Article

Text Mining Analysis of Korean University Students’ Academic Coaching Intake Session Reports

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Abstract: Academic coaching has been emphasized in Korean universities as an effective measure to assist students’ academic achievement and success. To better assess the needs of the students, the current study investigated academic coaching intake session reports archived at a Korean university from January 2017 to August 2021 and examined students’ descriptions of their academic concerns and barriers. The intake session reports were categorized according to (1) students’ affiliated department tracks, namely Humanities and Social Science (HSS) and Science, Technology, Engineering, and Math (STEM) tracks, and (2) the time the coaching sessions took place, i.e., before and after the outbreak of COVID-19. Text mining analysis was conducted to calculate the frequency of keywords, their degree of centrality, and the frequency of bigrams, or the sets of two adjacent words, for each category. Wordclouds and word networks were also visualized. The results indicated that the word study was dominant in both categories, reflecting the education culture in Korea. Similarities and differences between the two categories were also reported. Based on the results, practical implications for academic coaches, educators, and university administrators were proposed, and limitations were discussed.

Keywords: academic coaching; intake session; text mining; university student

1. Introduction

1.1. Background and Purpose of the Study

Universities are where students develop academically, as well as intra- and interpersonally, and mature into autonomous and responsible citizens. In order to better prepare students for the ever-changing modern society, universities are emphasizing the role of personalized learning to tailor the learning process for each student [1,2] and the development of generic skills that are applicable in various fields [3,4]. Recognizing the rapid changes in society and transition of the education paradigm, universities in Korea have strived for educational renovation [5]. Specifically, the Ministry of Education in Korea has endeavored to enhance the quality of university education since the late 2000s and implemented policies such as the Advancement of College Education (ACE) Project and the University Innovation Support Project. Accordingly, universities have reconstructed curricula to offer competitive majors [6] and developed new extracurricular programs to support underachieving students [7]. Aligned with such efforts to focus on students’ development of competencies, universities have also increased customized interventions to support students’ academic achievement and campus life satisfaction.

Among the various student support measures that universities provide, academic coaching has been identified as one of the effective individualized interventions. Academic coaching involves a partnership between a trained coach and a student, based on which the student is empowered to set his or her own goals and learn new skills to attain academic
success [8]. Although academic coaching is being widely implemented in universities, the studies thereof have only recently begun to accumulate, mainly because the history of the coaching field itself is relatively short [9]. Additionally, previous coaching-related studies have mainly targeted students in elementary, middle, and high schools [10,11]; studies on university students considered a specific population of students, such as those who were academically at-risk [12], with disabilities [13], or on the autism spectrum [14]. However, since the major purpose of coaching is to promote self-directed learning and personal growth [15], as well as academic achievement and success [10], it can be applied to any student who wants to improve their performance. Hence, more studies on academic coaching for general university students should be conducted.

In order to understand the needs of students and to devise coaching approaches to benefit more students, it was essential to first understand the range of issues brought to academic coaching by university students. For this purpose, the current study examined the intake session reports of an academic coaching program accumulated in the database at a four-year university in Seoul, Korea from 2017 to 2021 to gain understanding of the academic challenges that university students dealt with through coaching. Specifically, text mining analysis was applied to conduct a descriptive and exploratory study identifying keywords and their relations from the reports to highlight the aspects that students most frequently addressed in their initial coaching sessions. The study first made comparisons of the data according to two academic tracks, namely Humanities and Social Science (HSS) and Science, Technology, Engineering and Mathematics (STEM), and examined coaching issues before and after COVID-19 in order to raise awareness of coaches, educators, and university administrators regarding the academic needs of students.

1.2. Literature Review

Coaching is aimed at helping a coached student set appropriate goals based on self-awareness and find feasible ways to achieve them [16]. It is a process of maximizing the potential of the coached student [17], through which the coached student learns to take new actions autonomously [18]. It is a customized process that fosters growth and action in those who participate. More specifically, academic coaching is a responsive and supportive process through which a coach and a student engage in a partnership to promote the student’s academic achievement and success [10]. Academic coaching is different from domain-specific intervention, such as tutoring, in that it does not teach content materials but focuses on empowering an individual to identify and solve one’s own problems [16]. It has been found to enhance university students’ academic self-efficacy [19], increase metacognition [20], and improve their self-directed learning ability [21,22], as well as their self-understanding and ability to set goals for college life [21]. A recent study that examined the effects of an intervention that integrated coaching with mindfulness also found that the participants experienced improvement regarding self-regulation, emotion, and motivation [23]. As such, academic coaching could be an effective support for all students who want to improve their performance. It is a content-general approach promoting students’ personal growth [15] and academic achievement [10].

In order to devise specific coaching approaches for university students, issues related to their university life and academic concerns should be addressed. Most of all, students transitioning from secondary school to university need to adjust to the new environment, navigating through courses and getting used to campus life [24]. In a university setting, students are required to be more self-directed [25] and adaptive to an array of novice experiences, including meeting people from different backgrounds and making choices among countless opportunities and activities [26]. Other factors, such as social support and loneliness, were found to be related to university students’ academic persistence [27]. Moreover, the results of Allen et al. [28]’s study reported various factors, including academic performance, academic self-discipline, pre-college academic performance, and social connectedness, to be directly or indirectly associated with third-year college retention and transfer. In addition, students’ campus life and academic performance can be influenced
by behavioral factors, such as increased use of or addiction to cell phones [29–31] and emotional factors such as depression [32].

Student’s campus life and academic success can also be influenced by the characteristics of their affiliated departments, namely Humanities and Social Science (HSS) and Science, Technology, Engineering and Mathematics (STEM). Recently, universities in Korea have directed their attention toward providing customized learning support for students from HSS and STEM tracks. Previous studies have found that students from these two tracks showed significant differences in various areas; for instance, there were differences in the effects of subject satisfaction and relationship satisfaction on job-seeking stress [33], factors related to e-learning [34], and the tendency of general education enrollment, academic competencies, and career adaptability [35] between students affiliated with the HSS track and STEM track. Considering the different characteristics of these two tracks, it was hypothesized that students in each track would have different types of academic concerns or expectations.

Moreover, the prolonged outbreak of the pandemic affected university students, causing increased level of stress, anxiety, depression, and even suicidal thoughts [36] which could have impacted their academic performances, requiring adjustment to a remote instructional approach [37]. The pandemic changed the paradigm of higher education and students’ learning experiences thereof, and examining the keywords addressed before and after the pandemic could provide insight into understanding the academic concerns of university students.

Even though making an exhaustive list of these challenges or solving all the problems faced by university students through coaching is impracticable, the factors examined by previous studies were possible topics that could be addressed in academic coaching sessions. Understanding students’ major issues could assist coaches in devising more effective coaching interventions and guide educators and university administrators in generating the necessary support measures for students. Thus, the current study examined the keywords reported by students in coaching intake sessions to investigate the issues most frequently addressed in coaching sessions.

