

# Mentors' Awareness of Effective Consultation Skills in a Teaching Portfolio Workshop: A Text-Mining Approach

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*The aim of the present study was to examine mentors' awareness of effective mentoring skills prior to and after supervisory experiences of mentees' development of teaching portfolios. In the context of developing mentors' communication skills and reviewing strategies during a three-day intensive workshop, six consecutive meetings were conducted. The data of the discussions and reports among 11 mentors (three novice mentors, four experienced mentors, and four supervisory mentors) were analyzed by employing a quantitative content analyses method, namely, the Tiny Text-Mining tool (TTM). In the collected textual data, 1,484 different types of words were found during the mentors' reflections on their consultations with their mentees. The results revealed that mentors' images included the importance of communication skills, the perceived degree of the difficulties of consultation, complex and challenging processes, and mentoring effectiveness.*

*Keywords: Faculty learning community, Mentor training, Professional development, Quantitative research, Teacher learning*

## Introduction

Issues related to professional development are receiving increased attention, especially as teachers at all levels realize the centrality of their roles in school reform and improvement (Burbank & Kauchak, 2003).

In various studies on educational improvement, the term, learning community has been used to refer to a relatively small group that may include students, teachers, administrators, and others who have a clear sense of membership, common goals, and opportunities for extensive face-to-face communication (Baker, 1999). Cox (2001) defined a faculty learning community (FLC) as a cross-disciplinary faculty and staff group of six to 15 members who engage in collaborative programs with many activities.

Cox (2003), after examining the learning experiences in FLCs, classified two different learning communities, namely, cohort-based and topic-based FLCs. Cohort-based FLCs address the teaching, learning, and developmental needs of a faculty cohort. The curriculum of FLCs is developed by the participants and includes a broad range of teaching and learning areas as well as various topics of interest. Furthermore, each topic-based FLC has a curriculum that is designed to address special campus teaching and learning needs, issues, and/or opportunities. Although these FLCs have a particular theme, they provide learning opportunities for all the faculty members.

According to Burbank and Kauchak (2003), collaborative action research, which combines groups of teachers in design, implementation, and evaluation, provides a mechanism for professional development. With regard to learning for novice and experienced teachers, these trials are characterized by the pedagogy of investigation that addresses the disconnection between acquired knowledge in university coursework and applied knowledge in the classroom. Through generated action research, collaborative knowledge-sharing between participants offers opportunities for professional linkage and reflective discussion (Burbank & Kauchak, 2003; Rathgen, 2006).

## Mentorship in an Intensive Workshop

The most effective method of optimizing faculty development practices is peer mentoring based on real-world practices that may enable faculty members to examine their own practices, reflect on their methods, and socialize with mentors. Peer mentoring activities have been conducted to broaden teachers' ability to take control of their professional lives and create opportunities to publicize their views in relation to educational expectations (Clarke & Hollingsworth, 2002; Zwart, Wubbels, Bolhuis, & Bergen, 2008).

This working-together approach enables teachers to advance from a passive role to a truly collaborative one. To encourage this type of professional collaboration, participants use alternative forms of inquiry such as conducting peer observations, reporting on their own practices, and making collaborative reflections in the development of teaching portfolios. The empirical evidence on peer mentoring has revealed that the professional development of

teachers can be improved through experimentation, observation, reflection, exchange of professional ideas, and shared problem-solving (Zwart et al., 2008).

Mentoring is often identified as an essential step to achieve career success. In the context of education, it is commonly accepted that a mentor teacher leads, guides, and advises another teacher who is less experienced in a work situation and is characterized by mutual trust and belief. When establishing a mentoring program, the emotional and social aspects thereof must be respected.

Researchers are of the opinion that mentoring may be a valuable tool in educational reform for both novice teachers and experienced professionals. Formalizing the mentor role creates another niche in the career ladder of experienced professional faculty members and enhances the professionalism of education (Koki, 1997).

