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Keyword Network Analysis on the Integrated Research Trends of Early Childhood Education and Childcare

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Background/Objectives: The purpose of this study is to provide basic data on preparing a soft landing plan for the integration of early childhood education and childcare policies by exploring research trends of the integration of early childhood education and childcare through keyword network analysis. **Methods/Statistical analysis:** Based on the data provided by the National Research Foundation of Korea, we collected raw DATA on the keyword 'integration early childhood education and childcare'. The collected data was subjected to a first and second refinement process, and 104 keywords were selected based on the extracted word frequency. A 1-mode matrix was created and a keyword network analysis was conducted. **Findings:** According to the needs of the times and the global trends, the number of papers in 2 periods than 1 period increased significantly. In addition, as a result of examining the research trend by periods, 'teacher', 'certificate', 'perception', 'system', and 'teacher preparation program' were important during period 1, while 'In Jung children's centers', 'policy', 'unification', 'infant', 'analysis', 'Nuri curriculum' and young children' were important during period 2. Based on these results, we suggested implications for integration early childhood education and childcare. **Improvements/Applications:** In the future, It is suggested not only to investigating the perception of integration early childhood education and childcare and to express opinions, but also to provide a place for regular discussion where all stakeholders participate in in-depth discussions on the soft landing plan of integration early childhood education and childcare policy do.

Keywords: *Keyword Network Analysis, Integration, Early Childhood Education, Childcare, Research Trend.*

Introduction

For a happy society centred on infants, good quality childcare and childcare policies should be developed, along with administrative and financial support. Globally, policy changes focusing on early childhood education and childcare are actively being carried out, and the size and subject of the business is also gradually expanding and diversifying. As the awareness of the importance of infants / toddlerhood increases, support for infants and toddlerhood will be the most definitive preparation for the future in the current society with low birth rates and aging issues.

There is a growing awareness of the importance of early childhood education and childcare, and due to the increase in female employment, there is a growing demand for quality early childhood education and care. In addition, due to the high interest in early childhood education and childcare in OECD countries, interest in early childhood education and childcare policies is gradually increasing in Korea. At present, the direction of early childhood education and childcare policy in Korea is getting better by establishing the public system, such as quality management and financial support from the state. It aims to establish a new form of early childhood education and childcare system by including education and childcare of elementary school preschool infants in public education and the public education system.

The integration of early childhood education and childcare has become one of the long-standing controversies in the field of early childhood education in Korea due to the fact that the two fields have different backgrounds in law, institution, purpose and function. Recent social changes have increased the participation of women in society, and government measures to solve low birth problems have become active. As the functions of kindergartens and childcare are increasingly becoming similar, and the boundaries become blurred, the necessity of reservation integration is emphasised (Rhee et al., 2008). So far, the concept and role of early childhood education and childcare, free education of young children and infants, extension of kindergarten full day operation, expectations for interdisciplinary education of early childhood education, transition of kindergarten to early childhood, . However, in 2012, free education for young children began. After the plan to support the childcare allowance by local educational financial grants was established, discussions about the integration of early childhood education and childcare have been proceeding rapidly.

According to the Early Childhood Education Act and Infant Childcare Act, early childhood education and childcare means that the services are divided into two groups in terms of service functions, teacher qualifications, facility standards, and training course etc., (Kim et al., 2014). Currently, the educational system for infants and toddlers in Korea is divided into administrative departments, institutions, service targets, teacher standards, names, and related

matters. There has been expanded financial support for childcare, but inefficiency among ministries has been a problem (Moon et al., 2009).

