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## Breaking barriers: Research-based collaborative professional development between in-service teachers and university researchers

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### Abstract

In the Philippines, the recent curriculum reform has impelled the attention of various education sectors for teacher professional development (PD). The purpose of this qualitative study is to assess the impact of a year-long research-based collaborative PD of 30 elementary school science teachers with university science education researchers. The PD activity followed the lesson study model which features collaboration and reflection. Data were obtained from audio and video-taped transcripts and formal interview. The constant comparison method was used to analyze and formulate themes from the data transcripts. Reliability of codes was ensured using the Cohen inter-rater reliability analysis with an acceptable value of 0.734. Results reveal that a change in the teachers' professional culture was the main impact of study which encompasses collaboration, teachers' practices focused on student learning, continuous teacher learning and reflective practice.

Keywords: Classroom-based research; collaboration; lesson study, professional development; professional learning.

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## 1. Background of the Study

In the beginning of the 21st century, the recognition on the significance of teacher's professional development (PD) has grown internationally (Bates, Swennen & Jones, 2011; Ben-Peretz, et al., 2013). In the Philippines, this recognition was intensified in response to the recent curriculum reform in the basic education. Specific to science education, the curriculum "envisions the development of scientifically, technologically and environmentally literate and productive members of society who are critical problem solvers, responsible stewards of nature, innovative and creative citizens, informed decision makers and effective communicators" (Official Gazette of the Republic of the Philippines, n. d. p. 2). This is envisioned to accomplish the goal of "developing scientifically literate learners and make them informed and participative citizens who are able to make judgments and decisions regarding the applications of scientific knowledge that may have social, health, or environmental impacts" (Official Gazette of the Republic of the Philippines, n.d. p. 2).

Various authors has claimed successful forms of PD which include peer coaching, collaborative teacher consultation, teacher study groups, teacher mentoring (Brownwell et al. 2006), and collaborative professional learning through lesson study (Gutierrez, 2015, 2016). Key feature of these PDs are teacher centeredness which "lower their defensive barriers, broaden their educational horizons and give them a sense of pride, ownership and responsibility" (Dutt, 2001, p. 4) leading them to become empowered professional decision-makers in their professional community. Moreover, these forms of PD are usually school-based, sustainable and collaborative eliminating the problem of individualism thereby creating a mutual community of shared ownership and responsibility. Currently, PD requires teachers' active involvement in the evaluation of their practices (Gulamhusein, 2013) and as they are required to be linked to the teacher education field, they need to recognize their learning processes and they need to have a clear connection between their instructional practices and students' learning (Loughran, 2014).

Several authors have noted the characteristics of effective PDs in providing opportunities for teachers to acquire knowledge and revise their practices with peer support (Duncan-Howell, 2010, Weseley, 2013, Owen, 2014, Chen et al., 2016). According to Chen and colleagues (2016), PDs must be composed of a professional community with a shared vision and who "constantly meet, discuss, collaborate, and reflect on their shared practices together; and aim to improve instruction and student learning" (p. 252). Specifically, PDs must foster critical reflection and communicative learning in an informal, collaborative and teacher-driven inquiry practices (Trust & Horrocks, 2016; Servage, 2008; Herbers et al., 2011; Carpenter, 2015; Kyndt et al., 2016). Research showed that teachers prefer self-directed and flexible nature of informal learning (Lom & Sullenger, 2011) as they gain improvement in subject knowledge; enhance pedagogical skills and knowledge; and change professional attitudes and identity (Kyndt et al., 2016) in a non-structured and non-threatening environment.

Recently, Loughran (2014) described the teaching career as a "research journey" (p. 2). Thus, a number of studies on teacher educators emphasize the research component as a key to professional development (Lunenberg et al., 2014). As teachers engage in a research activity, they gain understanding on their students' learning, their own teaching and the nature of teacher education in general (Loughran, 2014). However, teachers refuse doing research because of problems such as lack of time, motivation and lack of priority (Dimmock, 2016). Most of the time, they rely on their personal knowledge and are pre-determined to rely on their experiences. Moreover, some teachers depend on third party intermediaries and usually choose to attend conferences, workshops or trainings where there is no lasting application when teachers eventually shift to traditional teaching methods after sometime. In the Philippines, these PDs are seen as sources of credits for teachers who aim for promotions. As such, the essence of PD is not reflected on teachers' practices. On the other hand,

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Kinchloe (2003) suggested that establishing a PD that is grounded on teachers' inquiry and can support teachers becoming researchers to bridge this thinking gap. Thus this paper accounts the reflections of in-service teachers on the significance of their partnership with university science researchers in their year-long research-based collaborative professional development.

## **2. Methodology**

This qualitative study was conducted to document the importance of a research and school-based collaborative professional development between 15 in-service elementary science teachers at the National Capital Region of the Philippines.

