IF YOU BUILD IT, WHY WILL THEY COME BACK? – MOTIVATION OF TEACHERS TO REENROLL IN A PROFESSIONAL DEVELOPMENT PROJECT

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Abstract

This qualitative study was conducted to understand teacher motivation to re-enroll in an extended professional development program. Data were collected from interviews with four teachers. We found that teachers made decisions to reenroll based on their perceived utility value of learning in this professional development, and that teachers were intrinsically motivated to explore their inquiry. We also found that providing teachers with autonomy to select learning issues and constructing extended learning communities could enhance teachers' perceived utility value of engagement and provoke teachers to generate new inquiry. Other factors, such as extrinsic incentives and an encouraging school culture also played a positive role on teachers' re-enrollment. Additionally, teachers had little concern about their capabilities to achieve learning tasks during their participation. Implications for programs of professional development and for future research are discussed.

If You Build It, Why Will They Come Back? Motivation of Teachers to Reenroll in a Professional Development Project

There are many factors that impact student achievement. Perhaps most important among these factors are the various roles that teachers play in the development of students (Carey, 2004; Haycock, 1998; Sanders & Rivers, 1996). Effective teaching, however, represents a set of complex and nuanced repertoire of skills that develop and change over time. Professional development activities, then, are paramount in helping teachers shape their practice and develop successful students (Smith & Gillespie, 2007).

Previous research has shown that teachers' motivation to attend professional development programs is associated with changes in their knowledge and action after participating in a professional development program (Smith, Hofer, Gillespie, Solomon, & Rowe, 2003). There are many reasons, however, why teachers chose to undertake professional development activities. Most K-12 teachers, for example, are required to participate in professional development programs to update their licensure, although this varies by state. Others undertake professional development in order to improve their practice. Some teachers are forced to participate by administrators, through school- or district-wide initiatives. Others feel compelled to participate by external conditions or out of professional or peer considerations. Teachers motivated to participate could be more involved in learning to improve their teaching than the teachers who are not motivated but feel forced to participate. When professional development programs are not required, teacher motivation, then, determines whether or not they opt to enroll. Therefore, research on teacher motivation to attend professional development programs is worthwhile and deserves more attention.

Background

In this study, we use the framework suggested by Jere Brophy (2004; 2007) who theorized three components of motivation:

Expectancy – The expectancy aspect refers to the degree to which people believe they are able to accomplish a particular task. Expectancy addresses questions, such as "What are the chances for achieving success?" and "How can I protect my reputation if I fail?" The expectancy aspect in teacher motivation for participation in professional development programs refers to teacher assessment of their chance to succeed in learning.

Value – The value aspect of motivation refers to people's judgment of the worthiness of a task, *i.e.,* "Why should I care about this?" and "What will I get out of it?" Relevant factors applicable in professional development contexts could include, but are not limited to, extrinsic incentives, learning outcomes, interests and enjoyment throughout the learning process. Brophy (2004) further explained that "Effort investment is viewed as the product rather than the sum of the expectancy and value factors because it is assumed that no effort at all will be invested in a task if one factor is missing entirely" (p.18). In regard to professional development, if teachers believe they can succeed and value the tasks involved in in-service, they will be motivated to participate.

Social Milieu – Motivation cannot be segregated from social influences (Deci and Ryan, 1985; 2002). People are more likely to be motivated if they feel connected to others within a social milieu or are in a setting encouraging learning inquiry. In this study, social milieu contains all environmental factors affecting teachers' participation in the

professional development, such as administration support and interactions with peers, facilitators, and parents.

Teacher Motivation in Professional Development

Some researchers have investigated the expectancy aspect of teachers' motivation to learn in professional development programs, and found a mutual influence between teacher's self-efficacy perception and their attempts to try new practices. On the one hand, teachers with high personal self-efficacy perceptions are more likely to adopt new practices and thus change their teaching practices as a result of participating in professional development programs (Guskey, 1988; Smylie, 1988). On the other hand, teachers' self-efficacy perceptions are enhanced by successfully implementing new practices which are considered effective in classroom instruction (Ross, 1998; Stein & Wang, 1988).

The majority of the prior research generated results on the value and social milieu aspects. Teachers who attend professional development programs expect themselves to change in practices (Scribner, 1999; Smith & Gillespie, 2007). The types of knowledge acquired by teachers in professional development programs, however, usually cater to school administrators and policy makers, rather than teachers themselves (Scribner, 1999). According to Eccles and Wigfield's (1985) theory on the utility value of tasks, it may undermine teachers' motivation to participate due to its distance from their instructional practices. The utility value refers to people's evaluation of the worthiness of engaged tasks in terms of their future goals, including career goals (Eccles & Wigfield, 1985). The utility value of participating in this program refers to the situation that the outcomes or benefits from the program are profitable to the participants in the sense of their teaching in classrooms. Teachers focus primarily on obtaining procedural knowledge directly applicable to their practices, and distrust outside experts with little

knowledge of their working contexts. Teachers' "preoccupation with acquiring nuggets of knowledge" (Scribner, 1999, p. 247) is embodied in their calls for obtaining knowledge from professional development programs directly applicable to their teaching. Therefore, the learning tasks involved in professional development programs should embrace the utility value – making a strong connection to teachers' own working contexts, especially if learning takes place outside the school (Smith & Gillespie, 2007). Moreover, teachers' assessment of their teaching effectiveness in terms of students' learning outcomes is one of the most compelling reasons for teachers to remain in teaching (Rosenholtz & Smylie, 1984).