The current study used text mining analysis to investigate the frequency and relations of keywords addressed in academic coaching intake session reports. Text mining is using a computer system to extract previously unknown information from vast written texts and making links to generate new information [38]. Text mining analysis has been used in various studies in the field of higher education to investigate students’ feedback [39], opinions in online platforms [40], or the syllabi of higher education institutions [41]. As a text mining approach allows unstructured text data to be changed into structured data for analysis, it provides quantitative understanding of the natural and authentic data. Additionally, the extracted information can be linked together to build new hypotheses that can lead to future studies for more explorations [38]. In order to investigate a large number of accumulated session reports of coaching intakes, and to identify the keywords and their relations to provide base line data, text mining was applied in the current study.

2. Materials and Methods

2.1. Dataset

The current study analyzed the archived intake session reports of an academic coaching program in a four-year university in Seoul, Korea. The participants of the coaching program were students from the same university who had voluntarily signed up to receive coaching service from trained coaches. Prior to participating in the program, students were offered a separate consent form for collecting and using their coaching-related data for research in general, excluding any personal information. Students were also informed that their refusal to consent to research would not influence their access to the coaching service and that they could withdraw their consent to research at any time. Students who consented were asked to directly enter their information, including gender, grade level, affiliated department, and prior experience of academic probation on a computer database.
system. Then, an intaker, a coach who had completed intake training, conducted an intake session for each student in which the student described his or her academic concerns and barriers, perceived cause of difficulty, and expectations about coaching. The intakers who conducted the intake sessions were trained to write a report in an objective manner using the in vivo expressions of the students as much as possible.

In the current study, intake session reports collected from January 2017 to August 2021 were used for analysis. During this time, 10 intakers took part in writing the intake session reports. Initially, there were 464 intake session reports, but a total of 383 reports, excluding 81 reports about graduate school students, were used for analysis because the present study focused on undergraduate students. The constitution of the data was as follows: 145 males (37.9%), 235 females (61.4%), 3 unanswered (0.8%); 210 from HSS (54.8%), 171 from STEM (44.6%), 2 unanswered (0.5%); 256 before COVID-19 from 2017 to 2019 (66.8%), and 127 after COVID-19 from 2020 to 2021 (33.2%).

Information on grade level was also collected: 74 freshmen (19.3%), 131 sophomores (34.2%), 107 juniors (27.9%), 65 seniors (17%), and 6 unanswered (1.6%). However, the grade level was not considered as a factor of comparison in the analysis because it did not accurately reflect the status of students. For instance, there were students who were still in their freshman year after completing three or more semesters because they did not register and complete the required courses; there were also students who signed up for coaching at the end of the school year before immediately moving onto the next grade level.

Additionally, 48 students (12.5%) had prior experience of academic probation, indicated by a semester GPA below 1.75 out of 4.5; among them, only 7 students applied for coaching because of receiving academic probation in the prior semester. Due to the small number of students, the experience of academic probation was not included as a factor of comparison in the analysis.

2.2. Ethical Concerns

The current study used archived data from a database and did not collect any new data. Thus, the Institutional Review Board of Sejong University, Seoul Korea approved of IRB exemption (SUIRB-HR-E-2021-005, 18 August 2021).

2.3. Analytic Procedure

Text mining analysis was conducted using R program to examine the text of intake session reports collected from university students who voluntarily applied for the academic coaching program. Text mining used natural language processing technology in order to extract information from the given text, from which values were generated and hidden relationships revealed [42]. The analysis was conducted in the following process: calculation of frequency of keywords, analysis of the degree of centrality of keywords, and examination of the bigram.

First, the frequency of keywords was calculated. Since the original dataset of intake session reports was written in Korean, the initial analysis was conducted in the Korean language in order to accurately analyze the data. First, the stopwords in Korea (e.g., postpositional particle, conjunctive particle) were deleted. After calculating the frequency of keywords in Korean, the identified keywords were then translated into English. In the process of translation, one-word keywords in Korean were translated into two- or more words in English (i.e., high school, do not know, or leave of absence, etc.). To reflect the accurate frequency of the keywords from the original text, these English translations were intentionally put into one word (i.e., HighSchool, NotKnow, and LeaveOfAbsence, etc.). When translating the keywords from Korean to English, extra attention was paid to avoid changing the actual meaning of the word or the context. In order to ensure accuracy, the original text and the translation process and results were reviewed by one of the coauthors, who received a doctoral degree in English linguistics. The frequency of keywords was calculated based on two categories: students’ affiliated departments and coaching issues before and after COVID-19. For each category, keywords that appeared more than 30 times
in the calculation were used to generate wordclouds. There were 156 keywords in the HSS track, 143 keywords in the STEM track, 200 keywords before COVID-19 (2017–2019), and 84 keywords after COVID-19 (2020–2021) with frequencies of 30 or more. The list of words is provided in Appendix A (Tables A1–A4).

Second, the degree of centrality of the keywords was analyzed. The degree of centrality refers to the number of links between words in the text [43]. A word with a higher degree of centrality indicated its higher centrality in the word network. A word network was displayed as a figure for each category, constructed with the top 30 keywords that had the highest frequency.

Finally, each category was investigated for bigrams. A bigram is a sequence of two adjacent keywords. This study investigated the frequency of sets of two words appearing together and presented the top 20 most frequently appearing bigrams.

3. Results
3.1. Keyword Frequencies
3.1.1. Affiliated Department Tracks

There were 156 keywords with a frequency of 30 or more appearing 14,007 times in the HSS track, and 143 keywords appearing 11,760 times in STEM track. The word “study” was dominantly the most frequent word for both HSS track and STEM track, followed by “semester”. The next most frequent words showed similar patterns, albeit in different orders, for the tracks. For the HSS track, the next most frequent words were “think”, “grade”, and “difficult” in order of frequency; for the STEM track, these were “grade”, “think”, and “difficult”, respectively. The word “major” appeared more frequently in the HSS track while the word “exam” appeared more in the STEM track. Additionally, the words “plan”, “school”, “enter”, and “worry” appeared only in the HSS track, while “method”, “prepare”, “people”, and “concentration” appeared only in the STEM track—referring to words appearing among the top 20 keywords. The top 20 words are provided in Table 1, and the wordclouds are depicted in Figure 1.