Recently, integration of early childhood education and childcare, which has emerged as a hot issue in early childhood education and childcare, has received great social attention. This is a major policy of the government and it is already being actively discussed as a topic of regional education for early childhood education and childcare groups. This has attracted a great deal of attention not only in early childhood education and care workers but also in parents with infants and toddlers. In 2002, 10 ministries formed a T / F team to discuss the integration of early childhood education and childcare. But since 2013, in regards to the the 3-5 year-old Nuri curriculum, whilst some aspects have been integrated, the problem of inefficiency of the administrative and financial systems that is systematically dualised has come to the surface. Efforts to integrate early childhood education and childcare, which have so far maintained a dual system, have been going on for more than 10 years in academia and research. In recent years, however, the government has been attempting integration. The government established the Infant and Toddler Education Integration Team on February 14, 2014, and has integrated the government's diverse management departments for the three years from 2014 to 2016, and integrate the financial integration of early childhood education and childcare And plans to finalize the integration of reserves.

However, there was a difficulty in improving the quality of services due to the pursuit of profit for the early childhood education and childcare services led by the private market. In other words, as the choice of parents is emphasised rather than the equality of starting points, it becomes an obstacle to the integration of reservations (Adamson and Brennan 2014). In addition, the results of previous research on the study of reservoir integration also showed that most of the previous research was limited to the recognition of the sample group based on the survey. Therefore, it is necessary to grasp trends of previous research through network analysis (Lee 2017).

In this study, we analyse the research trend of reservation integration through keyword network analysis. In order to analyse the research trend of reservoir integration, we collected the keywords presented in the journal research. The keywords and main words displayed in the research of the journal are concentrated and expressed by the researcher in order to express his or her idea or topic well (Jung et al., 2017; Kim and Yu 2013).

The purpose of this study is to provide basic data in preparing soft landing plan for the integration of early childhood education and childcare policy by exploring research trends of integration of early childhood education and childcare through keyword network analysis. The purpose of this study is to suggest the implications of the integration of early childhood education and childcare. In order to achieve the purpose of this study, what are the research

trends of the integration of early childhood education and childcare through keyword network analysis?

Materials and Methods

Research Data

In this study, raw DATA was collected from the journal provided by the National Research Foundation of Korea. The collection period was for the 10 years from 2009 to 2018, starting in 2010, when meaningful discussions on the integration of early childhood education and childcare in the field of early childhood education began to be made. Raw DATA was collected as a core keyword of integration of early childhood education and childcare. The collected data is of 46 journals derived from 173 journals. A total of 104 nodes are small-scale nodes data (Yousefi et al., 2020).

Analysis Tools

This study used the Korea Citation Index, the journal database system developed by NRF, to collect and refine data on integration of early childhood education and childcare (Kang et al., 2018). In addition, UCINET and NetDraw were used to analyse the network structure between integration of early childhood education and childcare related keywords (Borgatti et al., 2013).

Data Refining

For the purposes of this study, data cleaning was performed to derive meaning from raw DATA, and text mining was performed on the first refinement. In addition, Excel 2010 is used to remove keywords that are not relevant to core keywords, or that are inappropriate for analysis due to spacing. In the second refinement, synonyms or similar words were nominalised and used for analysis based on representative keywords (Yousefi et al., 2020; Hwang and Lee 2017; Kim et al., 2018).

Data Analysis

In this study, data on the integration of early childhood education and childcare was collected from the journal provided by the NRF and the 1st and 2nd refinements were conducted through text mining. The frequency analysis was performed based on the refined data through data cleaning, the top 20 nodes were selected and a 1-mode matrix data set was created (Borgatti et al., 2013). The network analysis was divided into a micro level and a macro level (Hwang and Lee 2017), and the procedure is as follows. First, frequency analysis was conducted to examine the research trends by period. Second, node, density, average connection distance,

number of components, diameter and network centralisation were analysed to identify network attributes. Third, in order to understand the structural characteristics among the nodes in the network, we analysed degree centrality (Kang et al., 2018; Borgatti et al., 2013). Fourth, NetDraw was used to visualise each network (Hwang and Lee 2017; Kim et al., 2018).