Empirical evidence on peer mentoring has revealed that professional development for faculties can be improved through experimentation, observation, reflection, exchange of professional ideas, and shared problem-solving (Zwart et al., 2008; Chan, Schulkin, Paris, Power, Holzman, et al., 2001). However, not all mentors recognize the value of the mentoring relationship. Mentors and educators in specialized areas rarely receive training on the mentoring process and consequently, they are often ill-equipped to confront challenges when accepting a major mentoring responsibility (Ramani, Gruppen, & Kachur, 2006). The actual learning processes of individual faculties that occur as a result of peer mentoring have, as yet, not been described in detail (Castle, 2006; Clarke & Hollingsworth, 2002; Zwart et al., 2008).

### **Prior Research on Mentorship at Intensive Workshop**

Since 2009, Osaka Prefecture University College of Technology has conducted an intensive three-day seminar, which is guided by mentor teachers, to create teaching portfolios. Faculty participants enrolled in this seminar reflect on their own teaching practices through the creation of a teaching portfolio. They collaborate with a teaching mentor by conducting one-on-one meetings with their mentors at least twice a day and critically examining and discussing scholarly topics on teaching and learning in their particular disciplines.

Furthermore, their mentors have opportunities to consult with a supervisor who has vast experience in teaching and mentoring different levels of trainees at peer-support mentor conferences. Ramani et al. (2006) found that some mentees' problems may not be within the boundaries of the usual mentor-mentee relationship and discussions. Accordingly, mentors should not be compelled to take on roles in which they do not have expertise, but should be supported by a network of specialists and other mentors. These influences on faculty members' learning are believed to emanate from three areas: The processes involved in portfolio creation; the mentoring and collaboration that is often associated with the process of portfolio creation; and the feedback on the completed portfolio (Zeichner & Wray, 2001; Wolf, 1994).

In the peer-mentoring conferences at Osaka Prefecture University College of Technology, the author focused on the second area that has been noted: The mentorship between mentors and mentees, and supportive collaboration among mentors. Furthermore, the author developed a collaborative FLC (Kato, 2013; Kato, 2014; Kato, Hogashida, Kaneda, Kitano, Furuta et al., 2018) to strengthen mentorship between mentors and mentees, and to identify the requirements needed to strengthen their professional development. This collaborative FLC was designed to engage midcareer faculty members in the theory, practice, and scholarship of teaching and learning, and to establish and support faculty communities of practice that provide mentorship and leadership in higher education.

Previous studies have analyzed discussions at the final meeting by employing the Steps for Coding and Theorization (SCAT) method, which is a sequential, thematic, qualitative data-analysis technique (Otani, 2008; Otani, 2011). This approach was employed for its explicit analysis process in that the process integrates qualitative data analysis with theoretical coding as well as for its efficiency and validity of theorization from relatively small-scale data (Aomatsu, Otani, Ban, & Dalen, 2017; Otani, 2008). It includes open to selective coding steps, storyline creation using the final selected codes, and the development of theories from the storyline.

With SCAT, the authors have anecdotally reported that mentors encounter the following: Difficulties in human relations; the inductive approach; self-awareness of immaturity; and a lack of a sense of achievement. In unbalanced mentee-mentor relationships, in particular, novice mentors become anxious and refrain from asking questions or advising older mentees, but rather content themselves with merely listening to their stories (Kato et al., 2018).

The second principal category, namely, data collection for mentors' educational improvement, suggests that mentors can learn mentees' rich educational experiences in mentoring from the latter. This category further suggests that

mentors can enrich and expand their teaching skills in mentoring. In particular, novice mentors without much teaching experience have experienced various teaching methods and strategies in various conversations with their mentees. Experienced mentors, through mentoring with young faculty members, have been afforded opportunities to understand other teachers' worries and anxieties, with which they are unfamiliar.

Although a previous qualitative and exploratory study (Kato et al. 2018) yielded significant insights into individual mentors' awareness toward mentorship, concerns have been raised that mentor experiences may influence the difficulties and personal satisfactions they experience while mentoring. An enhanced understanding of the perceptions of mentorship may help develop the professional development that will foster diversity among future academic educators and researchers in higher educational institutions.

