



Comparative Personality Education of Preschoolers, Adolescents and University Students Through Big Data and Network Analysis

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The purpose of this study is to suggest the direction that should be pursued after exploring the status of personality education for preschoolers, adolescents and college students by analysing big data using social network analysis. Data were gathered using the key words ‘preschoolers personality’, ‘adolescents personality’ and ‘personality of college students’, and the social network analysis was conducted using refined data. The research findings reveal that education that utilises media for personality education targeting preschoolers is necessary for student development and it is more crucial to give personality education to preschoolers at home. This is due to the fact that parents and grandparents greatly influence the development of preschoolers’ personalities at home. As for the adolescent personality, the research findings indicate that schools play more important roles in humanistic education. For this reason, schools should organise effective lectures and special lectures for personality education and provide opportunities for all students to perceive the importance of humanism. In terms of the college student group, the study has found that learners need to consolidate their personality through mentoring programs with professors, seniors and peers or through social activities. The results of the study suggest that the personality education approach would produce highly qualified and well-rounded members of society in accordance with emphasising the importance of the employee’s personality in the job market. Furthermore, people who have developed personality through personality education are a vital resource in this modern information-oriented society.



Key words: *Personality education; preschoolers; adolescents; university students; big data; social network analysis.*

Introduction

When the 2016 World Economic Forum (WEF 2016) focused on the theme of ‘Mastering the Fourth Industrial Revolution’, the key issue was adaptation to change. Emphasis was placed on potential changes to the content of education. In particular, with the development of technology, it was emphasised that human character education should not be overlooked. In addition, WEF 2016 presented social and emotional learning (SEL) skills, emphasising personality qualities that have the ability and resilience to cope with changing environments (Lee & Lim, 2019; Lee et al., 2017).

The importance of humanity is emphasised around the world, but it seems that virtues such as humanity and morality are getting lost in this modern society due to the technologically advanced world we inhabit. We frequently see news stories about celebrities incurring public anger because of inappropriate words and actions that jeopardise their careers. In such cases, we are witnessing a situation in which a celebrity’s reputation and career may be instantly destroyed as a result of their negative behaviour. It is clear that personality education is needed to develop children with good personalities (Yoon et al., 2017).

Today’s society has made progress in material civilisation, but it puts too much emphasis on achievement and competition, and this has consequences. Bullying in school and school violence have caused serious problems, and various problems have been pointed out in the personality, morality and sociality of adolescents. One of the causes is interpreted as absence from home and school education. In recent years, virtues-centred personality education has been conducted to directly teach desirable human values and virtues while emphasising practically oriented personality education to build desirable human characteristics, including sociality and emotional regulation (Yoon et al., 2017).

So are we doing character education right now? Isn’t it just emphasising the concept of personality education? There is a great deal of concern about how to teach the humanity that has not been learned in today’s system, which emphasises the importance of humanity to students without specific instruction. In recent years, the main educational goal of our society has been to cultivate creative human resources with desirable personalities and the ability to exercise moral judgement (Ministry of Education Science and Technology, 2009). Such humanity is already having a great influence on our education, so it will be effective for a long time to come. What should we do? Can character education proceed without repercussions?



Part of this concern is the recognition of the concept of humanity and the correct formulation based on it. Character education is an area that deserves more attention in the Fourth Industrial Revolution. In other words, it is necessary to create innovative education that can reinforce humans' natural mental capacity in a rapidly changing society. Personality education will play a role at the vanguard of such innovation.

Personality – which means human character – is a very important area of education from infancy and childhood, but recently personality education has not been practised at home or school due to social changes. This study examines the concern that character education should occur at each stage of growth: for infants, adolescents and college students. It seems natural that the more attention is paid to one's personality in society, the more attention is paid to the character education of Korean children. So what is the status of humanistic education, which is considered to be crucial in this society? What kinds of education models are being implemented at schools? The purpose of this study is to suggest directions for humanistic education after comparing and analysing the actual situation of humanistic education for preschoolers, adolescents and college students. Textom is used to analyse the big data that have been accumulated in Korean society.

Textom has been chosen to conduct this big data analysis since no research has compared and studied personality education for all ages of youth; while some research does relate to humanistic education, it was only conducted for each age separately.

