Text Mining Analysis for the Questionnaire Investigation on the High School Teachers' Work Load

Yasuo Ishii[1], Daisuke Takeyasu[2], Tatsuya Oyanagi[3] and Kazuhiro Takeyasu[4]

Abstract

High School teachers in Japan are sending very busy days on their daily works including teaching, support for the club activities and deskwork. Among them, they share a lot of time for managing the club actives of students compared with other countries. In that area, professionals can make instruction much better than teachers for the special sports like Judo and Kendo (Japanese fencing) etc. School Social Worker can coordinate the professionals out of school and can help teachers by decreasing their burden on that area. There are few related papers concerning the support of club activities by utilizing the professionals outside. In this paper, a

[1] Yamato University. E-mail: ishii.yasuo@yamato-u.ac.jp
[2] The Open University of Japan. E-mail: take1111@hotmail.co.jp
[3] Hachinohe Gakuin University. E-mail: oyanagi-t@hachinohe-u.ac.jp
[4] Tokoha University. E-mail: takeyasu@fj.tokoha-u.ac.jp

questionnaire investigation is executed to the five High Schools at Miyagi Prefecture in Japan in order to clarify their current condition and their consciousness, and to seek the possibility of utilizing school social worker for their support. Fundamental statistical analysis and Text Mining Analysis are performed. Some interesting and instructive results were obtained.

1. Introduction

Teachers at High school / Junior High School in Japan are sending very busy days in general on their daily works including teaching, support for the club activities and deskwork. Among them, they share a lot of time for managing the club actives of students compared with other countries. In particular, it takes time to manage the club activities for sports. In that area, professionals can make instruction much better than teachers for the special sports like Judo and Kendo (Japanese fencing) etc. School Social Worker can coordinate the professionals out of school and can help teachers by decreasing their burden on that area.

There are many researches made on School Social Workers' function. For example, H. Konyuba (2011) analyzed the teacher's sparing time for club activities and pointed out that there is a difference between the sports club and the culture club.

K.Yonekawa (2011) discussed the mental health support by school social worker. M.S.Kelly et al. (2010) made School Social work survey and derived instructive insight.

OECD (Organization for Economic Co-operation and Development) has released the investigation report of "Teaching And Learning International Survey (TALIS)" on June 25/2014. It is reported that the teacher's total working hours for a week in Japan were the most among 33 countries. Main data are as follows.

/Teacher's total working hours for a week in Japan: 53.9 (Average: 38.3)

/ Teacher's working hours of support for the club activities for a week in Japan: 7.7(Average: 2.1)

/Teacher's working hours of deskwork for a week in Japan: 5.5 (Average: 2.9)

/Teacher's teaching hours for a week in Japan: 17.7 (Average: 19.3)

Teacher's working hours of support for the club activities were nearly triple, and those of deskwork double compared with the average, while the teaching hours were less than those of the average. They are too busy for the support of the club activities and deskwork, which causes bad influence on their teaching activities.

Although there are some related papers as these, but there are few related papers concerning the support of club activities by utilizing the professionals outside especially in the Japanese case.

In this paper, a questionnaire investigation is executed to the five High Schools at Miyagi Prefecture in Japan in order to clarify their current condition and their consciousness, and to seek the possibility of utilizing school social worker for

their support. Fundamental statistical analysis and Text Mining Analysis are performed. Some interesting results were obtained.

The rest of the paper is organized as follows. Outline of questionnaire investigation is stated in section 2.   Text Mining Analysis is conducted in section 3 which is followed by the Remarks of section 4.

2. Outline and the Basic Statistical Results of the Questionnaire Research

2.1 Outline of the Questionnaire Research

We make a questionnaire investigation for the Support of High School Teachers by the School Social Worker. The outline of the questionnaire research is as follows (Table 2.1). The questionnaire sheet is attached in Appendix.

Table 2.1 The outline of the Questionnaire Research

(1)	Scope of investigation	High School Teachers, 5 High Schools in Miyagi Prefecture, Japan
(2)	Period	August 〜October 2015
(3)	Method	Leave until called for
(4)	Collection	Number of distribution 309 Number of collection 167(collection rate 54.0%） Valid answer 167

2.2 Basic Statistical Results

Now, we show the main summary results by single variable (Table 2.2).

