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The Study of Taiwan's New Immigrant Children's Mathematics Achievement[1]

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Introduction: According the 2011 Taiwanese Government Statistics, the lower secondary school enrollment number of the new-immigrant-children is about 200,000. As known, most of the new immigrants are from the Southeast Asian countries, such as Vietnam, China, Indonesia, Thailand, the Philippines and Cambodia. In order to satisfy the increasing needs and demands on education of the children of new immigrant (CNI, henceforth), Taiwanese government not only develops, but also puts the after-school learning assistance policy into practice from 2006. Therefore, the main purpose of this study is to explore the mathematics achievement of the CNI after the implementation of the after-school learning assistance policy (AsLA policy, henceforth).
Purposes: Firstly, to compare the mathematics achievement of the CNI by countries. Secondly, to compare the mathematics performance among the CNI, the children from high-risk family (CHRF, henceforth) and the children of general families.
Samples: The 2,452 samples, selected from two junior high schools located in central Taiwan, include 157 CNI, 522 CHRF.
Methods: The main method used in this study is interval fuzzy number (IFN, henceforth) in order to compare the mathematics achievement of the children after the implementation of the AsLA policy from different type of families.
Results: To reach the two purposes of this study .We can find the effectiveness of math-

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ematics performance from three group's children of new immigrants, high-risk, general family. Therefore, the results provide one of the ways to review the new immigrant's education policy of after-school learning assistance in Taiwan.

Keywords: new-immigrant-children, mathematics achievement, education policy, interval fuzzy number, nonparametric statistics
MESC Classification: D60
MSC2010 Classification: 00B10, 97D60

1. INTRODUCTION

According to statistics of Taiwan, the number of new-immigrant-children enrolled in the national education system has increased to nearly 200,000 in 2011. Most of these students come from Vietnam, China, Indonesia, Thailand, the Philippines, and Cambodia. Their successful education is highly relevant to Taiwan's future competitive strength. The education process must consider equal opportunities in education, as well as social justice. In John Rawls' *A Theory of Justice* (1972), he highlights that justice must be the first virtue of a social system regardless of how efficient a social system may be. Anything believed to violate justice must be corrected or abolished. This theory, in which justice is equivalent to fairness, proposes two principles that can satisfy the values of fairness. The first is the principle of equality, and the second is the principle of difference. These two principles symbolize the egalitarian concept of justice.

Education policy for children of new immigrants is considered as education for the underprivileged minorities in Taiwan. The goal of such an educational policy is to design educational programs for children with adverse financial, cultural, and learning conditions that compensate for the lack of a stimulating financial and cultural environment during their early child years. This can reduce the mathematics learning difficulties they may experience and enhance their mathematics learning abilities. In the sociological study of educational policy conducted by Weng (2008), he emphasizes the importance of countries providing support to underprivileged groups and protecting social fairness and justice to promote social mobility. Wang (1982) proposes that equal opportunity in education should be a vital principle and the highest ideal of the education system. Equal opportunity involves three concepts. First, "equality" means equality in opportunity, not equality in results. Second, equal opportunity in education includes providing substantial assistance and opportunity to compensate for deficiency to facilitate the full development of individual talent. Third, equal opportunity in education should not only reflect equal enrolment opportunities, but also encompass equal educational content and environments. Lin (2007) highlighted that providing education to underprivileged minorities from adverse financial and social backgrounds or unfavourable living environments not only stimulates personal growth, but also facilitates favourable career development in the future.

To support the growing number of new-immigrant-students, the Taiwanese government has worked intensively to establish educational policy that provides after-school learning assistance to new immigrants in the past few years. Immigrant students' mathematics performance since the implementation of these policies in 2006 is the primary focus of this study. This research has two objectives:

(1) To compare the mathematics performances of children of new immigrants according to country; and

(2) To compare the mathematics performances of new immigrant students, students from high-risk families, and all students enrolled at the specific school.