Results and Discussion

Frequency of Keywords Related to Integration Early Childhood Education and Childcare

Table 1: Frequency analysis result (top 20 node)

R	Period 1 (‘09-‘13)	N	R	Period 2 (‘14-‘18)	N
1	daycare	7	1	daycare	42
2	early childhood education	6	2	early childhood education	42
3	teacher	4	3	integration	35
4	integration	4	4	In Jung children's centres	9
5	certificate	2	5	policy	7
6	policy	2	6	unification	5
7	perception	2	7	infant	5
8	system	2	8	analysis	5
9	In Jung children's centeres	2	9	Nuri curriculum	5
10	unification	2	10	young children	5
11	young children	2	11	daycare centre	4
12	teacher preparation program	2	12	kindergarten	4
13	operating status	1	13	teacher	4
14	pre-school	1	14	assessment	3
15	parent	1	15	child	3
16	infant	1	16	education	3
17	Sweden	1	17	network	3
18	kindergarten	1	18	system	3
19	educational politics	1	19	new children and childcare system	3
20	-	-	20	quality	2

As shown in Table 1, the result of frequency analysis on the integration of early childhood education and childcare related keywords, a total of 104 keywords were extracted and the target nodes were selected based on 104 keywords. Table 1 shows the frequency analysis excluding the search terms results of the top 20 keywords among the selected keywords. The frequency analysis showed that the highest frequency was teacher (4), followed by certificate (2), policy (2), perception (2), system (2), In Jung children’s centres (2), unification (2), young

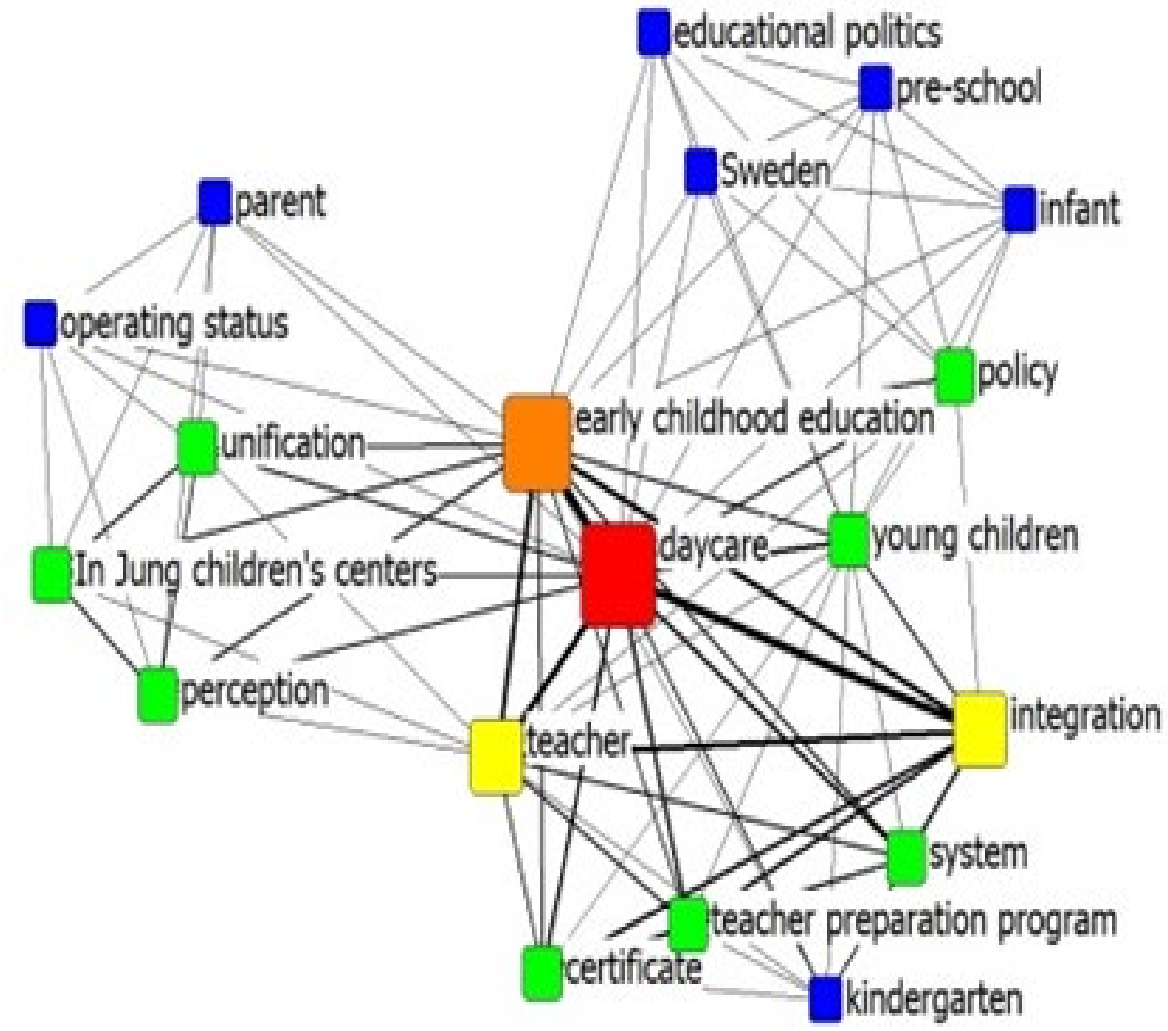
children (2), and teacher preparation program (2) during period 1, while the highest frequency of In Jung children's centres (9) followed by policy (7), unification (5), infant (5), analysis (5), Nuri curriculum (5), and young children (5) during period 2.

