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INVITED PAPER

Educational Innovations and Pedagogical Beliefs:
The Case of a Professional Development Program for Indonesian Teachers

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Abstract

This study aimed to explore the impact of a professional development program on the teachers' pedagogical beliefs and practices. More specifically, the program endeavoured to design a prototype for teacher professional development in Indonesia that was sustainable and scalable. This one-year program built upon the participating teachers' existing practices, reinforced with the concept of reflection as a tool for ongoing inquiry of their own practices. The three major components of this program were: action research, peer-coaching and leadership support. By using a mixed method of quantitative and qualitative data collection, this study examined the changes in the participating teachers' beliefs and practices, and how these changes may be related to the professional development program. The key findings in this paper have highlighted the importance of (1) the clarity of both the content and the outline of the program, (2) applicable and suitable professional learning methods, (3) modelling, and (4) collaboration among teachers. The findings have also identified teachers' (limited) resources, such as time and access to facilities, to be taken into account when planning for professional development programs. The discussion focuses on the challenge to design professional development programs based on a belief-action relationship.

Keywords: professional development; pedagogical beliefs; educational innovations; action research; peer coaching; educational leadership

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Introduction

Research suggests that teachers' beliefs about teaching and learning affect instructional practices (e.g., Lim & Chan, 2007; Northcote, 2005). According to Pajares (1992), beliefs affect the way teachers analyse, plan, and implement their teaching and learning activities. Therefore, addressing teachers' pedagogical beliefs with professional development programs may be pivotal in transforming teachers' instructional practices to improve student learning outcomes. There is also a growing consensus that teachers are more likely to accept education innovations that are consistent with their beliefs about teaching and learning (see Ertmer, 2005; Lim et al., 2013). A better understanding of pedagogical beliefs of teachers is then essential for the transformation of teachers' instructional practices to improve student learning outcomes.

Past educational reforms have often failed due to a mismatch between the innovation and the meanings attached to the innovation by those involved in the instructional process (Hermans et al., 2008). Nespor (1987) suggests that educational change is not a matter of abandoning pedagogical beliefs, but of gradually replacing or enriching them with belief systems that are relevant in view of the instructional context. According to Becker and Ravitz (1999), teachers' pedagogical practices and belief are continually shaped by their ongoing experiences as teachers. This "belief-action" relationship is bi-directional: beliefs lead to actions which, in turn, lead to the creation of new, reconstructed or reaffirmed beliefs (Haney et al., 2002). Pedagogical beliefs then may be best influenced through concrete experiences in a supportive environment. This provides us with the re-conceptualisation of the way professional development is set up; one that is informed by a practice-orientated teacher education model (Sang et al., 2010). In such a model, the teachers' existing practices are used as a starting point for their professional development activities; teachers are provided with opportunities and scaffolding to reflect upon their practices and identify areas for improvement or change. Together with the teacher educators, they would then co-develop strategies to transform practices in the classrooms or schools to improve upon student learning outcomes.

This paper provides a descriptive and interpretive account of a professional development program that was designed to bring about changes in the pedagogical beliefs of teachers and their instructional practices. More specifically, the Master Teachers and School Leaders Program (MTSLP) endeavoured to create a prototype for teacher professional development in Indonesia that was sustainable and scalable. This one-year professional development program built upon the participating teachers' existing practices, reinforced with the concept of reflection as a tool for ongoing inquiry of their own practices (cf. Lin & Schwartz, 2003; Romano, 2006). The three major components of the Master Teachers and School Leaders program were: action research, peer-coaching and leadership support. By engaging in action research, teachers take ownership of their professional development, which is an important factor for successful adult learning and transformation of practices (Boulton-Lewis et al., 1996). Peer coaching provides teachers with a supportive learning environment in which they support one another in a professional learning community (Joyce & Showers, 1996). Leadership support has been integrated in the program to ensure the sustainability of the program (Hargreaves & Fink, 2005).

