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Running Head: Factors on the utilization of assessment models

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Abstract

Objectives: This study aimed to identify factors related to the practical utilization of community health needs assessment (CHNA) models that public health nurses (PHNs) learned in their fundamental education.

Design: A nationwide questionnaire survey was conducted via postal mail.

Sample: We randomly selected 630 public health institutes in Japan. The participants were 3,397 full-time novice and mid-level PHNs.

Measurements: The questionnaire included the participants' basic personal information, six items regarding the perception of CHNA with a 4-point Likert scale, learned models in their undergraduate education, their utilization in practical settings, and the reasons for their answer in narrative form.

Results: There were 951 valid responses. The results of logistic regression showed that the significant positively factors with model utilization were perception of CHNA as "not troublesome" or "not impossible as they learned," continuing education with five years of experience, and identification of the learned model in continuing education. Furthermore, the results of text mining showed the reasons for non-utilization of the model included being "busy" and having a lack of "opportunity."

Conclusions: This study showed the associated factors with rare utilization of a learned model for PHNs. These findings may suggest improvement of continuing education and development of an appropriate assessment model.

Keywords: Community health; Public health nurses; Needs assessment; Theoretical Models;

Logistic regression; Continuing nursing education

Background

Community health needs assessment by public health nurses

Current community health needs have become more complicated, as characterized by an increase in communicable and non-communicable diseases caused by health gaps both locally and globally. Public health professionals play a key role in addressing these health inequalities, and governmental policy is one of the significant determinants of health. Policy can be used to improve a population's health (Centers for Disease Control and Prevention, 2012), meaning that policy development based on the health needs of populations is critical in solving issues that relate to health gaps. The U.S. Centers for Disease Control and Prevention (CDC) provides five domains of public health policy development process; one of these domains is problem identification, where the gaps in data are defined and characterized (CDC, 2012). Therefore, a community health needs assessment (CHNA) is essential for developing public health policies based on people's health needs (CDC, 2012). Public health nurses (PHNs) are expected to play a role in the implementation of CHNAs to determine potential health needs and the related skills required to deal with these needs both in Japan and internationally (American Public Health Association, 2013; Canadian Public Health Association, 2010). According to notifications from the Japanese Ministry of Health, Labor and Welfare in 2013, PHNs were required to understand the health conditions and living environment of the residents through their practices, analyze the components of health problems, and clarify the health needs to be addressed in the community (Japanese Ministry of Health, Labor and Welfare, 2013). The CHNA by PHNs is a logical, systematic, and comprehensive approach using primary and secondary data from various sources to clarify community health problems and strengths (Gibson & Thatcher, 2020). Furthermore,

through the public health nursing competencies demonstrated by Quad Council, community assessment is one of the three core functions of public health, and PHNs must acquire 12 competencies in analytic and assessment domains (Quad Council, 2018). These implied that CHNA is complicated and time-consuming process, and requires advanced ability. In addition, CHNA by PHNs is characterized by the intention of partnering and collaboration with community (DeMarco, 2020), and deploying it is not easy for PHNs.

The education of CHNA for PHNs

A CHNA is an essential piece in a PHN's fundamental education in Japan (Japanese Ministry of Health, Labor and Welfare, 2019). The model core curriculum of public health nursing, developed by the Japan Association of Public Health Nurse Educational Institutions, showed CHNA as a fundamental skill for students to qualify for a national PHN license in Japan (2017). The importance of CHNA education is also emphasized outside of Japan. U.S. textbooks (e.g., DeMarco & Healey-Walsh, 2020; Gibson & Thatcher, 2020) use several models to educate students on CHNAs, such as the Community-as-Partner model (CPM [Anderson & McFarlane, 2019]), Mobilizing for Action through Planning and Partnership (MAPP [National Association of County and City Health Officials, 2020]), and Community Health Assessment and Group Evaluation (CHANGE [CDC, 2018]). The CPM is used most frequently in Japanese literature about CHNA education, followed by the PRECEDE-PROCEED model (PPM [Shiomi et al., 2019]). The CPM consists of assessment, analysis, planning, implementation, and evaluation of nursing processes, which are based on theoretical foundations, such as system theory (Anderson & McFarlane, 2019).

Furthermore, nursing roles are shifting from hospital-based care to population-focused care, not only in public health nursing but in all nursing areas. Nursing education therefore needs to be redesigned (Lasater et al., 2020). CHNA may be essential in updating all nurses' education to meet the needs of social transition.