External incentives, such as offering remuneration and licensure, can encourage teachers to attend professional development programs (Scribner, 1999). Likewise, Kelly and Murray (1996) found that financial reward was the major motivator for general practitioners to attend educational meetings. Although extrinsic incentives play a role, they are not the only reason teachers enroll or re-enroll in professional development programs. In spite of the importance of professional development, we still have little knowledge on how extrinsic incentives are valued by teachers, especially when compared to other factors (e.g., learning outcomes, time commitment, etc) in a specific context.

Finally, social interactions are valued by teachers. Professional development is more effective if teachers participate with colleagues from their school buildings (Porter, Garet, Desimone, Yoon, & Birman, 2000; Smith et al., 2003). Peer interactions in professional development programs can have different forms, such as sharing and collaboration, and emotional support. Peers can motivate one another to learn and play multiple roles, including motivator, mentor, leader, and human resource (Park, Oliver, Johnson, Graham, & Oppong, 2007). School culture and structure could influence teachers' sense of efficacy and professional

motivation (Bredeson, Fruth, Kasten, 1983; Johnson, 1990; Lortie, 1975; Rosenholtz, 1989; Rosenholtz & Smylie, 1984; Seashore-Louis & Miles, 1990).

Professional Development Context for the Study

This study was part of a five-year NSF-funded research project – Problem-Based Learning Project for Teachers. In this project, we implemented a problem-based learning (PBL) model for a K-12 science teacher professional development program by using problems that focus on science knowledge and curriculum development as well as problems of practice that address pedagogy. To be admitted to this professional development project, teachers identified content difficult for them to teach or difficult for their students to learn.

This professional development project included summer and year-long components. Teachers worked through their self-selected science content knowledge and curriculum development during the first seven days in the summer component. About half of the teachers, then, chose to work on pedagogical problems for three more days in the summer and ended up selecting a specific teaching dilemma arising from their own classroom practice and shaping it into a testable hypothesis for investigation during the school year. Teachers were grouped in learning communities of 4-6 who met monthly under the guidance of at least one facilitator during the school year to collaboratively analyze data related to their teaching dilemmas. Lundeberg et al. (2007) provided a detailed description of the project and its impact on teachers.

We initially expected that teachers would only be in this project for one year and we were surprised when several teachers asked if they could participate a second and then a third year. Almost half (7 of 16) teachers have continuously participated in this project (both summer and academic year components) for the previous two years. Although some researchers have investigated teacher motivation to enroll and learn in professional development programs, prior

research was mainly conducted in the context of short-term teacher education programs. To continuously participate in this PBL professional development program for multiple years, and each year with full commitment, nevertheless, requires an enormous amount of teachers' involvement. Therefore, we conducted this interview study to address the research question: What are the factors that motivated these teachers to continuously participate in this extended professional development program? Addressing this question can provide us with important information on the factors teachers value in their learning process, and offer us suggestions on how to design professional development programs to get teachers persistently motivated to learn.

Method

Participants

Four of seven teachers who continuously participated in the professional development program for the first two years agreed to be interviewed for this study. Table 1 displays some basic information of these four participants, whose names are pseudonyms.

Table 1. *Demographic information of the participants*

Name	Gender	Grade level	Years of teaching experience
Melissa	f	6^{th} - 8^{th} grade	17
Kathy	f	8^{th} grade	5
Sue	f	Kindergarten	11
Lisa	f	7^{th} grade	25

Data Collection

Data was mainly collected using open-ended semi-structured interviews (Patton, 2002) focusing on participants' motivation for continuous enrollment in the PD program. An interview protocol (Appendix) was prepared to address motivational issues. Four questions in the interview protocol address the three aspects of motivation. Question one focuses on general information of participants' motivation as well as their expectations which belong to the expectancy aspect. The second question asks for participants' comparison on the value of varying components of the

program. Question three is centered upon the utility value of engaging in the program. The last question addresses the social milieu aspect of motivation.

During the interview process, the interviewer had the flexibility to waive or alter the protocol, or generate new questions based on interviewees' responses when necessary. The flexibility built on a prepared interview protocol offered interviewers freedom to shape interview contents when appropriate and to explore varying topics pertinent to a particular interviewee (Bogdan & Biklen, 2003). Meanwhile, semi-structured interviews enhance the integrity of all the information which may otherwise be overlooked, and ensure that the interviews are conducted with clear directions (McCracken, 1988). Time spent for the interviews ranged from one to one and a half hours for each teacher. The interviews were tape recorded and transcribed verbatim.

Data Analysis

This study is both narrative and interpretive (Erickson, 1986). Data was analyzed by using open coding technique (Strauss & Corbin, 1998). Based on different levels of analysis, we conducted coding at two different levels: descriptive coding and pattern coding (Miles & Huberman, 1994). Transcripts were coded in descriptive coding process, and generated a set of descriptive codes. Table 2 displayed an example of some descriptive codes. During pattern coding, investigators re-coded the transcripts semantically by comparing the meanings of varying codes, seeking connections among codes, and grouping codes into larger themes. The production of pattern coding is a set of hierarchical theme-based pattern codes. For instance, the above mentioned descriptive codes are all associated with teachers' learning outcome of the program and thus were grouped into "learning outcomes of participation". During both descriptive and pattern coding processes, coding and recoding the transcripts were alternated until categories were saturated and stable.

Table 2. *An example of descriptive codes*

Codes	Definition	Examples
Changes in practices	Teachers changed their classroom practices due to their participation in the PD.	"I think it is just the main thing that probably changed some of the ways I teach. … and sort of restructure my labs a little bit …" "So those are two changes that I have made that having more time for discussion, and looking at my assessment."
Changes in content knowledge	Teachers gain ed content knowledge due to their participation in the PD.	"Content. It's enriched my conten t. … So I think in content, I feel more comfortable." "I've learned a lot of content through problem - based learning process."
Changes in pedagogical knowledge	Teachers gain ed pedagogical knowledge due to their participation in the PD.	"you can…learn fro m the peers about the other ways to approach it, challenging myself continuously to empower the students to take charge of their own learning in that inquiry -based spectrum."