The following are the research questions used to achieve the goal of this research study:

1. What is the social perception and reality of personality education for preschoolers through big data and network analysis?
2. What is the social perception and reality of personality education for adolescents through big data and network analysis?
3. What is the social perception and reality of personality education for college students through big data and network analysis?

Materials and Methods

The purpose of this study is to recognise the personality of children by analysing social networks and refining the data collected from domestic portal sites containing online data to grasp the personality of children – that is, the characteristics of preschoolers, adolescents and college students. The detailed research method is described below.

Data Collection Target

The analysis subjects selected in this study are domestic online data focused on the personality of preschoolers, adolescents and college students. Data collection was done with Textom (2011), which is a convenient and optimised big data batch processing solution that collects online data for each channel of domestic and overseas portal sites (Google, etc.). The researchers determined that collecting data using Textom was the most accurate and easy way to collect and refine data and generate matrix data.

The analysis data were searched with the key word ‘preschooler + personality’, ‘adolescent + personality’ and ‘college student + personality’ in the search collection of Textom, and the perceptions of children’s age-specific personality were analysed through the key word direction. The data on the personality of children by age was collected and three perceptions were analysed. Naver blogs and Naver cafes, which are Korean online social clubs, Daum blogs and Daum cafes, another form of Korean online social clubs, and news articles from Naver, Daum and Google were chosen as the collection channels. Data collection for preschoolers’ personality was set for the period 3 December 2015 to 3 December 2018; during this period, the amount of news, cafes and blog searches was maintained over 5,000 items per month.

Since the subjects of this study have no limitations on age and gender, they are centred on text data that can be shared by anyone, so videos and images are not included. Specialised information such as academic papers, reports, statistics and national records were excluded from the collection. A total of 27,465 items of data were collected for the study, totalling about 9.54 MB. The data collected in this study are shown in Table 1.

Table 1: Collected data

Key word	Data frequency	Data amount (KB)
Preschooler + personality	16,365	5,826
Youth + humanity	5,483	1,904
University + personality	5,617	2,037

In the collected data, 16,365 (5,826 kb) of ‘preschooler + personality’ data were searched and 5,483 (1,904 kb) were data searched for using the key words ‘youth + humanity’. Lastly, 5,617 cases (2,037 kb) were searched for using the key words ‘university + personality’. This shows that the data searched for using ‘infant + personality’ is relatively large, whereas the ‘youth + humanity’ and ‘university + personality’ data are relatively small. The data on adolescent personality was the smallest body of information.



Data Collection and a Tool for Data Analysis

Social network analysis is a very effective methodology for explaining the effects of social structures (Kim et al., 2014). Social network analysis consists of lines containing points and links that represent nodes between variables (Lee, 2012). In addition, social network analysis is useful for explaining social perceptions and identifying relationships between key words based on the relationship between units (Choi & Choi, 2016). This social network analysis starts from the human relations network and is now expanding into the areas of policy, business, economy and education (Lee, 2012). In this study, the social network analysis tool was used to find out the connection between the personality of young children, the personality of adolescents and the personality of college students.

‘Degree centrality’ can analyse and measure the influence that the connection points of the data network have with each other and can also analyse and measure the influence that can spread to other near-field key words (Kim & Shon, 2016). ‘Closeness centrality’ is an indicator of how closely one connection point and the other connection point are located to describe a selected key word. ‘Betweenness centrality’ indicates whether there is an arbitration role between the connection points.

Results and Discussion

The purpose of this study was to examine social perceptions of children’s personality education and to suggest the direction of personality education through big data analysis. The researcher therefore collected online data using Textom, and the final collected data were subjected to the first refinement and the second refinement to calculate word frequency.

The top 50 words among those analysed were converted into symmetric matrix data and visualised by social network analysis. To examine the statistical significance of the network data, we used the bootstrap technique, which enables one-sample t-test using the Ucinet6 program (Kwahk, 2014). This technique can be used to calculate data averages and standard errors, and the statistics can be used to test whether the relationships between networks are significant (Seo, 2015). Moreover, the correlation between data was examined by analysing the degree of influence on the collected key words by calculating the connection centrality and the proximity centrality. The results of this study are as follows.

