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The Factors that Affects the Needs of the Korean Language Education in Children in Multi-cultural Families: Results of a National Cross Sectional Survey

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Abstract

The purpose of this study was to analyze the factors that affects the needs of the Korean language education in children in multi-cultural families. Data were from the A Study on the National Survey of Multicultural Families 2012. Subjects were 19,431 persons aged 19~24 years. A prediction model was developed by the use of a QUEST (Quick, Unbiased, Efficient, Statistical Tree) algorithm of data-mining approach. In the QUEST algorithm analysis, level of Korean language (reading, listening, speaking, and writing), experience of social adjustment training, experience of using for Multicultural Family Support Center, experience of social discrimination, experience of career counseling were significantly associated with needs of the Korean language education in children in multi-cultural families.

Keywords: Decision Tree, Prediction Model, Korean Language Education, Multi-Cultural Families

Introduction

Over the last 2 decades, international marriage ratio in Korea increased ten-fold from 1.2% to 11% and the number of children from multicultural family increased 150% in only 2 years from 100,000 in 2010 to 146,071 as of 2012 [1][2]. With this trend, it is predicted that the number of multicultural children will exceed 300,000 in 2020 [1].

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Especially, Korea is a country with extremely low birth rate and has the birth rate of only 1.3 over the last 5 years, which will steadily increase the rate of children in school age from multicultural families in Korea [1].

Children from multicultural families in Korea can be largely classified into those who were born and raised in Korea and those who immigrated to Korea from foreign countries. Children from multicultural families who were born and raised in Korea are mostly the children from international marriage between Korean fathers and foreign mothers and due to insufficient language input from their foreign mothers with poor Korean language ability during their growth period, they tend to show slow linguistic and cognitive development and suffer from under achievement owing to the lack of Korean language ability required for their studies. Children who immigrated to Korea from foreign countries are those who were born, raised and educated in foreign countries and moved to Korea and they face language barrier from the lack of communication ability in Korea and cultural barrier from cultural difference between two countries, which makes them suffer from severe lack of learning abilities and confusion of their self-identity [3].

In order for multicultural children to adapt to Korean society and grow into healthy members of society, Korean language education should take precedence over anything else because, in practice, they feel the greatest difficulty in their language although it is essentially required. As Korean education is emphasized for multicultural children on government level, educational institutions including schools are opening Korean language education courses for multicultural children and textbooks for them are being developed. In addition, studies have been conducted on the Korean language education for multicultural families. Korean textbooks for multicultural children, however, are mostly for elementary and middle school children and studies on Korean education have focused on necessity, educational contents and methods and educational policy on Korean in multicultural society. Thus, there has been lack of basic researches such as fact-finding survey on demand and level of necessity of multicultural children for Korean education. Therefore, it is necessary to conduct integrated research on factors such as what are the factors affecting the level of necessity for Korean education of multicultural children, the priority of these factors and how the factors affect one another and to seek out Korean educational policy reflecting them.

This study provides basic materials for Korean education of multicultural children and its policies by developing statistical classification model which can predict the level of necessity of the Korean language for multicultural children.

Methods

Subjects. Data source of this study was 2012 National Survey of Multicultural Families (NSMF) on multicultural families living in Korea conducted by Ministry of Health, Welfare and Family Affairs, Ministry of Justice and Ministry of Gender Equality. NSMF was conducted for the purpose of developing tailored policy by investigating realities of living of the multicultural families and their demand for welfare [2]. Items of survey were composed of general characteristics of multicultural families, employment, economic level, marriage life, health and health care. Subjects of the NSMF was the total number of 154,333 married immigrants in Korea and, in addition to married immigrants, questionnaire survey was conducted on the spouses of the immigrants and their children. For sampling method for the subjects, the study used foreign resident status and basic status material of multicultural families in 16 cities surveyed by Ministry of Government Administration and Safety. As the survey was complete enumeration survey, sample design was not made and the survey was conducted from July 20, 2012 through October 31, 2012.