The education-practice gap regarding CHNA

While CPM is the most popular model for PHN education in Japan as mentioned previously, it has often been recognized as a guide for comprehensive data collection because of the clarity of the community components (Baba et al., 2015). This might create a gap between undergraduate education and practice that can be seen in interviews with graduates. Hirasawa and Iiyoshi (2013) conducted interviews with recent graduates that clarified their recognition of the usefulness of CHNAs for comprehensive data gathering. PHNs have carried out CHNAs in undergraduate education by collecting a significant amount of data, but they cannot afford to do so in daily practice. The way that CHNA is taught has not changed since that time, which means that the situation may be ongoing. In addition, both the CPM and PPM were imported in different languages and cultures; this may make it difficult to understand and teach the entire concept of the model (Shiomi et al., 2019). Japanese PHNs within local governments perform different duties than similar nurses in the United States; they provide both direct individual care and develop needs-oriented services (Yoshioka-Maeda et al., 2020). The applicability of the two models to the practice of Japanese PHNs has not been sufficiently considered.

Most PHNs find it difficult to identify community health needs in a practical setting and evaluate their ability to assess these needs as inadequate (Ogawa et al., 2018). According to

Ogawa and Nakatani's (2020) self-evaluation survey of PHNs working in local governments, only 3 out of 24 CHNA practical items were practiced by more than half of the PHNs. This demonstrates a gap not only between education and practice but also a fundamental education between senior and novice PHNs. Since 2000, PHN education has shifted from being conducted primarily in vocational schools to primarily universities (Japan Nursing Association, 2016), and Japanese-translated CHNA models, such as the CPM, have been used more frequently. As a result, new PHNs have been educated using a different model than senior PHNs. Therefore, it is predicted that novice PHNs may not utilize the same model that senior PHNs use.

For CHNAs to fill the PHN role of needs-based practice, it is important to clarify whether the current learned model is being used and why or why not. Nurses who were certified after 2000 have been strongly influenced by their undergraduate education and are expected to play a core role in improving practice. Therefore, this study focused on novice and mid-level PHNs who were certified after 2000 and investigated their undergraduate and continuing education, utilization of learned knowledge, and perception of CHNAs. We defined CHNAs as assessments conducted by PHNs to gather and analyze data to clarify community health needs and determine the direction of PHNs' activities according to such needs. Novice PHNs were defined as those with less than five years of experience, and mid-level PHNs were defined as those with five or more years of experience. The cut-off date was 2000, which is consistent with other literature (Saeki et al., 2004), because the number of PHNs with a bachelor's degree (rather than a vocational certification) has increased since that year; also, the Long-Term Care Insurance program and promotion of outsourcing health care began in 2000.

Research Question

This study aimed to identify factors related to the practical utilization of CHNA models that novice and mid-level PHNs learned in their fundamental education. The results of this study suggest the benefits of filling the gap between fundamental education and practice and may contribute to the development of a more appropriate assessment model for PHNs in practical settings.

Methods

Design

A nationwide questionnaire survey was conducted in this study. We used an anonymous self-administered questionnaire via postal mail in January 2017. We randomly selected 1/3 of the 43 prefectures, 122 special wards or designated cities, and 1,447 municipalities in Japan, and surveyed 108 prefectural public health centers in 14 prefectures and 522 municipal health centers.

Sample

The participants were all full-time novice and mid-level PHNs who became certified after 2000. We predicted the number of PHNs at each center based on the population size and mailed a sufficient number of questionnaires to the PHN managers; the questionnaires were then distributed to those who met the inclusion criteria. Each participant returned the completed questionnaire directly by mail to the researcher. The sample size was calculated with a response ratio of 50%, sample error of 3%, confidence level of 95%, and estimated recovery rate of 30%.

We mailed a total of 3,397 questionnaires to achieve the expected sample size (1067).

Measures

The questionnaire included the participants' basic personal information (i.e., age, sex, years of experience as PHN, affiliated institution, department, practical operating system, educational institution for qualification as PHN, and academic background), and six items regarding the perception of CHNA (difficult, troublesome, available, should be done, could not be done as learned, and continuous) with a 4-point Likert scale (*strongly agree, agree, disagree, and strongly disagree*). Moreover, we asked participants to indicate the models via multiple-choice (i.e., CPM, PPM, Guideline for Community Inspection [Segawa, 1999], Ethnography, District Diagnosis Perspectives [Hirayama, 1999], and others), that they learned during their fundamental education. They also indicated the utilization of the models in practical settings, which included four choices (*usually, sometimes, rarely, and never utilizing*). The presented CHNA models were the most frequently used options, according to our literature review (Shiomi et al., 2019). Further, we asked why the participant gave the answer they did regarding model utilization in narrative form.

