

Investigating Good Teaching and Learning Experiences in the Perspectives of University Students through Social Network Analysis*

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This study investigated university students' perspectives on good class and instructional practices through social network analysis. The subjects were 321 students in the third and fourth academic years in a Korean university. The subjects completed four open-ended questions, asking about experience of good class, good instructors' teaching practice, and their feelings and attitudes when participating in good class. As social network analysis, KrKwic (Korea Key Words in Context) was used to compute word frequencies and analyze semantic network structures and Ucinet Netdraw to assess centrality in the social network, consisting of degree centrality, closeness centrality, and between centrality. The results are as follows. First, students showed 5 keywords to depict what good class is, including 'understanding', 'example', 'video', 'interest', and 'communication'. Second, the characteristics of teaching methods by professors who practice good class indicate 'assignments', 'questions', 'understanding', 'example', and 'feedback'. Third, the top 5 keywords of students' attitudes as participating in good class are 'active', 'participation', 'focus', 'listening', and 'asking'. Last, keywords depicting desirable class that students most wanted to take next time are 'assignments', 'rewards', 'understanding', 'difficulty', and 'interest'. The findings from this study include the meanings of the semantic network structures of words in the text making up messages. Also this study can provide empirical evidence for educators and educational practitioners in higher education to create effective learning environments.

Keywords : Good teaching and learning, Instructional practice, University students, Social network analysis

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Introduction

Today, the primary goal of university education is to cultivate students' abilities to use what they have learned beyond simply acquiring knowledge. To achieve this goal, universities have emphasized on quality of instruction for the past decades. Aligned with this, centers for teaching and learning (CTLs) of many universities support programs such as teaching method workshops, educational research, and teaching consulting for "good class". The Ministry of Education is also expanding the evaluation of teaching-learning fields to university evaluation. Therefore, it can be meaningful to continuously search for characteristics to improve the quality of college class and the learner's perceptions of "good class" to improve learning environments at universities.

Research on good teaching in college is a comparative study on the perceptions of major class and liberal arts class (Choi, 2016), and a case study on students' awareness of good instruction in college (Park, 2008). According to the research results of Jeong (2010), students recognized good class at the university as interacting with a professor and class with good communication like the characteristics of good class. Also, there were interesting classes in which students participate, using various learning materials. College students showed that the contents of lectures, teaching skills of faculties, motivation for active learning and communication between instructors and students were critical for good teaching (Min & Lee, 2012). Additionally, they indicated that the most important elements of good teaching were the instructor's aspects, such as academic professionalism, lecture contents, and classroom management skills. Next, interactions, assignments and assessments, student characteristics, and learning environmental factors followed.

Importantly, universities need to understand the characteristics of good class and reasons why students want to choose and take good class. University students choose good standards for class based on reasonable evidence such as professors'

teaching methods, evaluation reports, interests in subjects, and recommendations for experienced seniors (Park, 2001). Also, instructional strategies and evaluation methods have a great influence on students' class choices (Ryu & Shin, 2012). Lee, Yun, and Park (2017) reported that learning in convenient ways was the most important factor in the case of liberal arts courses and the characteristics of instructors in the case of major courses. Noh (2019) discussed that in general, college students' class choices depended on the easiness of obtaining credits and presence or absence of team projects.

Good class can show a variety of differences depending on the perspectives of individuals or social groups. The interpretations of its meaning vary depending on the purpose and contents of class. Baek (2017) argued that it is difficult to clearly define good class because of the lack of in-depth research on good class. Jeong (2010) contended that for providing good classes at universities, it is necessary to understand not only how instructors perceive good class, but also how students recognize good class.

Investigating university students' thoughts on good teaching methods and characteristics of good class need to study (Khandelwal, 2009). In other words, it is crucial to clarify the characteristics of good class which university students can acknowledge. This is because student-recognized classes obviously were student-centered and learning-focused. However, it is important to provide empirical evidence discussing the characteristics of good class recognized by university students. Thus, the necessity of this study was to identify the characteristics of good class from the perspective of college students. In addition, the results of this study can be provided for instructors as empirical information for improving instructional practice.

