



FORECASTING THE RESULTS OF STUDENTS ATTENDING SCHOOL IN VIETNAM BY GEOGRAPHICAL AREA

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ABSTRACT

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This study attempts to forecast the results of school students in Vietnam by geographical region analysis. Results show variations between regions. In the Red River Delta region, it is forecast that in the decade 2015 to 2025, the number of children attending to school will increase slightly. In the Midlands and Northern Mountains region, the average number of children attending school should increase gradually by 2.4 percent over five years. In the North Central and Central Coast regions, student numbers have increased and decreased erratically. In the Central Highlands, there has been an average rate increase of 3.45 percent over five years. In the Southeast region, student numbers at all levels are expected to increase by an average of 3.9 per cent over five years. In the Mekong Delta region, student numbers are expected to increase by one percent over five years but experience a 1.8 percent reduction by 2035. These data will be critical to planning for the education sector in the coming decades.

Contribution/Originality: This study contributes to the existing literature by use of a new estimation methodology for analyzing and comparing student numbers at each education level within an appropriate time-frame.

1. INTRODUCTION

Educational needs forecasting helps identify those resources necessary for the improvement of education. One essential element of this is to predict with reasonable accuracy the number of children who will be attending school over a given period of time. Such forecasts form the basis for the allocation of human resources – principally teachers – and designing policies and programs for teachers' professional development. The Vietnamese Ministry of Education and Training (MOET) has responsibility for these tasks (MOET, 2012; MOET, 2013a; MOET, 2013b).

The importance of educational forecasting is recognized globally. Drawing on data collected from six New England states in the US, the study examines the complex relationships between demographic trends, educational attainment, and workforce requirements. Prevailing economic uncertainty in New England makes the report's

prediction of long-term trends and its exposure of inadequacies in existing policies of significant value. It is forecast that by 2020 all, New England states will have a significant decrease within the younger demographics of individuals holding bachelor's degrees or higher. This finding should highlight concerns about the region's long-term economic vitality (Coelen and Berger, 2006). According to Gamoran's 2001 study, in twenty-first century America inequality among socioeconomic and racial groups will be the principal issue within the educational domain. First, it foresees a continuation of the long-term decline in inequality between white and non-white populations, and is consistent with contemporary understanding of the sources of racial inequality and its effect on educational outcomes. And although racial inequality in education is expected to decrease, any corresponding reduction in labor market inequalities is likely to be much smaller. Second, socio-economic inequality is expected to exist at the current level throughout the next century. This prediction is also based on past trends, suggesting that the socio-economic inequality is "maximally maintained". That is to say, privileged groups protect their advantages until almost all members reach a certain state, at which point the inequality axis moves to another level in terms of educational outcomes (Gamoran, 2001).

Vietnam is a united nation, not only between ethnic groups but also among geographical areas (Bankston III and Zhou, 1995; Giang, 2006). However, it is important to care about natural conditions; the issues relating to psychological, cultural and social life; and conditions that impact on specific regions (Communist Party of Vietnam, 2005; CPV, 2013). In forecasting the number of students attending school by area, it is necessary to focus on that area's characteristic features.

2. THEORETICAL FRAMEWORK

Educational forecasting is significant in establishing a scientific basis for determining the direction, duties and major objectives of education and training (Scott, 1998). It also determines the future status and orientation of the education system (Bogue, 1998). Its focus is national, and its features include developmental scale, structure of type, school networks, teacher staff, quality of education, and pedagogical organization (Hien *et al.*, 2013).

The authors believe that the term "education forecast" encompasses all implications of such forecasts within the educational domain including student numbers, educational needs according to societal development, socio-economic relationships, and the environment. In short, the likely future status of the educational system (Dickson *et al.*, 2015).

3. METHODS

It was necessary to collect population data according to the variation model and analyze it based on each five-year period using a determined process (Carnevale *et al.*, 2010; Liu *et al.*, 2018). Next, forecast criteria were established (Cazier *et al.*, 2017; Vermeulen *et al.*, 2018), *viz*:

1. The number of students per teacher.
2. Natural variations and variations based on the availability of human resources.
3. Analyzing and comparing the number of students by grade over an appropriate time-frame.