Analytic Strategy

We statistically analyzed the quantitative data using IBM SPSS 25. First, we examined the frequency distributions of the data. Subsequently, we used Pearson's chi-squared test and Fisher's exact test to examine the factors associated with the practical utilization of the learned model. Finally, we identified the significant variables using the chi-squared test and logistic

regression analysis. The criterion variable was the utilization of a learned model. The respondents were divided into two groups: utilization, who answered that they usually or sometimes utilized the model, and not utilization, who answered that they rarely or never utilized it. For the selection of explanatory variables, we used Spearman's rank correlation coefficient to evaluate multicollinearity and the step-wise method ($p < 0.1$) after the forced entry method. Statistical significance was set at $p < 0.05$.

The qualitative data regarding the utilized/unutilized learned models were analyzed using KH Coder 2, text mining software developed by Higuchi (2015). We drew a co-occurrence model of frequently used terms and conducted a corresponding analysis of model usage.

Ethical considerations

To ensure informed consent and protection of the participants' personal data, we included a letter regarding the discretion surrounding their participation and data management along with the questionnaire. This letter noted that the return of the questionnaire would be considered as consent. This research was approved by the research ethics committee at the College of Nursing Art & Science, University of Hyogo, to which first author had been belonging then, on November 8, 2016.

Results

Demographics of the participants

A total of 1,263 participants (37.2 %) returned the questionnaire. Among them, 35 and 277 were excluded due to invalid and incomplete data, respectively. The total number of valid

respondents was 951 (75.3 %).

Most respondents were women (96.0%). The mean age was 31.6 ± 5.8. The mean of their years of experience as PHNs was 6.7 ± 4.4, and about half had been PHNs for less than 5 years. The largest number of respondents (52.9%) belonged to municipalities. In addition, 88.6% of the participants worked in a public health department. Over half of them (61.3%) practiced with the area and task assignment system. Lastly, 76.8% of them received undergraduate education for PHN qualification at nursing college or university, while 79.2% had a bachelor's or higher degrees. (Table 1)

PHNs' perception, learned models, and the factors associated with model utilization

Table 1 shows the results of respondents' perceptions. The percentage of those who chose "strongly disagree" was very small. Thus, we divided the respondents into two groups: one group included those who answered "strongly agree" and "agree," and the other "disagree" and "strongly disagree." Most respondents selected "strongly agree" and "agree" in all perceptional views. Specifically, 90.5% perceived CHNA as "difficult" and 95.8% perceived it as "available"; 96.3% perceived "should be done" and 97.3% perceived it as "continuous." The item "troublesome" had the most opponents, but 74.7% of respondents agreed. Of the respondents, 87.2% agreed that CHNA was "impossible to implement as I learned it in PHN undergraduate education."

The most common model that the respondents learned in their undergraduate education was PPM (69.2%), followed by CPM (55.5%). Only a few respondents learned other models. Furthermore, 94.9% identified the models they learned.

Regarding the continuing education of CHNA, 72.8% of respondents had any education within five years of experience as PHN. The most familiar model that they learned in continuing education was CPM (24.3%), followed by PPM (18.9%). The rates of those who selected other models were less than 5%. About half of them could identify their learned model, and the proportion decreased compared to undergraduate education.

According to Pearson's chi-squared test and Fisher's exact test, eight factors were significantly associated with the utilization of the learned model(s). Those were age ($p<0.001$), affiliated institutions ($p<0.05$), perception that community needs assessment is "troublesome" ($p<0.001$), "should be done" ($p<0.05$), and "impossible to be implemented as I learned it in undergraduate education" ($p<0.01$), identification of learned model(s) in undergraduate education ($p<0.001$), continuing education within 5 experienced years ($p<0.001$), and identification of learned model(s) in continuing education ($p<0.001$). (Table 1)

Predictors of the practical utilization of a learned model

As the results of Spearman's rank correlation coefficient, all pairs of factors were under 0.20, and multicollinearity was not found. Therefore, the eight factors were input into logistic regression with the stepwise method, and we obtained the optimum solution in the fourth step. The correct answer rate for this logistic model was 80.9%.