| Rank | HSS (n = 210) | STEM (n = 171) |
|------|---------------|----------------|
| 1 | Study | 1002 | Study | 888 |
| 2 | Semester | 530 | Semester | 411 |
| 3 | Think | 419 | Grade | 354 |
| 4 | Grade | 364 | Think | 326 |
| 5 | Difficult | 323 | Difficult | 306 |
| 6 | Time | 321 | Class | 289 |
| 7 | Class | 316 | Time | 270 |
| 8 | Major | 233 | Exam | 190 |
| 9 | Friends | 224 | Friends | 185 |
| 10 | NotKnow | 212 | Feel | 174 |
| 11 | Feel | 198 | HighSchool | 171 |
| 12 | Exam | 193 | Major | 156 |
| 13 | HighSchool | 184 | Now | 15 |
| 14 | Now | 173 | University | 149 |
| 15 | Course | 168 | NotKnow | 145 |
| 16 | University | 168 | Method | 140 |
| 17 | Plan | 161 | Course | 136 |
| 18 | School | 153 | Prepare | 136 |
| 19 | Enter | 146 | People | 135 |
| 20 | Worry | 143 | Concentration | 123 |
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3.1.2. Coaching Issues before and after COVID-19

There were 200 keywords with a frequency of 30 or more appearing 20,082 times before COVID-19 (2017–2019), and 84 keywords appearing 6166 times after COVID-19 (2020–2021). The word “study” was the most frequent word, followed by “semester”. Before COVID-19, words appeared in the following order: “think”, “grade”, “difficult”, and “time”. After COVID-19, the ranks of the words were as follows: “grade”, “think”, “class”, and “difficult”. Words such as “friends” and “feel” were relatively more frequent before COVID-19, while “major” and “NotKnow” were more frequent after COVID-19. Table 2 presents the top 20 words before and after COVID-19 and Figure 2 illustrates the wordclouds.

Table 2. Frequencies of the top 20 keywords before and after COVID-19.

| Rank | before COVID-19 (n = 256) | after COVID-19 (n = 127) |
|------|--------------------------|--------------------------|
|      | Word | Frequency | Word | Frequency |
| 1    | Study | 1263      | Study | 627       |
| 2    | Semester | 677       | Semester | 264       |
| 3    | Think | 519       | Grade | 227       |
| 4    | Grade | 491       | Think | 226       |
| 5    | Difficult | 467      | Class | 202       |
| 6    | Time | 436       | Difficult | 162   |
| 7    | Class | 403       | Time | 155       |
| 8    | Friends | 309       | Major | 131       |
| 9    | Feel | 288       | NotKnow | 130    |
| 10   | Exam | 269       | Exam | 114       |
| 11   | HighSchool | 269    | Friends | 100      |
| 12   | Major | 258       | Course | 93        |
| 13   | Now | 247       | University | 93       |
| 14   | NotKnow | 227      | Plan | 92        |
| 15   | University | 224   | Goal | 87        |
| 16   | Course | 211      | Enter | 86        |
| 17   | Method | 208      | HighSchool | 86      |
| 18   | People | 207       | Concentration | 84     |
| 19   | Worry | 191       | Feel | 84        |
| 20   | Plan | 184       | Good | 81        |
Table 1. Frequencies of the top 20 keywords for HSS and STEM tracks.

| Rank | HSS (n = 210) | STEM (n = 171) |
|------|---------------|----------------|
|      | Word          | Centrality    | Word          | Centrality    |
| 1    | study         | 0.689          | study         | 0.660          |
| 2    | think         | 0.503          | think         | 0.437          |
| 3    | semester      | 0.450          | semester      | 0.391          |
| 4    | class         | 0.378          | class         | 0.377          |
| 5    | difficult     | 0.374          | difficult     | 0.376          |
| 6    | grade         | 0.341          | grade         | 0.360          |
| 7    | time          | 0.325          | time          | 0.325          |
| 8    | NotKnow       | 0.325          | feel          | 0.281          |
| 9    | friends       | 0.291          | friends       | 0.265          |
| 10   | major         | 0.276          | now           | 0.248          |
| 11   | feel          | 0.272          | HighSchool    | 0.246          |
| 12   | now           | 0.271          | NotKnow       | 0.239          |
| 13   | HighSchool    | 0.238          | exam          | 0.238          |
| 14   | worry         | 0.238          | major         | 0.227          |
| 15   | exam          | 0.230          | university    | 0.220          |
| 16   | plan          | 0.230          | professor     | 0.212          |
| 17   | university    | 0.226          | people        | 0.210          |
| 18   | course        | 0.224          | course        | 0.208          |
| 19   | school        | 0.220          | situation     | 0.208          |
| 20   | learn         | 0.201          | prepare       | 0.206          |

Figure 2. (a) Wordcloud of keywords before COVID-19; (b) Wordcloud of keywords after COVID-19.

3.2. Centrality
3.2.1. Affiliated Department Tracks

Centrality indicated a link with other words in the text; the higher the centrality, the more links there were. The word “study” showed the highest degree of centrality in both the HSS and STEM tracks, followed by “think”, “semester”, “class”, “difficult”, “grade”, and “time”. Table 3 presents the top 20 words and their degree of centrality.

Table 3. Centrality of the top-ranked words for HSS and STEM tracks.

| Rank | HSS (n = 210) | STEM (n = 171) |
|------|---------------|----------------|
|      | Word          | Centrality    | Word          | Centrality    |
| 1    | study         | 0.689          | study         | 0.660          |
| 2    | think         | 0.503          | think         | 0.437          |
| 3    | semester      | 0.450          | semester      | 0.391          |
| 4    | class         | 0.378          | class         | 0.377          |
| 5    | difficult     | 0.374          | difficult     | 0.376          |
| 6    | grade         | 0.341          | grade         | 0.360          |
| 7    | time          | 0.325          | time          | 0.325          |
| 8    | NotKnow       | 0.325          | feel          | 0.281          |
| 9    | friends       | 0.291          | friends       | 0.265          |
| 10   | major         | 0.276          | now           | 0.248          |
| 11   | feel          | 0.272          | HighSchool    | 0.246          |
| 12   | now           | 0.271          | NotKnow       | 0.239          |
| 13   | HighSchool    | 0.238          | exam          | 0.238          |
| 14   | worry         | 0.238          | major         | 0.227          |
| 15   | exam          | 0.230          | university    | 0.220          |
| 16   | plan          | 0.230          | professor     | 0.212          |
| 17   | university    | 0.226          | people        | 0.210          |
| 18   | course        | 0.224          | course        | 0.208          |
| 19   | school        | 0.220          | situation     | 0.208          |
| 20   | learn         | 0.201          | prepare       | 0.206          |

Figure 3 presents the centrality of keywords, showing the links between the words. A thicker link indicates a higher degree of centrality.
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3.2.2. Coaching Issues before and after COVID-19

The word “study” showed the highest degree of centrality both before and after COVID-19, followed by “think” and “semester”. The centrality of the top ranked words is shown in Table 4.

