

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

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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 activities 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,

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questionnaire investigation is executed 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, Multi Corresponding Analysis and Text Mining Analysis are performed. Some interesting and instructive results were obtained.

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Keywords: High school teacher; Multi Corresponding Analysis; Text Mining Analysis; School Social Worker

1 Introduction

Teacher 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 activities 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 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, Multi Corresponding 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. Multi Corresponding Analysis is executed in section 3. Text Mining Analysis is conducted in section 4 which is followed by the Remarks of section 5.

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). Questionnaire sheet is attached in Appendix.

Table 2.1: Outline of the Questionnaire Research

(1)	Scope of investigation	High School Teachers, 7 High Schools in Aomori Prefecture, Japan
(2)	Period	January ~ March 2014
(3)	Method	Leave until called for
(4)	Collection	Number of distribution 231 Number of collection 170(collection rate 73.6%) Valid answer 170

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) (%)			⑤How many years are you working for the present school? (Q4-5)	Within 1 year	4.71
① Sex (Q4-1)	Male	64.12		⑥How about the sort of job? (Q1-2-2-3)	1-2 years
	Female	31.76	3-4 years		12.94
	Not filled in	4.12	5-9 years		18.24
② Age (Q4-2)	20-29	16.47	More than 10 years		57.09
	30-39	28.82	⑥How about the sort of job? (Q1-2-2-3)		Adviser
	40-49	22.35	Deputy Adviser	11.18	
	50-59	29.41	Miscellaneous	2.35	
	60-	1.76	(2) Status of the club activity (2-2-3,4) (%)		
	Not filled in	1.19		Yes	18.82
③ Position (Q4-3)	Deputy Principal	3.53	①Is the club strong enough to participate in the national sport meet? (Q1-2-2-4)	Cannot say either	17.06
	a person in charge of educational affairs	8.24		No	62.94
	Teacher	74.71		Not filled in	1.18
	Lecturer	9.41		②Is the club	Yes

	Assistant	1.18	activity active? (Q1-2-2-5)	Cannot say either	31.76
	Miscellaneous	2.93		No	13.53
④Experience as a teacher (Q4-4)	Within 1 year	3.53		Not filled in	1.76
	1-2 years	2.94	(3) Course (Q1-2) (%)		
	3-4 years	11.18	①Course	Ordinary course	31.76
	5-9 years	14.71		Technical course	31.76
	More than 10 years	67.06		General course	5.29
	Not filled in	0.58		Professional course	14.12
				Ordinary/ Professional course	17.06

Next, the clubs that teachers are in charge of are as follows (Figure 2.1,2.2).

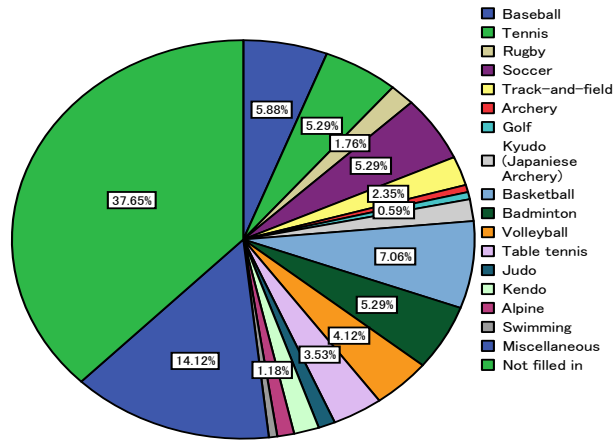


Figure 2.1: Sports Club (Q 1-2-1)

Large part one is Basketball (7.06%), Baseball (5.88%), Soccer (5.29%) and Badminton (5.29%). Miscellaneous (14.12%) includes Ice hockey, Softball, Bowling, Boxing, Karate etc. “99” means “Else”.