Table 2.2 The main summary results by single variable

(1)Attribute（Q4）　（%）			⑤ How many	Within 1 year	6.0
① Sex（Q4-1）	Male	65.9	years are you	1-2 years	4.8
	Female	34.1	working for the	3-4 years	15.7
			present school?	5-9 years	22.3
② Age（Q4-2）	20-29	23.2	（Q4-5）	More than 10 years	51.4
	30-39	24.4	⑥How about the	Adviser	72.1
	40-49	29.3	sort of job?	Deputy Adviser	20.6
	50-59	18.9	（Q1-2-2-3）	Miscellaneous	7.3
	60-	4.3	(2) Status of the club activity（2-2-3,4）（%）		
③ Position （Q4-3）	Deputy Principal	0.6	① Is the club strong enough to participate in the national sport meet?（Q1-2-2-4）	Yes	25.5
				Cannot say either	15.8
	a person in charge of educational affairs	13.3		No	58.8
	Teacher	58.4			
	Lecturer	22.9	② Is the club	Yes	54.2

			activity active? (Q1-2-2-5)	Cannot say either	33.1
	Assistant	1.2			
	Miscellaneous	3.6		No	12.7
④Experience as a teacher (Q4-4)	Within 1 year	4.3			
	1-2 years	4.3			
	3-4 years	11.7			
	5-9 years	19.0			
	More than 10 years	60.7			

Next, the clubs that teachers are in charge of are as follows(Figure 2.1,2.2).
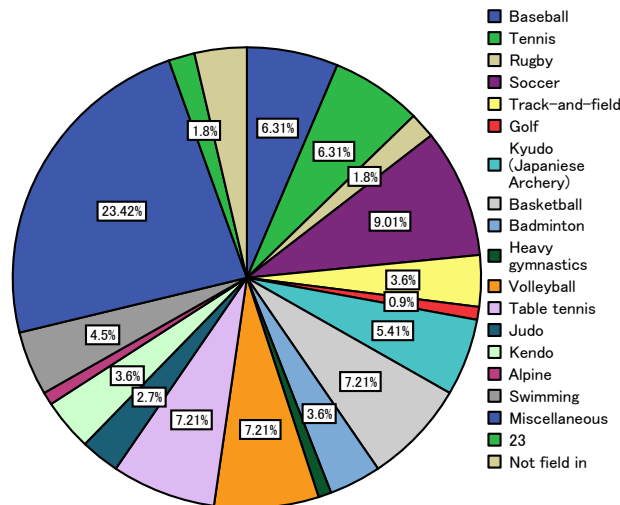
Figure 2.1: Sports Club (Q 1-2-1)

Large part one is Soccer (9.01%), Basketball (7.21%), Volleyball (7.21%), and Table Tennis (7.21%).
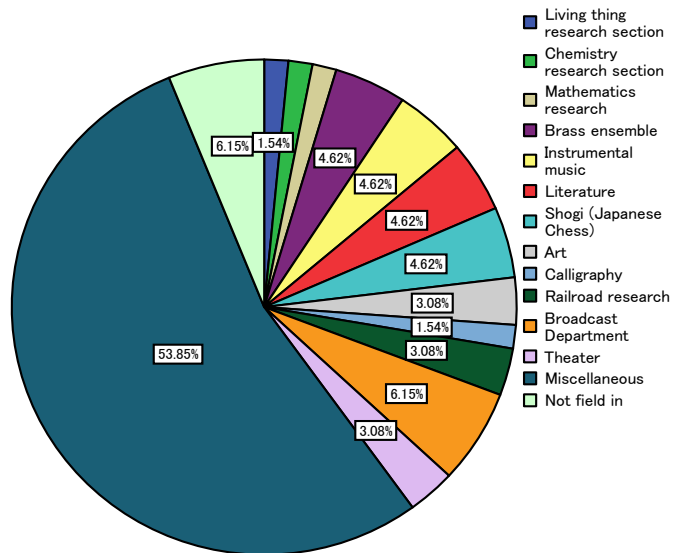

Figure 2.2: Culture Club (Q1－2－2)

Main items are as follows.

/Broadcast Department: 6.15%, /Literature: 4.62%, /Shougi (Japanese Chess): 6.2%, Brass Ensemble: 4.62%, /Instrumental Music: 4.62%