The results of this study provide the following innovations and contributions. First, examining the results of previous studies, we compare the mathematics performances of new immigrants, high-risk families, and all students; thus, the research sample is extremely unique. Second, we use fuzzy statistical analysis as the statistical method to better reflect the students' mathematics performance; thus, our research method is also innovative.

2. LITERATURE REVIEW

The literature review is divided into the following five sections:

(1) Studies on the mathematics achievements of new immigrant children in Taiwan;

(2) Studies on the mathematics achievements of Taiwanese children from high-risk families;

(3) Studies on the relationship between socioeconomic status and mathematics achievements;

(4) Studies on immigrant children's education based on families in Taiwan and other countries; and

(5) Studies on the application of fuzzy statistics and interval fuzzy numbers.

2.1. Studies on the mathematics achievements of new immigrant children

For this study, we defined "new immigrants" as people from the following Asian countries who have immigrated to Taiwan: Vietnam, China, Indonesia, Thailand, the Philippines, and Cambodia. They are currently the six main countries of origin for immigrants to Taiwan (according to data from the Ministry of the Interior, 2012). Below we list the discrepancies of various research results concerning the learning performance of children of new immigrants. Ho, Chen & Lian (2011) stated that the differences in mathematics performance for children from new immigrant families and children from Taiwanese families at grades 5 and 6 were not significant. Hsieh (2008) compared the TASA mathematics achievements of students from differing ethnic backgrounds. The results showed that of sixth graders, no significant differences existed between the various ethnic groups. However, for fourth graders, the achievement which local children performed was better on average compared to that of new immigrant children.

Wang & Tsai (2008) stated that the mathematics achievements of children from foreign-spouse families differed significantly from those of students from Taiwanese families. After controlling the influences of socioeconomic status, the performance of students from Southeast Asia was still inferior to that of Taiwanese students in seven major subjects. However, regarding students from China, their performance was only inferior to that of Taiwanese students in four subjects, that is, Natural Science and Life Technology, Social Studies, Health and Physical Education, and Arts and Humanities. Lai (2006) found that the learning achievements of new immigrant children were inferior of major subjects, and that the learning achievements of primary students depended heavily on school's location, the mother's nationality, and the family's socioeconomic background.

Chung & Wang (2004) examined the language abilities of children from foreign-spouse family and found that the standard deviation of language scores was extremely high. This indicates that the extent of their language development is unbalance. Furthermore, a small percentage of children from these families also exhibit slow language development. Chen & Chen (2004) found that "self-motived and a confident learning attitude," "family's capital support," and "preschool and afterschool support programs" were key factors that contribute to the successful learning of new immigrant children. Huang &Yang (2011) contend that remedial education can improve student's interest and confidence in mathematics learning and reduce the negative impacts of social and cultural vulnerability. For new immigrant children and children from family of lower socioeconomic status, their learning interest and confidence, as well as mathematics achievements, are not inferior to those of their counterparts.

2.2. Studies on the mathematics achievements of children from high-risk families

For this study, the "high-risk family" is defined as Taiwanese aboriginals, low-income family, single-parent family, foster family, and family that grandparents are the key carers of the children. These families represent five of the family types that exhibit high-risk characteristics. Concerning the learning performances of children from high-risk families, the results of these studies also had discrepancies, as described below. Chen and Cheng (2008) found that students with specific and objective forms of cultural assets achieved superior mathematics performances. In the study conducted by Deng (2007), high-risk parents who communicated with their children and made them aware of the family's situation enhanced their children's learning motivation. Regard to Taiwanese aboriginals, Su (2009) examined various research documentaries and attempted to identify the factors that contribute to poor mathematics performance for aboriginals. He found that factors such as culture, society, and financial resources were insufficient to fully explain their poor mathematics performances. However, to simply classify aboriginals as less intelligent than non-aboriginals and assume that their inferior mathematics performance is the result of lower intelligence would be inappropriate.