To increase the trustworthiness (Lincoln & Guba; 1985) of this study, we conducted investigator triangulation (Janesick, 1994; Johnson, 1997; Mathison, 1988). During descriptive coding, the first investigator of this study coded all interview transcripts, and generated a list of codes with definitions to explain the codes. To assess inter-rater reliability, a second investigator then randomly selected half of the transcripts and independently coded them using the previously established codes and explanations. The inter-rater reliability was 72.2%, which we deemed to be low for the purposes of reliability. To remedy this, the two investigators worked together to establish refined codes and explanations, from which the second investigator worked to recode the sample. Using this revised coding scheme, the inter-rater reliability was above 98%.

Findings

In this section, we first present the common themes identified by the teachers that affected their decision making on reenrollment. Later, we consider how to organize these responses into a model using motivational theory.

Common Themes Emerging From Teacher Interviews

Several themes emerged from the data analysis which influenced teachers' motivation to reenroll in this professional development program. We discuss each of these in turn.

Changes in Content and Pedagogical Knowledge. One of the benefits noted in the interview data was teachers' perception of gaining in content knowledge. From the interviews, three out of four teachers explicitly expressed their perceived gain in their self-selected content area. One example from Kathy is:

> So the first week is always hard and frustrating to me because I am learning so much. It is just challenging day after day… I am learning a ton, I am racking my brain and I am trying not to feel like an idiot a lot of time, but no. But I really like that week because I just feel like I walk away and have learned so much.

Besides content knowledge, all four participants reported their perceived changes in pedagogical knowledge. For instance, Kathy and Melissa had been working on the pedagogical issue of how to group students of different levels to maximize their learning. Kathy considered that her experience in the learning community was helpful for her to group better, and Melissa also commented:

> You can learn from the peers [in this program] about the other ways to approach it, challenging myself continuously to empower the students to take charge of their own learning in that inquiry-based spectrum. And I am always looking out for, not only the accommodations and alteration to a program that you might make for students who are challenged academically, but also for the high-ends students, the academically gifted students.

Sue and Lisa were more impressed by their awareness of big picture in science content and its impact on their instruction. “Because of the project, I can say, this is really what I want my students to know, and is this really what I am asking when I ask this question, kind of thing,” said Lisa.

Teacher changes in content and pedagogical knowledge were not only embodied in gaining knowledge per se, but also in the fact that teachers became more confident to teach. All interviewees expressed a concern for their insufficient knowledge. For instance, Lisa said, “I cannot [teach my students] if I am not good at identifying a lot of different things, and they've got in the microscopes and I am looking at them going. ‘I don't know what that is,’ you know.” Kathy also said, “I am a fairly new teacher, so anything that I can get to help my lesson on stuff like that [is helpful].” Grasping content and pedagogical knowledge enhanced teachers’ confidence to teach, like Sue said, “I’ve learned a lot of content through PBL process…, so now if kids say something to me like that heavy thing sinks, I might not explain the whole thing to them, but I know it. I feel confident.” Gaining content and pedagogical knowledge could directly improve teaching and enhance teachers’ self-efficacy perceptions and contribute to participants’ reenrollment in this professional development program.

Changes in Practices and Beliefs. Another beneficial outcome emerging from the interview data was teacher changes in instructional practices and beliefs. Three participants discussed changes occurring on their students and themselves. For instance, Melissa felt that she was “really able for them [students] to be more independent and more inquiry-based” by grouping students homogeneously rather than heterogeneously. She also tried implementing PBL model in her teaching, and found that her students “were engaged by this PBL process,” because she “had students turn in a big term paper,” and identified the “facts and learning issues

[appearing in students' paper] were different [than they did before]." Kathy responded, "It [the PD program] just helps me to restructure things so that I think kids are doing more critical thinking and problem solving." She further explained that she changed the way she taught. Instead of giving students the answer, she was trying to ask them to figure out through discussions. Kathy also felt that "kids' test scores were better this year than last year," but she did not consider that "they are [were] the brighter group." Sue summarized two major changes in her instructional beliefs:

> I might [have said] that we don't have time for discussions, and now I think, 'no, we need to make time.' It seems to be important, so I am going to include time for discussions this year.... And even in my assessment, it is like that I have been assessing differently. If this is the way I taught the lesson, and these were the things I used for the lesson, then I am going to include that in my assessment. …Or maybe I will have a totally different assessment to see if they could do some different. …so those are two changes that I have made: having more time for discussion, and looking at my assessment.

By setting aside some time for discussion, Sue's students were more engaged:

> They were just asking all kinds of great questions, and they were excited about science, and they were seeing things in a different way. Why was this and how was this? Before we started doing this [arranging time for discussions], we weren't even sure kids could ask questions like that.

Useful Products. Three participants explicitly mentioned the inclination to developing unit plans during the summer and then implementing the developed unit plans in their classrooms in the academic year. Melissa commented, "They [other teachers attending the program] just like

the time to work on the unit in PBL…the time to work on a unit, structure it, [and] get all sorts of resources in terms of lab experiences." Kathy told us that the unit plan she developed during the first year was not only used in that year, but also repeatedly used in her second year classroom without big changes. Sue indicated that there were four units covered in kindergarten, and she had already developed two units. Therefore, "that makes nice to continue." The fact that the participants generated products – unit plans – used in teaching was another factor for teachers' reenrollment.

*Shared Resources. T*he benefits also included the resources shared in the program. All four participants addressed their appreciation of resources they attained from this PD. Kathy, for example, told us that she obtained a wide variety of science content, not only in terms of information but also lessons, activities and labs, during the summer. She then summarized "[I re-enrolled] probably because of the resources."