The foregoing study revealed that there was a difference in the perceptions of mentorship between novice and experienced mentors. However, only a few studies have explored the influence of experiences on mentors' perceptions. Consequently, whether the same findings will be revealed in the analysis of reliable quantitative data remains untested.

### Research Purpose

The primary purpose of the present study was to explore mentors' perceptions of good mentorship and how mentoring experiences influence their awareness of communication skills and techniques as good mentors. In particular, the purpose was to explore how mentors perceive mentorship as part of professional development and how they evaluate their own mentoring experiences. Furthermore, this study examined whether there was difference in perception of mentorship between novice and experienced mentors. In accordance with previous findings, this study also investigated whether the same findings would be revealed by employing quantitative content analysis as those found in qualitative data analysis using TTM, which proved efficient and valid as theorization from the relatively small-scale data.

## Research and Design Method

### Participants

The participants included nine mentors and two supervisors. They were divided into two groups, namely, Group A and Group B. The distribution of the participants according to their mentoring experiences, academic backgrounds, and affiliations is presented in Table 1. The 11 mentors included three novice mentors (D, E, and K) who had never worked with mentees before; four experienced mentors (C, H, I, and J); and four supervisory mentors and coordinators (A, B, F, and G) who were largely responsible for designing the workshop and leading peer-mentor meetings.

Table 1

#### *Mentors' Profiles*

Group	Mentor (Age)	Mentoring experience	Academic background	Mentors' Affiliation
A	A* (Fifties)	More than five times	Chemistry	Technical College
	B** (Forties)	More than five times	Chemistry	Technical College
	C (Forties)	Four times	Mechatronics	Technical College
	D (Forties)	First time	Mechanical engineering	Technical College
	E (Thirties)	First time	Education	University
B	F* (Fifties)	More than five times	Educational technology	University
	G** (Fifties)	More than five times	Mechatronics	Technical College
	H (Fifties)	More than five times	Mathematics	Technical College
	I (Forties)	More than five times	Information Science	Technical College
	J (Forties)	Three times	Chemistry	Technical College
	K (Thirties)	First time	Chemistry	Technical College

(\* supervisor, \*\* coordinator)

### Data Collection

Each mentor group held six mentor meetings separately and discussed how to support mentees and promote collaborative mentorship in relation to the creation of teaching portfolios. Two group discussions were conducted and recorded with the participants' permission. Although Group A recorded discussions and reports at all six peer-mentor conferences, Group B only recorded their discussions during the final meeting on August 10, 2016. The

supervisors' involvement at meetings also varied; from very little involvement, for example, enquiring about the progress of the mentoring to significant involvement in the process of constructing a teaching portfolios and mentorship. However, during the last mentor meeting, a discussion on the way in which supervisors and coordinators encouraged or required their mentors to reflect on their mentoring process with their mentees in the three-day workshop was held.

In the group discussions, a supervisor acted as a facilitator and encouraged the participants to reflect on their mentoring process and the changes they were aware of prior to and after the mentoring experience. The questions were intended to elicit the mentors' awareness of what their role as a mentor entailed and what problems and difficulties they experienced during mentoring. It was hoped that this would project their perceptions about mentoring skills and competence. The mentors were informed of the purposes of the research and how data would be treated.

The interviewers primarily addressed the mentors' perceptions of their learning from the mentoring process and asked them to describe the mentoring process. The author transcribed audio-recorded data after the meetings.

## Data Analysis

Qualitative text analysis or text mining may be defined as any systematic reduction of a text to a standard set of statistically manipulatable symbols representing the presence, intensity, and/or frequency of some characteristics that are relevant to social science (Shikano, 2017; Goodman-Delahunty & Wakabayashi, 2012). When employing a text-mining approach, the more centrally a topic is processed, the more extensively that topic will be discussed, thus, yielding a high-frequency of words of collected data in transcripts that are related to the topic. Thus, an examination of discussion transcripts and the frequency of words related to mentorship and teaching portfolio creation can provide insight into the varying awareness between novice and experienced mentors toward mentorship.