Tang & Yeh (2011a) argued that an adverse socioeconomic background was no longer a significant influence for aboriginal high school students, and that support from teachers and parents would improve students' overall mathematics involvement in school. Tang & Yeh (2011b) also suggested that parents' educational and socioeconomic backgrounds were not necessarily significant contributors to the mathematics success of aboriginal university students. They believed that the level of challenge the students perceived was the decisive factor, determining whether or not they could make the adjustments required for mathematics success. Chang (2006) believes that allowing the voices of the various ethnic groups to be presented in the curricula is one of the necessary means of ethnic co-existence. Hong (2011) proposed the Night Angel Illumination Program for high-risk and aboriginal students to increase their mathematics achievements and learning performance.

Regarding children from single-parent family, He (2009) examined junior high school students from single-parent family and obtained the following results: First, significant differences were observed in the mathematics achievements between male and female students; that is, the performance of female students was superior to that of male students. Second, for junior high school students from single-parent family, the various causes of parental separation, new stepfather/stepmother, and the time of parental separation did not contribute to the significant differences in student's mathematics performance. Third, for junior high school students from single-parent family, varying styles of family discipline contributed to significant differences in student's mathematics achievements; students whose parents adopted a democratic disciplinary approach performed better than those whose parents adopted an indulgent approach. Fourth, the mathematics achievements of junior high school students from single-parent family differed significantly according to differences in socioeconomic status. Students from family with a high socioeconomic status achieved superior mathematics performance compared to their counterpart.

Chou (2008) found that the mathematics achievements of junior high school students from single-parent family were below average. However, female students still performed better than male students did. Students from single-parent family who had a high socioeconomic status performed better than those with a low socioeconomic status. Conducting a case study, Lin (2007) examined the effect that educational counselling had on primary school children from single-parent family, and observed improvements in the mathematics assessment results for students who participated in the EPA educational counselling (the Hand-in-Hand project). Regarding foster family, Yang (2010) set the "socioeconomic status" and "educational expectation" of foster family as dependent variables to examine their effects on foster children's mathematics performance, and the results showed a minimal correlation. Concerning family where the grandparents are the primary carers of the children, Hu (2005) found that grandparent-care had an adverse effect on children's mathematics achievements. However, for these families, the closer the grandparent-grandchild relationship, the better the students' mathematics performance will occur. In a case study, Lin (2007) examined the effect that educational counselling had on primary school children from families where the grandparents is the primary carers, and observed improvements in the mathematics assessment results of students who received EPA educational counselling (the Hand-in-Hand project).

2.3. Studies on the relationship between socioeconomic status and mathematics achievements

Research results regarding the relationship between socioeconomic statuses and learning achievements also differ significantly, as shown below. Sun & Cai (2007) collected 26 studies on the relationship between family socioeconomic status and mathematics achievements, and obtained the following results after conducting a meta-analysis: First, a minimal correlation existed between socioeconomic status and mathematics achievements. Second, student's study grade was a critical variable that determined the level of influence socioeconomic status had on mathematics achievements, where the level of influence decreased as the study grade increased. Third, the influence that socioeconomic status had on students' mathematics achievements differed significantly for different subjects, where the average correlation coefficient was significantly higher for single subjects compared to the overall grade. Regarding the differences between subjects, students' mathematics achievements in mathematics had the highest correlation with family socioeconomic status.

Zhang (2006) found that a positive correlation existed between parent's socioeconomic status and student's mathematics achievement. Lee & Yu (2005) examined Academia Sinica's Taiwan Education Panel Survey (TEPS) for 2001, and found that parent's socioeconomic status had a direct influence on student's educational achievements. Gong, Lin & Zhang (2009) stated that by employing the mediating effects of mathematics learning motivation, parent's socioeconomic status could indirectly affect student's mathematics achievements in mathematics. Furthermore, parent's socioeconomic status and student's mathematics learning motivation could be used to predict student's mathematics achievements in mathematics. Zhang (2011) used the Organisation for Economic Co-operation and Development (OECD) and Northern Europe's Programme for Internal Student Assessment (PISA) research concept to investigate the socioeconomic status factors that affect student's mathematics performance, and found that the socioeconomic status of fathers played a key role, especially the father's profession.