The pattern emerging from the data also suggested that resources not merely include shared materials during the summer but also shared knowledge from peers and facilitators in learning communities during the academic year. Words, such as "go to talk to mentors", "learn from the peers", and "peers to interact with", constantly appeared in the interviews. Lisa mentioned:

> It has good support with the MSU expert science teachers that are available for the questions, although they don't answer a lot of questions. But they are guidance…and helping us use that as we look up information. I think that's helpful.

Another example is from Kathy:

> What I like about the project is…the other people that I worked with were teaching a lot of the same materials, so they might come and say, 'Oh I did this really neat thing. You should give it a try.' I just think it was valuable and I did not expect to get that out of it.

Therefore, social help from peers and facilitators was one form of the resources beneficial to the participants and took the role of pulling these teachers back to the program. The data analysis also revealed the reason why participants echoed the value of obtaining resources. It could save teachers' time to find materials easier. For example, Kathy said:

> All the resources are there. I mean I looked at that even when I am not doing anything for this project just because something might come up. … I go to that Angel [an online system storing resources] because I can find stuff. …You know I am not going to spend a lot of time in the library to look at them, but when someone is there saying, 'Oh this might be helpful to you that you can look it over,' and kind of making that decision [easier].

Incentives. Consistent with the findings in previous studies, an important factor that emerged from the data was the positive role of incentives on teacher participation. In this case, incentives included remuneration, the offer of laptops and Continuing education units (CEUs). The interview data, such as "Obviously, the stipend helps", showed that all the four participants considered remuneration as an important factor to provoke their participation. Additionally, two participants, Kathy and Sue, mentioned that the offer of laptops also made them come back to the PD. Sue needed CEUs to maintain her licensure. Thus, offering CEUs was helpful for her reenrollment. Moreover, Lisa mentioned that the incentives were important not because the

amount of compensation they could get per se, but because these incentives conveyed the idea to recognize teachers' involvement as well as to appreciate their contributions to the research:

> The stipend is [helpful], definitely. But I don't do everything for the money. That's not why we're in teaching.… I mean it just says what we are doing is valued. … I think the stipend is necessary in order to do the research, because you [researchers in this professional development project] are benefiting.

More importantly, teachers did not simply and blindly pursue extrinsic rewards by attending the PD. They all valued their learning outcomes from the PD more than the attainment of extrinsic rewards. For instance, Kathy said:

> I think even the money is nice, if I wasn't getting anything out of that, I wouldn't have come back [for the second year], because you know the first year, the money is nice and you get stuff out of it, so it is kind of adding bonus in…. If you are not getting anything out of it, you know two weeks out of your summer, it is still you know not that great deal. So the fact you get something out of it, is kind of I think the reason why people would want to get back.

Awareness of Weaknesses in Practice. Another pattern noted in the interview data and constituted teachers' learning outcomes was participants' awareness of weaknesses in their own instruction. The facilitators in this program suggested teachers videotaping their classes to collect data to solve their self-selected teaching dilemma. By watching her own videos, Lisa reported that she realized her teaching problems: "I can see that I didn't always give them [students] a chance to expand on what they were saying, I was cutting them off and got where I wanted them

to go." Sue indicated that her participation in the program made her realize that she had misconceptions and she needed to know in-depth knowledge on science topics:

> I am realizing that I do need to know a lot more in-depth on these topics than I know. …I could be trying anything up there in front of kindergarten that's totally wrong and think it is not important. But I could give them misinformation. I need to know in detail, even if I am not showing them in detail… because like I said, if a kid said to me, "Well, my dad said plants have eggs" and then I said, "Plants don't have eggs, we just learn they have seeds!" You know that's not right. …I need to know these things, so I don't say something like that, which I probably would.

Although teachers' awareness of weaknesses in their instruction was not directly associated with the improvement in teachers' instructional practices or knowledge construction, being mindful of their weaknesses could drive teachers to learn to avoid their weaknesses and become better teachers. Thus, the awareness of weaknesses played a positive role on their professional career.

Intrinsic Motivation to Explore Evolving Learning Issues. Besides varying benefits obtained from teachers' participation, the data analysis revealed that the participants were intrinsically motivated to reenroll in this professional development program to accomplish their evolving learning inquiry. Their previous experience in the program provoked them to generate new learning issues that they wanted to explore for the next year. Before the first year, these four teachers did not have any expectations because of their little knowledge about the program. Like Melissa said, "I guess at the first year, I don't think PBL, as a group, even the mentors knew how exactly it was going to play out." Sue also commented, "all I knew [for the first year] was it was

an opportunity to work on a science unit and make some extra money…. I didn't know anything else."

At the end of the first year, all four participants decided to continue to enroll for a second year and were clear about their own expectations for the second year. Additionally, the interviews of this study were conducted at the end of the second year. All four participants had decided to enroll for a third year and had generated their new learning goals. Melissa, for instance, set up her learning objectives for her second year on the issue of grouping and started an initial attempt to incorporate PBL in her lesson plan. At the interview, she disclosed that she was planning to develop a PBL-based WebQuest lesson plan for her third year and would like to try this unit plan out to see how it could work differently on her students. Sue described in the interview that she explored how to design a good instructional activity in the first year, and during this process, she realized that "children may need more than good activities. They may need time to talk about it." Therefore, she set up her pedagogical learning issue centered upon classroom discussions for the second year. Meanwhile, her participation in this program also made her "look at several things, [such as] big ideas in science, seeing how things interconnect," which provoked her to consider how her students could learn about these big ideas and the methods she could use to evaluate students' learning. Sue then finalized her learning focus for the third year by saying, "It makes me think a lot of assessment … I am planning …thinking more about that, because the more we talk about assessment, it seems something I want to focus more."