In the context of developing mentors' communication skills and reviewing strategies during the three-day intensive workshop, the data of the final discussion and reports, were analyzed by the quantitative content analyses method of Tiny Text Miner (TTM), a free text-mining tool for the English and Japanese languages (Matsumura & Miura, 2014). The transcripts were prepared for analysis as follows. First, synonyms used in the final discussion and reports were identified and substituted with a single word so as to reduce the number of word categories and ensure more accurate results. Plural nouns were replaced by singular nouns to enable the software to recognize them as the same word. In addition, a proper noun was identified by its function and transformed into an appropriate noun with the same meaning. After this preliminary work, the software counted word frequencies generated by mentors in each discussion during the mentor meetings.

## Results

### Extracted Words on Mentoring Experiences

The number of extracted words from the three different groups of mentors, namely, novice, experienced, and supervisory is displayed in Table 2. In total, 2,434 words were extracted from the data (40:58 min) of Group A and 2,493 words from that (63:25 min) of Group B. In total, 5,027 words were extracted from the transcripts of the two final meetings and 1,484 different types of words were found in their reflections on their consultation with their mentees in the intensive three-day workshop. Novice mentors devoted less to the reflective mentoring process discussion than the experienced and supervisory mentors.

Table 2

*Number of Extracted Words*

Group	Num.	Num. of cases	Total num. of words	Different num. of words
Novice	3	55(11.1)	767(15.3)	292(19.7)
Experienced	4	214(43.1)	2434(48.4)	649(43.7)
Supervisory	4	227(45.8)	1826(36.3)	543(36.6)
Total	11	496(100.0)	5027(100.0)	1484(100.0)

\*The counted frequencies with percentages given in parentheses.

The 30 most frequently used words among the three different groups are displayed in Table 3. It is noteworthy that almost all the high-frequency words were prevalent across the three different groups. General verbs reflecting the common focus on the mentoring process with their mentees such as *do* (する), *be* (ある), and *say* (言う) were the most frequently counted across the three groups.

The author conducted chi-squared tests and Fisher's exact tests for independence on the frequency of the common words between the three conditions (novice, experienced, and supervisory) by employing statistical software on the web, js-STAR. Both the chi-squared tests and Fisher's exact tests revealed statistically significant differences in the frequency of reflections on mentoring in relation to the 30 most common topics. However, the chi-squared test was not suitable for small, sparse, or unbalanced data because exact p-values can be quite different and may lead to opposite conclusions concerning the hypothesis of interest (Tanaka & Yamagiwa, 1989). As shown in Table 3, the estimated values of counted frequencies are given in parentheses, which are calculated on the basis of total number of words of each group: Novice (767 words), experienced (2734 words), and supervisory (1836 words) in Table 2. Boldface words indicated that there were significant and marginally significant relationships among the variables and the estimated values of counted frequencies are given in parentheses in Table 3.

Table 3

Differences in the Frequency of Reflections on the Mentoring Process by Three Groups