### **2.1. Context**

The PD activity had two phases. Phase I was a five-day (40 hours) seminar-workshop designed using the lesson study model modified by Gutierrez (2016) which highlights collaborative goal setting, construction, modeling, implementation and revision of a research lesson. Phase II is composed of the implementation in actual classrooms and observation activities of the collaboratively constructed lesson plan followed by team reflection. The reflections covered insights on students' responses on the lesson, deviations during implementation and some suggestions for the lesson improvement. All reflections were documented and served as the basis of the team for the revision of the research lesson before the succeeding implementation stage. This study covered three grade levels (Grades 1, 3 and 6) and the implementation stages were spread across the school year with a maximum of five-day interval between the first and second implementations. During the implementation stages, at least two science education researchers were present as collaborators of the team.

### **2.2. Participants**

The study was composed of 15 public school science teachers from a pool of 30 participants in the professional development activity. These were the participants who formed a grade level team, Grades 1, 3 and 6, respectively. All the teachers to where the participants in this study were obtained were purposively chosen based on their availability during the summer vacation in the Philippines. The three teams of the study were led by the author and another science education researcher who served as facilitators of the seminar-workshop. The science education researchers facilitated and documented most of the PD activities and became sources of data for the study. The participants had an average of 9.47 years in the teaching service with two months as the minimum and 35 years as the maximum. All of the teachers have been teaching in the public school system in the Philippines since they started. Most of the participants were females, especially those from Grades 1–3.

### **2.3. Research design and data collection**

This qualitative research used thematic analysis on the reflections of teachers on their school-based collaborative research with university mentors. Data sources included audio- and video-taped transcripts, reflection logs during the seminar-workshop, and formal interviews at the end of the PD activity. During the seminar-workshop, the author led three teams of teachers (representative of three grade levels) in their collaborative goal setting, constructing and revising their inquiry-based science lesson plans. These were all presented for critiquing and significant suggestions were incorporated. The revised lesson plans were implemented twice to actual students during the coming school year which were observed, critiqued, and revised accordingly. During the implementation, most of the team members were present with the initiative of the mentors. At times, the science coordinator of the school is present in the post-lesson reflection and discussion. All discussions were audio-taped and transcribed, validated with the team and served as the basis for the lesson revision, if necessary. The lesson plan underwent three revisions from the modeling during the seminar-workshop to the revision made after

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the second implementation. At least two hours were allotted for each activity in Phase II which covered lesson implementation and post-lesson reflection and discussion. Also, there was a two to three days gap between implementation dates.

#### **2.4. Data analysis and interpretation**

Data of the study were analyzed through thematic analysis of the transcripts. Segmented transcripts were created in Microsoft Excel and categorization was established. Five categorization units were established during the initial analysis of the data transcripts based on the frequency of appearance of the initial themes. However, because some of the transcripts were not covered entirely by the initial themes, merging of themes were done into broader categories to accommodate all the segmented transcripts. Thus, iteration of coding yielded three themes. These were then validated from outside experts followed by reliability analysis using the with a Cohen kappa coefficient of 0. 734. Counter-checking was further done against the original transcripts to warrant claims.

### **3. Findings**

The objective of this paper is to document the impact of the school-based collaborative research-based PD of the in-service teachers with the university researchers. Results show that a change in the teachers' professional culture was the significant impact of this classroom research-based professional development. Collaboration, a focus on student learning, continuous teacher learning and reflective practice were some of the components of teachers' professional culture that was implicated. It conforms to the idea that learning is situated on the daily routines of the teachers and can be understood through deliberate critical reflection with peers (Buysse, Sparkman & Wesley, 2003).

#### **3.1. Collaboration**

In the study of Berry, Johnson and Montgomery (2005), the collaborative structure of sharing lessons, "using protocols for decision making, and relying on systematic note taking to inform colleagues about their work (p. 58)" helped a teacher professional learning community to examine their practices. It can be deduced from the teachers' responses (Teacher Norma) that they themselves can be "change agents" in their own field but their cooperation with the university researchers as mentors is significant in their professional learning community. The university researchers' presence and eagerness to sustain the activity enabled the teachers to commit in the process teacher development and brought the teachers closer with a common understanding. From the seminar-workshop to the PRD stages, the mentors provided professional support which was backed up by evidences from students' responses during the observation. As the mentors acted as peers and shared ownership of the lesson plan which is the object of learning, the teachers freely communicated with them thereby eliminating the professional gaps resulting to a richer collegial exchange of ideas and opinions regarding their instructional practices. Thus, this change in the teachers' culture likely led to a gradual shift from isolation to shared professional interaction between and among teachers.

Teacher Norma: 'The university researchers served just like our cooperating teachers when we were doing our practicum...they helped us point out what can be best applied in the classroom...we also learned how to do classroom observation...we have to focus on one group of students in order to do complete analysis of their responses on the lesson.'