This study can be consistent with the existing research methods (Heo, 2009; Jeong, 2010; Kim & Kang, 2019; Shim, 2012) that sought the meanings of good education from qualitative research analyses. Although the text data in the previous studies were analyzed by researchers, this study used qualitative data and statistics

from social network analysis (SNA) using digitized software tools. Most of the existing qualitative research methods have performed in such a way that researchers directly read and coded the contents to be analyzed for analysis (Park, Leydesdorff, 2004). Hence, existing qualitative analyses could have a problem that subjectivity may be involved in items arbitrarily composed by researchers. However, SNA which analyzes documents with computer software can complement the limitations of existing analysis methods causing objective results (Cho & Cho, 2018; Park & Leydesdorff, 2004).

SNA is one of the network analysis techniques used in social science. It is an analysis technique to derive the meanings of the structural relations of words within the text constituting messages (Kim, 2010; Wasserman & Faust, 1994). This semantic network analysis is useful as a method of analyzing the semantic structures as it can analyze not only the frequency of words, but also how individual words form relationships in the overall contents of messages (Kim, 2010; Kwak, 2017). Besides, semantic network analysis, which is useful for checking the relationships between words through text analysis and understanding the relationships between key concepts in the overall context, has the advantage of being able to easily understand and intuitively present results using various visualization techniques.

In this study, semantic network analysis was applied to analyze what university students think about good teaching and teaching methods. This analysis method has the advantage of being able to derive meanings in the context of the relationships considering the interactions of concepts and links (Cho & Cho, 2018; Park & Leydesdorff, 2004) and interpreting the concepts and substances of variables in a relationship network. Therefore, it would be helpful to be able to understand the contextual meanings and to clarify abstract concepts like good teaching which university students think about. Recently, an analysis of learner experience in a virtual environment (Choi & Kim, 2019) showed that it is possible to understand student experience by showing as words or phrases derived through interviews into the nodes of meaningful patterns.

In addition, a study that showed changes in teaching competencies of pre-service teachers on teaching practice was conducted through semantic network analysis (Ki, Kim, & Ryu, 2019). Therefore, this study can create a concrete conceptual semantic network structure by performing SNA on university students' thoughts on good class, providing more objective results and interpretations than existing qualitative methods did.

The purpose of this study was to conceptually explore what good class is in views of university students using SNA. Based on the previous good teaching articles (Baek, 2017; Choi, 2016; Jeong, 2010; Min & Lee, 2012; Noh, 2019; Park, 2001; Park, 2008), we selected the four questions to investigate student's thoughts about good class in learning. University students were asked to write their thoughts in response to the questions such as: What do you think is good class in college? What are the characteristics of teaching methods of a professor who had good class? What are students' attitudes as participating in good teaching? What are the characteristics of the class I want to take in the future?

To achieve the purpose of this study, the research questions are addressed as follows. First, what are the keywords and semantic network structure of good class that college students think? Second, what are the keywords and semantic network structure of good teaching methods that instructors use? Third, what are the keywords and semantic network structure for the attitudes of students as participating in good class? Last, what are the keyword and semantic network structure for the class that students want to participate in the future?

Research Design & Methods

Subjects

For this study, from September to October 2019, four open-ended questions were asked to 321 university students who were attending private universities in

Gwangju. The subjects were 141 male students (43.9%), 180 female students (56.1%). Also, 171 students were in the third grade (53.3%), and 150 students in the fourth grade (46.7%). They majored in early childhood education, youth counseling and lifelong education, architecture, and police law administration. They were asked to write good teaching and teaching methods in general college education, not specific instructional situations such as major, liberal arts, and student-centered learning methods. Specifically, the questions were about learning experience from good class, instructional practices by good instructors, feelings and attitudes as having good class, and conditions for enrollment in the class they would like to choose next time. Students freely wrote answers to the question for 30 minutes.

Data analysis and procedures

SNA is beneficial for investigating open-ended questions that include connections and relationships in the data collected from university students. To interpret results from SNA, it implements data preparation, data analysis, and visualization. The entire volume of responded texts was imported into a word-processing tool and converted to text files to run through the KrKwic (Korean Key Word in Context) and UCINET 6.

The KrKwic is a specialized social network program to analyze word frequencies, structures, and semantic network analyses of Korean language (Park & Leydesdorff, 2004). It consists of three sub-programs: Krwords, Krtitle, and Krtext. Krwords is used to extract main words and compute word frequencies from various text data. After analyzing word frequencies, Krtitle conducts semantic analyses based on relatively short sentences or messages. Krtext is used to analyze the enormous volume of Korean texts which Krwords and Krtitle are unable to handle.