This study analyzed 19,431 young adults (9,835 males and 9,596 females) at the age of 19 to 24 from the family of married foreign immigrants.

Measurement. Dependent variable was defined as level of necessity of Korean language education (necessary, mediocre, not necessary). Explanatory variables were included as age, gender, final education (elementary school and lower, middle, high school, over university), residing place (country, city), speaking level in Korean (good, fair, poor), listening level in Korean (good, fair, poor), reading level in Korean (good, fair, poor), writing level in Korean (good, fair, poor), experience of having used Multicultural Family Support Center (yes, no), education support experience (yes, no), experience in consultation on education and career path (yes, no), experience in adaptation education to Korean society (do not even know that such education exists, know the education but never used it before, not only know the education but also have used it before), experience in social discrimination(yes, no), and whether or not being engaged in economic activities (yes, no).

Statistical Analysis. Exploration on factors related to the level of demand for Korean education For general characteristics, mean and percentage was presented and the difference between groups depending on whether or not related to the level of demand for Korean was analyzed with Chi-square test, when explanatory variables with less than significance level of 0.1 were defined as related factors to the level of necessity for Korean education and included in QUEST algorithm [7].

QUEST Algorithm.QUEST(Quick, Unbiased, Efficient, Statistical Tree)[8] is a data-mining algorithm to select classification standard first by choosing significant variables to reduce variable selection bias and, based on selected variables, then by executing quadratic discriminant analysis. As methods to select variables based on classification standard, it uses ANOVA F-statistics for continuous variables while it chooses variables with smallest significant probability in chi-square test of contingency table for categorical variables[9]. During the process, it finally selects threshold by executing quadratic discriminant analysis on selected categorical variables.

The process of algorithm for the classification and prediction of the variables in QUEST is as follows;

First, to select variables, significant probability of continuous or ordinal predictor is calculated through ANOVA F-test.

Second, if the selected variable is a categorical predictor, significant probability of chi-square test is calculated in the contingency table of predictor and target variable, at which time if the smallest significant probability is smaller than the corrected Bonferroni's threshold, corresponding variable is selected as categorical variable. In the case of predictor with more than 3 categories, it is replaced with binary classification by two-means clustering.

Third, if split variable is not chosen, significant probability of Levene F-test for continuous or ordinal predictor is calculated, then, by comparing with corrected Bonferroni's threshold, the variable corresponding to significant probability is selected as a categorical variable. This process is repeated until the condition is completed.

In principle, as QUEST is suitable for classification analysis of nominal-type target classification and, in case of continuous variable, it uses ANOVA F-test or Levene'stest, there is a possibility of even a significant variable being treated as a meaningless variable when the analyzed data violate the assumption such as equal variance or normality. In spite of this bias, Loh and Shih [8] observed that in case of QUEST, when consequence and explanatory variable are independent, the bias is small enough to be neglected in the process an independent variable is chosen as a split variable.

In QUEST algorithm, in the case of data composed of categorical variables, when the categories of consequences are more than 3, two-means clustering composed of 2 categories is performed, when quadratic discriminant analysis is used as a method of seeking out optimal separation of explanatory variables and child node is formed at the classification of explanatory variable which best classifies consequences.

In order to reduce the bias of QUEST algorithm as much as possible, this study conducted analysis by treating all explanatory variables including consequences as categorical variables[10, 11].

In this study model, reference value for separation and merging of decision rule for QUEST algorithm was set in 0.05, and the number of parent nodes, that of child nodes and that of branch was limited to 200, 100 and 4, respectively. For evaluation of the validity of model, results of risk of the model were compared using 10-fold cross-validation. All analysis used MINITAB version 13 (Minitab Inc., State College, Pennsylvania, USA) and Decision Tree version 20.0 (IBM Inc., Chicago, Illinois, USA). Significance level was 0.1 in two-sided test only for chi-square test to explore related factors of consequences and was 0.05 in two-sided test for all the rest analyses.