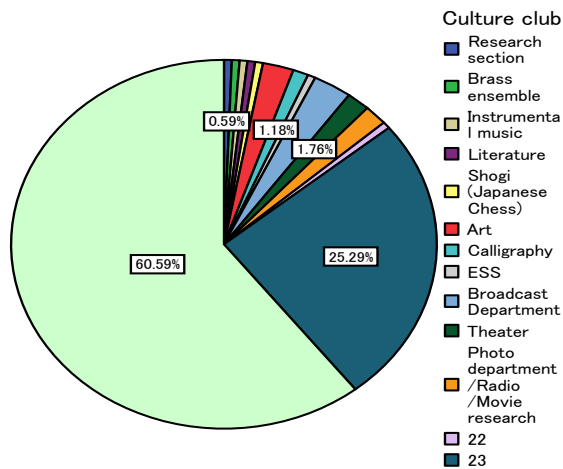


Figure 2.2: Culture Club (Q1-2-2)

Main items are as follows.

/ART: 2.35%, /Broadcast Department: 2.94%, /Theater Photo Department: 1.76%,
23(25.29%) consists by the following clubs with small number % ratio.

/Housing Research, /PC, /Manufacturing, /Baton etc.

On the whole, sports clubs consist nearly 60% and culture clubs 40%.

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.