Table 4. Centrality of the top-ranked words before and after COVID-19.

| Rank | Word Before COVID-19 (n = 256) | Centrality | Word After COVID-19 (n = 127) | Centrality |
|------|---------------------------------|------------|---------------------------------|------------|
| 1    | study                           | 0.698      | study                           | 0.624      |
| 2    | think                           | 0.521      | think                           | 0.400      |
| 3    | semester                        | 0.483      | semester                        | 0.345      |
| 4    | difficult                       | 0.443      | class                           | 0.338      |
| 5    | class                           | 0.397      | grade                           | 0.314      |
| 6    | grade                           | 0.376      | difficult                       | 0.270      |
| 7    | time                            | 0.370      | NotKnow                         | 0.261      |
| 8    | feel                            | 0.341      | time                            | 0.249      |
| 9    | friends                         | 0.322      | major                           | 0.207      |
| 10   | now                             | 0.321      | friends                         | 0.193      |
| 11   | HighSchool                      | 0.291      | feel                            | 0.184      |
| 12   | NotKnow                         | 0.287      | exam                            | 0.176      |
| 13   | exam                            | 0.278      | now                             | 0.176      |
| 14   | major                           | 0.275      | course                          | 0.173      |
| 15   | university                      | 0.262      | HighSchool                      | 0.168      |
| 16   | worry                           | 0.262      | plan                            | 0.164      |
| 17   | people                          | 0.260      | worry                           | 0.164      |
| 18   | professor                       | 0.251      | goal                            | 0.159      |
| 19   | situation                       | 0.248      | university                      | 0.158      |
| 20   | know                            | 0.247      | school                          | 0.155      |

Figure 4 presents the centrality of keywords identified from reports before and after COVID-19. The thicker the link, the higher degree of centrality.
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Figure 4. (a) Centrality of the top 30 keywords before COVID-19; (b) Centrality of the top 30 keywords after COVID-19.

3.3. Bigram

3.3.1. Affiliated Department Tracks

A bigram illustrates a relationship between words. For the HSS track, the word “study” appeared with “hard”, “method”, “time”, “concentration”, and “university”. For the STEM track, it was frequently used with “hard”, “HighSchool”, “time”, “habit”, and “difficult”. The word “time” most frequently appeared with “management” in both tracks. “Semester” was also mentioned often, and it coappeared with “freshman”, “AcademicProbation”, “grade”, and “study” in the HSS track, and with “method”, “freshman”, “grade”, and “study” in the STEM track. The word “university” appeared with “study” in the HSS track and with “enter” in the STEM track; the word “exam” appeared with “study” in the HSS track but with “period” and “prepare” in the STEM track. Examining the top 20 ranks of the bigrams, the word relations of “GraduateSchool—enter”, “grade—low”, “procrastinate—habit”, and “exam—study” were identified only in the HSS track, while relations between “other—people”, “university—enter”, “club—activity”, and “grade—raise” were identified only in STEM track. The top 20 most frequently-appearing word relations for the HSS and STEM tracks are presented in Table 5.

Table 5. Bigram of word relations for HSS and STEM tracks.

| Rank | HSS (n = 210) | STEM (n = 171) |
|------|---------------|----------------|
|      | Word1 | Word2 | Frequency | Word1 | Word2 | Frequency |
| 1    | Study  | Hard   | 65        | Study  | Hard   | 65        |
| 2    | Time   | Management | 56 | Study  | Method | 58        |
| 3    | Study  | Study  | 47        | Time   | Management | 53 |
| 4    | Study  | Method  | 44        | Study  | Study  | 40        |
| 5    | Study  | Time   | 39        | Freshman | Semester | 38 |
| 6    | Semester | Semester  | 35 | Exam   | Period  | 34        |
| 7    | University | Enter  | 35        | HighSchool | Study  | 32        |
| 8    | GraduateSchool | Semester  | 33 | Grade  | 31        |
| 9    | Freshman | Semester  | 31 | Study  | Time    | 31        |
| 10   | Study  | Concentration  | 29 | Other  | People    | 30        |
| 11   | University | Study  | 29        | University | Enter  | 26        |
| 12   | HighSchool | Study  | 28        | Semester | Semester  | 25       |
| 13   | Semester | AcademicProbation  | 28 | Study  | Habit    | 25        |
| 14   | Semester | Grade  | 28        | Exam   | Prepare  | 23        |
| 15   | Semester | Study  | 28        | Study  | Difficult | 23       |
| 16   | Grade  | Low    | 27        | Study  | Plan     | 23        |
| 17   | Hours  | Study  | 27        | Club   | Activity  | 22        |
| 18   | Procrastinate | Habit  | 27        | Grade  | Grade    | 22        |
| 19   | Study  | Plan   | 27        | Grade  | Raise    | 22        |
| 20   | Exam   | Study  | 26        | Semester | Study  | 22        |
3.3.2. Coaching Issues before and after COVID-19

The results of the bigram analysis of the top 20 word relations are presented in Table 6. For coaching issues addressed before the outbreak of the pandemic, the word “study” most often appeared with “method”, “hard”, “time”, HighSchool”, and “concentration”. After the outbreak of the pandemic, it most frequently appeared with “hard”, “NotKnow”, “semester”, “time”, and “major”. Before COVID-19, the word “semester” most frequently appeared with “freshman”, “grade”, “sophomore”, and “study”, while appearing with “freshman”, “academic probation”, and “study” after COVID-19. “The word “time” appeared with the word “management” in both categories. The relations between “other—people”, “club—activity” appeared before COVID-19, and relations between “assignment—submit”, “persistently—study”, “procrastinate—habit”, and “friends—around me” appeared in the top 20 rank after COVID-19.

Table 6. Bigram of word relations before and after COVID-19.

| Rank | before COVID-19 (n = 256) | after COVID-19 (n = 127) |
|------|--------------------------|-------------------------|
|      | Word1 | Word2 | Frequency | Word1 | Word2 | Frequency |
| 1    | Study  | Method | 88        | Study  | Hard   | 52        |
| 2    | Time   | Management | 81       | Study  | Study   | 28        |
| 3    | Study  | Hard   | 78        | Time   | Management | 28    |
| 4    | Study  | Study  | 57        | University | Enter | 25        |
| 5    | Study  | Time   | 52        | GraduateSchool | Enter | 22        |
| 6    | Freshman | Semester | 50   | Grade | Raise | 20        |
| 7    | Semester | Grade | 49 | Study | NotKnow | 20      |
| 8    | Semester | Semester | 49   | Exam  | Prepare | 19      |
| 9    | HighSchool | Study | 45 | Freshman | Semester | 19 |
| 10   | Other | People | 43 | Assignment | Submit | 18    |
| 11   | Club   | Activity | 36 | Semester | AcademicProbation | 18 |
| 12   | University | Enter | 36 | Semester | Study | 18 |
| 13   | Exam   | Period | 35 | Study | Time | 18 |
| 14   | Sophomore | Semester | 34   | Grade | Good | 17 |
| 15   | Study  | Concentration | 34 | Major | Study | 16 |
| 16   | Study  | Plan  | 34 | Persistently | Study | 16 |
| 17   | Grade  | Low   | 33 | Procrastinate | Habit | 16 |
| 18   | GraduateSchool | Enter | 32 | Study | Plan | 16 |
| 19   | Semester | Study | 32 | AroundMe | Friends | 15 |
| 20   | University | Study | 32 | Exam  | Study | 15 |

4. Discussion

4.1. Findings and Implications

The current study examined academic coaching intake session reports accumulated at a Korean university from 2017 to 2021 to investigate keywords and their relations using text timing analysis. In order to provide meaningful baseline information for coaches, educators, and university administrators, comparisons were made first between HSS track and STEM track students, and then between coaching issues before and after COVID-19. The findings and implication of the study were as follows.