To sum up, the participants were intrinsically motivated to explore their learning issues in this program. Meanwhile, they generated more questions that they wanted to explore for the future. Sue's comments summarized this point:

> It is sort of that kind of project that the more you [are] involved the more questions, dilemmas come up. So for next year, I am already excited again about working on something else to sign up again, because I am seeing that my teaching is changing, and I am finding things that I am really interested in learning more.

Teacher Autonomy to Select Learning Issues. As indicated in the project description, this professional development program encouraged teachers to select a science content area that they wanted to gain a better understanding of during the summer and identify a teaching dilemma that teachers could test in classrooms during the academic year. The interview data reviewed teacher's inclination to this feature of the program. Sue commented:

> I've done some others [professional developments]. But this one … you get a lot more freedom in choosing what you work on. Most things [in other PDs] they tell you, we are going to work on this; we are going to work on others. … And a lot of time it is not even something as a kindergarten teacher that I think relates to me …something I am not sure how to apply it to kindergarteners. … So PBL does a really good job, I think, of letting you pick the things you are interested and see how you relate it to yourself no matter subject area is.

The same answer was given from another teacher by commenting, "It helps if we could pick what we wanted to study or work on, because if it didn't fit in my [class]...that I thought I needed to work on. Then I probably wouldn't have done it." Teachers' autonomy to choose what they wanted to learn enabled them to select the topics, unit plans, and teaching dilemmas resonating with their teaching. This was one of the reasons motivating teachers to come back.

Extended Learning Communities. Learning communities of 4-6 teachers were built up to meet monthly throughout the academic year to share and help participants with their self-selected teaching dilemmas. The participants recognized the role of the academic-year component of this project. “The year long practice to me … is valuable, because that gives me a whole year to meet and work together, and have time to try these things with support from facilitators,” Sue said, “It is a big commitment, but I think that is the powerful part that really changes the teaching.” The year-long extended learning communities then provided participants with sufficient time to try out their interventions under the guidance of facilitators, and participants were more likely to find teaching strategies which were practically effective, compared with short-term professional development. Thus, teachers valued the worthiness of working in the extended learning communities.

Additionally, the extended learning communities exerted a positive external pressure on teachers’ learning. This idea appeared in three participants’ interviews. Lisa, for example, told us that it was the only kind of professional development that worked for her, because she needed to pull materials back out from the drawer in the fall to prepare for the monthly meetings. She further explained, “Because we are meeting again as a group, and we need to look at it…so this is the way its set-up forces me as a teacher when I am actually learning.” “There is something about knowing that you are going to meet next month, and you have to kind of talk about something, so you should do something, or you are going to have nothing to talk about,” Sue expressed, “so there is a little pressure, you know. You work hard on that.” Therefore, teachers valued this kind of pressure in the sense that it could push them to learn.

School Supports. Finally, the school culture encouraging teachers to learn to improve teaching played a role to motivate teachers to participate in this program. Two factors – *principal*

support and *peer influence* – were identified from the data. In school contexts, principal support is important and could influence teachers' participation in professional development programs. One participant, Melissa, told us that her principal had decided that the physical science was lacking and she asked all science teachers in her school to enroll in the physical science unit for the first year. Thus, principals were the persons that could influence teachers' enrollment. Additionally, all four teachers reported that their principals were supportive, and they felt encouraged to participate in this project. For example, Kathy's principal treated her like a "star teacher", which served as a motivator to her attendance:

> My principal is awesome. … He's talked about [what] I did. He's tried to encourage other people to do it, and he lets me leave early every time so that I can make my meeting on time. …He came… cause in one of the MSTA journals there was an article about problem-based learning, so he came to me and said, "This is what you are doing!" So it is all exciting for me. …every time they've come in to videotape, he will stop by my room and introduce himself and stuff like that. I definitely found that he has been supportive. … He probably thinks it's not a big deal, but it makes me feel special and something like cool. So I think if I didn't have his support, it was just kind of, it won't be motivating, I guess maybe to do it.

The interview data also indicated that peers from the same school building could influence teachers' participation in the PD. Melissa and her colleagues preferred company to each other. Melissa described how she and her colleagues decided what component they would enroll for the 3rd year:

> Kate [one of her colleagues] just said, "Let's just do the first week," and then I said, "Maybe I would do the second week, and maybe the full year." Now Diane said, "Maybe I will." Then Kate said, "You didn't tell me, and now I could."

The influences from peers exerted an impact on not only Melissa's enrollment but also her decision-making process of selecting content areas she wanted to learn:

> The next year [year 2] there were only two of us and the other teacher really wanted to go to the earth science that I thought I had to follow through. So I just asked the teacher, "Here that 6th grade was earth quake and volcanoes, 7th grade was the rock cycle basically, and the 8th grade was weather and water. …What do you want me to do?" She said, "Rock cycle," so I said, "OK, I will choose rock cycle."

Motivational Model of Teachers' Responses

In the previous section, we described, in teachers' own words, their reasons to reenroll in the program. The goal in this section is to analyze and organize these reasons in terms of the motivational constructs based on the synthesis of varying perspectives shown in the literature review, and to develop a model (see Figure 1) that helps inform how and why teachers decide to continue with a program of professional development.

Many of teachers' responses seemed to directly speak to how helpful the professional development was to their practice as teachers. Specifically, the themes of changes in content and pedagogical knowledge, practices and beliefs, teachers' development of unit plans, the access to shared resources, and teachers' awareness of weakness in their practice all speak to this idea. In motivational terms, this is the concept of *utility value* as defined by Eccles and Wigfield (1985), and is the first component of our model. Because the participants were so verbose and detailed

about how this program had changed their classroom instruction, we view this utility value component of the model to be an essential component. That is, teachers feel that they must see some utility or usefulness in the learning activities in order to reenroll in the professional development.