In this study, we first used Krwords to find the most frequently mentioned words in students' responses. Prior to running Krwords, the texts were converted to default format files (e.g., text.txt), and the files ran through Krwords several times removing unnecessary words such as particles and connection words to find

key words. At times, differently spoken words with similar meanings were manually simplified as one single word. For example, teachers, educators, instructors, tutors, and professors were coded as educators. Next, Krtitle yielded matrices including nodes and distances. For SNA in UCINET 6, we selected only 20 keywords written in Korean for each matrix that included the most frequently mentioned and become nodes. Prior to importing a matrix including 20 keywords into UCINET 6, the 20 keywords were translated in English by the authors. To reflect the consistency and accuracy of meanings in the 20 keywords, one expert in English linguistics and the other in English literature reviewed these keywords according to the contexts in which the keywords spoken.

Matrices obtained from the KrKwic were used for SNA in UCINET 6 and visualization in NetDraw. Grunspan, Wiggins, and Goodreau (2014) noted that SNA basically intends to understand the determinants, structures, and consequences of relationships between actors, same as nodes. In SNA, the most basic measurement at network level is network density. Network density refers to a typical index that simply shows how many ties between actors are present. That is, network density is a measurement of how many links are observed in a whole network divided by the total number of links that could exist if every actor was connected to one another (Grunspan, Wiggins, & Goodreau, 2014).

At the actor level measurement of SNA, centrality is critical measures to examine positions of nodes in the network (Grunspan et al., 2014). Specifically, centrality measures are degree centrality, closeness centrality, and between centrality (Freeman, 1977). Degree centrality means the total number of connections a node has. A node with more connections is regarded as holding most information or quickly connected with the wider network. Closeness centrality focuses on how close one actor is to other actors on average. It is a useful measure to find actors that are best placed to influence the entire network most quickly. Betweenness centrality shows whether actors serve as bridges in the shortest paths between two actors. Actors with high betweenness centrality have a high probability of existing as a link on the shortest path between any two actors in a network.

Visualization

After SNA in UCINET 6, we used NetDraw to visualize social network data. NetDraw is a useful technique bundled with UCINET 6 to graphically identify and represent patterns of connections, relationships, and interactions between nodes (social entities or individuals).

Results

This study investigated what university students think about good class, effective teaching strategies, students' attitudes, and the most wanted class next time, using SNA through UCINET 6 and NetDraw. For each category, the results from SNA follow.

Keywords describing good class

A definition of good class may vary. For example, good class refers to quality class that could be depicted with the characteristics: class of best professors, class of innovations, and class of high scoring evaluation (Im & You, 2018). Based on SNA, 20 keywords and its density and centrality exhibit. Table 1 displays a list of keywords that students have written to describe good classes taken. According to density, students chose 'understanding', 'example', 'video', 'interest', and 'communication' as listing top 5 words. The results of degree centrality show that 'understanding', 'example', 'contents', 'fun', and 'explanation' have large values. These keywords may have more information about good class students believe that could be connected to other keywords in the network. Next, closeness centrality indicates that 'understanding', 'example', 'video', 'interest', and 'communication' are the most important keywords, positioning on the critical places in the network. Lastly, betweenness centrality presents that 'understanding', 'communication',

‘feedback’, ‘interest’, and ‘video’ are core keywords. Since these keywords with higher betweenness centrality tend to hold more shortest paths than other keywords, they would appear to be more influential to other keywords in the network.

Table 1. List of keywords describing good class

Keyword	Density	Degree Centrality		Closeness Centrality		Betweenness Centrality	
		Value	Rank	Value	Rank	Value	Rank
understanding	17	75	1	0.905	1	14.012	1
examples	15	47	2	0.826	2	7.095	6
video	15	37	6	0.826	2	7.343	5
interest	15	31	7	0.826	2	7.727	4
communication	14	28	9	0.792	5	12.266	2
fun	13	39	4	0.760	6	4.658	8
participation	13	23	10	0.760	6	5.509	7
feedback	12	20	12	0.731	8	8.391	3
materials	11	30	8	0.704	9	1.321	15
focus	11	23	10	0.704	9	3.627	10
explanation	10	39	4	0.679	11	2.070	12
contents	10	43	3	0.679	11	1.323	14
media	9	13	14	0.655	13	1.745	13
assignments	8	20	12	0.633	14	0.345	18
classroom climate	8	13	14	0.633	14	2.236	11
Classroom management	8	8	16	0.633	14	4.642	9
opinions	5	6	17	0.576	17	0.167	19
retention	5	6	17	0.576	17	0.125	20
interaction	5	5	20	0.576	17	0.658	17
discussions	4	6	17	0.559	20	0.742	16

Note. Top 5 keywords, values, and ranks in each measure displayed in bold.