Chi & Lin (2009) found that socioeconomic status was a crucial factor that influenced Taiwanese student's performance for PISA subjects. Zhang (2011) focused on the role of cultural communication within family and found that if parents invested more time and effort in their children's learning, the cultural communication between parents and children could improve the learning of students who were underperforming in reading. Additionally, parents should provide children with a wealth of reading materials because the amount of books possessed and used as family education resources had a significant influence on students' learning performance.

2.4. Investigation of education for children of immigrants commonly adopted in Taiwan and other countries

In this section, we discuss the actions that have been adopted by the government regarding the education of children of immigrants. Guo (2012) examined the values and implications of the American No Child Left Behind Act along with the current conditions and practices of the Adequate Yearly Progress system. She proposed the following strategies to outline Taiwan's obligations to the educational performances of primary and junior high school students:

(1) To value the student's development of basic subject proficiency;
(2) To establish more flexible and realistic standards for learning performance;
(3) To ensure that educational responsibilities are diversified;
(4) To increase the professional competency of educational personnel;
(5) To conduct education reforms that emphasize effective learning to ensure that every child has the opportunity to improve; and
(6) To pay close attention to the development of reading abilities.

Yan (2009) explained after the Australian government's establishes multicultural policies for new immigrants and see the immigrant management as a "customer service" issue, that to increase customer satisfaction and to enhance the service provided by government sectors to new immigrants was emphasized.

Qiu & He (2008) examined 340 educational institutions for new immigrants and found that they possessed the following characteristics:

(1) To pay more attention to literacy education, life adjustment education, and family education, but less to vocational training;

(2) To increase the grant related projects annually;

(3) To promote wide range an educational activities; the top three activities are adult literacy classes, parenting education activities, and adult life adjustment classes;

(4) The main human resource to educational activities are primary school teachers and administrators; but new immigrant volunteers or retired teachers are rarely employed;

(5) The information on the subject of new immigrants, online information, and the new immigrant helpline all required improvement; and

(6) The new immigrants experienced obstacles, such as low participation rates for activities or classes, a shortage of exclusive classes or resource materials, and a shortage of learning venues and hardware facilities.

2.5. Studies on the application of fuzzy statistics and interval fuzzy numbers

Since Zadeh (1965) developed fuzzy theory, it has been used to explain a number of real-life phenomena. Because thoughts are primarily products of a person's subjective understanding of the surrounding natural and social phenomena, human knowledge possesses the features of fuzziness because of differences in subjective awareness, time, environment, and perspective. The fuzzy theory is developed based on how the human thought process applies fuzzy measurements and classification principles to the environment. This theory provided a more concrete understanding on the process of diverse and complex phenomena that are both ambiguous and uncertain. Human thoughts can be divided into two categories: The first is formal thinking, and the other is fuzzy thinking. Formal thinking is logical and sequential, whereas fuzzy thinking is all-in-one and synthesized (Xie & Wu, 2010).