The data was analysed based on frequency and percentage, which showed the ratio of male to female and the number of students attending school in Vietnam.

4. RESULTS

Results are divided into six geographical areas, coding the population area in the forecast for the purpose of analyzing specific data (Hong, 1996).

4.1. The Forecast of the Students Attending to School in the Red River Delta

Red River Delta consists of 11 provinces and cities: Ha Noi, Vinh Phuc, Bac Ninh, Quang Ninh, Hai Duong, Hai Phong, Hung Yen, Thai Binh, Ha Nam, Nam Dinh and Ninh Binh. There are over 5 million children. The number attending school at any given time is subject to complex fluctuations.

Table-1. The forecast of the students attending to school in Red River Delta (Unit: Million).

Education level	2010	2015	2020	2025	2030	2035
Kindergarten	1,009,896	1,042,984	1,003,801	974,095	1,000,159	934,654
Preschool	885,393	889,164	917,852	937,578	882,742	886,972
Primary school	1,355,620	1,382,851	1,412,965	1,450,354	1,402,098	1,370,500
Secondary school	1,111,750	1,038,105	1,063,672	1,095,267	1,119,298	1,070,495
High school	1,052,923	801,417	810,266	832,382	856,993	872,798
Total	5,415,582	5,154,521	5,208,556	5,289,676	5,261,290	5,135,419

Source: The data is extracted from the annual forecasted reports of the General Statistics Office of Vietnam, 2018. (accessed from: <https://www.gso.gov.vn/>).

The results of the analysis suggest that student numbers will decrease slightly in the next decade (see Table 1). If in 2015, the number of the students in this area decreased to 261,061 (about five percent of the total compared to 2010) in the 10 years to 2025 numbers should increase slightly, ranging from 50,000 to 100,000 children every five years, an increase of 1.3 percent. However, from 2025 to 2035, numbers will decrease by an average of 1.46 percent every five years. Also, if Vietnam's birth rate is taken into account, forecast student numbers in the 10 years post-2015 will also reduce. This factor is influenced by reproductive health education, population planning, and social changes surrounding childbirth and childhood education (Hahn and Truman, 2015). It has also been evident in countries such as Japan and Korea (Han, 2007; Yagi *et al.*, 2017).

Kindergarten numbers in 2015 increased by about 3.2 percent compared to 2010. The forecast for 2015 to 2025 is a gradual decrease by about 3.35 percent every five years. Between 2030 and 2035 it is predicted that preschool numbers will fall sharply 6.5 percent (65,505 children).

The number of preschool-age children in this area increased slightly in 2015 compared to 2010 (0.4 percent). The forecast is for an increase of 2.68 percent every 5 years for the ten years from 2015 to 2025. It is worth noting that until 2030, the number of preschool children in this area will decrease by 6 percent compared to 2025. Then, it will increase slightly in 2035 by 4,230 which is 0.47 percent compared to 2030.

The forecast for primary school students is an increase of 2.27 percent every five years for the 15 years from 2010 to 2025. However, the number of the primary students should decrease gradually between 2025 and 2035 with by 2.79 percent every five years.

Secondary school student numbers in 2015 decreased by 6.6 percent compared to 2010. However, the 15-year forecast for 2015 to 2030 is for an increase of 81,193 students or 2.54 percent every five years. Then, numbers will decrease by 4.3 percent in 2035.

It is noteworthy that high school student numbers declined radically by 23.88 percent in 2015 compared to 2010. However, it is forecast that the number of the students at this level will increase between 2015 and 2035 by an average of 2.1 percent every five years.