Figure 1 displays the visual structure of 20 keywords students described about good classes, showing the locations and widths of the keywords refer to the strengths of connections between the keywords in the network. ‘Understanding’ is

not only close to ‘example’, ‘video’, ‘interest’, and ‘communication’ but also strongly tied with ‘explanation’, ‘contents’, ‘examples’, and ‘video’.

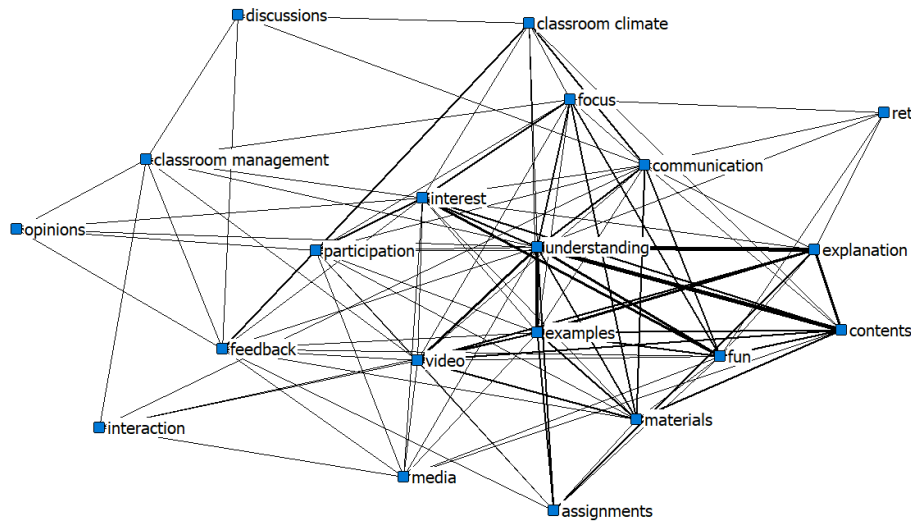


Figure 1. Visual structure of social network data for keywords describing good class

Teaching methods of professors who practice good classes

Table 2 shows the list of words if students picked a keyword to describe good educators’ teaching styles, strategies, and critical features. First of all, density shows that ‘assignments’, ‘questions’, ‘understanding’, ‘example’, ‘feedback’, and ‘unique’ are the important characteristics, depicting of good professors’ instructional practices. Among the results of degree centrality, ‘assignments’, ‘evaluation’, ‘questions’, and ‘feedback’ are top 5 connected keywords in the network. These keywords hold the most links with other keywords. Next, closeness centrality presents that the same top 5 keywords like density are presented. Last, betweenness centrality provides ‘assignments’, ‘understanding’, ‘questions’, ‘example’, and ‘unique’ as top 5 keywords. Based on closeness and betweenness, these keywords appear to have the shortest paths between keywords and hold the most influential

positions in the network. In particular, ‘evaluation’ shows a high degree centrality value but a less influential location in the network.

Table 2. List of keywords describing good professors’ instructional practices

Keyword	Density	Degree Centrality		Closeness Centrality		Betweenness Centrality	
		Value	Rank	Value	Rank	Value	Rank
assignments	16	115	1	0.864	1	19.821	1
questions	16	42	4	0.864	1	15.391	3
understanding	16	67	2	0.864	1	18.372	2
example	12	32	8	0.731	4	10.793	4
feedback	11	38	5	0.704	5	4.313	6
unique	11	16	14	0.704	5	6.860	5
participation	10	19	11	0.679	7	4.226	7
focus	9	10	15	0.655	8	3.294	8
collaboration	9	35	7	0.655	8	2.586	9
video	9	36	6	0.655	8	1.945	11
applications	8	18	12	0.633	11	1.380	13
evaluation	8	54	3	0.633	11	0.993	15
discussions	8	20	10	0.633	11	2.047	10
fun	8	18	13	0.633	11	1.121	14
exams	7	27	9	0.613	15	0.452	18
effort	6	8	18	0.594	16	1.561	12
friendly	6	9	17	0.594	16	0.950	16
communication	6	6	20	0.594	16	0.458	17
review	5	8	19	0.576	19	0.236	19
preparation	5	10	16	0.576	19	0.200	20

Note: Top 5 keywords, values, and ranks in each measure displayed in bold.