The investigation of the application of fuzzy statistics and interval fuzzy numbers in this section was divided into three parts. The first part is the development of fuzzy statistical theory. Fuzzy theory introduced by Zadeh (1965) can explain a number of phenomena, and since its establishment it has been widely developed and implemented. Recent studies have also developed numerous statistical analysis methods and concepts for fuzzy theory (Fan, 2010; Hsu, Tsai & Chiang, 2009; Ravi, Shankar, Sireesha, Rao & Vani, 2010; Sun & Wu, 2007; Wang & Chen, 2010; Wu & Lin, 2002). The second part involves the examining of the interval fuzzy number method to expand the applicability of the theory (Chu & Lin, 2009; Hung, Vladik, Wu & Gang, 2011; Lin & Chen, 2004; Sengupta & Pal, 2000; Yager, Detyniecki & Bouchon-Meunier, 2001). The third part includes research documents on the sorting of fuzzy numbers. These research results introduce several methods, and propose a new model for comparing students' interval fussy scores. With sorting after defuzzification, the issue of poor discrimination is resolved (Dubois, Fargier & Fortin, 2005; Harloff, 2011; Lee & Lee-Kwang, 2001; Lin, Yi & Wu, 2006; Liu, Wu & Liu, 2008; Nguyen & Wu, 2006; Suleman & Suleman, 2012; Wu & Lin, 2002).

3. RESEARCH METHODS

For this study, we purposively select two junior high schools in central Taiwan as the samples in 2011, and conduct an analysis of their midterm examinations. For the analysis, the schools afford 2,452 students, of whom 157 are new immigrant children, and 522 are children from high-risk families. The research procedures are explained as follows: To use interval fuzzy numbers to compare the mathematics performance of new immigrant children in Taiwan, the first step was to collect the students' grades for the subjects of mathematics. These grades are converted into T-scores to define the interval fuzzy score (a, b), which then serve as the basis for Definition 3.1. The second midterm examination results for both the first and second semesters of 2011 are used to define the interval fuzzy scores (a, b), where a ≤ b. The second step is to identify the fuzzy means for the subjects of mathematics, which are subsequently used as the basis for Definition 3.2. The third step is to convert the interval fuzzy scores into defuzzified values, which then became the basis for Definition 3.3. The fourth step is to conduct a nonparametric analysis and comparison using the defuzzified values.

For the quantitative statistical analysis section of this research, we use nonparametric analysis and MINITAB16.0 statistical software. The reasons we used this analysis method are because it is designed for new immigrant children and children from high-risk families, who comprise the research sample for this study. The size of the sample is relatively small and the Kolmogorov-Smirnov test shows non-normal distributions. Therefore, the use of nonparametric analysis is more appropriate to the actual situation (Xie & Wu, 2010; Hung, Vladik, Wu & Gang, 2011; Nguyen & Wu, 2006). For this study, we use four definitions for fuzzy statistical quantitative analysis, that is, Definitions 3.1, 3.2 and 3.3. These definitions are described below.

3.1. Fuzzy statistical definitions

Definition 3.1. Interval fuzzy scores: In this study, interval number (a, b) is treated as student performance interval fuzzy scores, where a and b represent two different test scores for the same student, and $a \le b$. (Lai & Wu, 2012)

For example, if a student received 88 and 78 (out of 100) for the two recent mathematics examinations, his/her mathematics performance interval fuzzy score would be represented as (78, 88). This means that the student's mathematics performance is between 78 and 88. The use of fuzzy scores (78, 88) can better reflect the true performance capabilities of student compares to the traditional approach where the average of the two numbers (i.e., (78 + 88)/2 = 83) is employed. This is because human capabilities have highs and lows instead of being exact; thus, the use of exact values, although simpler, is not realistic.

Definition 3.2. Fuzzy sample means for continuous models: For the fuzzy sample means for continuous models (where the samples are continuous and evenly distributed), *U* is set as the domain, and *L* as the *k* number of linguistic variables in U, where L = {L1, L2, Lk}. *Xi* is a fuzzy sample in U and the fuzzy sample mean is

$$F\overline{x} = [\frac{1}{n}\sum_{i=1}^{n} a_i, \frac{1}{n}\sum_{i=1}^{n} b_i].$$

(Nguyen & Wu, 2006)