Results

General characteristics of subjects and factors related to the level of necessity of Korean education

General characteristics of subjects and factors related to level of necessity of Korean education are presented in Table 1. Of a total of 19,413 subjects, those who responded that Korean education is necessary was 5,055 subjects (26.0%) while those who responded that Korean education is unnecessary was 11,275 subjects (58.0%).

As the result of chi-square test, level of necessity for Korean education has statistically significant difference in gender, residing city, (final) level of education, level of listening to Korean, level of speaking Korean, level of reading Korean, level of writing Korean, experience in social discrimination, experience in use of Multicultural Family Support Center, experience in adaptation education to Korean society and experience in consultation on education and career path ($p<0.05$). Demand for Korean education was high in males (26.7%), city residents (27.3%), middle school graduates (34.7%), those who have low level of listening to Korean (80.7%), those who have low level of speaking Korean (82.1%), those who have low level of reading Korean (67.7%), those who have low level of writing Korean (63.3%), those who have experienced social discrimination (35.2%), those who have used Multicultural Family Support Center (52.3%), those who have experienced adaptation education to Korean society (39.4%) and those who have experienced consultation on education and career path (34.8%).

Table 1: General characteristics of subjects and factors related to level of necessity of Korean education, n (%)

Variables	Level of necessity of Korean education			p
	Necessary (n=5,055)	Mediocre (n=3,101)	Not necessary (n=11,275)	
Gender				<0.001
Male	2,624 (26.7)	1,654 (16.8)	5,557 (56.5)	
Female	2,431 (25.3)	1,447 (15.1)	5,718 (59.6)	
Residing place				<0.001
City	4,484 (27.3)	2,609 (15.8)	9,369 (56.9)	
Country	571 (19.2)	492 (16.6)	1907 (64.2)	
Education				<0.001
Elementary school	51 (25.1)	26 (12.8)	126 (62.1)	
Middle school	860 (34.7)	468 (18.9)	1,151 (46.4)	
High school	3,424 (24.1)	2,277 (16.0)	8,489 (59.8)	
Collage	720 (28.1)	330 (12.9)	1,512 (59.0)	
Economic activities				0.656
No	2,979 (26.2)	1,796 (15.8)	6,614 (58.1)	
Yes	2,076 (25.8)	1,305 (16.2)	4,661 (58.0)	
Listening level in Korean				<0.001
Good	2,706 (17.6)	2,377 (15.5)	10,302 (67.0)	
Fair	1,346 (48.0)	680 (24.3)	778 (27.7)	
poor	1,002 (80.7)	45 (3.6)	195 (15.7)	
Speaking level in Korean				<0.001
Good	2,506 (16.6)	2,340 (15.5)	10,268 (67.9)	
Fair	1,439 (48.5)	691 (23.3)	835 (28.2)	
Poor	1,109 (82.1)	70 (5.2)	172 (12.7)	
Reading level in Korean				<0.001
Good	2,460 (16.3)	2,356 (15.6)	10,317 (68.2)	
Fair	1,396 (55.2)	652 (25.8)	481 (19.0)	
poor	1,198 (67.7)	94 (5.3)	477 (27.0)	
Writing level in Korean				<0.001
Good	2,389 (16.2)	2,262 (15.3)	10,113 (68.5)	
Fair	1,421 (52.6)	694 (25.7)	586 (21.7)	
Poor	1,245 (63.3)	145 (7.4)	576 (29.3)	
Experience in social discrimination				<0.001

No	3,987 (24.3)	2,392 (14.6)	10,017 (61.1)	
Yes	1,068 (35.2)	709 (23.4)	1,258 (41.4)	
Experience of having used Multicultural Family Support Center				<0.001
Do not even know that such education exists	2,447 (27.1)	1,550 (17.2)	5,027 (55.7)	
Know the education but never used it before	2,041 (21.9)	1,495 (16.0)	5,787 (62.1)	
Not only know the education but also have used it before	567 (52.3)	56 (5.2)	461 (42.5)	
Experience of adaptation education to Korean society				<0.001
No	4,780 (25.2)	2,998 (15.8)	11,215 (59.0)	
Yes	275 (62.6)	104 (23.7)	60 (13.7)	
Experience in consultation on education and career path				<0.001
No	4,574 (25.1)	2,866 (15.7)	10,773 (59.2)	
Yes	480 (39.4)	236 (19.4)	502 (41.2)	