4.1.1. Common Tendency toward Frequency, Centrality, and Bigram across Categories

A common tendency toward frequency and centrality of keywords, as well as bigrams, were found across all categories. Most of all, it was notable that the word “study” had a dominant appearance, with the highest frequency and the highest centrality, in all categories. This finding should be viewed in relation to the word “learn”, which did not appear in the top 20 rank in any category. Even though the words study and learn are closely related, there is a noteworthy difference. According to Oxford Learner’s Dictionaries, the word study is defined as “to spend time learning about a subject by reading, going to college, etc.; to examine a problem, situation, group, etc. in detail in order to analyze or understand it” [44] and learn is defined as “to gain knowledge or skill by studying, from experience, from being taught, etc.; to gradually change your attitudes about something so that you
behave in a different way." [45] As the definition suggests, studying is usually associated with formal education, where it allows one to “read, memorize facts, and attend school, etc.” [46] and to engage in the cognitive work of inputting and processing information [47]. On the other hand, learning is related to the process of knowing and doing, in which one becomes skillful or knowledgeable about something which may also affect one’s attitude and behavior [47].

It is true that university students attend a formal educational institution that requires studying the necessary course materials, but they also enter into adulthood; adult learners have been found to have different characteristics and motives for learning compared to children, being more autonomous and focused on making changes in their lives [48,49]. However, findings indicate that university students in Korea mainly talked about studying when they signed up for coaching services. Considering other frequently addressed words such as “grade”, “exam”, “class”, and “course” across the categories, the data could be interpreted to suggest that students in Korea study for exams to get good grades in their classes.

Bigrams also showed that “study—hard” was in the top 3 rank of the most frequently appearing word sequence in all the categories, and other links, such as “study—time” and “study—plan” also appeared in all the categories. This result may reflect the context of Korean education in which students in secondary school are drilled into pursuing high academic achievements by cramming information and getting the right answers in exams [50,51]. Such a prolonged approach to education could have influenced the students’ perception that even in university, they are merely students who have to study the given materials for an exam or for a good grade, rather than seeing themselves as learners autonomously learning to better themselves. It would be important for students to recognize themselves as self-directed learners so that they could extend their experiences in university rather than focusing on studying for an evaluation.

Another notable finding was the common appearance of “HighSchool”, “university”, and “semester” in the top 20 rank of frequency as well as their centrality in all the categories. Bigrams also showed “university—enter” and “freshman—semester” sequences across the categories, as well as the “HighSchool—study” sequence, appearing in both tracks and before COVID-19. The challenges and changes students encounter when transitioning from high school to university have been addressed by previous research [24–26]. For students in Korea, high school years mainly focus on preparing for the university entrance exam [52], without deep consideration for the choice of their major or career path [53]. In high school, students had a clear goal—to enter a prestigious university—and knew how and what to study. Entering a four-year university in Seoul, Korea indicated that the students were high achieving students who had received a fairly high grade on the entrance exam. However, after entering a university, they have to compete with other well-performing students and adapt to a different learning environment while also planning for the future. Compared to their past, with high school years as their frame of reference, they may feel that they are not performing sufficiently, leading them to seek coaching. Thus, preparing students for the transition and guiding them to set appropriate future goals rather than referencing to their past success could help students with their campus life.

4.1.2. Similarities and Differences between HSS Track and STEM Track

The findings showed similarities and differences in the intake session reports of students from the HSS and STEM tracks. First, the word “friends” appeared in the top 20 frequency and centrality for both tracks. University is not just a place for learning; it is also for engaging in various interpersonal relationships. Bowman et al. [54] found that social connection and relationship satisfaction with college friends were closely related to the sense of belonging and well-being of students. It was noteworthy that students seeking coaching for academic performance and success addressed “friends” frequently. Although exploring the specific context would be beyond the scope of the current study, it could
be suggested that relationships and social support are an important factor affecting the academic achievement of students.

Second, words such as “major” and “NotKnow” appeared in both tracks, but had higher frequency and centrality in the HSS track. Students in Korea do not have sufficient chances to explore suitable majors or career paths prior to attending university [53], so they may wonder about their fit to their major as the semesters progress. Consideration of their major seemed to occur more often in the HSS track. This result should be viewed in line with the appearance of “plan” and “worry”, as well as “GraduateSchool—enter” relation in the top 20 rank only in HSS track. The context of what HSS track students plan for, or what they worry about, was not provided in the findings, but it could be hypothesized that their concerns are related to their future career trajectory. There is a growing concern for students in the HSS track regarding their career trajectory due to the rapid advancement of technology and the changing labor market [55]; the frequency of these words may reflect such uncertainty.

Third, in STEM track, the word “people” showed higher frequency and centrality. This may reflect the university setting and culture, in which undergraduate students in STEM are often assigned to work in a lab with professors and graduate school students. Thus, the relationship with people may be an important factor affecting their academic performance. Additionally, noting that the “other—people” relation was found in the bigram analysis of the STEM track, it could be interpreted that students in the STEM track may be paying more attention to others’ performance or perspectives since they have more opportunities to work collaboratively with others in a lab setting.

Lastly, the word “method” appeared to have high frequency, along with “prepare” and “concentration” in the top 20 rank, albeit only in the STEM track. In the bigram analysis, the word “prepare” appeared with “exam”. In STEM track, the curriculum flowcharts were usually fixed and most courses required prerequisite learning (e.g., mathematics, physics) as students advanced into higher levels in their coursework [56]. Students need to accumulate specific knowledge in order to advance in their fields, and many quizzes and exams are involved in the process of student evaluation. Students enrolled in STEM tracks tend to struggle more with GPA than non-STEM students [57]. The extracted keywords could be interpreted in relation to the learning context of STEM track. STEM students talked more about searching for methods to deal with their academic affairs, preparing for exams, and trying to enhance concentration for their studies.

In summary, understanding the similarities and differences of coaching issues for the two tracks may help provide varied support that meets the needs of students.

4.1.3. Similarities and Differences between Coaching Issues before and after COVID-19

The current study also compared the keywords of coaching issues before and after COVID-19. First, while the words “friends” and “people” showed high frequency and centrality before COVID-19, only “friends” had high frequency and centrality after COVID-19. This may be due to the social quarantine measures implemented in early 2020, mandating the university courses to be taught online and restricting social contact. Although students had access to online platforms to participate in class and keep in touch with their friends, encounters with people in general were restricted. Lampe et al. [58] found that college students used social networking services such as Facebook primarily to extend pre-existing offline relationships rather than to initiate new ones. This indicates that there were less opportunities to meet new people due to social distancing policies, and that students seeking coaching after the outbreak of the pandemic talked mainly about their close friends.

