from cheating.

(2) Accept reality: the results of the examination in 2013 and the PISA-D (see MoEYS, 2018a) test in 2017 clearly indicate that essential interventions to improve student learning outcomes have become a part of the policy and strategy of the MoEYS and related stakeholders. A vital component of these efforts has been the establishment of SRSs because, according to the findings of the present study, they have significantly contributed to improvements in student learning outcomes.

(3) Secondary Resource School Monitoring and Evaluation Framework and standard test system: the monitoring framework and standard test system are the key pillars to ensuring transparency at the school level. They help to reveal the true quality of education to relevant stakeholders and especially the community and parents, which builds trust and boosts encouragement among educators, parents, and stakeholders in monitoring student learning and resource contributions.

On the other hand, the findings also indicate the need for improvement and further investment to ensure the sustainable development of SRSs in order to realize the vision and ambitions of the MoEYSand RGC for 2030 and 2050. Although the results have pointed out that facilities and teacher qualifications have significant connections with student performance, Cambodia is still struggling to provide and improve for SRSs and all other schools at all levels across the country. The strong effort and commitment of MoEYS and government to provide modern facilities and raise teacher qualification can account for gains in outcomes. The lack of school facilities and teacher qualifications are common issues that developing countries have been facing for decades (see Akey, 2006a; Kimani, Kara, & Njagi, 2013; Rockoff, 2004). While developing countries, including Cambodia, are trying to fortify their education systems with their available resources, they are also trying to catch up with evolving regional and global education trends. So, resource allocation has to be split between efforts to meet urgent needs specific to the country and long-term aims of the education and global development vision.

6. Implications

The findings of the present study provide a clear understanding of the strong connections between resource allocation and student performance at SRSs, over the time period of the last five years. This study has important implications for policy and practice. The results have revealed that school facilities and school teacher qualifications play a crucial role in determining student performance. Therefore, several implications are ca be considered. First, the continuation of constructing school buildings with a concrete structure and reducing the

number of schools with a wooden-structure is necessary. Each classroom shall be equipped with enough teaching and learning facilities needed for the different subjects in the school curriculum, especially science subjects which require a diversity of teaching and learning materials. Second, teacher upgrading, teacher training and professional development programs should be strengthened and encouraged. There are already various educator capacity-building and professional development programs) such as Teacher Upgrading Program (TUP) at the Royal University of Phnom Penh), teacher training programs, and scholarship for teachers. Schools should encourage teachers to pursue any opportunity for professional development in in order to increase benefits for themselves but also to impact student learning outcomes as a whole. Lastly, SRSs continue to expand and enhance the implementation of autonomy, accountability and assessment. This implementation has distinguished SRSs from other secondary schools for its effectiveness in provoking transparency and justice at school for better student learning outcomes. The findings of the current study provide a good indication of steps to take for the MoEYS to further strengthen and develop the system of schools and educators to improve their school's outcomes.

7. Conclusion

The current study has sought to contribute to the evaluation of the advancement and effectiveness of resource allocation to SRSs in Cambodia. It was found that among the 32 variables of the 4 constructs, several variables related to the infrastructure and human resource constructs were found to have significant positive and negative relationships with the variables for student performance. A decrease in schools with a wooden structure tended to have significant connections with increased student performance such as repetition rate, net enrollment rate at lower and upper secondary education, success of candidates in grade 9, and completion rates of both lower and upper secondary education. An increase in schools with a concrete structure had positive relationship with the number of students, net enrollment at the upper secondary level, success of candidates in grade 9 and completion rates at lower secondary schools. It had a negative correlation with repetition rate at upper secondary schools. At the same time, increased schools with a separate office had a positive correlation with net enrollment at lower secondary schools. Teachers with a lower secondary education had a significant positive correlation with the number of students, the repetition rate at lower secondary schools, the net enrollment at lower secondary schools, the net enrollment at upper secondary schools, and completion rates at upper secondary schools. Teachers with a lower

secondary education had negative connections with the repetition rate at upper secondary schools and the dropout rate at upper secondary schools. Teachers with upper secondary education were found to have a negative relationship with the number of students, the net enrollment at lower secondary schools, the net enrollment at upper secondary schools, the success of candidates in grade 9, the completion rate at lower secondary schools, and the completion rate at upper secondary schools. Also, it was found to have a negative relationship with the repetition rate upper secondary schools. Lastly, teachers with a post-graduate education were found to have positive correlations with the number of students, the net enrollment at upper secondary schools, the success of candidates in grade 9, and the completion rate at lower secondary schools. Having teachers with a post-graduate education was found to have a negative correlation with repetition rates upper secondary schools.

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