Summary results about Q2 "Consciousness for the daily works" and Q3 "Consciousness for guiding the club activities" are exhibited in Figure 2.3 and 2.4 for each.
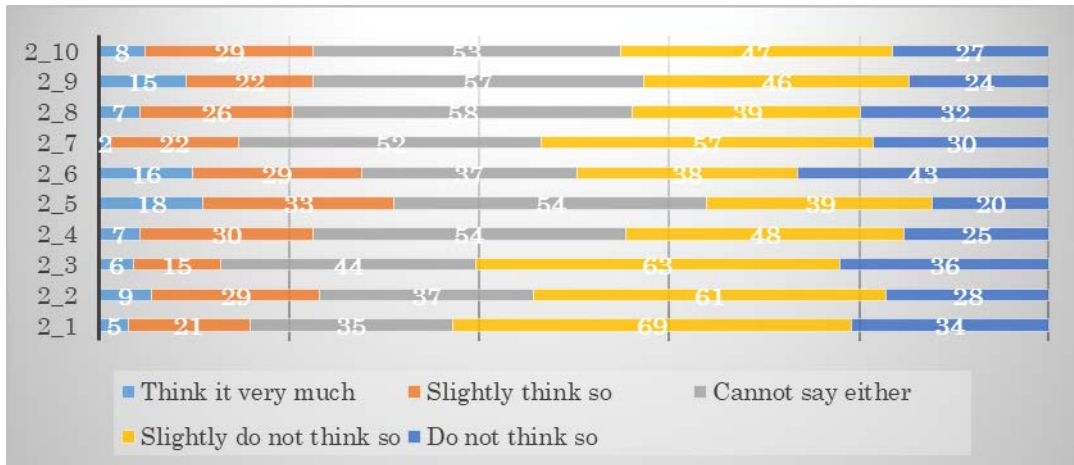
Figure 2.3: Consciousness for the daily works

Considering the two themes: "Think it very much" and "Slightly think so", they feel burden for "Student Guidance", "Club Activities", "Preparing Teaching", "Handling Students Performance", "Meeting" and "PTA Meeting".
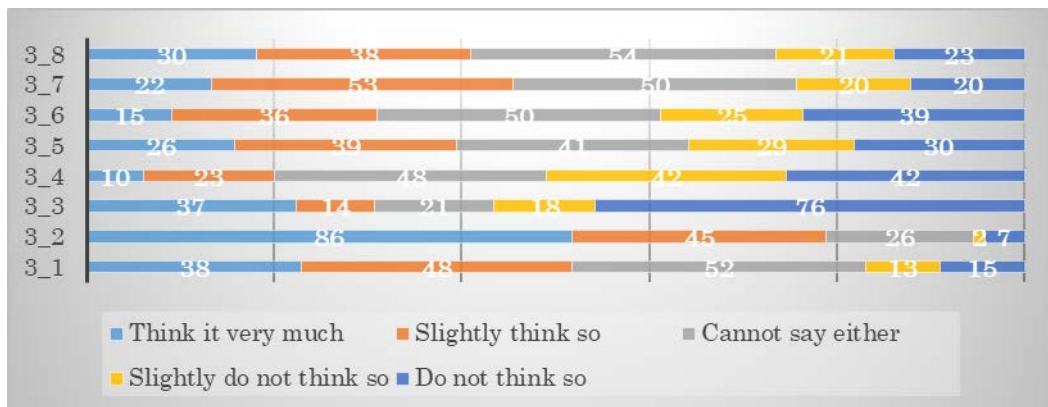

Figure 2.4: Consciousness for guiding the club activities

Looking over the parts "Think it very much" and "Slightly think so", they have the high consciousness of "It is better for the professionals to guide club activities"

and "Feel worthwhile to guide club activities", and then   "Have a hard time for the mental guidance", "Want to have a person to consult with in guiding club activities" and "Quite tired because of the activity on holiday" follow.

3. Text Mining Analysis

Now, we make analysis utilizing "Text Analytics for Surveys" by focusing important keywords found in Key Graph. Key Graph is a method to visualize the data structure using key words. Data occurrences at the same period of the time are exhibited by the link of Key Graph. Jaccard coefficient and Co-occurrence probability are utilized for the analysis of co-appearance rate.

5 rating scale in Q2 and Q3 is converted into 3 in order to grasp the clearer relationship among items.

First of all, we explain the abbreviation form in the following figures. If the sentence is stated in the figure as it is, it becomes too complicated and we can hardly identify them.

The character "1", "2", "3" at each word means:

  "1": Affirmative   / It is better to do so.   I think so.

  "2": Neutral   /Not either

  "3": Negative   / It is not better to do so.   I do not think so.