The second component in our model is teachers' *intrinsic motivation* to continue in the professional development. In our interview data, teachers spoke about their intrinsic motivation in terms of wanting to continue to explore and work on their self-selected topics, such as "So for next year, I am already excited again about working on something else to sign up again." The literature on motivation is clear in identifying the importance of intrinsic motivation in undertaking learning activities (Ryan & Connell, 1989). Therefore, we include it in our model as well. The literature is also clear that intrinsic motivation is a separate construct from other components of motivation, such as extrinsic motivation (Eckblad, 1981) and needs (Collier, 1994).

The third factor in our model, we call *enhancing factors,* because they refer to teachers' responses that occurred less frequently, but were mentioned as adding to, or enhancing the utility value or intrinsic motivation components. Specifically, teachers' interview themes of "Teachers' Autonomy to Select Learning Issues", and "Extended Learning Communities" were seen as enhancing factors in our model. For example, extended learning communities through the school year provided teachers with more time exploring their learning issues based on their classroom practice. This enhanced the accuracy for teachers to evaluate the effectiveness of interventions in school contexts, and thus strengthened teachers' perceived utility value of engagement in professional development programs. On the other hand, since teachers spent more time to learn in the extended learning communities, they were more likely to produce new questions, which

spurred their intrinsic needs to continue their inquiry. Although teachers participating in short-term professional development may also generate new learning issues, they will hardly have chance to work on them after the professional development. Thus constructing extended learning communities in professional development programs can enhance the utility value of engagement and provoke teachers' intrinsic motivation. Furthermore, teachers were motivated to find new learning issues when they had control on deciding what they learned. Like Sue said, "I am working on things that I am interested in. You are more willing to try something if you are interested in it than if someone just tells you to try…You've got some ownership to it. You are doing it yourself, and that gives me that excitement." This result is consistent with the positive association between subjective perceptions of self-determination and intrinsic motivation proposed by Deci and Ryan (2000). Additionally, the interview data also shows the positive role of teacher autonomy to select learning contents on the utility value of participation in the sense that it increased the chance for teachers to work on the issues hard to handle in their classrooms, and thus ensured the usefulness of their learning in professional development context which resonated with their school contexts.

Teachers also mentioned several *extrinsic incentives*, including monetary compensation, use of laptops, and CEUs. Extrinsic incentives has also been identified as an important contributor to individual's motivation to participate in activities (Scribner, 1999; Kelly & Murray, 1996), and so it should be no surprise that extrinsic incentives contribute to teachers' willingness to reenroll in this professional development.

Finally, the last category of teacher responses related to *school supports*. Teachers talked about how principals and peers influenced their decision on their participation in this professional development. We include it in the model as its own category, because it is clearly

not related to intrinsic or extrinsic motivation, nor was it mentioned as an enhancing factor to protect teachers' perceived utility value of this program (although we argue that school support is an important consideration).

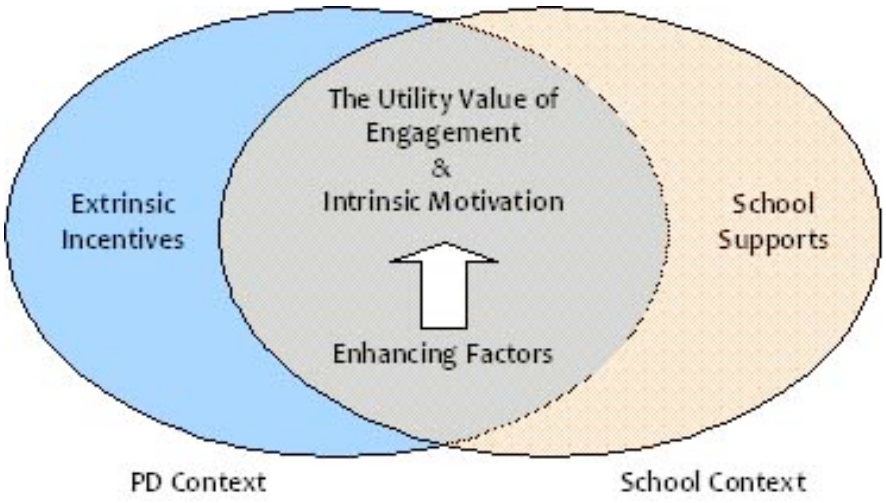

Figure 1: Teacher motivation for reenrollment

In our model, these factors interact to help teachers made a decision to reenroll in the program. The utility value of engagement and teachers' intrinsic motivation to explore their evolving learning issues were two essential factors that are necessary in order for teachers to decide to re-enroll in professional development. It is important to recognize that teachers can, and often do, operate in multiple contexts: the professional development context, and the school context. If teachers see these two contexts a non-overlapping, they will see little purpose (or utility) to the professional development, as it has little (or no) significance to their lives as practicing teachers. When professional development works, however, teachers see significant overlap between these two contexts and find the professional development useful to improve their practice as teachers. Thus, in the model, utility value sits at the intersection of the two contexts that teachers must consider in their decision to reenroll in professional development.

Intrinsic Motivation plays an important role too, and is placed with utility value because it is also central to the model in similar ways – teachers not only need to see the utility value in their professional development activities, but they also must have some internal (intrinsic) interest or enjoyment in learning activities to continue as a teacher in the professional development project. The enhancing factors (e.g., teacher autonomy and extended learning communities) feed into the utility value and intrinsic motivation to further strengthen teachers' commitment to the professional development activities.