Definition 3.3. Interval fuzzy number defuzzification: By defuzzifying the interval fuzzy numbers, $X = (a, b)$ can be converted into an interval fuzzy number where

$$\mathrm{c} = \frac{a+b}{2}$$

is the center of the interval, and $l = |b - a|$ is the absolute range of the interval. The defuzzified interval fuzzy number is

$$x_f = \mathrm{c} + 1 - \frac{\ln(1+|X|)}{|X|}.$$

If $a \to b$, then the interval will approach to $\frac{a+b}{2}$. (Nguyen & Wu, 2006)

4. RESULTS AND DISCUSSION

First, regarding the analysis of mathematics performance for new immigrant children, we use the research samples of these two junior high schools in central Taiwan and conduct an analysis of their midterm examinations. For this analysis, the schools provide 2,452 students, of whom 157 are new immigrant children, and 522 are children from high-risk families. Thus, the research targets were 2,452 students (coded TT), including 157 new immigrant children (coded TN) from the six main immigrant countries of Vietnam (coded Vi), China (coded Ch), Indonesia (coded In), Thailand (coded Th), the Philippines (coded Ph), and Cambodia (coded Ca).

The calculation process for students' mathematics grades is as follows:

(1) To record the students' results for the second midterm examination for the first and second semesters of 2011;

(2) To convert the marks from the two examinations into T-scores;

(3) To use Definition 3.1, we record these marks as interval fuzzy scores (a, b), where $a \leq b$;

(4) To calculate the fuzzy sample means by using Definition 3.2 and listed them in Table 4.1, where MI denotes the mathematics interval scores.

(5) To defuzzify the interval fuzzy scores by using the defuzzification conversion method described in Definition 3.3, and then list the MD in Table 4.1; and

(6) We organize the defuzzification scores from highest to lowest and order after sorting in table (ORDER, henceforth).

However, because the 2,452 students from the two junior high schools (coded TT) are used as the population for the various groups, the MI scores in Table 4.1 are (50, 50), and all have a defuzzified score of 50. The results of this study can serve as the norm- referenced average score for various sample and population comparisons.

Table 4.1. Analysis on the mathematics performance of new immigrant children listed by country (all midterm results were converted into T-scores)

	TT	TN	Vi	Ch	In	Th	Ph	Ca
First grade	810	60	22	13	9	4	6	6
Second grade	811	56	19	10	10	8	6	3
Third grade	832	41	16	7	6	4	6	2
Total	2452	157	57	30	25	16	18	11
MI	(50,50)	(47,51)	(45,52)	(48,50)	(46,51)	(48,51)	(49,51)	(46,50)
MD	50	49.5976	49.2029	49.4507	49.1416	50.0379	50.4507	48.5976
Order	3	4	6	5	7	2	1	8

Regarding the analysis on mathematics performance for children from high-risk families, the study samples comprise 2,452 students from two junior high schools (coded TT), of whom 522 are children from high-risk families (code TH). They consist of the five major groups of aboriginals (Aa), low-income families (Bb), single-parent families (Cc), families where the grandparents are the primary carers of the children (Dd), and foster families (Ff).

The calculation of the students' mathematics marks is shown as followings:

(1) To record the students' results of the second midterm examination of the first and second semesters of 2011;

(2) To convert their grades for the two examinations into T-scores;

(3) Using Definition 3.1, to record the marks as interval fuzzy scores (a, b), where $a \leq b$;

(4) To calculate the fuzzy sample means using Definition 3.2 and to list them in Table 4.2, where MI denotes the mathematics interval scores;

(5) To defuzzify the interval fuzzy scores by using the defuzzification conversion method explained in Definition 3.3, and list the MD in Table 4.2;

(6) To organize the defuzzification scores from highest to lowest, ordered after sorting in table (ORDER, henceforth).

However, because the 2,452 students from the two junior high schools (coded TT) are used as the population for the various groups, the MI scores in Table 4.2 are the overall scores (50, 50), and all have a defuzzified score of 50. This is used as the average score for the norm-referenced test conducted in this study to compare the various types of samples with the population.