For example,

"1"FeelItBurdenToTeach

"2"FeelItBurdenToTeach

"3"FeelItBurdenToTeach

3.1   Consciousness for the club activities and the daily works（Q1-2&Q2）

The Key Graph analysis is executed selecting the item of Q1-2 "Current Condition of Club Activities" and Q2 "Consciousness for the daily works". Jaccard coefficient is utilized for the analysis of co-appearance rate.
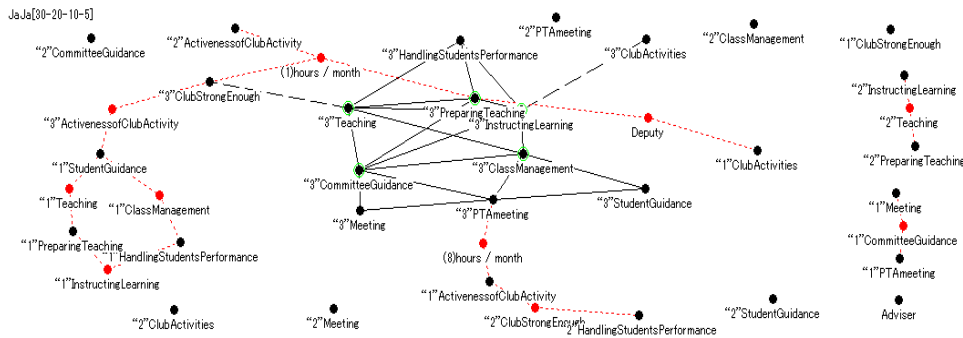

Figure 3.1: Consciousness for the club activities and the daily works （Q1-2&Q2）

From Figure 3.1, we can extract 2 clusters. The cluster located in the upper middle is a clear one which shows that "Do not feel burden for teaching" has a strong co-occurrence rate with "Club is not so strong". "Club is not so strong" also has a rather high co-occurrence rate with "Club activities is not so active", and "Club activity is one hour per month". "Do not feel burden for teaching" has a

strong co-occurrence rate with ""3" Handling student performance"," "3" Student Guidance", "3" Preparing Teaching" and "3" Class Management", where these mean that they do not feel burden to such daily works in which club is not so strong. On the other hand, we can observe the second cluster in the left downward in the figure. Those who feel it burden for the daily works feel it burden for other jobs. In particular, those feel it burden for "Students Guidance" also feel it burden for "Teaching", "Class Management" where club activity is not so active.

3.2   Consciousness for the daily works（Q2）

In this section, relationship among items in "Consciousness for the daily works" is analyzed. Jaccard coefficient is utilized for the analysis of co-appearance rate.
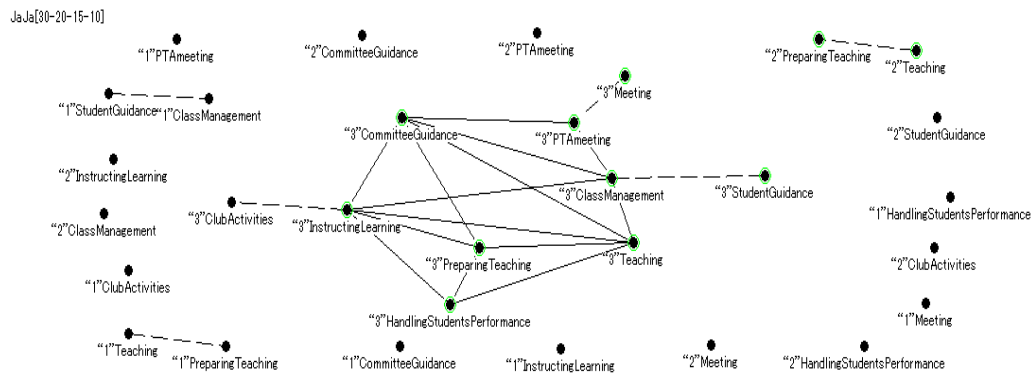

Figure 3.2: Consciousness for the daily works（Q2）

From Figure 3.2, we can observe one cluster. Those who do not feel it burden for the daily works do not feel it burden for each job.

3.3 Consciousness for guiding the club activities（Q3

Focusing on Q3 "Consciousness for guiding the club activities", relationship among items is pursued. Jaccard coefficient is utilized for the analysis of co-appearance rate.
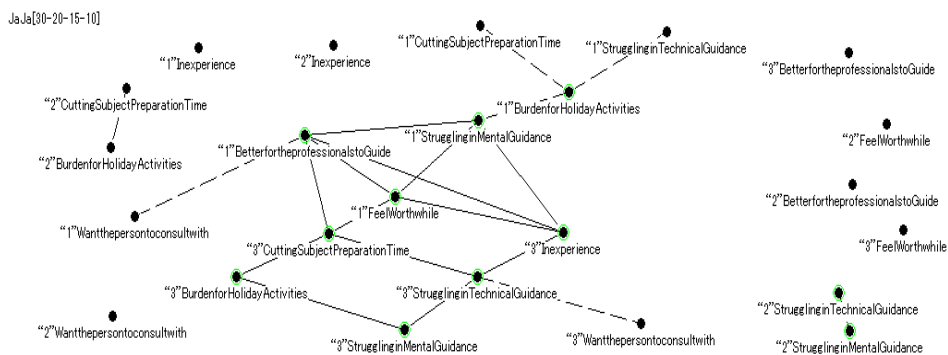

Figure 3.3: Consciousness for guiding the club activities （Q3）

One strong cluster can be found from Figure 3.3. "Feel Worthwhile" has a high co-occurrence rate with "Better for the professionals to Guide" and "Struggling in Mental Guidance". Therefore it is expected to decrease the burden by utilizing professionals outside.