A Keyword Network Analysis of Integration Early Childhood Education and Childcare by Period

A Keyword Network Analysis during Period 1 (`09-`13)

The macro-level network structure for integration of early childhood education and childcare during period 1 is shown in Figure 1.

Figure 1. Period network (`09-`13)



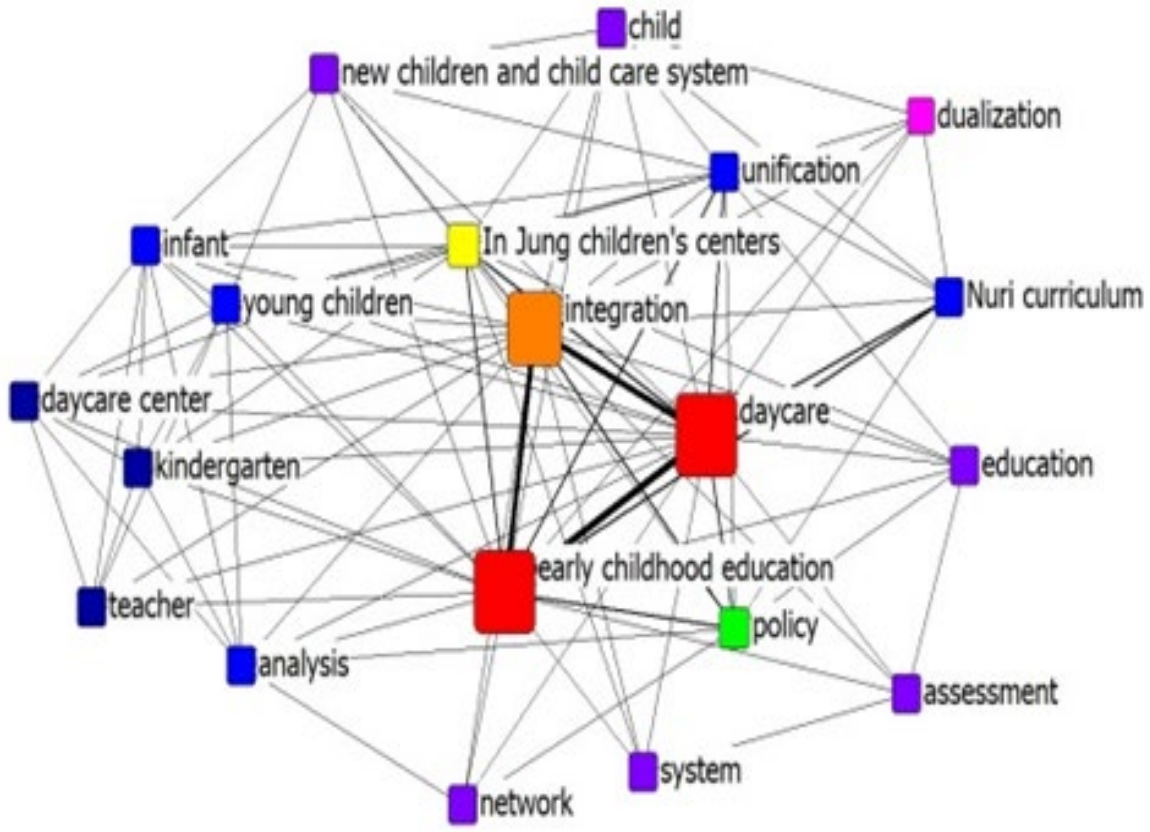
As a result of analysing the structural characteristics of the network of period 1, the nodes were 19, the density was .503, the average connection distance was 1.497, the number of components was 1, the diameter was 2 and the network centralisation was 25.485%.