Second, the word “NotKnow” appeared before and after COVID-19 but showed a higher rank of frequency and centrality after COVID-19. Additionally, the bigram analysis only showed a frequent appearance of the “study—NotKnow” link after COVID-19. Studies have shown that learning in online spaces can cause great uncertainty and confusion [59] and that reduced contact with other learners and instructors may lead to a drop in
academic performance [60]. Increased reference to not knowing something could reflect the uncertainty students experienced when engaging in online courses during the pandemic.

Lastly, the word “plan” had higher frequency and centrality after COVID-19, and the word “goal” appeared in the top 20 rank of frequency and centrality only after COVID-19. This should also be viewed in association with “assignment—submit”, “persistently—study”, and “procrastinate—habit”, relations that only appeared after COVID-19. These results reflected the phenomenon of students’ taking courses online, requiring them to set their own goals and make specific plans on their own, to manage assignment submissions, and to study persistently without procrastinating. These results indicated that, in the post-pandemic era where online courses are prevalent, self-management intervention would be beneficial for students.

4.1.4. Implications Based on the Findings

Taking all the results into account, the following implications can be proposed: first, it would be important to help university students in Korea understand their roles as adult learners, and not students passively taking in information. Based on theories and approaches of adult learning, such as andragogy [49], coaches could work with individual students to enhance their understanding of themselves, explore the meaning of learning, and empower them to take initiative for learning. Educators could design and implement various instructional strategies so that students could take part in their own learning process [48]. At a university level, university administrators could implement policies and systems to foster generic competencies of students, rather than evaluating them based primarily on grades, in order to help students grow into more autonomous and adaptive learners [3,4].

Second, coaches and educators should recognize the influence of social relationships on students’ academic performance and success and devise interventions or instructions that promote interpersonal skills, such as conflict resolution, communication, and a sense of belongingness. Specifically, with the prolonged pandemic, students’ campus life was moved to online classrooms, restricting the level of interaction among peers and with instructors. Coaches and educators should assess the needs of students and provide them with possible opportunities to interact with one another in class and in coaching sessions.

Third, ways to enhance self-management skills may be necessary for students adapting to online campus life. Martin [61] emphasized that educators needed to be mindful of delivery of instructions, managing the quality of contents, and motivating students in order to promote their self-regulation and management while engaging in online learning. Coaching could also help students with self-regulation, including time management and organization [13].

Finally, challenges that students encounter regarding the changing trajectory of their majoring field, especially for those in the HSS track, should be recognized. There have been studies examining the digital literacy of HSS students [62], and developing theories and models to converge STEM and HSS [63]. In alignment with such studies, university-level approaches providing opportunities for convergent majors should be implemented to better prepare students for the rapidly changing world.

4.2. Limitations and Directions for Future Research

The current study had certain limitations. First, the text mining approach used in the study was an effective way to extract information from a vast amount of text, but it was limited in that it could not provide in-depth understanding of the context in which the text was written, or identify specific variables and their relations. The current study investigated the keywords and their co-occurrences, providing only descriptive and exploratory understanding. Additional qualitative research will be needed to analyze the experiences of students comprehensively and to identify specific ways for coaches, educators, and university administrators to provide necessary student support.
Second, the current study made comparisons between students’ affiliated tracks and between issues before and after COVID-19, which were prominent topics of interest for Korean universities. However, as the aforementioned literature review shows, there were various factors affecting students’ academic life, and students’ characteristics, such as gender and grade level, could also affect their academic success. Hence, future study will be needed to examine factors other than affiliated tracks and the impact of the pandemic in order to comprehensively understand students’ academic challenges and gain insight about necessary interventions.

Third, the findings reflected the educational culture and situation in Korea, but university life and academic challenges students face may differ in other cultural settings. Thus, further study will be needed to compare coaching issues addressed in different university settings in various countries.

Fourth, the study only investigated the initial intake session reports, in which students described their current academic concerns and perceived barriers. However, as coaching proceeds and students gain understanding of themselves and their situations, they could discover other issues that were affecting their academic performance, or their perception of the problem could change. In order to enhance understanding of students’ academic concerns and barriers and to devise better coaching interventions, future studies must investigate the process and outcome of academic coaching.

Despite these limitations, the current study was meaningful in that it examined accumulated authentic data collected from students who were voluntarily seeking coaching services. The findings provided insight into the needs of students and helped to elucidate directions for individualized student support, to be provided at the university level to promote academic success.

5. Conclusions

The current study examined the intake session reports of an academic coaching program provided at a university in Seoul, Korea, using text mining analysis. The study examined the frequency and centrality of words and their relations based on students’ affiliated department tracks and coaching issues before and after the pandemic. The results of the study provided baseline information from the authentic and natural dataset to inform coaches, educators, and policymakers as they work to devise appropriate interventions to satisfy the needs of the students. Although the current study was limited in its ability to explain the specific context of students’ academic concerns, the results could provide insight into understanding the issues that students bring into their academic coaching sessions. Based on the results of the current study, further study could provide additional evidence to aid in the enhancement of academic coaching for university students.

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# Appendix A

Table A1. Keywords in HSS track with frequency of 30 or more.