3.4 Consciousness for the daily works and Consciousness for guiding the club activities（Q2&Q3）

The Key Graph analysis is executed selecting the item of Q2 "Consciousness for the daily works" and Q3 "Consciousness for guiding the club activities". Jaccard coefficient is utilized for the analysis of co-appearance rate.
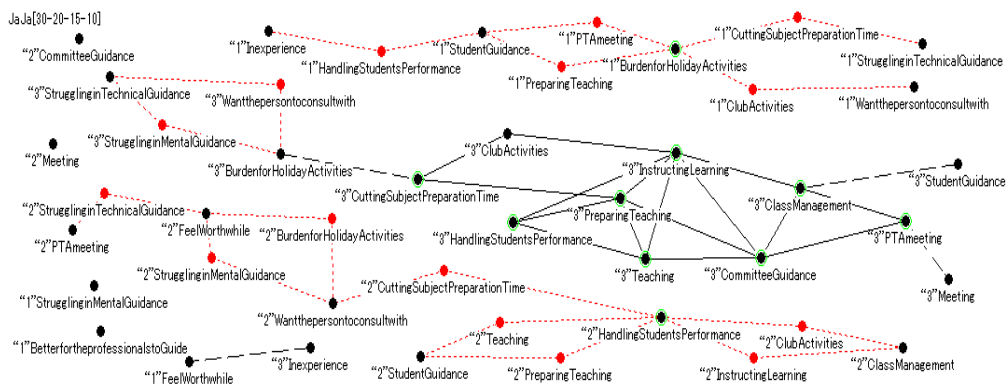

Figure 3.4: Consciousness for the daily works" and Consciousness for guiding the club activities（Q2&Q3）

From Fig.3.4, we can observe one strong cluster and the other several clusters. Strong cluster located at the right center is the one that they do not feel it burden for the daily works. The cluster located in the upper is the one that they feel it burden for the holiday works.

3.5 Consciousness for the club activities and Consciousness for guiding the club activities（Q1-2&Q3）

In this section, Consciousness for the club activities and Consciousness for guiding the club activities（Q1-2&Q3）are analyzed in order to search the relationship between these and the key word: "Feel Worthwhile". Co-occurrence probability is utilized for the analysis of co-appearance rate.
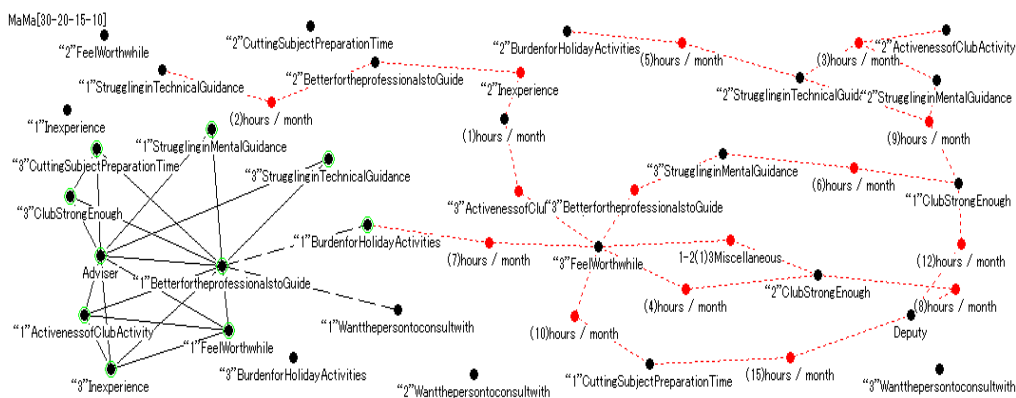
Figure 3.5: Consciousness for the club activities and Consciousness for guiding the club activities（Q1-2&Q3）

From Figure 3.5, we can find a strong cluster and a rather strong cluster. From the left hand cluster (the strong one), we can find that "Adviser" has a high co-occurrence rate with "Feel Worthwhile", "Club Activities is active", "Better for the professionals to Guide", "Struggling in Mental Guidance", and "Not Inexperience". From the right hand cluster (the rather strong one), we can observe that "Do not feel worthwhile" has a high co-occurrence rate with "Club Activities

is not active" and "It is not better for the professionals to Guide". We can see that even if they feel worthwhile to guide club activities, many of think that they are struggling in mental guidance and it is better for the professionals to guide club activities.