The factors significantly positively associated with model utilization were perception of CHNA as "not troublesome" ($p<0.01$) or "not impossible as they learned about it" ($p<0.01$), continuing education within five experienced years ($p<0.05$), and identification of learned model in continuing education ($p<0.001$). According to the odds ratio, it was most strongly predicted

factors of the model utilization was that they could identify their learned model(s) in continuing education (OR=2.93), followed by continuing education within five years of experience (OR=1.79) (Table 2).

The reasons of utilized/unutilized model(s) learned in undergraduate education

We conducted the content analysis and illustrated the co-occurrence network with KH Coder 2 to understand frequency words and their connection in the narrative data about whether models were utilized or not; Figure 1 shows the network of 50 words with the highest frequencies. There were 11 categories, eight of which were related. The most frequent word was "task" which connected with "time" and "busy" in the main category. The second category showed that "consciousness," "think," "consider," and "tight" were connected (Figure 1).

Figure 2 shows the results of correspondence analysis with model utilization or not as the variable, and the top 10 characteristic words of each group are shown in Table 3. In the utilizing group, "project," "agenda," and "training" were the characteristic words. In the non-utilization group, characteristic words included "task," "time," "opportunity," and "tight." For example, PHNs in the utilizing group answered, "I use the model for CHNA when I plan the project based on needs and evaluate it," and "I used the model for continuous training about CHNA." Those in the not-utilizing group expressed that: "I spend so much time on my daily tasks that I do not assess the community well," and "I did not have the opportunity to use the model in my practice because of heavy workload."

Discussion

This is the first study that shows the actual state of learned model utilization and its related factors through a nationwide survey. The findings of this study reflected the actual situation of PHNs in daily practice, as only 18.9% of respondents utilized their learned model. The chi-squared test and logistic regression analysis showed that the associated factors of non-utilization were perceptions of feasibility such as "troublesome" and "impossible to be implemented as I learned." Furthermore, the results of KH Coder 2 showed the reasons for non-utilization of the model included being "busy" and having a lack of "opportunity." The utilization group also mentioned "project," "agenda," and "training." Thus, the fundamental education-practice gap for PHNs was caused by their negative recognition of CHNA and lack of experience in knowledge-based practice and continuing education. This is similar to the results of Hashemiparast's (2019) qualitative research, which showed that the barriers to utilizing theoretical knowledge in practice were non-standard practices, lack of perceived professional support, and insufficiencies in teaching and learning processes.

Undergraduate education tackling CHNA is overly focused on comprehensive information gathering (Shiomi et al., 2019), thus, novice and mid-level PHNs perceived CHNAs as "troublesome." Additionally, in busy practices, they could not utilize CHNA as they learned it. Even though the number of public servants in Japan has been decreasing since 2005 (Ministry of Internal Affairs and Communications, 2020), the number of healthcare services has been increasing. Additionally, PHNs in municipalities have expanded their role since the Community Health Act of 1994, including services like maternal and child health and mental health (Maternal and Child Health Act, 2013; Act on Mental Health and Welfare for the Mentally Disabled, 2014). Furthermore, community integration was conducted in 2000, and the number of

municipalities in Japan decreased by one-third. Thus, PHNs cover a wider area and have worked in various sections of local governments than they did before. These situations made it difficult for PHNs to execute CHNA according to any model.

On the other hand, these results suggest that continuous education using CHNA models in the first five years of practice was effective for PHNs to utilize the model they had learned. Previous studies have shown the theory-practice gap in the nursing field (Martínez-Linares et al., 2019). Further, the strategies to reduce the gap were need-based reformation and improvement of educational processes (Safazadeh, 2018). In this study, more than half (53.5%) of the respondents could not identify their learned model; thus, continuing education at the novice level should be reformed and enhanced to facilitate theory/model-based CHNA learning. Ogawa and Nakatani (2020) clarified the factors associated with professional confidence in PHNs: "technical practice," "effortful learning," "exploring the evidence," and "educators in the workplace." To implement effortful education in the shortage of senior nurses serving as educators in practical settings, partnership with academic institutions such as universities that have the role of fundamental education to be PHNs seems necessary.