Extrinsic incentives have a positive effect on teachers' participation in professional development. However, incentives are not related to or enhancing teacher's classroom practice. Therefore, extrinsic incentives lie exclusively in the professional development context. School supports, including principal support and peer influences, are the factor exists in the school context. Extrinsic incentives and school supports, then, perform as motivators for teachers' reenrollment in their own context.

Discussion

The majority of factors emerging from the data analyses nest in the value and social milieu aspects of motivation, rather than the expectancy aspect. The utility value of the outcomes, teachers' intrinsic motivation, and the extrinsic incentives the participants attained belong to the value aspect. The positive role of extended learning communities, principal support, and peer influences lie in the social milieu aspect.

Value Aspect of Motivation

Among the factors constituting the value aspect of motivation, to engage in the program, participants achieved a plethora of outcomes at the cost of losing time and putting forward efforts. When teachers were involved in the PD to complete a series of tasks, they could not

engage in other tasks (e.g., spending time with family, or going to the gym). Wigfield and Eccles (1992) used the term "cost belief" to describe the perceived negative aspects of engaging in the task. According to the interview data, time was an important issue for the teachers and they were reluctant to give away their time. On the other hand, they obtained resources and expert support, developed unit plans, gained content and pedagogical knowledge to improve their teaching practices as well as incentives. When facing such a voluntarily participated professional development program embracing costs and benefits, participants could conduct cost-effective analyses – judging whether it was worthwhile to attain benefits at the expense of losing other things valuable to them. If the importance of achieving the benefits outweighed the costs, teachers were likely to engage in the task and considered that what they lost was valuable because they were compensated by more important things.

The interview data in this study supported this point. All four participants explicitly expressed that the time they spent or the effort they put forward in this PD was valuable, because they believed that they had obtained what they wanted. Sue, for instance, commented, "The time working on the unit is very valuable, cause [we] never got the time to [do] that," which illustrated that the value of developing unit plans, perceived by Sue, outweighed the time she lost, and showed that the time sacrificed for the task was worthwhile. In short, the cost-effective analysis could be a cognitive process for participants' decision making on reenrollment.

As mentioned in the literature review, Scribner (1999) questioned that the knowledge acquired by teachers in professional development programs was usually selected to cater to school, policy makers, rather than teachers. Teachers, in reality, wanted to obtain procedural knowledge directly applicable to their practices. The utility value was considered essential by the participants. In this study, teacher gaining benefits with the utility value outweighed their loss of

time and the effort they invested, and thus, strengthened the benefit side in teachers' cost-effective analyses. In the professional development context, only one factor in value aspect – extrinsic rewards – was found to be effective to influence teachers' reenrollment in the program. The extrinsic incentives did not have utility value, but it served as a motivator in this case as well as in other professional development environments revealed in previous research. Therefore, to develop an intriguing professional development program, designers should strive to tie the professional development context tightly to teachers' school contexts and provide some incentives.

Expectancy Aspect of Motivation

According to Brophy's (2004) theoretical framework, a student is motivated to complete a learning task only if both value and expectancy aspects exist. In this case, the expectancy aspect of motivation was not prominently featured. We believe that this is the case because teachers were more interested in value judgments with respect to the professional development. However, other possibilities exist. The interview questions themselves may be better suited to address the value aspect, and not directly address the expectancy aspect sufficiently.

Another possibility is that teachers found the environment to be non-competitive. Teachers were not graded, nor were they asked to accomplish a certain set of criteria. Teachers seemed to set their primary goal on becoming better teachers. The learning tasks were created by themselves and would undergo with the guidance of facilitators and assistance from group members. Teachers may have felt less pressure, and may have worried less about failure in this environment.

Another reason why the interview data did not address the expectancy aspect is due indirectly to the reenrollment per se. Before the initial enrollment, participants had vague

knowledge about this program. They were not able to generate expectations. After experiencing a year, participants were familiar with the structures and the instructional approach of this program. This enabled them to generate some expectations before their reenrollment for the second year. These expectations then were realistic because they were built on participants' previous experience. Their actual gain in learning, therefore, should dovetail nicely with their expectations. Since the discrepancy between participants' expectations and their actual outcomes was small, teachers were unlikely to fail in learning, and thus they did not need to worry about their capabilities.

Social Milieu

We have argued that the extended learning communities constructed an environment to enhance the utility value of learning tasks. We also displayed that teachers were mainly seeking for "nuggets of knowledge" (Scribner, 1999; p. 247) functionalizing efficiently in their classrooms. Yet the ultimate goal of professional development programs should focus on the learning that could exert a far-reaching impact on practitioners. Constructing extended learning communities has the potential to accomplish this goal, because teachers have enough time to generate hypotheses, try out new instructional approach in classrooms, collect and compare data, and solicit help in learning communities. The repeating teachers can even collect more longitudinal data, maintain a larger data set, and explore questions in coherent lines of inquiry. Thus, professional development having longer duration is more likely to contain a wide variety of learning opportunities for teachers to integrate new knowledge into practice (Brown, 2004). Since the effect of an intervention in educational setting usually takes a long time to occur, constructing extended learning communities can be a good strategy to enhance the fundamental impact on teachers.

What Else Can Be Learned?

All four participants in our study confessed the positive role of extrinsic incentives. Yet each of them considered that their actual learning was more important. For professional development projects, extrinsic incentives can attract teachers to enroll, but the reenrollment relies heavier on teachers' intrinsic motivation (Turner & Kim, 2006). Thus, it is essential to build up teachers' intrinsic motivation during the professional development to pull them back. We have discussed that offering teachers autonomy to select learning issues can enhance teachers' intrinsic motivation. Additionally, reducing teachers' concerns on their abilities is also important. Strategies, such as conveying the ideas that learning to become a better teacher is the ultimate goal of professional development programs, encouraging teachers to speak out about their ideas or questions rather than being nervous about their mistakes or lack of knowledge, should be used to minimize teachers' ability concerns. Moreover, three of our participants in this study indicated their preference for being grouped with the teachers of the same grade level. This inclination might stem from their inherent ability concerns. Hence, to avoid grouping them with others whose grade levels are significantly different might be a strategy to shy away from teachers' ability concerns.