Prediction model for necessity level of Korean education for multicultural children using QUEST algorithm

Prediction model for necessity level of Korean education for multicultural children using QUEST algorithm is presented in Figure 1. As the result of constructing statistical classification model using QUEST algorithm after including variables set as factors related to the level of necessity of Korean education through chi-squared test, factors having significant effect were level of reading Korean, experience in adaptation education to Korean society, level of speaking Korean, experience in use of Multicultural Family Support Center, level of writing Korean, experience in social discrimination, experience in consultation on education and career path and level of listening Korean. The most preferentially involved predictor was the level of reading.

As the second predictor, experience in adaptation education to Korean society was categorical variable for the group who can read well while the level of speaking Korean was categorical variable for the group whose level of reading Korean was below average.

Third predictor was the experience in use of Multicultural Family Support Center and the level of writing Korean. Fourth categorical variable was the experience in social discrimination.

Fifth categorical variable was the experience in consultation on education and career path and the level of listening Korean.

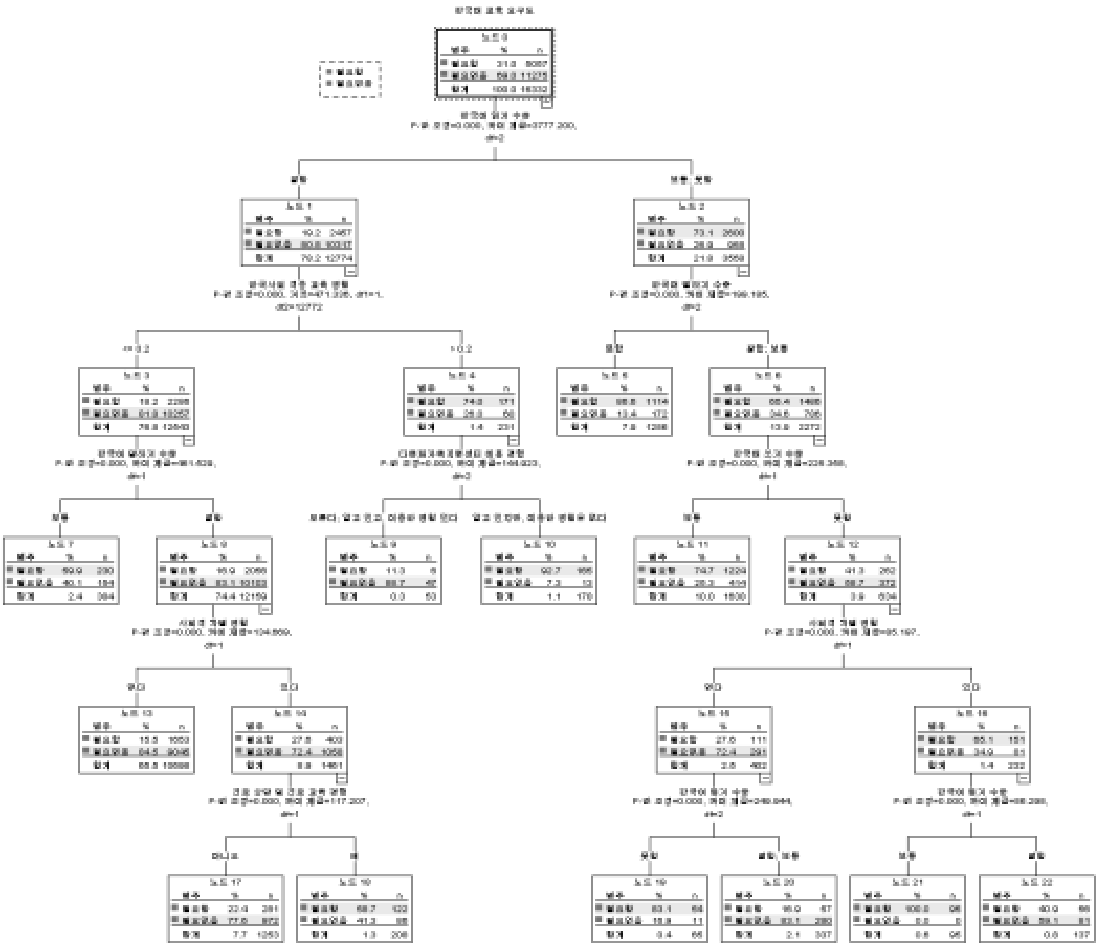

Figure 1: Prediction model for necessity level of Korean education

Table 2 is a profit graph of prediction model for the level of necessity for Korean education of multicultural children by QUEST algorithm suggested in the higher order of path for subjects' improved gain. In QUEST algorithm, the paths with improved gain of less than 100% are regarded as insignificant. When this study drew out profit indicator for each node to seek out prediction paths for the level of necessity for Korean education of multicultural children, 7 nodes were confirmed as significant paths which effectively predict the groups requiring Korean education.

The first path with the biggest profit indicator for the prediction of the level of necessity for Korean education was "multicultural young adults whose level of reading Korean was below average and whose level of speaking Korean was above average while the level of writing was low with the experience in social discrimination" and its profit indicator was 323.0%.