Red River Delta region had the highest rates of the six regions with 80.77 percent of primary school-age children attending, 47.2 percent for secondary schools, and 27.87 percent for high schools (MOET, 2013a). At the primary level, the rate of the standardized schools' attendance in this region was higher than the sum of the rates for the Highland, Southeast and Mekong Delta regions. However, the analysis of the number of the children per teacher in this region in 2015 showed an average rate of 16.07 per teacher. At the kindergarten level, the ratio of children to teacher was 9.91:1; 16.08:1 at the preschool level; 21.24:1 at primary school; 15.96:1 at secondary school and 16.41:1 students/teacher at high school. This result showed that the ratio for the kindergarten teachers was much lower than the average, enabling greater one-on-one teacher-student interaction and improving performance

in the special requirements of early childhood education. However, it was noted that the primary teachers in this region were overloaded.

4.2. Forecasting the Students Attending to School in the Midland and the Northern Mountainous Area

The Midland and the Northern mountainous area are the ones formed by the most provinces – 14 provinces: Ha Giang, Cao Bang, Bac Kan, Tuyen Quang, Lao Cai, Yen Bai, Thai Nguyen, Lang Son, Bac Giang, Phu Tho, Dien Bien, Lai Chau, Son La, Hoa Binh. This is also a large and complex geographical area of population and education.

Table-2. Forecasting the children and the students attending to school in the Midland and the Northern mountainous area (Unit: Million).

Education level	2010	2015	2020	2025	2030	2035
Kindergarten	642,229	682,185	711,027	657,3	684,667	647,046
Preschool	582,475	596,837	626,287	647,781	618,918	629,338
Primary school	929,070	959,830	1,000,853	1,040,011	1,019,966	1,009,495
Secondary school	785,663	737,103	776,155	807,802	841,667	819,729
High school	708,350	551,365	569,182	595,465	626,681	650,366
Total	3,647,787	3,527,320	3,683,504	3,748,372	3,791,899	3,755,974

Source: The data is extracted from the annual forecasted reports of the General Statistics Office of Vietnam, 2018. (accessed from: <https://www.gso.gov.vn/>).

The forecasts in [Table 2](#) predict that students numbers will gradually increase every five years from 2020. In 2015, student numbers attending in the region decreased by 3.3 percent or 120,467 compared to 2010. Forecasting for the 15 years from 2015 to 2030 has average student numbers gradually increasing by 2.45 percent every five years, but with a one percent decrease in 2030 compared to 2035.

Kindergartens numbers in this region increase by an average of five percent every five years from 2010 to 2020. It should be noted that the number of the children of kindergarten age has been on the rise for 10 years but is forecast to fall sharply in 2025 by 7.5 percent compared to 2020. Numbers will again increase by four percent in 2030 and reduce by 5.5 percent compared to 2030 and 2035. For the 15 years from 2010 to 2025, the number of the preschool children increased at an average of 3.61 percent every five years. However, by 2030, the number of nursery children in this region will decline by 4.5 percent compared to 2020. Then, it will slightly increase by 1.68 percent or 10,420 by 2035.

It is forecast that the number of primary school-age children will increase by an average of nearly four percent every five years for the 15 years from 2010 to 2025. However, the same group will decrease by an average of 1.5 percent every five years from 2025 to 2035.

Secondary school student numbers decreased by 6.18 percent in 2015 compared to in 2010. For the 15 years from 2015 to 2030, that number is forecast to increase by 4.5 percent every five years. By 2035, the number of the will fall by 3 percent or 21,938 students compared to 2030.

There was a fairly large fall of 22.16 percent in the number of the high school students in this region in 2015 compared to 2010. However, in the 30 years from 2015 to 2035 this number should increase by 4.21 percent every five years.

The student-to-teacher ratio in this region was 14:1 according to the 2015 yearbook of statistics ([Nhung, 2017](#)), with preschools enjoying the lowest ratio of 10.17:1. Other school levels fluctuated around the average plus or minus two. The overall student to teacher ratio in this region was generally lower than the national average.

4.3. Forecasting the Number of the Children and the Students Attending to School in the North Central and the Central Coast

The North Central and the Central Coast have the highest number of students in the country across 14 provinces: Thanh Hoa, Nghe An, Ha Tinh, Quang Binh, Quang Tri, Thua Thien - Hue, Da Nang, Quang Nam, Quang Ngai, Binh Dinh, Phu Yen, Khanh Hoa, Ninh Thuan and Binh Thuan. This is an area with narrow and stretch terrain. The coastline of this region is also the longest in VietNam.