| Rank | Word             | Frequency | Word Frequency | Word Frequency | Word Frequency | Word Frequency |
|------|------------------|-----------|----------------|----------------|----------------|----------------|
| 1–4  | study            | 1002      | semester       | 530            | think          | 419            | grade          | 364            |
| 5–8  | difficult        | 952       | time           | 321            | class          | 316            | major          | 233            |
| 9–12 | friends          | 224       | NotKnow        | 212            | feel           | 198            | exam           | 193            |
| 13–16| HighSchool       | 184       | now            | 173            | course         | 168            | university     | 168            |
| 17–20| plan             | 161       | school         | 153            | enter          | 146            | worry          | 143            |
| 21–24| good             | 142       | concentration  | 137            | Korean         | 128            | learn          | 128            |
| 25–28| people           | 120       | DoWell         | 118            | graduate       | 116            | GraduateSchool | 116            |
| 29–32| prepare          | 116       | assignment     | 115            | contents       | 112            | interest       | 112            |
| 33–36| method           | 111       | understand     | 111            | know           | 109            | other          | 107            |
| 37–40| situation        | 107       | student        | 105            | choose         | 104            | hours          | 103            |
| 41–44| start            | 103       | freshman       | 101            | professor      | 100            | management     | 99             |
| 45–48| career           | 97        | procrastinate  | 96             | goal           | 94             | English        | 91             |
| 49–52| problem          | 91        | dislike        | 90             | JobHunting     | 89             | continuously   | 87             |
| 53–56| lack             | 77        | task           | 77             | currently      | 76             | parents        | 76             |
| 57–60| LeaveOfAbsence   | 74        | AcademcProbation| 71            | stress         | 71             | work           | 71             |
| 61–64| interesting      | 70        | Korea          | 70             | like           | 70             | life           | 69             |
| 65–68| MajorCourse      | 68        | reason         | 68             | habit          | 67             | hard           | 65             |
| 69–72| activity         | 64        | DoubleMajor    | 63             | GiveUp         | 63             | AroundMe       | 58             |
| 73–76| anxious          | 60        | apply          | 59             | department     | 59             | money          | 59             |
| 77–80| lose             | 58        | read           | 58             | effort         | 57             | club           | 56             |
| 81–84| submit           | 55        | lecture        | 54             | motivation     | 53             | relationship   | 53             |
| 85–88| sleep            | 52        | well           | 52             | ability        | 51             | military       | 51             |
| 89–92| efficient        | 50        | ReturnToSchool | 50            | suitable       | 50             | want           | 50             |
| 93–96| help             | 49        | math           | 46             | need           | 46             | talk           | 48             |
| 97–100| studies         | 47        | ByMySelf       | 46             | need           | 46             | need           | 46             |
| 101–104| UntilNow    | 46        | ElectiveCourse | 45            | different      | 44             | find           | 44             |
| 105–108| presentation    | 44        | WorkHard       | 44             | cellphone      | 43             | home           | 43             |
| 109–112| score         | 43        | alone          | 43             | current        | 42             | current        | 42             |
| 113–116| feeling        | 42        | low            | 42             | memorization   | 42             | rest           | 42             |
| 117–120| review         | 42        | change         | 41             | credit         | 41             | difficulty     | 41             |
| 121–124| confident    | 40        | experience     | 40             | improve        | 39             | use            | 38             |
| 125–128| decide        | 37        | inquire        | 37             | follow         | 36             | learning       | 36             |
| 129–132| midterm       | 36        | PartTimeJob    | 36             | RetakingCollegeEntranceExam | 36             | execute        | 35             |
| 133–136| academic     | 34        | adapt          | 34             | CampusLife     | 33             | China          | 33             |
| 137–140| game         | 33        | TeamProject    | 33             | work           | 33             | work           | 33             |
| 141–144| writing       | 33        | burden         | 32             | persistently   | 32             | questions      | 32             |
| 145–148| undergraduate | 32        | deadline       | 31             | organize       | 31             | research       | 31             |
| 149–152| avoid         | 30        | computer       | 30             | cramping       | 30             | cramping       | 30             |
| 153–156| doctoral     | 30        | period         | 30             | physics        | 30             | process        | 30             |

Table A2. Keywords in STEM track with frequency of 30 or more.

| Rank | Word             | Frequency | Word Frequency | Word Frequency | Word Frequency | Word Frequency |
|------|------------------|-----------|----------------|----------------|----------------|----------------|
| 1–4  | study            | 888       | semester       | 411            | grade          | 354            | think          | 326            |
| 5–8  | difficult        | 306       | class          | 299            | time           | 270            | exam           | 190            |
| 9–12 | friends          | 185       | feel           | 174            | HighSchool     | 171            | major          | 156            |
| 13–16| now              | 153       | university     | 149            | NotKnow        | 145            | method         | 140            |
| 17–20| course           | 136       | prepare        | 136            | people         | 135            | concentration  | 123            |
| 21–24| enter            | 122       | worry          | 120            | professor      | 117            | DoWell         | 115            |
| 25–28| plan             | 115       | good           | 114            | situation      | 108            | management     | 105            |
| 29–32| assignment       | 103       | freshman       | 100            | learn          | 100            | English        | 99             |
| 33–36| interest         | 99        | other          | 99             | contents       | 95             | stress         | 95             |
| 37–40| GraduateSchool   | 93        | career         | 85             | choose         | 84             | goal           | 84             |
| 41–44| know             | 82        | school         | 81             | graudate       | 79             | Korean         | 77             |
| 45–48| military         | 76        | LeaveOfAbsence | 74            | like           | 74             | relationship   | 74             |
| 49–52| JobHunting       | 69        | dislike        | 68             | task           | 68             | lack           | 67             |
| 53–56| hard             | 66        | activity       | 65             | motivation     | 65             | understand     | 65             |
| 57–60| habit            | 64        | problem        | 63             | work           | 63             | life           | 62             |
| 61–64| club             | 60        | currently      | 60             | need           | 60             | talk           | 60             |
| 65–68| MajorCourse      | 59        | start          | 58             | continuously   | 57             | period         | 57             |
| 69–72| WorkHard         | 57        | student        | 55             | apply          | 54             | different      | 54             |
| 73–76| submit           | 54        | procrastinate  | 53             | want           | 53             | ReturnToSchool | 51             |
| 77–80| effort           | 50        | read           | 50             | GiveUp         | 48             | help           | 48             |
| 81–84| sophomore        | 48        | vacation       | 48             | well           | 48             | alone          | 47             |
| 85–88| anxious          | 47        | department     | 47             | thesis         | 46             | current        | 45             |
| 89–92| doctoral         | 45        | find           | 45             | Korea          | 45             | AcademicProbation | 44             |
| 93–96| hours            | 44        | studies        | 44             | article        | 43             | experience     | 43             |
| 97–100| review          | 43        | peers          | 42             | difficulty     | 41             | efficient      | 41             |
### Table A2. Cont.

| Rank | Word       | Frequency | Word       | Frequency | Word       | Frequency | Word       | Frequency |
|------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|
| 101~104 | lecture | 41 | undergraduate | 41 | DoubleMajor | 40 | research | 40 |
| 105~108 | feeling | 39 | suitable | 39 | reason | 38 | write | 38 |
| 109~112 | AroundMe | 37 | lose | 37 | writing | 37 | burden | 36 |
| 113~116 | home | 36 | persistently | 36 | questions | 36 | sleep | 36 |
| 117~120 | cellphone | 35 | important | 35 | math | 35 | parents | 35 |
| 121~124 | ability | 34 | follow | 33 | MiddleSchool | 33 | presentation | 33 |
| 125~128 | academic | 32 | decide | 32 | diligently | 32 | inquire | 32 |
| 129~132 | lab | 32 | learning | 32 | low | 32 | master | 32 |
| 133~136 | UntilNow | 32 | memorization | 31 | midterm | 31 | myself | 31 |
| 137~140 | PrivateInstitute | 31 | process | 31 | program | 31 | rest | 31 |
| 141~143 | ByMySelf | 30 | finish | 30 | personality | 30 |