Words	Novice	Experienced	Supervisory	Chi	P
する(do)	41 (42.8)	134 (135.5)	105 (101.6)	$\chi^2(2) = 0.207$	n.s.
ある(be)	32 (34.3)	108 (108.4)	84 (81.3)	$\chi^2(2) = 0.241$	n.s.
<b>言う(say)</b>	40 (34.1)	130 (107.9)	53 (80.9)	$\chi^2(2) = 15.176$	<.01
思う(feel)	23 (22.8)	82 (71.4)	42 (53.4)	$\chi^2(2) = 4.086$	n.s.
タイミング(timing)	18 (16.4)	54 (51.8)	35 (38.8)	$\chi^2(2) = 0.636$	n.s.
自分(self)	18 (15.0)	52 (51.8)	28 (38.8)	$\chi^2(2) = 2.655$	n.s.
それ(it)	16 (14.4)	49 (45.5)	29 (34.1)	$\chi^2(2) = 1.221$	n.s.
<b>共有(share)</b>	9 (14.1)	60 (44.5)	23 (33.4)	$\chi^2(2) = 10.443$	<.01
私(I)	15 (13.9)	51 (44.0)	25 (33.0)	$\chi^2(2) = 3.135$	n.s.
いい(good)	16 (13.5)	41 (42.6)	31 (31.9)	$\chi^2(2) = 0.565$	n.s.
<b>やる(perform)</b>	4 (13.3)	42 (42.1)	41 (31.6)	$\chi^2(2) = 9.332$	<.01
メンター(mentor)	10 (12.1)	13 (38.2)	56 (28.7)	$\chi^2(2) = 43.049$	<.01
聞ける(can hear)	6 (11.8)	44 (37.2)	27 (28.0)	$\chi^2(2) = 4.085$	n.s.
なる(become)	15 (11.0)	39 (34.8)	18 (26.1)	$\chi^2(2) = 4.468$	n.s.
何(what)	8 (10.7)	31 (33.9)	31 (25.4)	$\chi^2(2) = 2.160$	n.s.
ない(nothing)	13 (9.6)	33 (30.5)	17 (22.9)	$\chi^2(2) = 2.884$	n.s.
<b>すごい(great)</b>	1 (8.0)	26 (25.2)	25 (18.9)	$\chi^2(2) = 8.096$	<.05
<b>感じ(impression)</b>	2 (7.5)	38 (23.7)	9 (17.8)	$\chi^2(2) = 16.975$	<.01
人(person)	3 (7.2)	29 (22.7)	15 (17.1)	$\chi^2(2) = 4.410$	n.s.
書く(write)	8 (7.2)	22 (22.7)	17 (17.1)	$\chi^2(2) = 0.116$	n.s.
<b>できる(can do)</b>	10 (6.6)	24 (20.8)	9 (15.6)	$\chi^2(2) = 5.066$	.10<.05
メンタリング(mentoring)	7 (6.4)	14 (20.3)	21 (15.2)	$\chi^2(2) = 4.249$	n.s.
<b>今回(this time)</b>	3 (6.4)	15 (20.3)	24 (15.2)	$\chi^2(2) = 8.038$	<.05
<b>メンティー(mentee)</b>	14 (6.0)	10 (18.9)	15 (14.2)	$\chi^2(2) = 15.038$	<.01
違う(differ)	0 (4.9)	14 (15.5)	18 (11.6)	-	n.s.
<b>先生(teacher)</b>	4 (4.7)	24 (15.0)	3 (11.3)	$\chi^2(2) = 11.563$	<.01
ほんとう(true)	9 (4.7)	12 (15.0)	10 (11.3)	$\chi^2(2) = 4.562$	n.s.
<b>教育理念(educational philosophy)</b>	9 (4.7)	10 (15.0)	12 (11.3)	$\chi^2(2) = 5.539$	.10<.05
学ぶ(learn)	4 (4.6)	19 (14.5)	7 (10.9)	$\chi^2(2) = 2.848$	n.s.
考える(think)	3 (4.4)	13 (14.3)	13 (10.5)	$\chi^2(2) = 1.123$	n.s.

\*The estimated values of counted frequencies are given in parentheses.

\*\*Boldface words indicated that there were significant and marginally significant relationships among the variables.

With regard to the novice mentors' reflections, five words, namely, *share* (共有), *perform* (やる), *great* (すごい), *impression* (感じ) and *this time* (今回), appeared less than in the experienced mentors and supervisors' reports. On the contrary, two nouns, namely, *mentee* (メンティー) and *educational philosophy* (教育理念), which are directly related

to teaching portfolio creation, appeared more in the novices' reports than those of the experienced mentors. This tendency indicated that novice mentors reflected on teaching portfolio creations with their mentees, which was the main concern of mentorship in the intensive workshop. The nature and quality of the social interactions that experienced mentors reported in the reflections varied with those of the novices and supervisors. Peculiar nouns such as *say* (言う), *share* (共有), *impression* (感じ), and *teacher* (先生) appeared more in the experienced mentors' reports than those of the novices and supervisors. This tendency indicated that experienced mentors emphasized the importance of information sharing between mentors for improving their mentor skills.

## Discussion

This study, designed as a quantitative content analysis, intended to explore how mentors perceive mentorship as part of professional development and how they evaluate their own mentoring experiences. The author integrated qualitative data analysis with theoretical coding and quantitative content analysis using TTM, which proved efficient and valid as theorization from the relatively small-scale data of the 11 mentors whose data the authors analyzed in previous research (Kato et al., 2018).