Likewise, Figure 2 presents the visual structure of 20 characteristics students described about good professors’ instructional practices, providing the information on the locations and widths of the 20 characteristics which indicate the strengths of connections between nodes in the network. ‘Assignments’, ‘questions’, and ‘understanding’ are comparatively close to one another and ‘assignments’, ‘feedback’, and ‘evaluation’ hold strong ties in the network.

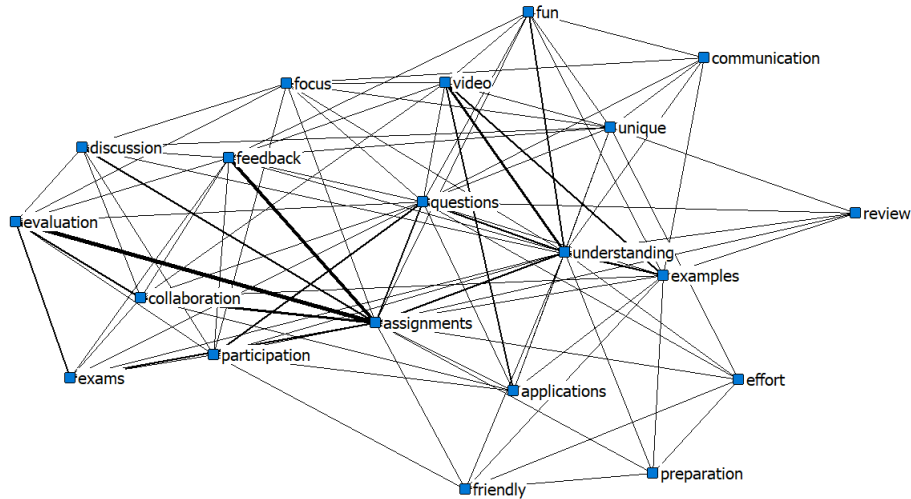


Figure 2. Visual structure of social network data for characteristics describing good professors' instructional practices

Students' attitudes participating in good class

Table 3 indicates the list of keywords regarding students' attitudes when they participated in good class to describe their attitudes, feelings, and thoughts. Based on the results of density, 'active', 'participation', 'focus', 'listening', and 'asking' are top 5 ranked. Students were 'active', 'focusing', 'participating', 'listening', and 'responding' according to degree centrality that indeed indicate the number of connections between keywords in the network. Next, closeness centrality shows that 'active', 'participation', 'focus', 'listening', and 'asking' mark top 5 high values. These keywords mean to hold more the shortest paths to all other keywords, located at the most influential places. Lastly, betweenness centrality displays 'active', 'participation', 'focus', 'listening', and 'asking' like density that means these students' attitudes have strong influences on other keywords with the shortest paths.

Figure 3 depicts the visualization of social network data for 20 students' attitudes, feelings, emotion, and thoughts when they learn in good classes. In this network structure, the locations and widths of the keywords means how strongly they are

connected with other keywords and which influential locations there are placed in the network. ‘Active’, ‘participation’, ‘focus’, and ‘listening’ are confirmed as closest and strongest ties in the network.

Table 3. List of keywords describing students participating in good class

Keyword	Density	Degree		Closeness		Betweenness	
		Centrality		Centrality		Centrality	
		Value	Rank	Value	Rank	Value	Rank
active	17	86	1	0.905	1	27.160	1
participation	17	81	3	0.905	1	26.410	2
focus	15	86	1	0.826	3	15.843	3
listening	15	60	4	0.826	3	12.226	4
asking	12	27	7	0.731	5	7.100	5
responses	11	30	5	0.704	6	3.650	7
hardworking	9	29	6	0.655	7	2.800	8
attitude	9	16	9	0.655	7	5.183	6
note-taking	9	18	8	0.655	7	1.117	10
reaction	7	13	12	0.613	10	0.310	14
positive	7	14	11	0.613	10	0.700	11
laughing	6	13	12	0.594	12	2.200	9
understanding	6	8	14	0.594	12	0.200	15
collaboration	6	16	9	0.594	12	-	
interest	6	7	16	0.594	12	0.510	13
cell-phones	4	7	16	0.559	16	-	
proactive	4	4	19	0.543	18	0.593	12
communications	4	8	14	0.559	16	-	
no missing	3	5	18	0.528	20	-	
activities	3	4	19	0.543	18	-	

Note: Top 5 keywords, values, and ranks in each measure displayed in bold.