Moreover, this study showed that the respondents utilized the models they had learned to plan and evaluate health projects. PHNs utilize CHNA to identify community health needs and set agendas to develop healthcare planning (Yoshioka-Maeda et al., 2021). However, only 18.9% of respondents were utilizing the models, indicating that most PHNs could not do CHNA with the model because they struggled with their daily tasks. Espina et al. (2016) found that the substance of practice-training gap among PHN leaders and regarding population-focused practice competency needs was the lack of a practical strategy to incorporate daily individual services

(Espina et al., 2016). The low percentage of model utilizing PHNs in this study was caused by both the working environment and the lack of practical model. Okura (2019) indicated that PHNs were too overwhelmed with supporting high risk cases to develop community need based activities. She clarified the process by which municipal PHNs identified health problems in their daily practice using qualitative research. It showed that PHNs understood community characteristics in their daily practices and integrated qualitative and quantitative data to identify the community health needs. Further, Omori et al. focused on the problem of separating daily practices from CHNA and struggled to develop a practical model. Their study showed that practical CHNAs occurred due to empirical and scientific intuition, as well as the ethical sensitivity of PHNs who took the useful data and awareness along to the PDCA cycle. Unfortunately, these findings have not yet been utilized sufficiently in practical settings. For the future, it is necessary to develop a practical CHNA model that can reflect empirical awareness of PHNs through their daily tasks and individual needs. Moreover, it is important to utilize the developed model in undergraduate and continuing education.

There are some limitations to this study. We had a substantial number of respondents, but the rate of respondents who utilized the model was small. This might have influenced the detection of related factors. In addition, the independent variables designed were not various. Hence, it is not possible to conclude all the predicted factors of model utilization. Further studies are required to analyze other factors based on sufficient data of the model utilizing respondents. Moreover, since we did not ask which model was being utilized by those who learned multiple models in their undergraduate education, we could not analyze each model's utilization. Therefore, further research is required to establish this association.

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Table 1. Related factors of the educated model(s) utilization on the public health nursing practice

Variables		Total		Utilization of model				P-value
				Utilizing		Not utilizing		
		N	(%)	n	(%)	n	(%)	
Gender	Men	38	(4.0)	6	(0.6)	32	(3.4)	0.832
	Women	913	(96.0)	174	(18.3)	739	(77.7)	
Age (22-50)	Under 29	394	(41.4)	95	(10.0)	299	(31.4)	0.001
	Over 30	557	(58.6)	85	(8.9)	472	(49.6)	***
Years of experience as PHN (1-17)	1-5	459	(48.3)	94	(9.9)	365	(38.4)	0.219
	6-10	300	(31.5)	47	(4.9)	253	(26.6)	
	over 11	192	(20.2)	39	(4.1)	153	(16.1)	
Affiliated institution	Prefecture	131	(13.8)	96	(10.1)	35	(3.7)	0.050
	Special ward, Designated city	209	(22.0)	172	(18.1)	37	(3.9)	*
	Municipalities	611	(64.2)	503	(52.9)	108	(11.4)	
Department	Public health	843	(88.6)	162	(17.0)	681	(71.6)	0.602
	Others	108	(11.4)	18	(1.9)	90	(9.5)	

Variables		Total		Utilization of model				P-value
				Utilizing		Not utilizing		
		N	(%)	n	(%)	n	(%)	
Practical operating system	Area assignment	120	(12.6)	28	(2.9)	92	(9.7)	0.619
	Task assignment	228	(24.0)	42	(4.4)	186	(19.6)	
	Area and task assignment	583	(61.3)	106	(11.1)	477	(50.2)	
	Others	20	(2.1)	4	(0.4)	16	(1.7)	
Educational institution for PHN	School of PHN, Junior college	221	(23.2)	44	(4.6)	177	(18.6)	0.695
	College, University	730	(76.8)	136	(14.3)	594	(62.5)	
Academic background	Vocational school	104	(10.9)	20	(2.1)	84	(8.8)	0.203
	Junior college	93	(9.8)	18	(1.9)	75	(7.9)	
	Bachelor degree	718	(75.5)	130	(13.7)	588	(61.8)	
	Master/doctor	35	(3.7)	12	(1.3)	23	(2.4)	
	Others	1	(0.1)	0	(0.0)	1	(0.1)	