Analysis of data related to ‘preschooler personality’, ‘adolescent personality’ and ‘college student personality’ through big data

In order to analyse the perception of preschooler personality based on big data analysis, we collected data related to ‘preschooler + personality’ through Textom, and calculated the word

frequency after first and second refinement of the collected data. Table 2 shows the frequency of key words related to ‘infant + personality’.

Table 2: Frequency of key words related to ‘infant + personality’

Rank	Word	Freq.	Rank	Word	Freq.	Rank	Word	Freq.
1	Education	2359	18	Day care centre	676	35	Soft water	502
2	Book	2315	19	Creativity	667	36	Experience	500
3	Kinder-garten	1841	20	Mother	652	37	Certificate	499
4	Program	1505	21	Picture book	634	38	Children’s personality Fairy tale	486
5	Operation	1146	22	Forest	609	39	Nature	484
6	Fairy tale	1136	23	Object	604	40	Happiness	478
7	Early childhood education	1081	24	Play	577	41	Professor	466
8	Personality education	1056	25	Need	575	42	Consideration	462
9	Parents	994	26	Think	568	43	Nuri Course	457
10	Mind	993	27	Develop	568	44	Time	453
11	Teacher	850	28	Friend	562	45	Fun	446
12	Personality fairy tales	746	29	Class	542	46	Start	432
13	Words	742	30	Cultivation	532	47	Process	413
14	Story	715	31	Subject	525	48	Life	393
15	Help	685	32	Elementary School	517	49	Growth	384
16	Complete works	683	33	Support	516	50	Social	378
17	Activity	681	34	Student	513			

Source: Ucinet6.

As a result of analysing word frequency according to simultaneous appearance by collecting online data related to ‘preschooler + personality’, ‘education’ showed the highest frequency at 2,359 times, followed by ‘book’ (2,315), ‘kindergarten’ (1,841) and ‘program’ (1,505). ‘Fairy tale’ (1,136) was the sixth most frequent, and words such as ‘infant education’, ‘humanity education’, ‘parent’, ‘mind’, ‘teacher’ and ‘humanity fairy tale’ were in the top 50.

Network analysis

The top 50 major words analysed through online text data related to ‘preschooler + personality’ were converted into a symmetrical matrix, and social network analysis was conducted utilising the Ucinet6 program (Borgatti et al., 2013).

As a result of the significance test of network data, network data related to ‘preschooler + personality’ has 0.0002 probabilities that the absolute value is larger than z-score. In other words, the relationship among the network data related to ‘preschooler + personality’ is statistically significant when the significance level is .05. The network analysis of ‘preschooler + personality’ is visualised through Netdraw (Kim et al., 2014), as shown in Figure 1.

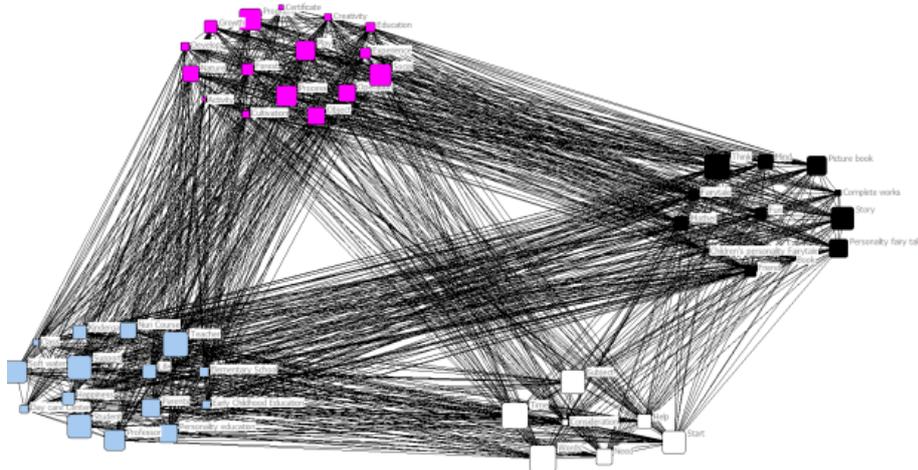


Figure 1. Visualisation of ‘preschooler + personality’ network

Source: Netdraw.