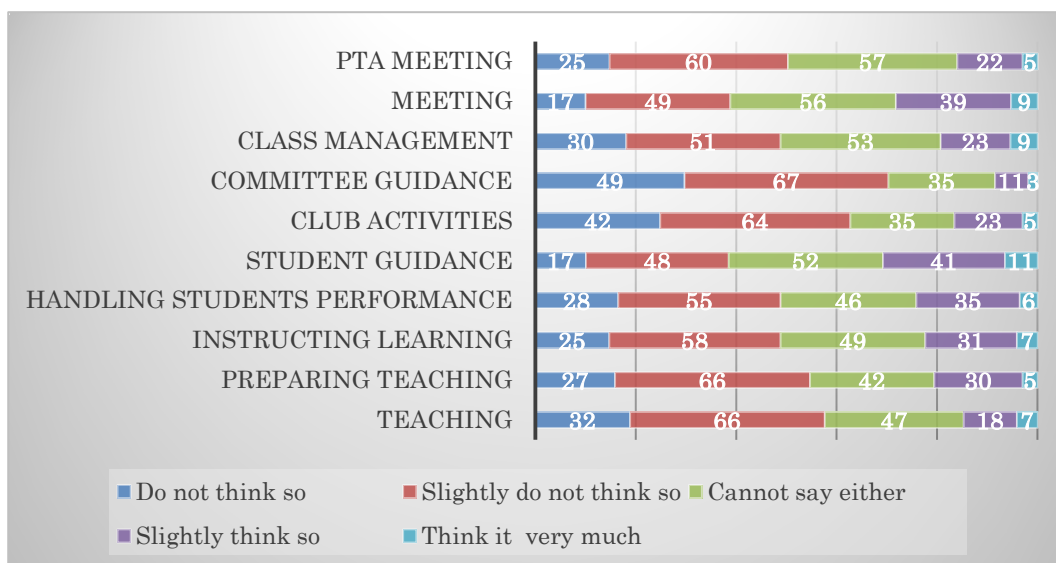


Figure 2.3: Consciousness for the daily works

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

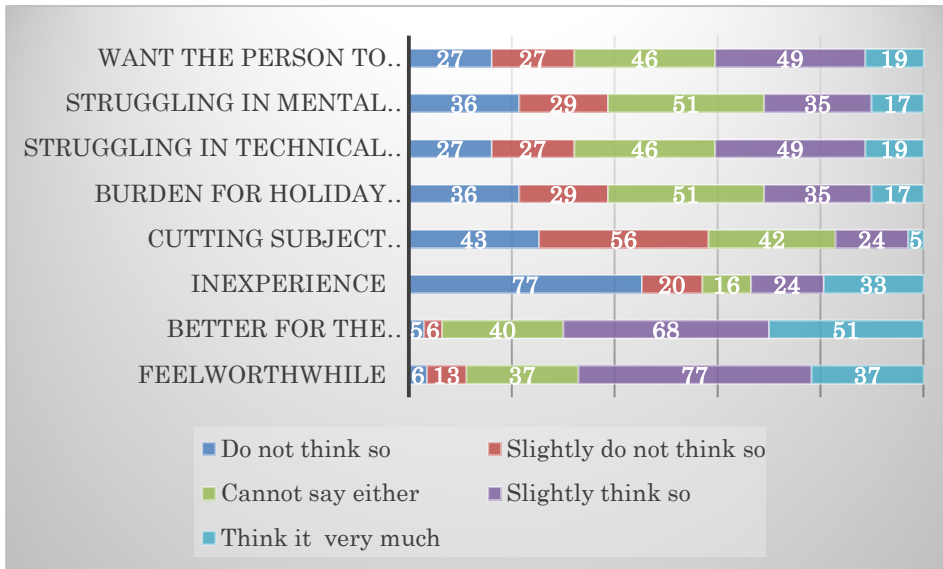


Figure 2.4: Consciousness for guiding the club activities

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 “Want to have a person to consult with in guiding club activities” and “Have a hard time for the technical guidance” follow.

3 Multi Corresponding Analysis

We execute the multi correspondence analysis in Q2 “We ask you a consciousness for the daily works” and Q3 “We ask you a consciousness for guiding the club activities” in order to find the correlation of each items.

3.1 Q2 “We ask you a consciousness for the daily works”

We can observe the following result from Figure 3.1. From the data, an eigenvalue of Dimension 1 axis is 0.527 and those of Dimension 2 is 0.428. 95.4% can be explained by these two major axes. We can extract 6 clusters. We can assume that the first cluster (Right Upper) shows “Jobs concerning teaching” (2.Preparing Teaching, 4.Handling Students Performance, 3.Instructing Learning). The second one(Right Middle) would mean “Jobs about Teaching” (1.Teaching, 5.Student Guidance, 8.Class Management). Other 4 clusters are the independent item clusters. Among them, the cluster “6.Club Activities” is far from other clusters and it shows the uniqueness of its characteristics.