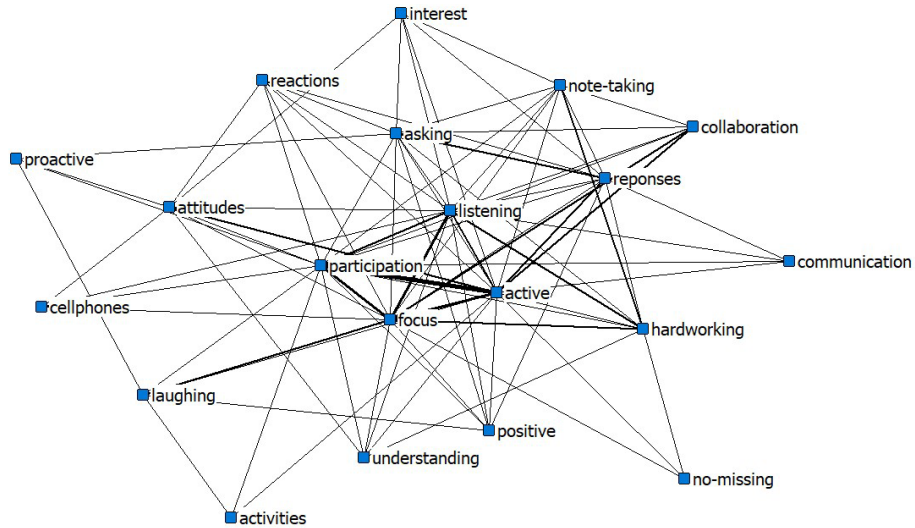


Figure 3. Visual structure of social network data for students participating in good class

Class that students want to take next semester

Table 4 presents the list of keywords depicting desirable class' characteristics which students most wanted to take next semester. According to the results of density, students were interested in 'assignments', 'rewards', 'understanding', 'difficulty', and 'interest'. These keywords simply have the most connections with all other keywords. However, degree centrality presents that 'assignments', 'difficulty', 'exams', 'rewards', and 'understanding' are top 5 ranked that means they would semantically have the most links between 20 keywords. Closeness centrality indicates that 'assignments', 'rewards', 'understanding', 'interest', and 'difficulty' have the highest values from the top. These keywords present the important locations with strong ties with other keywords. However, betweenness centrality shows that 'rewards', 'understanding', 'meaningful', 'group activities', and 'exams' are the most powerful top 5 keywords with the most bridges with the shortest paths between 20 keywords.

Table 4. List of keywords describing students' most wanted class

Keyword	Density	Degree Centrality		Closeness Centrality		Betweenness Centrality	
		Value	Rank	Value	Rank	Value	Rank
assignments	14	45	1	0.792	1	9.070	6
rewards	11	17	4	0.704	2	153.233	1
understanding	10	15	5	0.679	3	64.077	2
difficulty	9	25	2	0.613	5	7.511	9
interest	9	13	7	0.633	4	8.769	7
exams	9	22	3	0.613	5	15.927	5
useful	8	15	5	0.576	10	7.861	8
group activities	8	11	11	0.576	10	19.333	4
fun	7	12	9	0.594	8	1.135	17
explanation	7	8	13	0.594	8	2.435	14
meaningful	7	11	11	0.613	5	35.827	3
applicable	6	6	15	0.528	13	1.667	15
retention	6	7	14	0.576	10	4.476	12
focus	5	5	17	0.500	14	3.893	13
classroom climate	4	13	7	0.463	17	1.393	16
agreeable	3	3	18	0.487	15	4.643	11
expertise	3	12	9	0.475	16	0	19
respectful	3	6	15	0.452	18	0	19
grade	2	2	19	0.432	19	5.500	10
life	1	2	19	0.388	20	0.250	18

Note: Top 5 keywords, values, and ranks in each measure displayed in bold.