Table-3. Forecasting the children and the students attending to school in the North Central and the Central Coast (Unit: Million).

Education level	2010	2015	2020	2025	2030	2035
Kindergarten	899,719	925,125	938,494	854,666	887,818	823,351
Preschool	901,732	940,847	920,901	939,292	879,439	894,260
Primary school	1,543,560	1,561,234	1,622,746	1,405,384	1,577,512	1,544,333
Secondary school	1,457,435	1,341,364	1,375,228	1,405,384	1,443,637	1,388,911
High school	1,332,528	1,010,350	1,020,558	1,049,890	1,091,419	1,119,164
Total	6,134,974	5,778,920	5,877,927	5,654,616	5,879,825	5,770,019

Source: The data is extracted from the annual forecasted reports of the General Statistics Office of Vietnam, 2018. (accessed from: <https://www.gso.gov.vn/>).

Student numbers in this region will likely decrease over the next 15 years as per Table 3. In 2015 particularly, the number of the children declined by 5.8 percent or 356,054 children compared to 2010. It is forecasted that by 2020, the number of the children will slightly increase by 1.7 percent compared to 2015. By 2025, the number will decrease by 3.8 percent compared to 2020, followed by a rise of nearly 4 percent in 2030. By 2035, the number of the student numbers in this region will reduce by two percent compared to 2030. In fact, these are mechanical and natural variations within this area, so the data should be noted in the context of overall educational development.

Kindergarten student numbers will increase slightly by about 2.13 percent every five years from 2010 to 2020. It is worth noting that the increase for this period will peak in 2025 with the signs of a reduction of nearly nine percent compared to 2020. It will subsequently rise by nearly four percent in 2025, then fall by 7.26 percent in 2035.

For the ten years from 2010 to 2020, the number of primary school children will increase slightly by 2.54 percent every five years. It should be noted that by 2025, this number will fall sharply by 13.39 percent compared to 2020. However, by 2030, it will rise again at the rate of 12.24 percent, and then will slightly decrease by two percent in 2035.

The number of the secondary school students in 2015 decreased by 7.9 percent compared to 2010. However, the number at this level for the 15 years from 2015 to 2030 will rise gradually at the average rate of 2.47 percent every five years, and then reduce by 3.79 percent in 2035 compared to 2030.

Most notably, the number of high school students fell sharply by 24.17 percent compared to 2010. However, it is expected that over the ensuing 20 years this number will increase by 2.6 percent every five years. These data show that planning for high school teachers in this region should be carefully considered and carried out.

According to the education and training statistics in 2015 by MOET, the student/teacher ratio in this region was not much different from the national average: 15.6:1 compared to 15.9:1 (Hung, 2016) with preschools having the lowest ratio. The ratio at primary and secondary levels were both higher than the national average. Therefore, to reduce this ratio, it is necessary to provide more teachers at all school levels.

4.4. Forecasting the Children and the Students Attending to School in the Central Highlands

The Central Highlands have the lowest number of school-age children of all regions across five provinces: Kon Tum, Gia Lai, Dak Lak, Dak Nong and Lam Dong. The data in Table 4 gives an overview of student numbers in this area.

Table-4. Forecasting the number of the children and the students attending to school in Central Highlands (Unit: Million).

Education level	2010	2015	2020	2025	2030	2035
Kindergarten	321,306	348,670	370,069	349,651	372,762	360,129
Preschool	310,687	327,442	350,618	371,300	363,697	378,632
Primary school	555,592	594,268	631,506	673,636	681,356	690,600
Secondary school	459,264	451,244	486,013	520,175	557,625	556,363
High school	358,133	288,532	307,029	331,354	360,858	386,895
Total	2,004,982	2,010,156	2,145,235	2,246,116	2,336,298	2,372,619

Source: The data is extracted from the annual forecasted reports of the General Statistics Office of Vietnam, 2018. (accessed from: <https://www.gso.gov.vn/>).