3.6 Current Health Condition（Q4-15,16,17）

Here, Current Health Condition（Q4-15,16,17）is analyzed. Jaccard coefficient is utilized for the analysis of co-appearance rate.
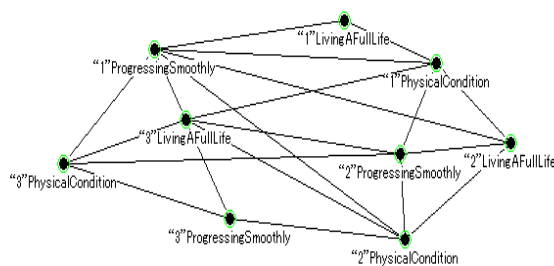
Figure 3.6: Current Health Condition（Q4-15,16,17）

From Figure 3.6, we can find one strong cluster. "Good Physical Condition"," Progressing Smoothly", and "Living a Full Life" have a high co-occurrence rate with one another. Keeping a good health condition makes a great influence to having the feeling of "Worthwhile".

3.7   Consciousness for the daily works and Attributes（Q2&

Q4-1~4-5 & Q4-7~Q4-8）

Consciousness for the daily works and Attributes（Q2＆Q4-1~4-5＆Q4-7~Q4-8）
are analyzed. Co-occurrence probability is utilized for the analysis of
co-appearance rate.
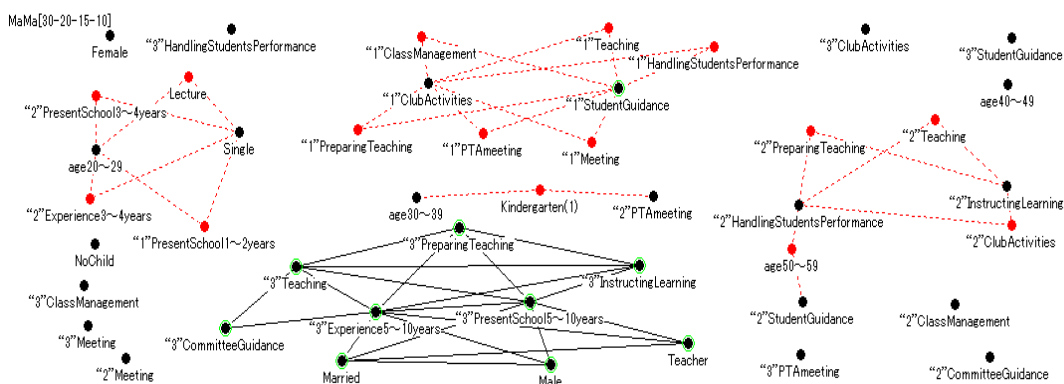
Figure 3.7: Consciousness for the daily works and Attributes

（Q2&Q4-1~4-5&Q4-7~Q4-8）

From Figure 3.7, we can observe four clusters. In the center downward (the
strong one), "Male" has a high co-occurrence rate with "married", "Experience
5~10 years"," Present School 5~10 years" and "Do not feel it burden to
teach" has a high co-occurrence rate with "Do not feel it burden to prepare
teaching", "Do not feel it burden to instruct learning", "Do not feel it burden to
guide committee", " Present School 5~10 years" and "Experience 5~10 years".
The left clusters shows the young cluster such as "Single", "age 20~29", "Present

School 3~4 years" and 〝Experience 3~4 years". From these, what kind of burden they feel depends upon their experiences.

3.8 Consciousness for guiding the club activities and Attributes （Q3&Q4-1~4-5&Q4-7）

Consciousness for guiding the club activities and Attributes（Q3＆Q4-1~4-5＆Q4-7）are analyzed. Jaccard coefficient is utilized for the analysis of co-appearance rate.
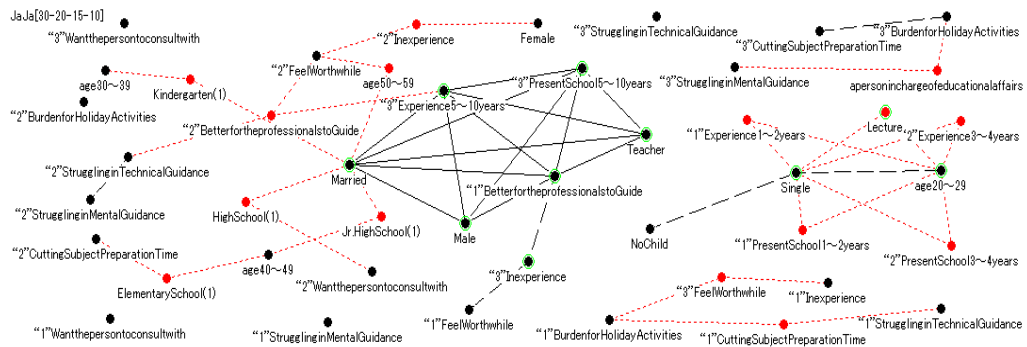
Figure 3.8: Consciousness for guiding the club activities and Attributes（Q3 & Q4-1~4-5 & Q4-7）