Variables		Total		Utilization of model				P-value
				Utilizing		Not utilizing		
		N	(%)	n	(%)	n	(%)	
PHNs' recognition								
Difficult	Agree	861	(90.5)	157	(16.5)	704	(74.0)	0.118
	Disagree	90	(9.5)	23	(2.4)	67	(7.0)	
Troublesome	Agree	710	(74.7)	116	(12.2)	594	(62.5)	0.000
	Disagree	241	(25.3)	64	(6.7)	177	(18.6)	***
Available	Agree	911	(95.8)	177	(18.6)	734	(77.2)	0.064
	Disagree	40	(4.2)	3	(0.3)	37	(3.9)	
Should be	Agree	916	(96.3)	178	(18.7)	738	(77.6)	0.046
done	Disagree	35	(3.7)	2	(0.2)	33	(3.5)	*
Impossible as	Agree	829	(87.2)	144	(15.1)	685	(72.0)	0.003
I learned	Disagree	122	(12.8)	36	(3.8)	86	(9.0)	**
Continuous	Agree	925	(97.3)	176	(18.5)	749	(78.8)	0.802
	Disagree	26	(2.7)	4	(0.4)	22	(2.3)	

Variables		Total		Utilization of model				P-value
				Utilizing		Not utilizing		
		N	(%)	n	(%)	n	(%)	
Identification of learned model(s) in undergraduate education	Identified	807	(84.9)	167	(17.6)	640	(67.3)	0.001
	Unidentified, Non-learned	144	(15.1)	13	(1.4)	131	(13.8)	***
continuing education within 5 experienced years	Had	692	(72.8)	150	(15.8)	542	(57.0)	0.000
	Not had	259	(27.2)	30	(3.2)	229	(24.1)	***
Identification of learned model(s) in continuing education	Identified	442	(46.5)	124	(13.0)	318	(33.4)	0.000
	Unidentified, Non-learned	509	(53.5)	56	(5.9)	453	(47.6)	***
Total		951	(100.0)	180	(18.9)	771	(81.1)	

* = p<0.05, ** = p<0.01, *** = p<0.001

Table 2. Predictors of the practical utilization of learned model(s)

Variables		B	OR	95% confidence interval		P-value
				Lower	Upper	
Age under 29 years old		-0.335	0.715	0.503	− 1.017	0.062
PHNs' recognition	Troublesome	-0.586	0.557	0.386	− 0.803	0.002 **
	Impossible as I learned	-0.631	0.532	0.338	− 0.837	0.006 **
Identification of learned model(s) in undergraduate education		0.613	1.845	0.992	− 3.435	0.053
Continuing education within 5 experienced years		0.580	1.786	1.146	− 2.784	0.010 ***
Identification of learned model(s) in continuing education		1.075	2.931	2.054	− 4.183	0.000 ***

N=951

*= p<0.05, ** = p<0.01, *** = p<0.001

Nagelkerke R2 =0.137

OR=odds ratio, PHN=public health nurse

Table3. Characteristic words regarding utilization of learned model

Utilizing		Not utilizing	
Words	Jaccard index	Words	Jaccard index
utilize	.116	task	.169
district	.068	community diagnosis	.081
project	.062	theory	.077
district diagnosis	.060	model	.075
consider	.059	time	.064
viewpoint	.056	consciousness	.054
assessment	.054	opportunity	.050
community	.052	tight	.038
organize	.050	daily	.037
conduct	.049	think	.035