In the educational setting, "collaboration strategy provides the context for teacher to explore, question, and dialogue about their practices in order to be able to integrate them into school life" (Lang & Fox, 2004, p. 167). Accordingly, it is built upon trust, openness and reflective experiences both from inside and outside of the school. In this study, this was explicated during most of the interactive dialogues between the teachers and the mentors. Moreover, this study cultivated the idea that sharing

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of direct experiences assesses teachers' theoretical knowledge which was explicitly observed from classroom practices. Results of the study suggest therefore that the collaborative creation of knowledge through in-service professional development can be a benchmark to design more effective ones in the future.

### **3.2. Teaching practices focused on student learning**

For many decades, education has put much priority on creating an effective learning environment for students (Hakverdi-Can & Sonmez, 2012). Specific to science education, educators has constantly been promoting inquiry-based learning to integrate both content and process in teaching science (Project 2061, AAAS, 2001). The US National Science Education Standards [NSES] defines inquiry as "the activities of students in which they develop knowledge and understandings of scientific ideas, as well as an understanding of how scientists study the natural world" ((NRC, 1996, p. 23). In this study, inquiry-based teaching materials were developed collaboratively with the aim to develop an active learning that focuses on student-based concept formation. The teaching materials were mostly focused on how to make teaching more engaging while concepts are formed. It is for the purpose of building the interests of students to synthesize knowledge and deliberately become active in the development of their higher order thinking skills.

In this study, as teachers reflect on the impact of their lesson plans and the implementation process, they begin to put meaning on every aspect of the student learning process. Thus, the constant improvement of the lesson is collaboratively done based on the PRD in order to focus on the how the lessons will be improved to suit the diverse learning styles of the students. The group developed the skill of analyzing and integrating their learned educational theories against their current classroom practices. This may be termed as "practical wisdom"—an element that connects theory and practice (Luneberg & Korthagen, 2009).

Teacher Norma: 'I just realized that we can use students' responses during discussion when doing classroom research...and with the help of the university researchers, we were able to analyze their responses...hmmm the university researchers also helped us understand the meaning of their responses to help us in lesson planning...we used it in our analysis to improve our next lesson plans.'

### **3.3. Continuous teacher learning**

Changes in teachers' beliefs and practices are gradual and challenging. More often than not, one-shot workshop sessions and seminars are not enough for changes to occur. In this study, it was found out that the teachers valued the PD program as their instructional practices are refined in the process of collaborative planning, observation and implementation, reflection and revision of their lesson plans. The collective effort to analyze students' works provided a comprehensive understanding and judgment of emerging teaching strategies based on students' responses. This aligns with the idea of Drits-Esser, Gess-Newsome, and Stark (2016) which states that a considerable support and encouragement for teachers must be ensured to sustain their eagerness for significant change in their beliefs toward teaching and learning. In this study the PD model engaged teachers in a sustained systematic inquiry onto their own practice (Seider & Lemma, 2004). The university researchers served as expert-collaborators so that how they reconstruct or alter their teaching processes are prompted by immediate and expert-based constructs. The university researchers, though treated as peers in the process, were regarded as leaders who initiated the work with a goal toward improvement of instructional practices.

In Philippine pre-service education institutions, inquiry teaching is deliberately taught especially in science education. However, theoretical knowledge is not a guarantee for full application. Thus, well-structured PD which targets the implementation of inquiry-based teaching in classroom is significant in making teachers focus their beliefs and practices about the value of this teaching strategy. In this study,

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the teachers acknowledged the PD as a review of their theoretical knowledge and that there was a direct application to their actual classrooms. Moreover, as the teachers ensured students' maximum learning through their lessons, the PD process increased their sense of preparedness as they shared ownership of their lesson plan.

Teacher Norma: 'The university researchers served just like our cooperating teachers when we were doing our practicum...they helped us point out what can be best applied in the classroom...we also learned how to do classroom observation...we have to focus on one group of students in order to do complete analysis of their responses on the lesson.'

### **3.4. Collaborative reflective practice**

Collaborative reflection with colleagues allows teachers to gain insights from each other. As such, collaboration becomes the link between PD and reflection (Glazer, Abbott & Harris, 2004). In this study, the teachers agreed that their reflections which were strengthened by their colleagues were important in their professional lives. Moreover, in the process, as each one shared their insights, this created a mirror effect wherein the idea is learning from others' ideas which were not personally known. Moreover, the long term engagement created impact on teachers' beliefs and practices.