From Fig.3.8, we can observe one strong cluster and the second cluster. Strong cluster is located at the center. "Better for the professionals to guide" has a high co-occurrence rate with "Male", "Married", "Experience 5~10 years"," Present School 5~10 years". The right hand side cluster shows the 20th, single, short experienced lecturers.

4. Remarks

In this paper, text mining method is applied and exquisite analysis was performed. Followings are the main results.

(1) Those who feel it burden for the daily works feel it burden for other jobs. In particular, those feel it burden for "Students Guidance" also feel it burden for "Teaching", "Class Management" where club activity is not so active.

(2) "Feel Worthwhile" has a high co-occurrence rate with "Better for the professionals to Guide" and "Struggling in Mental Guidance". Therefore it is expected to decrease the burden by utilizing professionals outside.

(3) "Good Physical Condition"," Progressing Smoothly", and "Living a Full Life" have a high co-occurrence rate with one another. Keeping a good health condition makes a great influence to having the feeling of "Worthwhile".

(4) "Male" has a high co-occurrence rate with "married", "Experience 5~10 years"," Present School 5~10 years" and "Do not feel it burden to teach" has a high co-occurrence rate with "Do not feel it burden to prepare teaching", "Do not feel it burden to instruct learning", "Do not feel it burden to guide committee", " Present School 5~10 years" and "Experience 5~10 years". The left clusters shows the young cluster such as "Single", "age 20~29", "Present School 3~4 years" and "Experience 3~4 years". From these, what kind of burden they feel depends upon their experiences.

(5) "Better for the professionals to guide" has a high co-occurrence rate with "Male", "Married", "Experience 5~10 years"," Present School 5~10 years".

We can find a cluster that they do not feel it burden for the daily works. On the other hand, there is also a cluster that they feel it burden for the daily works. Connecting item for each cluster is "Feel Worthwhile". This item is a key word for solving problem. To promote to feel worthwhile by decreasing burden would be an essential function to be investigated. To introduce outer professionals in guiding the club activities is one of the solutions for that.

5. Conclusion

High School teachers in Japan are sending very busy days on their daily works including teaching, support for the club activities and deskwork. Among them, they share a lot of time for managing the club actives of students compared with other countries. In that area, professionals can make instruction much better than teachers for the special sports like Judo and Kendo (Japanese fencing) etc. School Social Worker can coordinate the professionals out of school and can help teachers by decreasing their burden on that area. There are few related papers concerning the support of club activities by utilizing the professionals outside. In this paper, a questionnaire investigation was executed to the five High Schools at Miyagi Prefecture in Japan in order to clarify their current condition and their consciousness, and to seek the possibility of utilizing school social worker for their support. Fundamental statistical analysis and Text Mining Analysis were performed. Based upon the results, these suggest that unique/original approach

should be executed to the "Club Activities". Teachers' burden may be decreased by utilizing outer specialist in guiding club activities. School Social Worker can coordinate the professionals out of school and can help teachers by decreasing their burden on that area. This suggests the possibility of developing the new activity field for the School Social Worker. Various cases should be investigated here after.

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Appendix: Questionnaire about the Club Activities at High School

１．**Q1 Please select the appropriate item in each column.**

1 Q1-1	① Private	② Public		
2 Q1-2	① Ordinary course	② Technical course	③ Commercial course	④ Miscellaneous ( )
	（1）　**Select the club you are in charge of.**			
Q1-2-(1) Sports club	① Baseball　② Tennis　　③ Rugby　④ Soccer　⑤ Track-and-field ⑥Hockey ⑦Archery ⑧Golf ⑨Kyudo (Japanese Archery) ⑩ Horsemanship　⑪　Basketball　⑫　Badminton　⑬ Heavy gymnastics ⑭Volleyball ⑮ Table　tennis　⑯ Judo　　⑰ Kendo　　⑱ Alpine　⑲ Skiing　⑳ Swimming　㉑Miscellaneous ( )			