Based on the network of the top 50 words related to ‘preschooler + personality’, degree centrality, closeness centrality and betweenness centrality were calculated to analyse the influence of each word on ‘preschooler personality’. Table 3 shows the results of the centrality analysis of the key words of ‘preschooler personality’.

Table 3: Centrality of main words on ‘preschooler + personality’

No	Degree centrality		Closeness centrality		Betweenness centrality	
	Word	Centrality	Word	Centrality	Word	Centrality
1	Education	0.189	Education	1.000	Education	1.470
2	Book	0.121	Book	1.000	Book	1.470
3	Kindergarten	0.195	Kindergarten	1.000	Kindergarten	1.470
4	Program	0.135	Program	0.990	Happiness	1.470
5	Operation	0.115	Operation	0.980	Activity	1.470
6	Fairy tale	0.088	Fairy tale	1.000	Fairy tale	1.470
7	Early Childhood Education	0.084	Early Childhood Education	0,990	Time	1.470
8	Personality education	0.092	Personality education	0,980	Personality education	1.470
9	Parents	0.094	Parents	1.000	Parents	1.470
10	Mind	0.072	Mind	0.990	Words	1.470

Source: Ucinet6.

As a result of the analysis of the centrality of the 50 major search terms related to ‘preschooler personality’, in terms of the centrality of connection ‘education’, ‘book’, ‘kindergarten’, ‘program’, ‘operation’, and ‘fairy tale’ were found to be higher from the most frequent searched term to the least frequent searched term. In other words, we can see that these words are directly connected to various words among the key words related to ‘preschooler personality’. Next, as a result of analysing the closeness centrality, education, book, kindergarten, program, operation and fairy tale were higher from the most frequent to the least frequent searched term. Words with high closeness centrality can easily reach all words in the data network.

Thus, education, books, kindergartens, programs, operation and fairy tales play a central role in the network structure of preschooler personality. Finally, as a result of analysing betweenness centrality, education, book, kindergarten, happiness, activity and fairy tale were higher in order.

In other words, we can see that ‘education’, ‘book’, ‘kindergarten’, ‘happiness’, ‘activities’ and ‘fairy tales’ have a lot of influence by acting as mediators for connecting with other words in the network structure.

Analysing data related to ‘adolescent personality’: Word frequency analysis by simultaneous appearance

To analyse the perception of adolescent personality based on big data analysis, the data related to ‘adolescent + personality’ were collected through Textom. After refining the collected data, the word frequency by simultaneous appearance was calculated. The frequencies of key words related to ‘adolescent + personality’ are shown in Table 4.

Table 4: Word frequency of key words related to ‘adolescent personality’

No	Word	Frequency	No	Word	Frequency	No	Word	Frequency
1	Education	1005	6	School	389	11	Practice	326
2	Program	778	7	Hold	389	12	Object	324
3	Youth Personality Education	665	8	Operation	386	13	Camp	315
4	Progress	598	9	Activity	342	14	Special Lecture	307
5	Personality education	526	10	Student	334	15	Parents	299

Source: Ucinet6.

As a result of analysing word frequency with simultaneous appearance by collecting online data related to ‘adolescent + personality’, ‘education’ showed the highest frequency at 1,005 times, followed by ‘program’ (778) and ‘adolescent personality education’ (665). ‘Progress’ (598) was also found to have a high frequency. In addition, ‘school’ (389) was the sixth most common frequency, and words such as ‘student’, ‘implementation’, ‘parent’, ‘support’, ‘future’ and ‘growth’ were included in the top 50 major words.

Network analysis

The top 50 key words analysed related to ‘adolescent + personality’ were converted into symmetric matrices, and a social network analysis was conducted using the Ucinet6 program. First, as a result of the significance test of network data, the network data related to ‘adolescent + personality’ has 0.0001 probabilities that the value of absolute value is larger than z-score. In other words, the relationship among network data related to ‘adolescent + personality’ is considered to be statistically significant when the significance level is .05. The network analysis of ‘adolescent + personality’ can be visualised using Netdraw as shown in Figure 2.