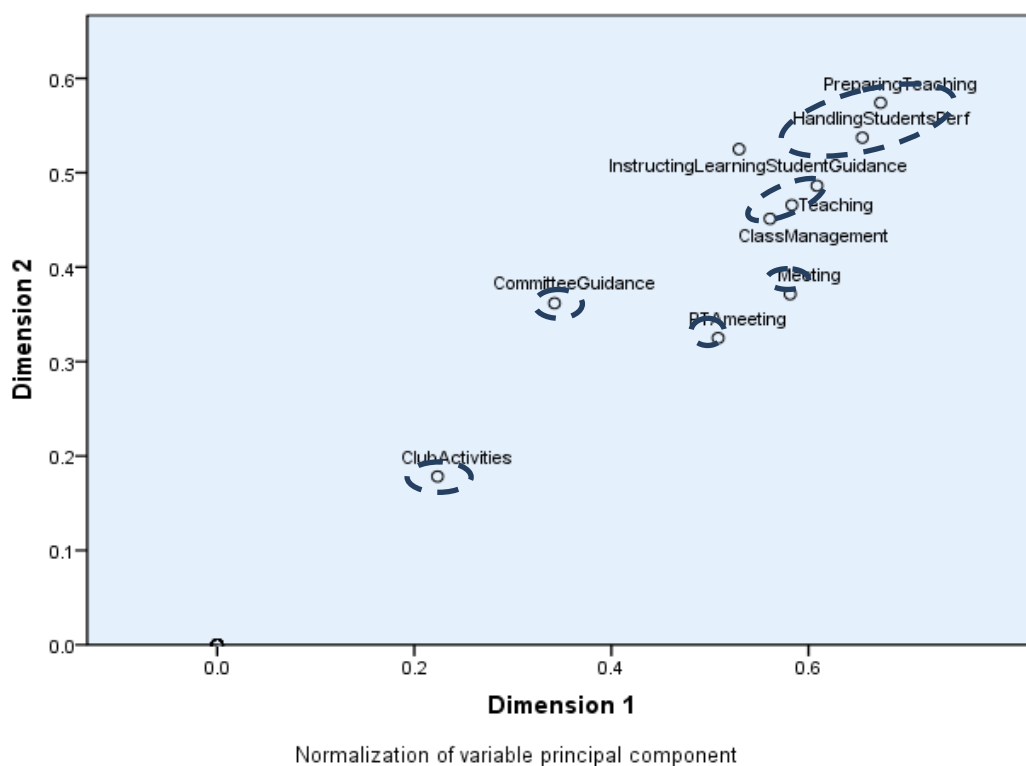


Figure 3.1: Q2 Consciousness for the daily works

3.2 Q3 “We ask you a consciousness for guiding the club activities”

We can observe the following result from Figure 3.2. From the data, an eigenvalue of Dimension 1 axis is 0.430 and those of Dimension 2 is 0.324. We can extract 5 clusters. We can assume that the first cluster (Right Upper) shows “Hardness in guiding” (6.Struggling in Technical Guidance, 7.Struggling in Mental Guidance). The second one(Right Middle) would mean “Mental burden” (5.Burden for Holiday Activities, 8.Want the person to consult with). The third cluster (Left Upper) would mean “Lack of Specialization” (3.Inexperience, 2.Better for the professionals to Guide). Other 2 clusters are the independent item clusters.