As a result of testing the statistical significance of the network of integration of early childhood education and childcare during period 1, the average sampling distribution of the network data was 0.8655 and the standard error was 1.3953. As a result of calculating the Z-score, the probability that the network data for integration of early childhood education and childcare are greater than the Z-score is 0.0002 at Z = 4.6001, and the relationship between the network data at the significance level of 5%.

A Keyword Network Analysis during Period 2 (`14-`18)

The macro-level network structure for integration early childhood education and childcare during period 2 is shown in Figure 2.

Figure 2. Period network (`14-`18)



As a result of analysing the structural characteristics of the network of period 2, the nodes were 20, the density was .521, the average connection distance was 1.479, the number of components was 1, the diameter was 2, and the network centralisation was 14.475%.

As a result of testing the statistical significance of the network of integration of early childhood education and childcare during period 2, the average sampling distribution of the network data was 2.1158 and the standard error was 0.2783. As a result of calculating the Z-score, the probability that the network data for integration of early childhood education and childcare are greater than the Z-score is 0.0002 at Z = 2.6936, and the relationship between the network data at the significance level of 5%.

A Centrality Analysis of Integration of Early Childhood Education and Childcare by Period

In order to examine the micro-level network characteristics of integration of early childhood education and childcare, we conducted a centrality analysis of the top 20 keywords. The results are shown in Table 2.

Table 2: Centrality analysis result (top 20 node)

N	Period 1 (‘09-‘13)	Degree	N	Period 2 (‘14-‘18)	Degree
1	daycare	36.508	1	daycare	18.253
2	early childhood education	30.159	2	early childhood education	18.253
4	integration	22.222	3	integration	15.118
3	teacher	19.841	4	In Jung children’s centres	5.039
11	young children	13.492	5	policy	3.135
8	system	12.698	6	unification	3.135
5	certificate	12.698	7	infant	3.135
12	teacher preparation program	12.698	10	young children	3.135
9	In Jung children’s centres	8.730	9	Nuri curriculum	2.352
6	policy	8.730	12	kindergarten	2.352
7	perception	8.730	11	daycare centre	2.352
10	unification	8.730	8	analysis	2.240
18	kindergarten	7.937	13	teacher	2.240
17	Sweden	5.556	19	new children and childcare system	1.904
19	educational politics	5.556	15	child	1.456
16	infant	5.556	16	education	1.456
14	pre-school	5.556	17	network	1.456
13	operating status	4.762	18	system	1.120
15	parent	4.762	14	assessment	1.008
-	-	-	20	dualisation	.896

As shown in Table 2, the results of the centrality analysis of keyword network for integration of early childhood education and childcare were based on the top 20 keywords and the

standardised values were used to take into account the influence of the network scale. The centrality analysis excluding the search terms showed that the highest degree centrality was teacher (19.841), followed by young children (13.492), system (12.698), certificate (12.698) and teacher preparation program (12.698) during period 1, while the highest degree centrality was In Jung children's centres (5.039), followed by policy (3.135), unification (3.135), infant (3.135), young children (3.135), Nuri curriculum (2.352), kindergarten (2.352) and daycare centre (2.352) during period 2.