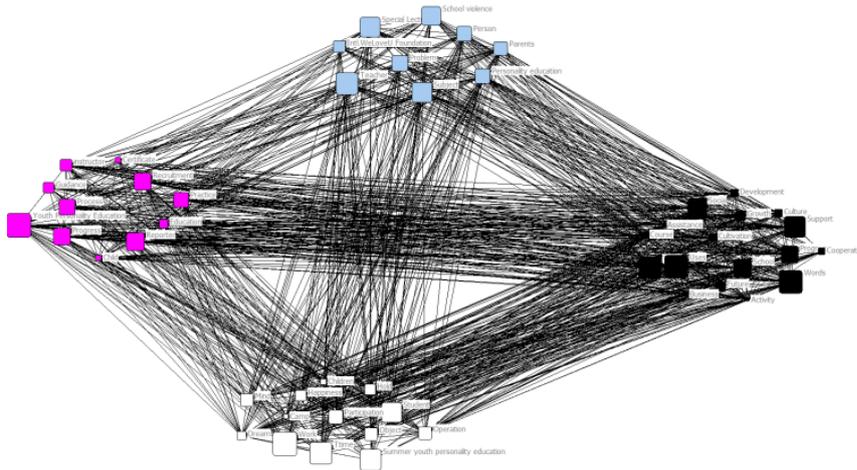


Figure 2. Network visualization for ‘adolescent + personality’
Data source: Netdraw.

Based on the network of the top 50 words related to ‘adolescent + personality’, degree centrality, closeness centrality and betweenness centrality were calculated to analyse the influence of each word on ‘adolescent personality’. Table 5 shows the results of the centrality analysis of the key words of ‘adolescent personality’.

Table 5: Centrality of key words on ‘adolescent + personality’ (Source: Ucinet6)

No	Degree centrality		Closeness centrality		Betweenness centrality	
	Word	Centrality	Word	Centrality	Word	Centrality
1	Education	0.258	Education	1.000	Education	0.487
2	Program	0.199	Program	1.000	Program	0.487
3	Youth Personality Education	0.171	Youth Personality Education	0.990	Object	0.487
4	Progress	0.183	Progress	1.000	Progress	0.487
5	Personality education	0.141	Personality education	1.000	Personality education	0.487
6	School	0.098	School	0.990	Practice	0.462
7	Hold	0.100	Hold	0.990	Hold	0.462
8	Operation	0.100	Operation	0.949	School	0.441
9	Activity	0.077	Activity	0.990	Children	0.436
10	Student	0.105	Student	0.990	Youth Personality Education	0.432

As a result of the analysis of the centrality of the 50 major words related to ‘adolescent + personality’, the degree centrality was the highest, in order, for ‘education’, ‘program’, ‘adolescent personality education’, ‘progress’, ‘humanity education’ and ‘school’. In other words, these words are directly connected to various words among the key words related to ‘adolescent personality’. Next, as a result of analysing the closeness centrality, education, program, adolescent personality education, progress, humanity education and school were the highest, in order. Words with high proximity centres can easily reach all words in the data network.

Therefore, ‘education’, ‘program’, ‘adolescent personality education’, ‘progress’, ‘humanity education’ and ‘school’ play a central role in the network structure of ‘youth personality’. Finally, as a result of analysing the betweenness centrality, ‘education’, ‘program’, ‘object’, ‘progress’, ‘humanity education’ and ‘implementation’ were shown to be the highest, in order. In other words, we can see that ‘education’, ‘program’, ‘object’, ‘progress’, ‘humanity education’ and ‘implementation’ have a lot of influence by acting as mediators for the other words in the network.

Analysing data related to ‘college student personality’

In order to analyse the perception of college students’ personality based on big data analysis, the data related to ‘college student + personality’ was collected through Textom and refined to calculate the word frequency by simultaneous appearance. Table 6 shows the frequency of key words related to ‘college student + personality’.

Table 6: Frequency of key words related to ‘college student + personality’

No	Word	Frequency	No	Word	Frequency	No	Word	Frequency
1	Student	1953	6	University	1074	11	School	927
2	Research	1736	7	Education	1029	12	Progress	899
3	Program	1500	8	Child	1022	13	Operation	844
4	Youth	1353	9	Support	1018	14	Course	753
5	Personality education	1299	10	Activity	945	15	Employment	729

Source: Ucinet6.