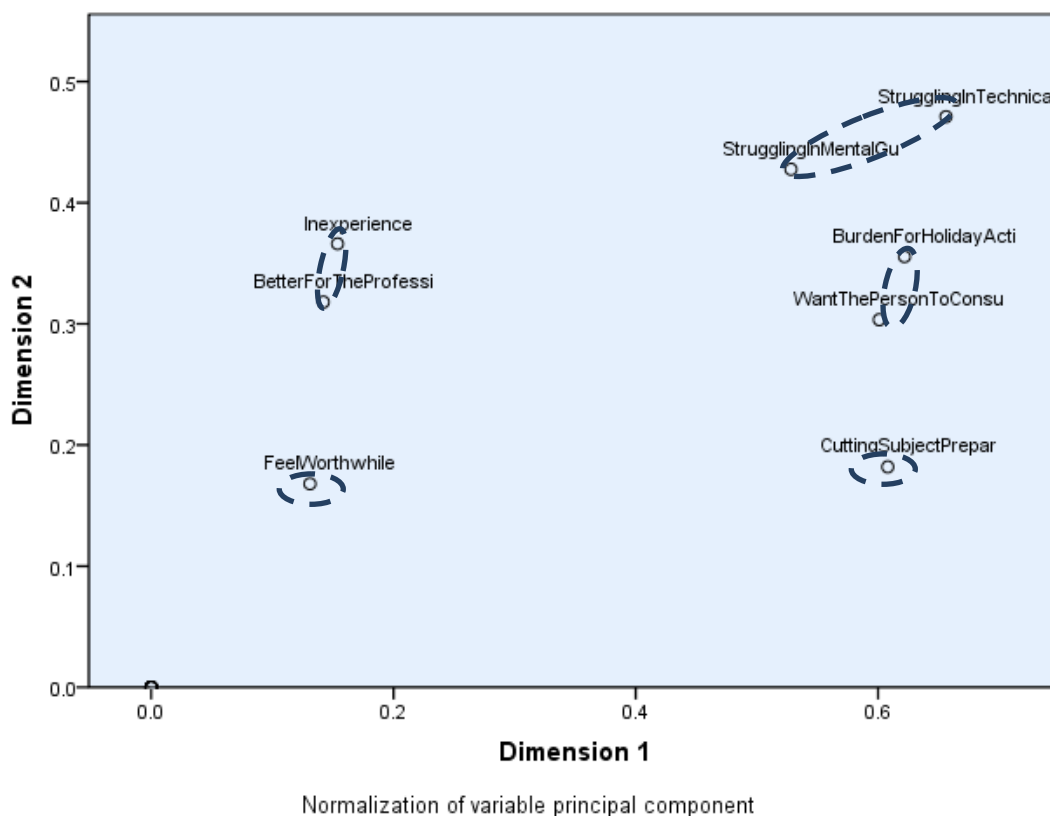


Figure 3.2: Q3 Consciousness for guiding the club activities

3.3 Remarks

In this paper, a questionnaire investigation is executed in order to clarify their current condition and their consciousness, and to seek the possibility of utilizing school social worker for their support.

In the Multi Corresponding Analysis, 6 clusters could be confirmed. Among them, the cluster “6.Club Activities” consisted as an independent item and was located far from other clusters and it shows the uniqueness of its characteristics.

Considering these facts, these suggest that unique/original approach should be executed to the “Club Activities”. Based upon the results of hypothesis testing, 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.

4 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

4.1 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”. Co-occurrence probability is utilized for the analysis of co-appearance rate.

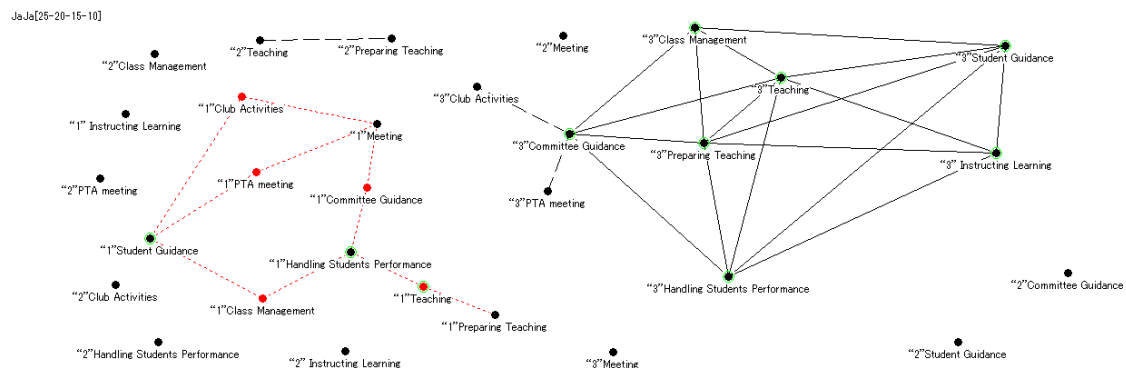


Figure 4.2: Consciousness for the daily works (Q2)

From Figure 4.2, we can observe two clusters. Those who do not feel it burden for the daily works do not feel it burden for each job (Right hand side of the figure). While those who feel it burden for the daily works feel it burden for each job (Left hand side of the figure).

4.3 Consciousness for guiding the club activities (Q3)

Focusing on Q3 “Consciousness for guiding the club activities”, relationship among items is pursued. Co-occurrence probability is utilized for the analysis of co-appearance rate.

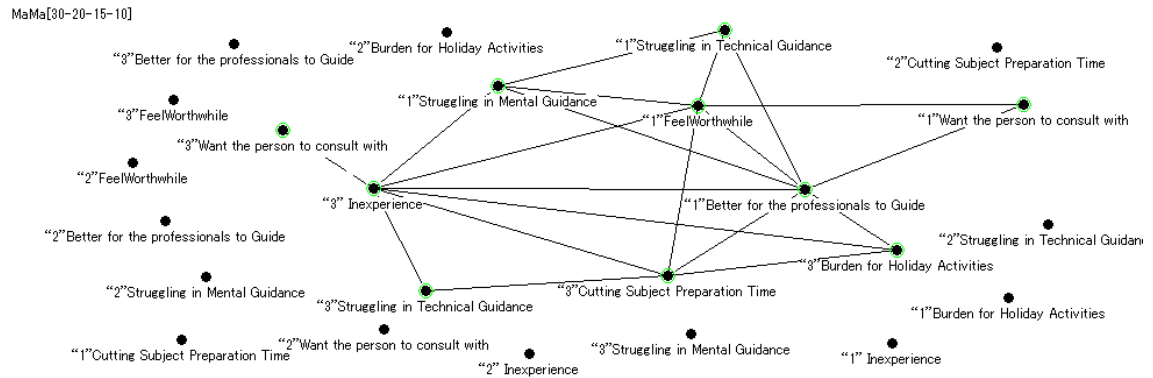


Figure 4.3: Consciousness for guiding the club activities (Q3)