The second path was "multicultural young adults whose level of reading Korean was high with experience of adaptation education to Korean society but without the experience in use of Multicultural Family Support Center" and its profit indicator was 299.4%.

The third path was "multicultural adolescents whose level of reading Korean was below average and whose level of speaking Korean was also low" and its profit indicator was 279.8%. The fourth path was "multicultural young adults whose level of reading Korean was below average and whose level of speaking Korean was average while the level of writing and listening was low without the experience in social discrimination" and its profit indicator was 268.3%.

Table 2: A profit graph of prediction model for the level of necessity for Korean education of multicultural children by QUEST algorithm

Node no	Node n (%)[1]	Gain n (%)[2]	Response %[3]	Gain Index %[4]	Description
21	95 (0.6)	95 (1.9)	100	323.0	Reading level in Korean - Fair or Poor; Speaking level in Korean – Fair or Good; Writing level in Korean - Poor; Experience in social discrimination - Yes; Listening level in Korean - Fair
10	178 (1.1)	165 (3.3)	92.7	299.4	Reading level in Korean - Good; Experience of adaptation education to Korean society - Yes; Experience of having used Multicultural Family Support Center - Know the education but never used it before
5	1,286 (7.9)	1,114 (22.0)	86.6	279.8	Reading level in Korean - Fair or Poor; Speaking level in Korean –Poor
19	65 (0.4)	54 (1.1)	83.1	268.3	Reading level in Korean - Fair or Poor; Speaking level in Korean – Fair or Good; Writing level in Korean - Poor; Experience in social discrimination-No; Listening level in Korean - Poor
11	1,638 (10.0)	1,224 (24.2)	74.7	241.3	Reading level in Korean - Fair or Poor; Speaking level in Korean – Fair or Good; Writing level in Korean - Fair
7	384 (2.4)	230 (4.5)	59.9	193.4	Reading level in Korean - Good; Experience of adaptation education to Korean society -No; Speaking level in Korean -Fair
18	208 (1.3)	122 (2.4)	58.7	189.4	Reading level in Korean - Good; Experience of adaptation education to Korean society - No; Speaking level in Korean- Good; Experience in social discrimination - Yes; Experience in consultation on education and career path - Yes

[1] Node n(%); node number, % to 19,431
[2] Gain n(%); gain number, % to 5,055
[3] Response (%): The fraction of the needs of the Korean language education
[4] Gain index (%):=323.0 in total 12 node

The fifth path was "multicultural young adults whose level of reading Korean was below average and whose level of speaking Korean was above average and the level of writing was average" and its profit indicator was 241.3%.