As a result of analysing the word frequency according to simultaneous appearance by collecting online data related to ‘college student + personality’, ‘student’ showed the highest frequency at 1,953 times, followed by ‘research’ (1,736), ‘program’ (1,500) and ‘youth’ (1,353). In addition, ‘humanity education’ (1,299) had the fifth highest frequency, and words such as ‘education’, ‘career’, ‘job’, ‘society’ and ‘impact’ were included in the top 50 major words.

Network analysis

The top 50 major words analysed through online data related to ‘college student + personality’ were converted into a matrix and social network analysis were implemented through the Ucinet 6 program.

First, as a result of the significance test of the network data, the network data related to ‘college student + personality’ has 0.0003 probabilities that can be a larger absolute value than the z-score. In other words, the relationship among network data related to ‘college student + personality’ is statistically significant at the .05 significance level. The network analysis related to ‘college student + personality’ can be visualised using Netdraw, as shown in Figure 3.

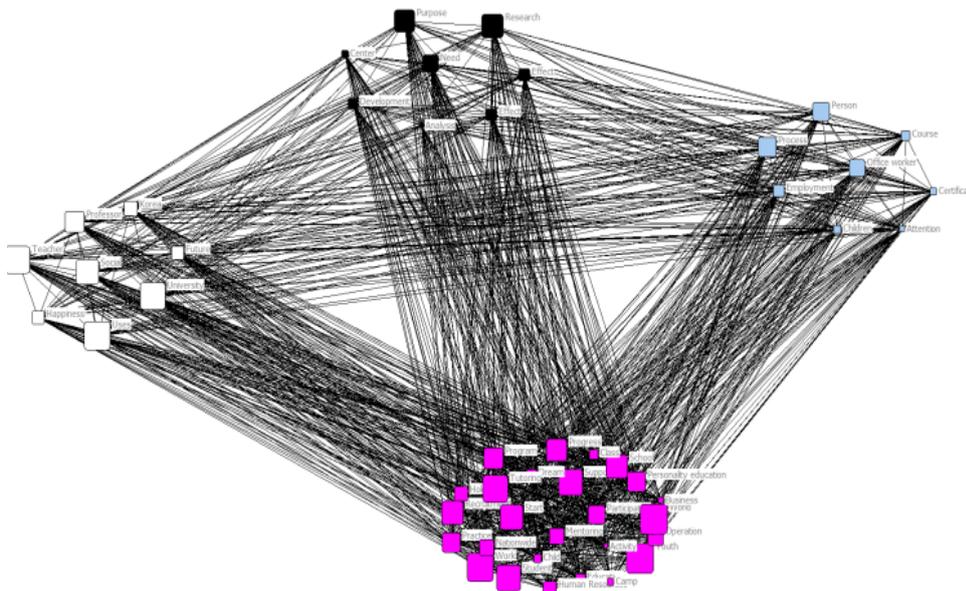


Figure 3. Visualisation of ‘college student + personality’ Network

Source: Netdraw.

Based on the network of the top 50 key words related to ‘college student personality’, degree centrality, closeness centrality and betweenness centrality were calculated and the influence of each word on ‘college + student personality’ was analysed. Table 7 shows the results of the centrality analysis of the key words for ‘college student + personality’.

Table 7: Centrality of key words on ‘college student + personality’

No	Degree Centrality		Closeness Centrality		Betweenness Centrality	
	Word	Centrality	Word	Centrality	Word	Centrality
1	Student	0.200	Student	1.000	Student	0.119
2	Research	0.171	Research	0.959	Child	0.119
3	Program	0.207	Program	1.000	Program	0.119
4	Youth	0.169	Youth	1.000	Youth	0.119
5	Personality education	0.145	Personality education	1.000	Personality education	0.119
6	University	0.108	University	1.000	University	0.119
7	Education	0.106	Education	1.000	Education	0.119
8	Child	0.097	Child	1.000	School	0.119
9	Support	0.128	Support	1.000	Support	0.119
10	Activity	0.102	Activity	0.990	Practice	0.119

Source: Ucinet6.