Q1-2-(1) Culture club	①Human sciences ②Research section ③Living thing research section ④Chemistry research section ⑤Physics research ⑥Mathematics research ⑦Brass ensemble ⑧Instrumental music ⑨Literature ⑩Shogi (Japanese Chess) ⑪Art ⑫Calligraphy ⑬Railroad research ⑭ESS ⑮Newspaper ⑯Broadcast Department ⑰Classic ⑱Theater ⑲Debating ⑳Photo department ㉑Radio ㉒Movie research ㉓Miscellaneous ( )		
	（2）　Q1-2-(2)-3 How about the sort of job?		
3	① Adviser	② Deputy Adviser	② Miscellaneous ( )
	Q1-2-(2)-4 Is the club strong enough to participate in the national sport meet?		
4	①Yes	②Cannot say either	③ No
	Q1-2-(2)-5 Is the club activity active?		
5	①Yes	②Cannot say either	④ No
	Q1-2-(2)-6 How long a time do you spare for the club activity (Include moving time)		
6	( )　hours / month		

2. Q2 We ask you a consciousness for the daily works.

1	2	3	4	5
Think it very much	Slightly think so	Cannot say either	Slightly do not think so	Do not think so

1.	Feel it burden to teach	1 2 3 4 5
2.	Feel it burden to prepare for teaching	1 2 3 4 5
3.	Feel it burden to instruct for learning	1 2 3 4 5
4.	Feel it burden to handle the students' performance	1 2 3 4 5
5.	Feel it burden to guide students	1 2 3 4 5
6.	Feel it burden to guide club activities	1 2 3 4 5
7.	Feel it burden to attend conference	1 2 3 4 5
8.	Feel it burden to manage the class	1 2 3 4 5
9.	Feel it burden to deal with meeting, advance arrangement	1 2 3 4 5
10.	Feel it burden to deal with parents	1 2 3 4 5

3. Q3 We ask you a consciousness for guiding the club activities.

1.	Feel worthwhile to guide club activities.	1 2 3 4 5
2.	It is better for the professionals to guide club activities.	1 2 3 4 5
3.	I do not know the club field precisely that I take charge of.	1 2 3 4 5
4.	I cannot share enough time to prepare for teaching because of the workload for the guidance of club activities.	1 2 3 4 5
5.	Quite tired because of the activity on holiday.	1 2 3 4 5
6.	Have a hard time for the technical guidance.	1 2 3 4 5
7.	Have a hard time for the mental guidance.	1 2 3 4 5
8.	Want to have a person to consult with in guiding club activities.	1 2 3 4 5

4. Q4 We ask questions about yourself.

1	Sex	①Male	②Female				
2	Age	②20～29	③30～39	④40～49	⑤50～59	⑥More than 60	
3	Position.	①Deputy Principal	②a person in charge of educational affairs	③Teacher	⑤ Lecturer	⑤Assistant	⑥Miscellaneous （　）
4	Experience as a teacher.	①Within 1 year	②1～2 years	③3～4 years	④5～9 years	⑤10 years or more	
5	How many years	①Within 1 year	②1～2 years	③3～4 years	④5～9 years	⑤10 years or more	

	are you workin g for the present school ?						
6	Blood Type.	① A Type	② B Type	③ O Type	④ A B Type	⑤ Unknow n		
7	Are you marrie d ?	①Single	② Marrie d				
8	How many childre n do you have?	① Member-of -society (daughter who got married) ( ) people	② Colleg e student ( ) people	③ High schoo l stude nt ( ) peopl	④Junior high school student ( ) people	⑤ Schoolch ild ( ) people	⑥Less than kinderga rten ( ) people	⑦ Noth ing

				e				
9	Are you positive to do anything?	③Positive	② Cannot choose either	① Not positive				
1 0	Do you like to be alone?	⑤Think it so much	④ Slightly think it so	③ Cannot choose either	②Slightly do not think it so	①Not think it so		
1 1	How do you spend holidays ?	①Outdoor	② Indoor	③ Cannot choose either				
1 2	What is most import	①Affection	② Money	③ Honor	④ Clothes/Eating/House	⑤ Self-realization	⑥ Miscellaneous	

	ant to you? Choose only one.					( )	
13	Do you have a brother?	①Yes	②No				
14	In what situation among brothers?	①The eldest son or the eldest daughter	② Between ① and ③	③ Youngest child			
（1）We ask questions about your current condition.							
		⑤Very good	④ Rather good	③ Ordinary level	②Not so good	①Bad	

15	How about your physical condition?	⑤	④	③	②	①		
16	Is your work progressing smoothly?	⑤	④	③	②	①		
17	Do you living a full life?	⑤	④	③	②	①		