### Table A3. Keywords before COVID-19 (2017–2019) with frequency of 30 or more.

| Rank | Word       | Frequency | Word       | Frequency | Word       | Frequency | Word       | Frequency |
|------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|
| 1~4 | study | 1263 | semester | 677 | think | 519 | grade | 491 |
| 5~8 | difficult | 467 | time | 436 | class | 403 | friends | 309 |
| 9~12 | feel | 288 | exam | 269 | HighSchool | 269 | major | 258 |
| 13~16 | now | 247 | NotKnow | 227 | university | 224 | course | 211 |
| 17~20 | method | 208 | people | 207 | worry | 191 | plan | 184 |
| 21~24 | enter | 182 | concentration | 176 | good | 175 | prepare | 175 |
| 25~28 | DeWell | 171 | Korean | 171 | professor | 171 | school | 167 |
| 29~32 | situation | 161 | GraduateSchool | 158 | other | 158 | know | 155 |
| 33~36 | learn | 151 | interest | 148 | contents | 147 | freshman | 147 |
| 37~40 | management | 147 | English | 142 | assignment | 139 | graduate | 139 |
| 41~44 | student | 134 | career | 125 | understand | 125 | stress | 122 |
| 45~48 | choose | 121 | problem | 116 | start | 115 | currently | 110 |
| 49~52 | hours | 108 | relationship | 108 | Korea | 105 | like | 105 |
| 53~56 | lack | 104 | continuously | 103 | military | 103 | JobHunting | 101 |
| 57~60 | LeaveOfAbsence | 100 | work | 100 | task | 99 | club | 96 |
| 61~64 | MajorCourse | 96 | goal | 91 | dislike | 88 | activity | 86 |
| 65~68 | anxious | 86 | sophomore | 86 | talk | 86 | habit | 85 |
| 69~72 | department | 84 | life | 84 | read | 83 | need | 82 |
| 73~76 | procrastinate | 81 | parents | 80 | hard | 79 | help | 79 |
| 77~80 | different | 78 | reason | 78 | apply | 77 | interesting | 75 |
| 81~84 | DoubleMajor | 73 | thesis | 72 | submit | 70 | want | 69 |
| 85~88 | motivation | 67 | well | 67 | WorkHard | 67 | difficulty | 66 |
| 89~92 | AcademicProbation | 65 | alone | 65 | cellphone | 65 | doctoral | 65 |
| 93~96 | ability | 64 | efficient | 64 | AroundMe | 63 | home | 63 |
| 97~100 | undergraduate | 63 | article | 62 | current | 62 | vacation | 62 |
| 101~104 | ReturnToSchool | 61 | decide | 60 | lose | 60 | low | 60 |
| 105~108 | sleep | 60 | find | 59 | GiveUp | 59 | mother | 59 |
| 109~112 | research | 58 | ElectiveCourse | 58 | period | 58 | review | 58 |
| 113~116 | studies | 58 | math | 57 | peers | 57 | ByMySelf | 56 |
| 117~120 | experience | 55 | feeling | 55 | follow | 55 | presentation | 55 |
| 121~124 | score | 55 | memorization | 54 | suitable | 54 | writing | 54 |
| 125~128 | effort | 52 | MiddleSchool | 52 | use | 52 | inquire | 52 |
| 129~132 | master | 51 | lab | 51 | write | 50 | RetakingCollegeEntranceExam | 50 |
| 133~136 | burden | 49 | learning | 49 | lecture | 49 | process | 49 |
| 137~140 | PartTimeJob | 46 | Chinese | 45 | PrivateInstitute | 45 | academic | 44 |
| 141~144 | change | 44 | credit | 44 | finish | 44 | job | 44 |
| 145~148 | China | 43 | confident | 43 | family | 43 | midterm | 43 |
| 149~152 | program | 43 | game | 42 | improve | 42 | information | 41 |
| 153~156 | organize | 41 | questions | 41 | rest | 41 | upperclassman | 41 |
| 157~160 | important | 40 | myself | 40 | StudyingAbroad | 40 | UntilNow | 40 |
| 161~164 | book | 39 | check | 39 | counseling | 39 | execute | 39 |
| 165~168 | junior | 39 | beginning | 38 | deadline | 38 | materials | 38 |
| 169~172 | personality | 38 | result | 38 | CollegeEntranceExam | 37 | InternationalStudent | 37 |
| 173~176 | persistently | 37 | satisfied | 37 | bad | 36 | CampusLife | 36 |
| 177~180 | field | 36 | language | 35 | discharged | 34 | father | 34 |
| 181~184 | high | 34 | adapt | 33 | Exchangestudent | 33 | teacher | 33 |
| 185~188 | atmosphere | 32 | avoid | 32 | notetaking | 32 | physics | 32 |
| 189~192 | schedule | 32 | transfer | 32 | answer | 31 | computer | 31 |
| 193~196 | EMI | 31 | money | 31 | participate | 31 | report | 31 |
| 197~200 | diligently | 30 | easy | 30 | quit | 30 | TeamProject | 30 |
Table A4. Keywords after COVID-19 (2020–2021) with frequency of 30 or more.

| Rank | Word                      | Frequency | Word                     | Frequency | Word             | Frequency |
|------|---------------------------|-----------|--------------------------|-----------|------------------|-----------|
| 1–4  | study                     | 627       | semester                 | 264       | grade            | 227       |
| 5–8  | class                     | 202       | difficult                | 162       | time             | 155       |
| 9–12 | NotKnow                   | 130       | exam                     | 114       | friends          | 100       |
| 13–16| university                | 93        | plan                     | 92        | goal             | 87        |
| 17–20| HighSchool                | 86        | concentration            | 84        | feel             | 84        |
| 21–24| assignment                | 79        | now                      | 79        | learn            | 77        |
| 25–28| worry                     | 72        | dislike                  | 70        | procrastinate    | 68        |
| 29–32| school                    | 67        | interest                 | 63        | DoWell           | 62        |
| 33–36| career                    | 57        | JobHunting               | 57        | management       | 57        |
| 37–40| effort                    | 55        | freshman                 | 54        | situation        | 54        |
| 41–44| hard                      | 52        | GraduateSchool           | 51        | motivation       | 51        |
| 45–48| AcademicProbability       | 50        | English                  | 48        | LeaveOfAbsence   | 48        |
| 49–52| people                    | 48        | life                     | 47        | habit            | 46        |
| 53–56| professor                 | 46        | start                    | 46        | task             | 46        |
| 57–60| activity                  | 43        | method                   | 43        | continuously     | 41        |
| 61–64| ReturnToSchool            | 40        | hours                    | 39        | like             | 39        |
| 65–68| problem                   | 38        | UntilNow                 | 38        | apply            | 36        |
| 69–72| lose                      | 35        | suitable                 | 35        | Korean           | 34        |
| 73–76| work                      | 34        | WorkHard                 | 34        | studies          | 33        |
| 77–80| AroundMe                  | 32        | rest                     | 32        | MajorCourse      | 31        |
| 81–84| persistently              | 31        | diligently               | 30        | DoubleMajor      | 30        |

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