It is forecast that the number of students in the Central Highlands from 2010 to 2035 will tend to increase gradually by an average of 3.4 five percent every five years. In particular, students numbers slightly increased by 0.25 percent in 2015 compared to 2010, and will peak in 2020 with an increase of 6.72 percent. In comparing this to a comparable area (number of provinces, mechanical population) such as Southeast Vietnam, there has been a similarity in terms of the trend increase for 30 years, although there are some provinces in Southeast Vietnam where the number of children increased more rapidly than in the Central Highlands (Giang, 2006).

The number of kindergarten-age children has fluctuated. From 2010 to 2020, numbers increased by an average rate of 7.32 percent every five years. By 2025, this will reduce by 5.51 percent compared to 2020; and then rise by 6.6 percent in 2030 compared to 2025 and decrease by 3.38 percent in 2035 compared to the number over the previous 5 years.

The preschool-age population will tend to increase gradually for 15 years from 2010 to 2025 by an average rate of 6.12 percent every five years. However, this increase will be interrupted in 2030 when the number of the children will decrease slightly by two percent compared to 2025, and then rise by four percent in 2030.

At primary school, the number of the students will tend to rise for the next 35 years at a rate of 4.48 percent every five years. In particular, the lowest number of students will increase in 2030 by 1.35 percent, and the highest increase in student numbers will be shown to have occurred from 2010 to 2025 at an average rate of above 6 percent every five years. This increase has many causes including migration from other places (Nhung, 2017).

In 2015, the number of secondary school students increased slightly by 1.74 percent compared to 2010. It is forecast that the number of secondary students between 2015 and 2030 will increase gradually at the rate of over seven percent every five years; and then fall by 0.2 percent (1,262 students) compared to 2030.

It is worth noting that the decrease in the number of the high school students in 2015 compared to 2010 was 19.43 percent. However, forecasting for the ensuing 30 years, the number of the students at this level will tend to increase gradually at an average rate of 7.6 percent every five years, so it will be necessary to ensure the conditions exist for the general development of the education.

The student/teacher ratio in this region is slightly higher than the national average rate of 16.34:1. Only at the preschool level is it lower than the national average rate, which is 11.57:1 compared to 16.34:1. One area of concern highlighted by the data in recent years is the excessive number of the educational managers and teachers in some districts in Dak Lak. Krong Pak-Dak Lak district assigned 34 redundant vice-principals and recruited more than 500 contracted teachers over the target numbers (Cuong, 2016). Although this finding is considered as only one manifestation of the problem, it is enough to conclude that essential teacher recruitment and development strategies are in place. This result is similar to the review of data on national schools' standards in the region in terms of the educational assessment. This is the region with the lowest results compared to the national standard: primary education 34.46 percent; lower secondary education 20.43 percent; and the upper secondary education just 13.19 percent national standard schools. While it is not necessary to emulate the national average standard, this current forecast is similar to the results of multidimensional comparisons. Again, it is asserted that the forecast results are reliable because they are based on objectivity and a scientific approach, and the statistics are quite convincing.

4.5. Forecasting the Children and the Students Attending to School in the Southeast Area

Southeast Vietnam consists of six provinces: Binh Phuoc, Tay Ninh, Binh Duong, Dong Nai, Ba Ria - Vung Tau and Ho Chi Minh city. It is forecast that the number of students of all levels in this area has and will continue to increase over the 25 years from 2010 to 2035, with an average rate of 3.9 percent every five years as per Table 5. In particular, the data forecast the slowest increase in student numbers of 0.55 percent in 2035 compared to 2030, and the strongest increase of 7.62 percent in 2020 compared to 2015. These results are contributed to by various factors: the mechanical population growth of the immigration movement, cultural interference, and economic development leading to an increase in the immigration of the foreigners (CPV, 2011).

Table-5. Forecasting the children and the students attending to school in the Southeast (Unit: Million).