The sixth path was "multicultural young adults whose level of reading Korean was high and whose level of speaking Korean was average without experience of adaptation education to Korean society" and its profit indicator was 193.4%.

The seventh path was "multicultural young adults whose level of reading and speaking Korean was high with experience in consultation on education and career path and in social discrimination but without experience of adaptation education to Korean society" and its profit indicator was 189.4%.

When the analysis on the prediction model by QUEST algorithm was completed, this study conducted 10-fold cross-validation test to assess developed prediction model. As the result of the (10-fold) cross-validation test to compare stability of drawn-out model, drawn-out risk index was 0.17 and misclassification rate was 17% for cross classification model, showing the same risk index (0.16) and misclassification rate (16%) of prediction model.

Discussion

So far, studies on Korean education for children from multicultural families have been mainly conducted on the necessity of Korean education, policies on Korean education and methodology of Korean education for children of school age. As these studies have been conducted assuming that the young adults from the age of 19 through 24 from multicultural families are already fluent in Korean language or sufficiently adapted to Korean society, those young adults from the age of 19 through 24 have not been even mentioned. This study constructed prediction model for the level of necessity for Korean education of young adults from the age of 19 through 24 from multicultural families and suggest following policies.

First, continuous Korean education is required for young adults from multicultural families. Currently, policies on Korean education for children from multicultural families have focused only on primary and middle school education. As this study found out that young adults from multicultural families still need Korean education, policies for Korean education for this group are necessary. Korean education for them should focus not only on the improving daily communication abilities but also on obtaining academic achievements in universities and cultivating sense of community necessary for them to live as healthy individuals in Korean society.

Second, it is necessary perform thorough analysis on the demand of children from multicultural families for Korean education when establishing education curriculum and policies. It is the analysis on needs that is generally conducted at the time of establishment of educational curriculum. Demand for Korean education is not simply decided by the lack of Korean language capability of reading, listening, speaking and writing but also complexly influenced by various factors such as experience of adaptation education to Korean society, experience of social discrimination and experience in use of Multicultural Family Support Center. As this study found out that although the lack of language ability such as reading and writing works as factor for the need of Korean education, those who have high level of language ability but at the same time experienced social discrimination or have little or no experience to have used Multicultural Family Support Center also have higher level of need for Korean education, the need for Korean education should be analyzed with various factors taken into consideration.

Third, the factor which has the biggest effect on the necessity of Korean education is the level of 'reading.' Reading is important in that it not only is the most important area of activity and is vital in the interpersonal function and 'getting along' in society but also can become major channel of access to information [12] because reading ability is utilized in various ways from understanding traffic lights, use of materials like books and magazines and access to computer and internet to the provision of important input data like information and news in daily life. Therefore, the critical area to pay most attention to in Korean education of multicultural children is judged to be reading. In addition, as overall order of effect on the level of necessity of Korean education is 'reading > speaking > writing > listening', Korean education of multicultural children from the age of 19 through 24 should place more importance to reading education.

Fourth, tailored Korean education reflecting multicultural young adults' demand for Korean education is required. Since studies so far have not considered the factors deciding the level of necessity of Korean education, only uniform methods and policies of Korean education have been suggested. Still, since the level of necessity for Korean education is influenced by various factors, tailored Korean education considering linguistic ability and social experience which affect the level of necessity of Korean education is required.

Fifth, in addition to Korean education, education and policy on the factors affecting the level of Korean education is required. As most young adult who experienced social discrimination keenly feel the necessity of Korean education, counseling programs are required to treat various mental problems such as anxiety, depression and post-traumatic stress together with language education. On top of that, as experience in use of Multicultural Family Support Center, experience of adaptation education to Korean society and experience in consultation on education and career path are the factors which have significant effect on the necessity of Korean education, it is necessary for Multicultural Family Support Center to promote the use of the Center by multicultural children with diverse programs ready to be applied and the government should implement policies to conduct adaptation education to Korean society and consultation on future education and career path.

Conclusions

Based this study model, systematic education and development of programs are required for effective Korean education for young adults from multicultural families.

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