Figure 4 displays the visual structure of 20 characteristics about classes students wanted to take next semester. In the network the locations and widths of the keywords refer to the strengths of connections between the keywords. Like the results of centrality measures, 'assignments' appears to be close to 'rewards', 'difficulty', and 'exams' and also strongly ties with 'difficulty', 'expertise', and 'useful'.

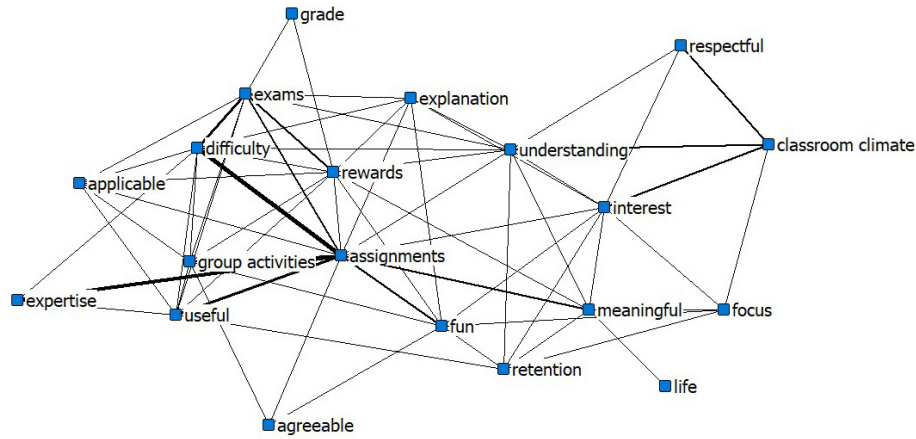


Figure 4. Visual structure of social network data for class most wanting

Discussion

This study investigated and analyzed university students' perspectives on good teaching and instructional practices through social network analysis. The analyzed topics were what university students think about good teaching, the features of teaching strategies of professors who implemented good class, the attitudes of students in participating such a class and the most wanted class they wanted to take next semester. We used SNA to find the relationships between words through text analysis and understanding the relationship between key concepts in the overall context. The findings of this study are as follows.

First, students showed five words with a high density of what good class is. The words are 'understanding', 'example', 'video', 'interest', and 'communication'. The keywords for good classes that students think are partially consistent with the research findings of Jeong (2010) and Min and Lee (2012). In the precedent study, college students revealed that classes with interest and various learning materials as well as actively communication for learning understanding are labeled as good classes. In the case of 'communication', 'feedback', and 'interest', 'the intermediary

focus' was higher betweenness centrality level than degree centrality level. This result showed that the words: 'communication', 'feedback', and 'interest' played an important role in the relationships with other keywords and played key roles in constructing an excellent semantic structure. In the case of 'example', 'contents', and 'explanation', the rankings of degree centrality were high, which it appears to show simply more connections with other keywords. This result showed that students most frequently cited 'understanding', 'examples', 'video', 'interest', and 'communication' as good class. However, good class was recognized since 'understanding', 'communication', and 'feedback' were considered as more important factors than 'video' and 'examples', based on the results of closeness and betweenness centrality.

Second, regarding the characteristics of teaching methods of professors who practice good classes, high level density showed that 'assignments', 'questions', 'understanding', 'example', and 'feedback' are important. For the teaching strategies of a good educator, 'assignments', 'questions', 'understanding', and 'feedback' ranked high in closeness and moderateness centrality. It may be seen that these words played critical roles in constructing an important semantic structure and in shaping the relationships with other subject words in the structure. On the other hand, the word 'evaluation' had a high degree centrality, but relatively a low ranking in the betweenness centrality. These results showed that this word was presented as a major topic because the number of linked links was relatively large, but it was relatively low in terms of semantic compositions through the connections with other words. 'Assignment' was the keyword for teaching strategies of professors who taught good class. 'Assignment' was the highest-ranking keyword in the degree centrality, closeness centrality, and betweenness centrality. This can be said to have shown that the most important teaching strategies of professors who had good classes were the appropriate amount of assignments, detailed explanations of assignments, feedback, and fair evaluations. When professors were asked about how to evaluate the class, the most difficult part of evaluation was conducting peer

evaluation or self-assessment due to the challenges and barriers in ensuring objectivity. Feedback on the report- or paper-based assessments was another difficulty to professors due to the large number of students and time-consuming evaluation methods (Son, Yoon, & Maeng, 2018). The results of this study showed that students valued ‘assignments’ and ‘evaluation’ as an element of good instruction. University CTLs, for example can help professors understand the purpose and function of assignments and evaluations, and recognize that the reflection of various evaluation methods and evaluation results can play an important role in improving the quality of instruction (Watering & Rijt, 2006).