To solicit teachers' passions to learn continuously, facilitators need to direct teachers to realize the utility value of the learning. As we have argued in the findings, teacher autonomy to select learning issues can bridge the gap between teachers' learning in professional development programs and their classroom practices. Thus, the professional development should embrace the flexibility to encourage teachers to learn what they want.

We also discussed that teachers needed to contribute their time to participate in the program. It is important to design professional development programs that maximize the

outcomes / time commitment ratio. We suggest the model used in this professional development program – summer + extended learning communities, because teachers have more time to engage in intensive learning during the summer, and the extended learning communities encourage them to conduct research and implement what they have learned in their practices.

To re-enroll in such an extended professional development program requires teachers to be highly motivated. Unfortunately, not every teacher is excited to learn, especially when they have to contribute time and effort. Then, how can we make these teachers enroll in professional development programs? The findings of this study identified two solutions consistent to Hewson's (2007) contention. The data showed that participants' initial motivation to enroll in the program could be caused by the awareness of their insufficient content knowledge. Thus, if teachers feel a lack of knowledge or some aspects of practice are problematic, they may attend professional development programs to seek for help. Yet there could still be some teachers, even though they notice their knowledge barrenness, hesitate to spend time learning. In this situation, an encouraging school culture, such as principal's support on teacher learning, could affect teachers' decisions.

Limitations of the Study and Implications for Future Research

The present study adopted the interview method to collect data. Although interviewees provided us with deep description, the sample size was too small for us to generate conclusions on how important each factor played a role in teachers' decision-making for the participation. Future studies to understand how effective each factor can motivate teachers to attend professional development programs in larger samples would be informative.

Second, the present study was also limited in that the majority of the interviewees were experienced teachers, and only one teacher was relatively new. It was hard to identify whether or

not teaching experiences interfered with the motivation to participate in this program. Future study should make an effort to interrogate this issue.

The present study highlighted some factors influencing K-12 science teachers' motivation to re-enroll in an extended professional development program. Such studies are important for professional development designers and facilitators not in the sense of blindly catering to teachers' needs, but constructing a well-structured professional development program to fundamentally improve teaching practice by considering and using these motivational factors wisely. Future studies to continue searching for other factors or confirming these factors in other contexts would be beneficial. The research oriented towards correlational studies to test the interconnections among these factors and how strongly they are associated with one another would also be important.

Finally, the findings of this study were extracted mainly from the four repeating teachers, who were replete with passions to learn continuously. Thus, this study focused exclusively on the subgroup of teachers who embraced very positive attitudes, but did not include other teachers who were not willing to participate or who left after their participation. To understand teacher motivation to learn in professional development programs, all subgroups should be carefully studied in the future.

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Appendix

Repeating Participant Interview Protocol

Introduction

We are interested in understanding why you continued with the PBL Project for a second year. I would like you to tell me about the features of our professional development program that helped you decide to enroll again, so that your experience can serve future participants in this project.

The interview is for professional development and research purposes only. You can discontinue your participation in the interview at any time, and you can choose to not respond to certain questions. If at any point you feel any discomfort with the materials or questions please do not hesitate to stop me.

1. You chose to enroll in the PBL Project for a second year or more. We are interested in your reasons for returning for the second year. What is it about this professional development that drove your decision to participate for a second year?

Possible Probing Questions:

- Why were you interested in this project the first year? What were you hoping or expecting to learn as a result of participating in the first year of the project? Were your expectations met? In what ways?
- What were you interested in when you decided to return for a second year? What were you hoping or expecting to learn as a result of participating in the second year of the project? Were your expectations met? In what ways?
- Is the PBL project the first professional development you have been involved in? If not, what features of the PBL project are different from other professional

development projects you have been involved in? Are these differences important to your participation in a second year of the PBL project? If so, how?

2. As a participant in the PBL Project, you have been involved in the Professional Working Conference, developed and taught a unit, and engaged in a Focus On Practice group to talk about your own classroom-related inquiry. How did these components contribute to your decision to enroll for a second year?

Possible Probing Questions:

- How did varying components [PWC, Unit Development, Teaching Strategies, FOP] influence your decision to enroll for a second year?
- Were some of these components more important to your decision to participate for a second year? Why?

3. We would also like to know how the science content and/or teaching strategies you have learned in the PBL project have become part of your teaching practice. Has the PBL Project had an impact on your teaching? If so, what kind of impact?

Possible Probing Questions:

- Do you feel your teaching has changed as a result of this project? In what ways?
- Do you feel that you have changed as a person or a science educator/professional because of this project? If so, how?
- Could you tell me about some specific ideas you learned in this project that you incorporated in your teaching?
- Do you think the ideas you have learned as part of this project have impacted your students? If so, how?

- What is it about [the topic being taught] that is challenging for either you or your students?
- Do you think your participation in the PBL project has influenced other teachers and/or administrators in your school? If so, how?

4. We would also like to understand the importance of the relationships you developed with other participants and facilitators in the Professional Working Conference and Focus on Practice. Please tell me how your relationships with your teammates and/or facilitators in the PWC and/or FOP groups influenced your participation in the second year?

Possible Probing Questions:

- Are there other teachers from your school or district involved in this project? How does working with a team of teachers from your school/district influence your decision to participate in this project?
- Does it matter to have a team of other teachers to connect with while doing this work? Why or why not?
- If you were no longer involved in the PBL professional development process do you think you will continue to communicate about your teaching with other PBL participants?