One strong cluster can be found from Figure 4.3. “Feel Worthwhile” has a high co-occurrence rate with “Better for the professionals to Guide”, “Want the person to consult with”, “Struggling in Technical Guidance” and “Struggling in Mental Guidance”. Therefore it is expected to decrease the burden by utilizing professionals outside.

4.4 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.

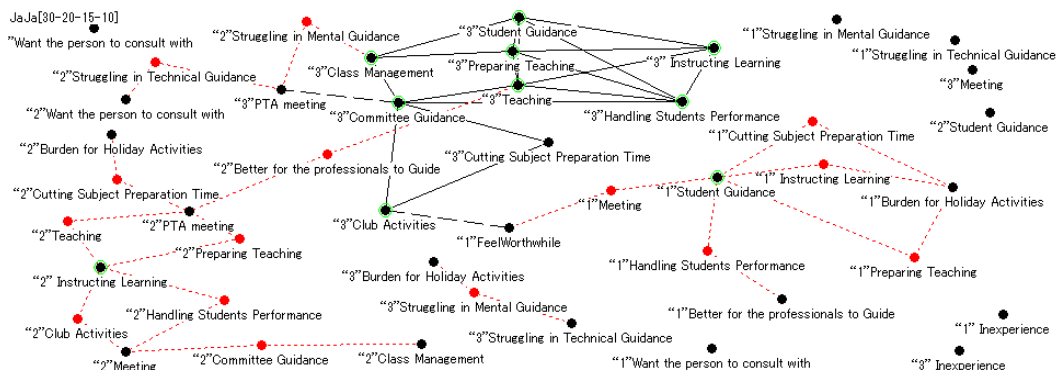


Figure 4.4: Consciousness for the daily works” and Consciousness for guiding the club activities (Q2&Q3)

From Figure4.4, we can observe one strong cluster and the second two clusters. Strong cluster located at the center is the one that they do not feel it burden for the daily works. The cluster located in the right hand downward is the one 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.

4.5 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”. Jaccard coefficient is utilized for the analysis of co-appearance rate.

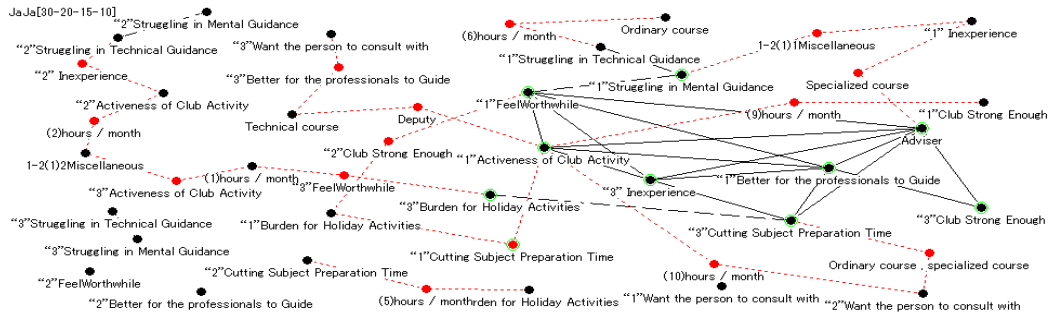


Figure 4.5: Consciousness for the club activities and Consciousness for guiding the club activities (Q1-2&Q3)

From Figure 4.5, we can find one strong cluster. “Feel Worthwhile” has a high co-occurrence rate with “Club Activities is active”, “Better for the professionals to Guide”, “Not Inexperience” and “Adviser”, and a rather high co-occurrence rate with “Struggling in Mental Guidance”. 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.