As a result of the analysis of the centrality of the 50 major words related to ‘college student + personality’, in terms of the degree centrality, ‘student’, ‘research’, ‘program’, ‘adolescent’, ‘humanity education’ and ‘university’ were the highest, in order, of the searched terms. In other words, these words are directly connected to various words among the key words related to ‘college student + personality’. Next, as a result of analysing the closeness centrality, the words ‘student’, ‘research’, ‘program’, ‘adolescent’, ‘humanity education’ and ‘university’ were ranked higher, in order. Words with high closeness centrality can easily reach all words in the data network. Thus, ‘students’, ‘research’, ‘program’, ‘adolescent’, ‘humanity education’ and ‘university’ play a central role in the network structure of ‘college student + personality’.

Finally, as a result of analysing the median centrality, ‘students’, ‘children’, ‘program’, ‘adolescent’, ‘humanity education’, and ‘university’ appeared in the highest order. In other words, ‘students’, ‘children’, ‘programs’, ‘adolescent’, ‘humanity education’ and ‘university’ have a lot of influence by acting as mediators for connecting with other words in the network structure.

Conclusion

The purpose of this study was to examine the status of personality education in preschoolers, adolescents and college students in Korea by analysing big data using social network analysis, and to suggest future educational plans. Data were collected on ‘preschooler personality’, ‘adolescent personality’ and ‘college student personality’. The word frequency

was then calculated by simultaneous appearance through refining of collected data, and the social network on the top 50 key words was analysed. The results of analysis are as follows.

First, as a result of analysing data related to ‘preschooler personality’, word frequency appeared in the order of ‘education’, ‘books’, ‘kindergarten’, ‘program’, ‘operation’, ‘fairytale’, ‘preschooler education’, ‘humanity education’, ‘parents’, ‘mind’ and so on. In particular, in all centralities, such as degree centrality, closeness centrality and betweenness centrality, these words can be interpreted as playing a meaningful role in the network with relatively high centrality value. In addition, words such as ‘parent’, ‘play’ and ‘time’ showed lower frequency than words such as ‘education’, ‘books’, ‘kindergarten’, etc., but high values in closeness centrality and betweenness centrality. The findings therefore suggest that the words ‘parent’, ‘play’, ‘time’, etc. are not apparent, but are closely related to other data in the network. In summary, it was once again confirmed that playtime with parents is an important factor for preschoolers’ personality development. Early childhood institutions such as kindergartens should not only provide personality education through books but also have humanity education time so children have the opportunity to play with their parents at home.

Second, as a result of analysing the data related to ‘adolescent personality’, word frequency appears, in order, as ‘education’, ‘program’, ‘adolescent’, ‘personality education’, ‘progress’, ‘humanity education’, ‘school’, ‘holding’, ‘operation’, ‘activity’ and ‘student’. In particular, in all centralities, the words ‘education’ and ‘program’ can be interpreted as playing a meaningful role in the relatively high centrality value and data network. On the other hand, the words ‘social’, ‘certification’, ‘dream’, ‘process’ and ‘help’ showed lower frequency than words such as ‘education’ and ‘program’, but were high in degree centrality and closeness centrality.

In summary, it can be seen that personality education for teenagers is widely recognised as an educational program. In particular, the talents needed in society in the future will be able to benefit the future of youth as the perception is that those who have good character rather than those with good education or good specifications will be competitive. The current system must change. For example, if community and village projects are provided with personality involvement programs and the youth participation in these community personality programs is taken into account, this will benefit youth in many ways.

Third, as a result of analysing data related to ‘college student personality’, word frequency appeared in order of ‘student’, ‘research’, ‘program’, ‘youth’, ‘character education’, ‘university education’, ‘children’, ‘support’ and ‘activity’. In particular, it can be interpreted that the words ‘students’, ‘humanity education’ and ‘programs’ play a meaningful role in the data connection network with relatively high centrality values. In particular, words such as ‘job’, ‘centre’, ‘operation’, ‘society’ and ‘participatory process’ showed lower frequency than



words such as ‘education’ and ‘program’, but were high in degree centrality and closeness centrality. In other words, personality education programs are being conducted for college students, but if a personality program related to job preparation is presented or personality education programs are developed in which social participation is possible, the educational effect will be improved.

a result of analysing ‘preschooler personality’, it was found that there was not a wide variety of mediums that children could easily access to develop an interest in in personality education. More specifically, these findings demonstrate that character education is being conducted in a form of telling stories in a limited medium –for example, books and fairy tales.

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