Table 4.2. Analysis on the mathematics performance for children from high-risk families listed by groups (all midterm results were converted into T-scores)

	TT	TH	Aa	Bb	Cc	Dd	Ff
First grade	810	185	15	22	101	29	18
Second grade	811	149	21	17	93	7	11
Third grade	832	188	18	21	114	20	15
Total	2452	522	54	60	308	56	44
MI	(50,50)	(46,50)	(46,49)	(48,51)	(45,49)	(47,53)	(48,52)
MD	50	48.5976	48.0379	49.4507	48.1416	51.1416	50.5976
Order	3	5	7	4	6	1	2

Because the research samples used in this study are specified targets, that is, new immigrant children and children from high-risk families, and the sample number is small, we apply nonparametric analysis, which is more appropriate for the actual situation (Xie & Wu , 2010; Hung, Vladik, Wu & Gang, 2011; Nguyen & Wu, 2006). To determine whether significant differences in learning achievements exist between the various groups of students, we use the fuzzy Wilcoxon rank sum test. "※"denotes those that achieve the 0.05 level of significance; the analysis results are recorded in Table 4.3.

Table 4.3. Results of the fuzzy Wilcoxon rank sum test

	TT	Vi	Ch	In	Th	Ph	Ca	TN	Aa	Bb	Cc	Dd	Ff	TH
TT		※	※			※	※	※	※	※	※	※		※
Vi														
Ch		※												
In		※												
Th		※						※						※
Ph					※									
Ca					※									
TN														
Aa					※									
Bb		※												
Cc					※					※				
Dd				※	※					※			※	
Ff		※	※			※	※	※	※	※	※			※
TH														

5. CONCLUSION AND RECOMMENDATIONS

The results of analysis have three parties about comparison on the mathematics achievement of new-immigrant-children from the main immigrant countries, comparison on the mathematics achievement of new immigrant children, children from high-risk families, and all students enrolled at the school, counselling strategy suggestion.

5.1. Comparison on the mathematics achievement of new-immigrant-children from the main immigrant countries

The results of analysis have six parties about the mathematics achievement of new-immigrant-children from the main immigrant countries. The mathematics scores, in descending order, are the Philippines, Thailand, all students in the school, China, Vietnam, Indonesia, and Cambodia.

5.2. Comparison on the mathematics achievement of new immigrant children, children from high-risk families, and all students enrolled at the school

The results of analysis have six parties about the mathematics achievement of new immigrant children, children from high-risk families, and all students enrolled at the school. The mathematics scores, in descending order, are all students in the school, new immigrant children, and children from high-risk families. But the differences in mathematics performance are not significant between new immigrant children and children and high-risk families.

5.3. Counselling strategy suggestion

There are three counselling strategy suggestions for new-immigrant-children in Taiwan's government.

(1) They are the important strategies that long-term achievement monitoring and quality control, and attaching great significance to the learning process and results: In both the U.S. and Australia, regular and long-term learning achievement tests and tracking are conducted. For student's learning process, we recommend schools to use supportive mechanisms to stimulate student's learning motivation and to increase their mathematics achievements. Schools should also organize a wide variety of mathematics competitions to provide students with successful learning experiences. We also recommend that schools to organize parental education activities for parents of middle to low socioeconomic status to help improve their children's mathematics achievements.

(2) **Increase the probability of success in learning:** to develop initiatives and a confident learning attitude among students, and to provide family capital support and preschool and afterschool support programs to incorporate the perspectives of various groups in school curricula. In addition, it is also necessary to provide materials to children increases their probability of successful learning.

(3) **Support from teachers and parents can improve student's learning outcomes:** Teachers can help students to develop the motivation of succession while parents focus on family-oriented cultural communication. Although families may be unable to upgrade the cultural resources they possess, by acting in a more engaging manner and investing in their children's learning and cultural communication, they can improve students' overall learning.

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