The author focused on how mentoring experiences affect mentors' awareness of effective consultation skills. After a three-day teaching portfolio workshop at Osaka Prefecture University College of Technology, discussions at the final meeting were analyzed using the TTM method. Differences among three groups of mentors, namely, novice, experienced, and supervisory were identified.

The quantitative content analysis revealed two points. First, general verbs such as *do*, *be*, and *say* were the most frequently counted across the three groups. More distinctive words including *say*, *share*, *can do*, *impression*, and *teacher* appeared on the reports of the experienced mentors. It may be concluded that the experienced mentors could explicitly reflect on and explain their difficulties and satisfaction as mentors by using words such as *say* and *impression*. The experienced mentors clearly reported their mentees' teaching portfolios creations by quoting their mentees' when they used the word *say*. They also explicated their own feelings toward their mentees and mentoring process by using the word *impression*. Furthermore, they frequently asked for supervisors' and other mentors' opinions and ideas to develop effective questions to promote mentees' reflections, which may explain the high-frequency words *share* and *teacher*.

Second, on the contrary, novice mentors were apt to explain their own experiences to other mentors and supervisors. They often confessed their worries and difficulties about their mentoring styles and communication skills. Furthermore, the four words *share*, *perform*, *great*, and *this time* appeared less in their reports than those of the experienced mentors and supervisors. Notably, the experienced mentors and supervisors reflected on their mentoring *this time* compared to their previous experiences as mentors and mentees. In novices' reports on mentorship, two nouns, *mentee* and *educational philosophy*, which are directly related to mentees' teaching portfolio creation appeared more than in the reports of experienced mentors. This supported the notion that novice mentors focused on teaching portfolio creations with their mentees, which was the main concern of mentorship in the intensive workshop.

Actually, several mentors, regardless of their mentoring experiences, reflected on their worries and difficulties during consultations in a study designed to investigate the results of a qualitative study by the same author (Kato et al., 2018). During the consultation, it was clear that mentors often mentioned mentees' progress during teaching portfolio creation and consulted the mentoring process to discover the mentees' educational philosophy. The results of this quantitative study concurred with previous qualitative research, and its findings enhance previous insights. The specific character of the reported mentoring was found to differ depending on mentoring experiences. Relatively more mentoring and consulting activities were reported during the consultation of the actual mentoring and teaching portfolio creation. Consequently, it appears that the novice mentors clearly learned about real mentoring with their mentees.

The innovative text-mining analysis of word frequencies was compatible with quantitative and qualitative analysis as a means to add rigor to evaluate the subtle differences between the novice, experienced, and supervisory mentors. The results of this study have provided some empirical support for these differences between mentor groups so as to promote communication between the mentors and enable them to exchange their ideas and opinions in the mentor meetings.

In the introduction, it was observed that the previous qualitative study of mentorship provided only approximate classifications of the learning activities of mentors because it focused on selected aspects of mentor experiences. Quantitative studies of mentoring, in contrast, have utilized more detailed analysis of the mentoring process and reflections during the intensive workshop. Consequently, it is recommended that a combination of the two

forementioned perspectives in the form of a more dialed description of the mentoring process will yield a more thorough and accurate picture of teacher learning during peer mentoring.

The author is of the view that the results of the present study confirm that innovative text-mining analysis of word frequencies is compatible with quantitative and qualitative analysis as a means to add rigor to evaluate subtle differences between novice, experienced, and supervisory mentors. The results of this study provide some empirical support for these differences between mentor groups to promote communication between mentors to allow them to exchange their ideas and opinions in the mentor meetings.

However, it may be difficult to determine exactly where and when a particular insight occurred. Reporting about one's mentoring process appears to be a complex endeavor. Reflections also varied in the way in which cooperating mentors and supervisors are involved in reflections and discussions during mentor meetings. It is imperative that future studies employ both qualitative and quantitative analysis to learn more about the nature and quality of reflection that emerges under different conditions of mentor meetings.

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