Third, as the top five high density keywords of student attitudes were ‘active’, ‘participation’, ‘focus’, ‘listening’, and ‘asking’, while participating in good class. In terms of words describing the attitudes of students who participated in good class ‘active’, ‘participation’, ‘focus’, ‘listening’, ‘asking’, ‘responses’, and ‘hardworking’ were high in both degree centrality and betweenness centrality. It would be understood that these words could play important roles in constructing flexible semantic structures and building their relationships with other subject words.

Fourth, the list of words depicting desirable class that students most wanted to take next time. According to the results of density, students were interested in ‘assignments’, ‘rewards’, ‘understanding’, ‘difficulty’, and ‘interest’. Interestingly, the degree centrality values of ‘assignments’, ‘difficulty’, ‘exams’, ‘useful’, and ‘fun’ were higher, but betweenness centrality ranks were relatively lower. While these words could play crucial roles in constructing a major semantic structure, they may not play comparatively important roles in the relationships between other words. In contrast, regarding ‘rewards’, ‘understanding’, ‘meaningful’, and ‘group activities’, the betweenness centrality values ranked higher than those in degree centrality. This implies that they could play important roles in shaping the semantic relationships with other words in the social network structure. These results can be interpretable that they would have strongly wanted to experience meaningful learning and make knowledge applicable to other situations like rewards given to them after finishing

class. In other words, when registering for a course, the priorities from students would appear to consider the tasks, course difficulty, tests, usefulness, and fun. However, it argued that students can be interested in rewards, understanding, meaning, and presence or absence of group activities. This supports a study that grades, and presence or absence of a team project were important criteria for course registration (Noh, 2019).

Last, SNA has the advantage of being able to interpret university students' opinions from various perspectives about good teaching. In other words, in the existing qualitative research, if mainly arbitrary frequency analysis was used, it could be confirmed that even words frequently suggested by learners in the semantic network analysis do not necessarily have a high level of control to mediate the meaning and activity. By its own nature in the translations of keywords from Korean to English, the understandings of results from semantic network structures in SNA may depend on interpretations by the perspectives of this study. These findings from this study supported the previous research that the semantic network can be interpreted not only by the frequency of the keywords but by various centralities (Lim & Park; Park & Leydesdorff, 2004, 2017; Wasserman & Faust, 1994).

This study discussed university students' perspectives on good class and instructional practices by professors through SNA. According to the findings from this study, we conclude as the followings to provide the learning environments where students will be able to learn in effective ways. Firstly, understanding is the priority in class when students come to learn. Communication and feedback can be appropriate support to the learner's understandings of learning materials along with fun videos and interesting examples. Secondly, professors who present good teaching practices need to provide the appropriate amount and difficulty levels of assignments. Since students want to receive good grades from assignments and exams, feedback on assignments and evaluations, and fair evaluations are critical factors. Lastly, students want to take such good class because they could have

positive attitudes in good class as professors provide quality instructions to increase their understandings of learning. It appears to be clear that students earn understanding, rewards, good grades, and positive attitudes from good class. Thus, it is necessary to understand the characteristics of learning environments like “good class” because students can experience better learning as professors provide quality instructions.

The limitations of this study and suggestions for further research are as follows. First, it is expected that there will be differences in perceptions of good class among university students according to majors and types of teaching methods, grades, and gender. However, this study investigated the perceptions of good class without considering the differences in these peripheral variables. In future research, if the variables are diversified in consideration of these differences, and comparative studies according to the variables, will be implemented, more in-depth and contextual results will be obtained. Second, this study conducted SNA of general instructional settings at a university. In future research, it is expected that the results will be easier applications when analyzing good class in specific class contexts such as online or blended learning situations and learner-centered instructions through SNA. Third, in this study, the text data explained by students through open-ended questions were organized into keywords through SNA. This study did not consider the causal interpretations of connected words. Therefore, causal interpretations of the process of forming a meaning can be needed in future studies (Ki et al., 2019). Last, because students described their opinions in Korean, it is inferred that there could be differences in contexts and meanings in the process of translating into English. Future research needs to consider the differences from translation between languages.

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