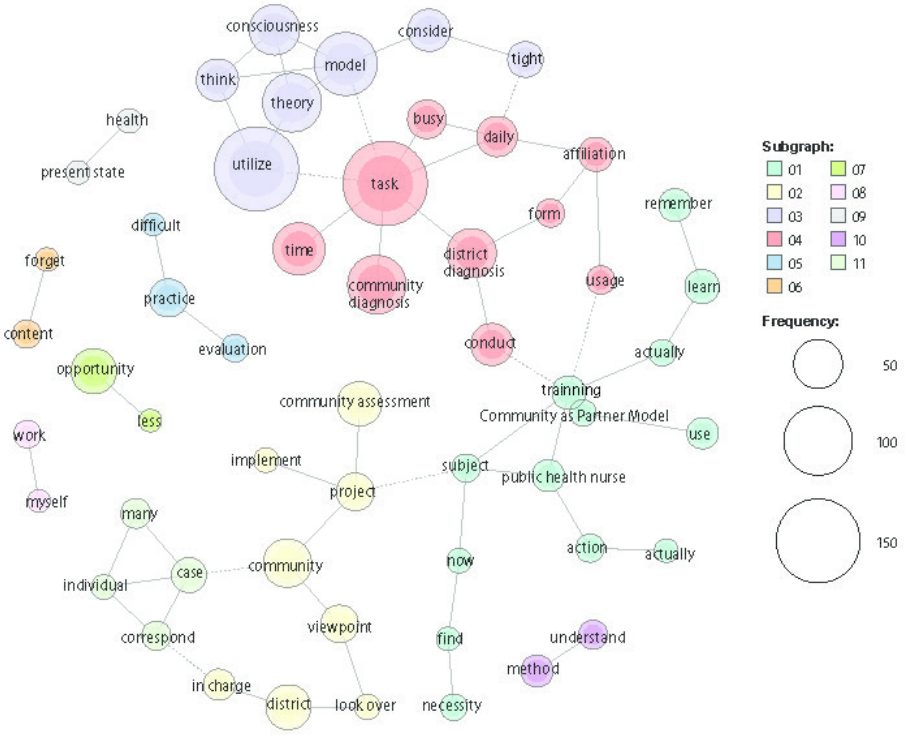

Figure 1. Co-occurrence network with frequent words

270x203mm (72 x 72 DPI)

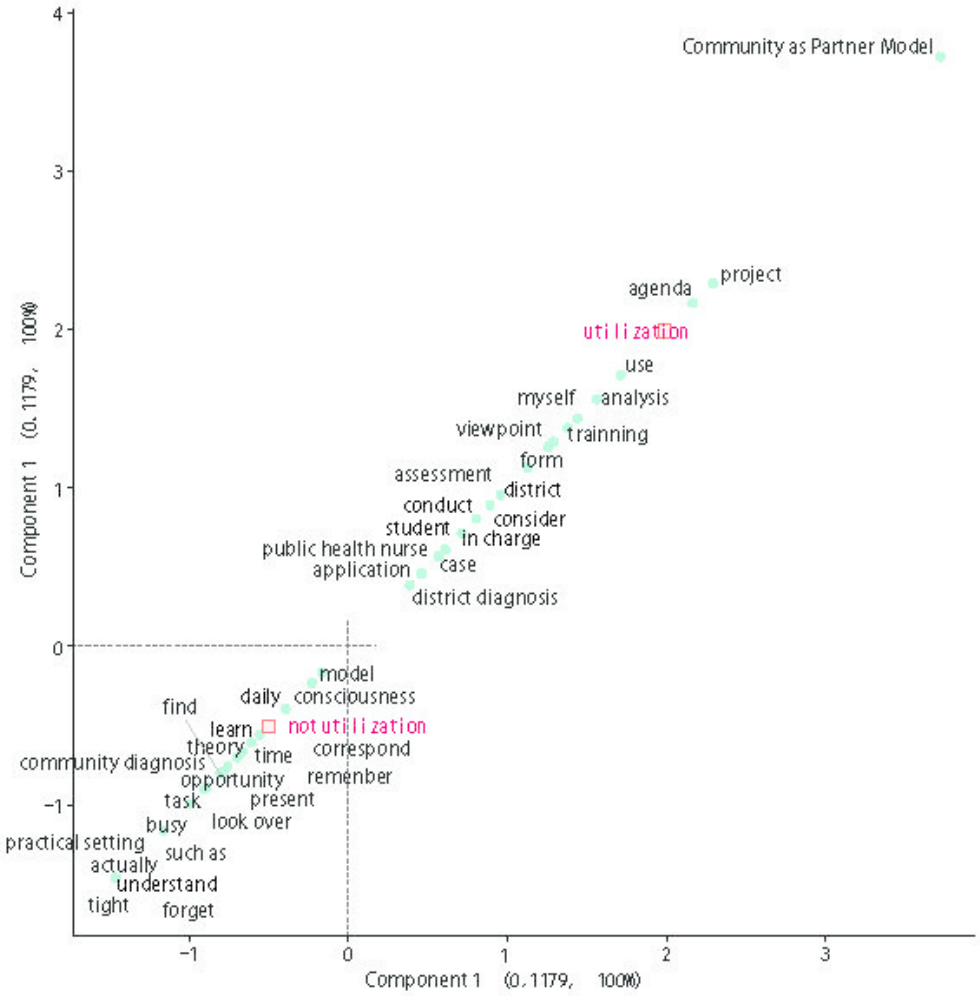

Figure 2. Corresponding analysis with model utilization

203x203mm (72 x 72 DPI)