4.6 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.

From Figure 4.6, we can find one strong cluster. “Good Physical Condition”, “Progressing Smoothly”, and “Living a Full Life” have a high co-occurrence rate. Keeping a good health condition makes a great influence to having the feeling of “Worthwhile”.

JaJa[30-20-15-10]

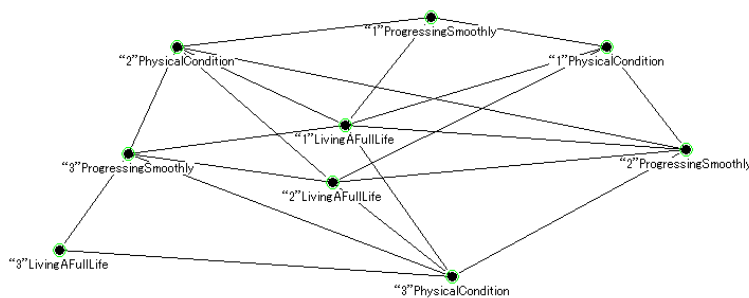


Figure 4.6: Current Health Condition (Q4-15,16,17)

4.7 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. Jaccard coefficient is utilized for the analysis of co-appearance rate.

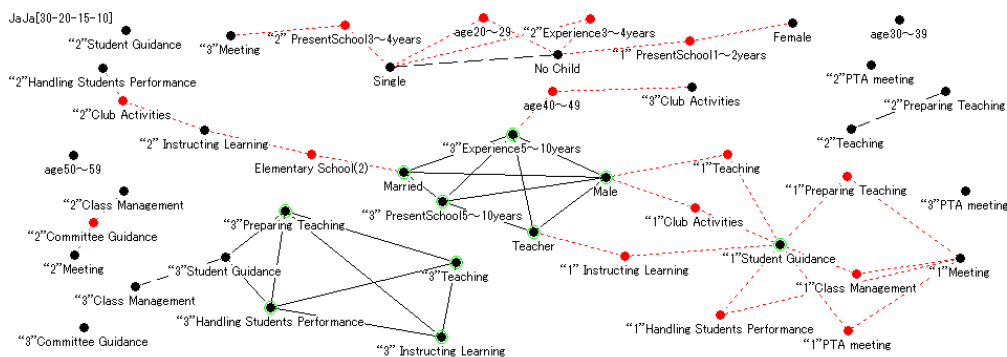


Figure 4.7: Consciousness for the daily works and Attributes
(Q2 & Q4-1~4-5 & Q4-7~Q4-8)

From Figure 4.7, we can observe the new item including cluster which is located at the center. “Male” has a high co-occurrence rate with “Teacher”, “married”, “Experience 5~10 years”, “Present School 5~10 years”, “Feel it burden to teach” and “Club activities is active”.

4.8 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.