Education level	2010	2015	2020	2025	2030	2035
Kindergarten	662,254	720,074	770,882	731,721	777,079	745,361
Preschool	634,395	684,303	742,173	788,503	768,826	793,654
Primary school	994,284	1,112,696	1,193,823	1,278,422	1,281,242	1,290,822
Secondary school	756,130	790,777	854,882	913,029	968,992	953,284
High school	709,743	583,016	625,682	672,414	721,469	759,524
Total	3,756,806	3,890,866	4,187,442	4,384,089	4,517,608	4,542,645

Source: The data is extracted from the annual forecasted reports of the General Statistics Office of Vietnam, 2018. (accessed from: <https://www.gso.gov.vn/>).

First, the number of children in kindergarten fluctuated at an average rate of five percent every five years. For the decade 2010 to 2020, the number of the nursery-age children increased at an average rate of 7.89 percent every five years. However, by 2025, these numbers will have reduced by 5.08 percent compared to 2020, and then rise by 6.19 percent compared to 2025 and decreased by 4.08 percent in 2035 compared to 2030.

For the five years from 2010 to 2015, kindergarten numbers have increased by an average of 7.52 percent. However, the rate of increase will be interrupted by 2030 when numbers will fall by 2.49 percent compared to 2025, and then rise again by 3.22 percent in 2035 compared to 2030.

Primary school student numbers in this region will increase over 25 years from 2010 to 2035, with the average rate of 5.45 percent every five years. In particular, the data predicts the lowest increase of 0.22 percent in 2030 compared to 2025, and the highest increase of 11.9 percent in 2015 compared to 2010.

It is noteworthy that there was a decline of the large number of the high school students in this region in 2015 with the rate of up by 17.85 percent compared to 2010. However, the forecast for the 20 years from 2015 to 2035 is for an average rate increase of 6.83 percent every five years.

Southeast Vietnam has the highest student/teacher ratio in the country of 18.38:1, except for kindergarten group whose ratio is lower than the national average. It is noteworthy that the ratio in primary schools is 1.6 higher than the national average ratio, and in secondary 1.27 higher. The reason for this is the mechanical growth of the population, and economic development of Ho Chi Minh city, widely regarded as the most dynamic in the country. These are remarkable data that the authorities should seriously consider when developing teacher development policies and programs. It is interesting that this region has Ho Chi Minh city and the neighboring provinces of Ho Chi Minh city that are well-developed such as Dong Nai and Binh Duong, but the percentage of the national standard schools is ranked second of the six regions, and the average below 25 percent of standard schools (Son, 2013). In concrete terms, the percentage of the national standard primary schools in this region was 23.98 percent; 22.49% was accounted for by secondary schools and 19.35 percent by the high schools in 2015. This requires the mid-term development plans for the assurance of strategic and focused educational development.

4.6. Forecasting the Children and the Students Attending to School in the Mekong Delta

Mekong Delta includes 13 provinces and central cities: Long An, Tien Giang, Ben Tre, Tra Vinh, Vinh long, Dong Thap, An Giang, Kien Giang, Can Tho, Hau Giang, Soc Trang, Bac Lieu, Ca Mau. This area is considered as the "hollow region" with a lack of human resources and underdeveloped education compared with the rest of the country. The forecast results for student numbers partly provides the basic data necessary for educational development in this region (see Table 6).

Student numbers in this region reduced at the rate of 7.23 percent in 2015 compared to 2010. The forecast for the 15 years from 2015 to 2030 is for an increase of one percent every five years. From 2030 to 2035 numbers will fall by 1.8 percent. Therefore, the pressure on human resources in education in the Mekong Delta is not about quantity but quality of the teachers and education in general (Thanh, 2007).

Table-6. Forecasting the children and the students attending to school in Mekong Delta (Unit: Million).