Conclusion

The purpose of this study is to provide basic data for preparing a soft landing plan for the integration of early childhood education and childcare policy by exploring research trends of integration of early childhood education and childcare through keyword network analysis. To do this, we collected raw DATA for 'integration early childhood education and childcare' and conducted network analysis focusing on frequency analysis and centrality analysis. The results of this study are as follows.

First, the result of examining the research trend by periods, 'teacher', 'certificate', 'perception', 'system', and 'teacher preparation program' were important during period 1, while 'In Jung children's centers', 'policy', 'unification', 'infant', 'analysis', 'Nuri curriculum', and young children' were important during period 2.

Second, the results of network analysis on the integration of early childhood education and childcare by period are summarised in two parts. First, analysis of structural attributes for network analysis during period 1 (`09-`13) showed 19 nodes, density of .503, average connection distance of 1.497, component number of 1, diameter of 2 and networks centralisation of 25.485% respectively. Also, in the statistical significance test of network for integration of early childhood education and childcare during period 1, the sampling distribution of the network data was 0.8655 and the standard error was 1.3953. In particular, the Z-score was calculated as Z = 4.6001 and the probability that the network data about the integration of early childhood education and childcare showed a larger absolute value than the Z-score was 0.0002. In addition, 'teacher', 'young children', 'system', 'certificate' and 'teacher preparation program' among the keywords that appeared in integration of early childhood education and childcare during period 1 are high in the centrality indicators such as connection centrality. In other words, the main keywords of integration of early childhood education and childcare during period 1 can be seen as 'teacher', 'system', 'certificate' and 'teacher preparation program'. Based on these keywords, we can identify keywords with high connection strength to integration of early childhood education and childcare during period 1. Therefore, during this period, it was confirmed that the theoretical discussion about

integration of early childhood education and childcare centred on ‘system’, ‘certificate’ and ‘teacher preparation program’ rather than detail.

Next, analysis of structural attributes for network analysis during period 2 (`14-`18) showed 20 nodes, density of .521, average connection distance of 1.479, component number of 1, diameter of 2 and networks centralisation of 14.475% respectively. Also, in the statistical significance test of network for integration of early childhood education and childcare during period 2, the sampling distribution of the network data was 2.1158 and the standard error was 0.2783. In particular, the Z-score was calculated as Z = 2.6936, and the probability that the network data about integration of early childhood education and childcare showed a larger absolute value than the Z-score was 0.0002. In addition, ‘In Jung children’s centers’, ‘policy’, ‘unification’, ‘infant’, ‘young children’, ‘Nuri curriculum’, ‘kindergarten’ and ‘daycare center’ among the keywords that appeared in integration of early childhood education and childcare during period 2 are high in the centrality indicators such as connection centrality. In other words, the main keywords of integration of early childhood education and childcare during period 2 can be seen as ‘policy’, ‘unification’, ‘infant’, ‘young children’, ‘Nuri curriculum’, ‘kindergarten’ and ‘daycare center’. Based on these keywords, we can identify keywords with high connection strength to integration of early childhood education and childcare during period 2. Therefore, during this period, it was confirmed that the main idea of integration of early childhood education and childcare was discussed, mainly about ‘policy’, ‘Nuri curriculum’ rather than general theories.

These results suggest that regardless of the timing, ‘infant’, ‘young children’, ‘child’, ‘teacher’, ‘daycare center’, ‘kindergarten’, and ‘parent’ are referred to as core keywords. Therefore, infant & young children, teachers, early childhood education institutes and parents should be considered to be the centre for a soft landing of the integration of early childhood education and childcare policy.

In this study, it is meaningful to exploring the core keywords related to integration of early childhood education and childcare by period by using keyword network analysis and to grasp specific tendencies of integration of early childhood education and childcare. Subsequent research suggests that discussions should be made at the level of social practice at the actual site in addition to discussing the details of the reservation integration policy. It also suggests that bottom-up, rather than top-down, policies be provided by actively engaging stakeholders such as infant & young children, teachers, early childhood education institutes and parents in these discussions.

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