Teaching is usually devoid of collaborative and participative mentoring. This due to the long standing notion that mentoring is usually practiced to assist early career teachers to help them prepare in the induction phase of the teaching profession (Kemmis et al., 2014). However, as the teaching profession is viewed as a dynamic profession, mentoring is not only addressed to early career teachers but to in-service teachers as well. Moreover, there is less opportunity to learn from colleagues after pre-service student teaching (Morocco & Solomon, 1999). In this study, mentoring is not confined to mentor-mentee process rather a collaborative effort whereby teachers' commitment to the process is the key to its success. Because the team ensured their trust to all the members, each was able to develop a disposition to engage in the learning community which is committed to individual and self-development. The teachers were able to discuss and share their teaching practices in a 'safe' professional community, all of them acting as co-mentors and co-mentees for each other in a mutual professional environment (Kemmis et al., 2014).

## **4. Discussion**

Data analysis indicated that a research-based PD had a positive effect for teachers. As observed from the improving quality of lesson plans after every implementation, the teachers were able to apply an inquisitive lens of evaluation procedures on their teaching practices. More so, with the help of the university researchers, the diversity of ideas was increased and the theoretical basis of their ideas was amplified during their post-lesson reflection and discussion. Therefore, students were immediately benefitted as the teachers always ensured the benefit of a good lesson plan for their students. Moreover, as this culture of collaboration in a research-based community persisted, the probability of increasing student achievement can be speculated. As this develops into a culture with supported actions from schools, teachers will become acquainted to research-based culture of lesson planning and classroom inquiry.

According to Dimmock (2016), teachers usually refuse to do research because of lack of time, motivation and lack of priority. In most circumstances, they rely on in-service training usually conducted during school breaks. In the Philippines, these in-service trainings require compulsory attendance usually conducted during the summer breaks and are administered by various institutions with the aim to update teachers' knowledge base. Thus, proofs of attendance are distributed after the trainings and these have corresponding points for accumulation for future promotions. Thus, teachers' attendance to in-service trainings does not depict the purpose of authentic professional development. With these in

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mind, these trainings will surely create no impact on teachers' practices. In this study however, teachers were fully engaged in their PD making more accountable to their personal and professional development. As their potentials were recognized, they became "change agents" for themselves and for others.

Based on the teachers' insights, this kind of PD experience resulted to teachers' ownership of practices. The PD approach used in this study ensured that teachers feel that they have capacity and competence for their personal development (Priestley et al., 2011) thus establishing their efficacy for future teacher initiatives. Teachers' willingness to be fully involved in the development of the instructional capacities served as the foundation for the team for shared learning. As they serve as the bridge to create change in the school cultures, their positive disposition to continuous learning is key to creating more expansive future PDs with the goal to fully involve them in benchmarking teacher education activities and practices at a personal, professional and collective level (Kennedy, 2005).

Incorporated in the PD model used in this study was the classroom observation. In the reflection sessions, the teachers embraced the idea of allowing their colleagues to observe their lesson implementation since they bear in mind that this is part of the research process they have committed into. They supported the idea that classroom observations by colleagues allowed and helped them discover what is going on in their classroom and their lessons. The trust they have built with one another was the foundation to engage in collaborative work with shared accountability and motivation. This supports Jao and McDougall's (2016) claims stating that "when colleagues collaborate, professional relationships will be strengthened as a result of shared experiences, achieving successes and working through challenges as a group" (pp. 561). The equal distribution of tasks for each member encouraged active participation and their shared accountability made every member committed to invest effort in meeting the team's goals which made them more apt to participate in the process. Thus, the culture of community in this study whereby the team freely communicated with each other in their successive collaborative activities established a culture that united everyone.

## 5. Conclusion

This paper was conceptualized to determine the impact of the PD activity in developing teachers' instructional capacities as they face the challenges of the recent curriculum change in the basic education system of the Philippines. Since the PD activity was a collaborative effort between teachers and university researchers, the study was conceptualized to determine the impact of this joint effort on the teachers' instructional practices. Together as one team, the study determined the importance of collaborative research between two stakeholders of education. The study came to conclude therefore that through collaborative research, classroom practices can be investigated and amended based on contextualized and evidence-based proofs. Therefore, the contextualized and timely nature of the study was a promising approach to ensure that teachers will consider the idea of seeing their lesson plan as subjects and their classroom as a venue to study and evaluate their instructional practices. The PD activity acknowledged the value of collaboration among the institutions involved in the promotion and advancement of knowledge with coherent objectives in the improvement of the quality of learning.

The classroom served as the best place to generate and understand the nature of teaching and learning (Dimmock 2016). This study confirmed this idea and recognized the teachers' involvement in the production of new teaching strategies appropriate across content areas in a research-based strategy. Being hands-on in the process, teachers were empowered and developed a shared accountability for their own learning with the immediate availability of mentors (e.g. university researchers) to minimize misconceptions. As such, teachers' potentials extended beyond transmission to production of knowledge that is evidence-based. Thus, this study claims and suggests that research

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based PD in schools can be a good source of knowledge in understanding the dynamics of learning and teaching.

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