Education level	2010	2015	2020	2025	2030	2035
Kindergarten	760,442	765,805	777,088	709,587	730,768	682,795
Preschool	821,591	802,427	821,291	839,959	795,407	800,132
Primary school	1,334,572	1,324,877	1,348,403	1,390,058	1,356,083	1,331,730
Secondary school	1,075,488	977,925	1,005,925	1,037,244	1,072,452	1,030,799
High school	925,615	690,909	698,961	724,327	757,288	778,606
Total	4,917,708	4,561,943	4,651,668	4,701,175	4,711,998	4,624,062

Source: The data is extracted from the annual forecasted reports of the General Statistics Office of Vietnam, 2018. (accessed from: <https://www.gso.gov.vn/>).

Numbers of nursery-age children in this region will experience considerable fluctuations. It is forecast that numbers will increase slightly between 2010 and 2020 at around one percent every five years. However, by 2025 the number will reduce significantly by 8.68 percent compared to 2020. Then it will increase by three percent compared in 2030 compared to 2025 and reduce by 6.56 percent in 2035 compared to 2030. This variation also showed the uncertainty of the natural population including the changes in student number. This finding needs to be considered within the context of education management and overall socio-economic development.

In 2015, the number of nursery-age children reduced by 2.3 percent compared to 2010. Forecasts for the subsequent decade (2015 to 2025) is for a gradual increase at an average rate of 2.3 percent every five years. However, it will decrease by 5.3 percent in 2030 compared to 2025, and then rising by 0.59 percent in 2035 compared to 2030.

In primary schools, student numbers decreased slightly by 0.72 percent in 2015 compared to 2010. For the next 10 years this number will increase gradually at an average rate of 2.43 percent every five years. From 2025 to 2035, primary student numbers will decrease gradually by about 2.11 percent every five years.

The number of secondary students in this region decreased significantly with by 9.07 percent between 2010 and in 2015. From 2015 to 2030, it is forecast that this number will increase gradually by 3.12 percent every five years, and then reduce by 3.88 percent between 2030 and 2035.

High school student numbers decreased by 25.35 percent from 2010 to 2015. However, the forecast for the subsequent 20 years to 2035 is an increase of 3.04 percent every five years.

Mekong Delta ranks the second in the six regions with a student/teacher ratio of 17.02:1, above the national average. Particularly, ratio in preschool, primary and secondary schools is higher than the national average. This finding partly reflects a teacher shortage, and the necessity for increased the teacher numbers at all school levels.

5. DISCUSSION

Analyzing the number of students by geographic area shows wide variations according to the forecasts. First, the Red River Delta area is the most developed regional economy in Vietnam (Bui *et al.*, 2018). In general, student numbers are predicted to decrease slightly between 2015 and 2035. This may be attributed to the family planning policy which has been in force for many years in this area (Mont and Nguyen, 2018). With the highest concentration of population in the country, a lack of population regulation policies will lead to a shortage of teachers (Labbé, 2019). In particular, the results also show a shortage of preschool and primary teachers (even a small number) and also suggest the continued absence of a population dispersion policy will adversely impact on the education sector in the future.

In the Midlands and Northern Mountains area - where many ethnic minorities are concentrated - the level of high population dispersion, as well as the infrastructure for education, is limited due to the influence of indigenous culture and the region's financial capacity (Sharma *et al.*, 2017). In general, during the period 2015 to 2035, student numbers should not diverge significantly from the national average. This reflects the fact that educational development investment policies cannot cover the whole of this area, and local authorities have no strategies in place for direct investment in education infrastructure (CPV, 2013). It is, moreover, necessary to set out the

requirements for overcoming the customs, culture and the nomadic lifestyle of the people there, a major impediment to educational development in the area (Keck and Hung, 2019).

The North and Central Coast area has limited mineral resources, frequent natural disasters (floods, storms, landslides, etc.) and many other problematic environmental factors (climate, land, etc.) (Nguyen and Tran, 2018). The forecast is that student numbers for 2015 to 2035 will fluctuate, which also reflects the characteristics of the local population. For people in the Central Coast region, who suffer from many natural disasters and unfavorable natural conditions (Schmidt-Thome *et al.*, 2015) some have opted to migrate to South or North in the hope of increasing their quality of life. It is this migration that affects the number of students who attend school. On the other hand, in recent years, the economy of this area has changed, many tourist sites have been exploited, the family economy of many households has become better, so the concentration of population has again increased (Giuliani *et al.*, 2019) affecting the number of students attending school. Thus, the planning of teachers at all levels for this area should be considered very carefully and conducted cautiously. It is recommended that a five-year plan be formulated using forecasts to develop regional education in this area.