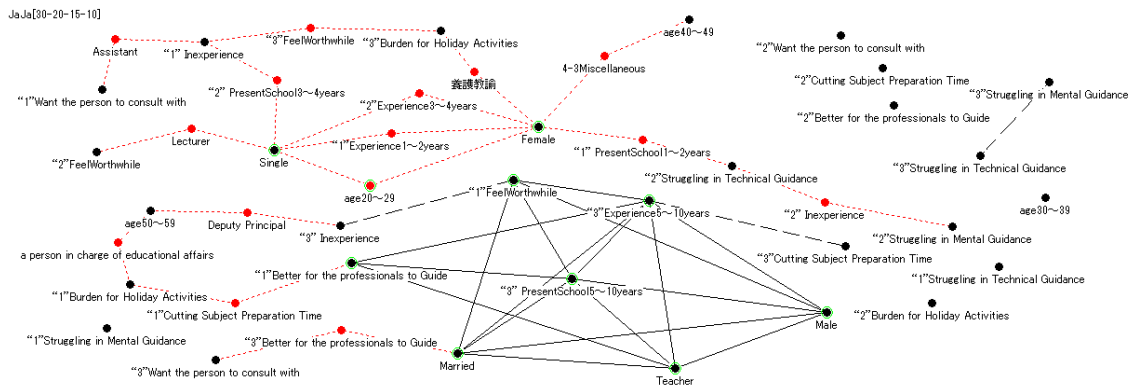


Figure 4.8: Consciousness for guiding the club activities and Attributes (Q3 & Q4-1~4-5 & Q4-7)

From Fig.4.8, we can observe one strong cluster and the second two clusters.

Strong cluster is located at the center. “Male” has a high co-occurrence rate with “Feel Worthwhile”, ”Married”, “Experience 5~10 years”,” Present School 5~10 years” and “Teacher” .

5 Remarks

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

- (1) “Adviser in the non-strong club” has a strong co-occurrence rate with ““3” Handling Students Performance”,” “3”Teaching”,” “3” Preparing Teaching”,” “3” Club Activities”,” “3” Committee Guidance”,” “3” Class Management” and ““3” PTA meeting”, where these mean that they do not feel burden to such daily works. On the other hand, those who feel it burden for the daily works feel it burden for other jobs.
- (2) “Feel Worthwhile” has a high co-occurrence rate with “Better for the professionals to Guide”, “Want the person to consult with”, “Struggling in Technical Guidance” and “Struggling in Mental Guidance”. Therefore it is expected to decrease the burden by utilizing professionals outside.
- (3) “Male” has a high co-occurrence rate with “Feel Worthwhile”, ”Married”, “Experience 5~10 years”,” Present School 5~10 years” and “Teacher”. These suggest that married male teachers who are working long have the high possibility to feel worthwhile.
- (4) “Good Physical Condition”,” Progressing Smoothly”, and “Living a Full Life”

have a high co-occurrence rate. Keeping a good health condition makes a great influence to having the feeling of “Worthwhile”.

“Feel Worthwhile” has a high co-occurrence rate with “Club Activities is active”, “Better for the professionals to Guide”, “Not Inexperience” and “Adviser”, and a rather high co-occurrence rate with “Struggling in Mental Guidance”. 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.

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.

6 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, questionnaire investigation is executed 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, Multi Corresponding 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.

Acknowledgements The authors are grateful to all those who supported us for answering questionnaire investigation.

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Appendix: Questionnaire about the Club Activities at High School

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

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

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 ㉒ Movie research ㉓Miscellaneous ()		
(2) Q1-2-(2)-3 How about the sort of job?			
3	①Adviser	②Deputy 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 are you working for the present school ?	①Within 1 year	②1 ~ 2 years	③3 ~ 4 years	④5~9 years	⑤10 years or more		
6	Blood Type.	①A Type	②B Type	③O Type	④A B Type	⑤ Unknown		
7	Are you	①Single	②Married					

	married?							
8	How many children do you have?	①Member of -society (daughter who got married) () people	②College student () people	③High school student () people	④Junior high school student () people	⑤Schoolchild () people	⑥Less than kindergarten () people	⑦Nothing
9	Are you positive to do anything?	③Positive	②Cannot choose either	①Not positive				
10	Do you like to be alone?	⑤Think it so much	④Slightly think it so	③Cannot choose either	②Slightly do not think it so	①Not think it so		
11	How do you spend holidays?	①Outdoor	②Indoor	③Cannot choose either				
12	What is most important to you? Choose only one.	①Affection	②Money	③Honor	④Clothes/Eating/House	⑤Selfrealization	⑥Miscellaneous ()	
1	Do	①Yes	②No					

3	you have a brother ?							
14	In what situation among brothers?	①The eldest son or the eldest daughter	②Between ① and ③	③Youngest child				
(1) We ask questions about your current condition.								
		⑤Very good	④Rather good	③Ordinary 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		