The Central Highlands is not only a new economic area but also an area heavily affected by wars (Dang, 2018). Forecast student numbers for 2015 to 2035 indicate increases occurring very rapidly with the implementation of economic development policies. At the same time, the area of unpopulated land in the Central Highlands is the highest (Dang and Hanh, 2018) making it the most suitable area for migration. Therefore, the local education management needs to pay close attention and have the right policies to upgrade the existing educational institutions and open more new schools.

The Southeast is the southern key economic region, with the greatest concentration of industrialization and modernization in Vietnam (Dell *et al.*, 2018). The economic and financial development of this region come ahead in leaps and bounds (SarDesai, 2018). Moreover, this is an area with an attractive lifestyle and has the most potential for development in Vietnam, once known as the Far East Pearl in the 1960s (McNamara, 2017). Therefore, forecast student numbers for the period 2015 to 2035 reflect exactly the development of this area. Every year, student numbers of children increase gradually, and occasionally rapidly. This proves that people in all regions of the country tend to gravitate there for business and lifestyle (Gillen, 2016). Therefore, it is necessary to anticipate the educational development needs of this area. It is recommended that educational managers should prioritize investment in personnel development targets, educational facilities (especially preschool and primary education) because of the rapid increase in student numbers.

The Mekong Delta area is blessed with natural advantages, particularly fertile soil, and a complex system of canals (Elliott, 2016). However, the forecast of student numbers indicated a likely decrease over coming years. Conducting an in-depth analysis of regional culture as well as population characteristics shows that the region's occupational tradition is in the cultivation agricultural and aquatic products (Li *et al.*, 2017). Parents rarely want their children to go into these traditional industry, so many are sent to city schools in the Southeast area of Vietnam (Lee and Jun, 2016). Further, educational institutions in this area are few in number and have lacked serious investment. (Tran *et al.*, 2016). Therefore, student numbers are decreasing with most migration going to Ho Chi Minh City in the southeast (Pham and Van, 2016). Thus, the pressure on human resources in education in this area does not take place in terms of quantity, but rather in the quality of education, and local cultural and family practices.

6. CONCLUSION

The forecasting of student numbers on a geographical basis shows considerable variations across different regions. In the Red River Delta area, it is forecast that student numbers will increase by 1.3 percent every five years between 2015 and 2025. In the Midlands and Northern Mountains area, student numbers will increase by 2.45 percent every five years over the 15 years from 2015 to 2030. However, this number will be reduced by one percent in

2035 compared to 2030. In the North Central and Central Coast area, student numbers have increased and decreased erratically. This is a natural and mechanical variation that seems to be characteristic of this area. Most notably, the number of high school students in 2015 fell sharply by 24.17 percent compared to 2010, showing that the planning of high school teachers for this area in general and the provinces in this region need to be very balanced. In the Central Highlands area for the 25 years from 2010 to 2035, student numbers tend to increase at an average rate of 3.45 percent every five years, the largest increase being 6.72 percent in 2020. In the Southeast area, the number of students at all levels is expected to increase gradually from 2010 to 2035 with an average rate of 3.9 percent every five years. The biggest increase is forecast to be 7.62 percent in 2020 compared to 2015. The development of human resources, and facilities for preschool and primary education is critically important. In the Mekong Delta area, student numbers tend to increase by about one percent every five years, and after that reduce by about 1.8% in 2035. Thus, it can be seen that the pressure on human resources in education in the Mekong Delta region is not quantitative.

In general, students numbers have experienced varying rates of increase and decline in recent years. The results of these forecasts is the laying of the foundation for a study of possible solutions aimed at improving the quality of education in each of the six regions. The development of a national education system must be based on the results of the forecast of students in order for sustainable and steady development to occur.

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