The three components were expected to provide a conducive environment for the teacher professional development program to change teachers' beliefs (see Figure 1). By engaging in cycles of collaborative reflective practice and action research (Kemmis & McTaggart, 1988), the master teachers in the program were expected to continually self-evaluate and improve their practices and hence, enhancing student learning outcomes. The participating teachers have been referred to as master teachers because they were expected to play the role of master teachers who are able to reflect on their practices and examine their beliefs, analyse and address problems, involve in collaboration activities with other teachers, and share their knowledge and experience with other teachers.

The study aimed to examine the changes in the teachers' pedagogical beliefs and practices as a result of their participation in the Master Teachers and School Leaders Program. Two assumptions were made about professional development: (1) effective programs improve teachers' instructional practice and with it students' learning; and (2) effective programs have to be a belief-changing

experience if they are to have an impact on teachers' instructional practice. By using a mixed method of quantitative and qualitative data collection, the study examined (1) the changes in the participating teachers' beliefs and practices, and (2) how these changes might be related to the professional development program. In the next section, we examine how "educational beliefs" has been defined in recent educational research and describe the three major components of the professional development program and how they are likely to influence changes in teachers' pedagogical beliefs and practices.

Figure 1. Conceptual framework of the study
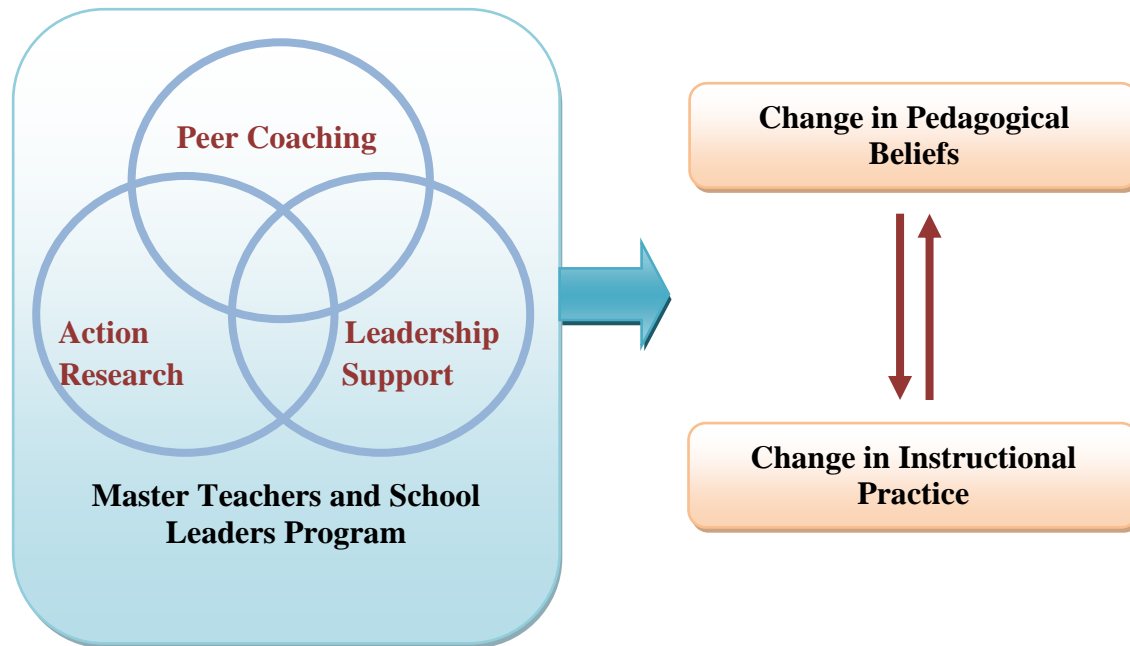
Theoretical Background

While the term "belief" is considered to be a messy construct (Hermans et al., 2008), teachers' pedagogical beliefs are their understandings, premises or propositions about teaching and learning (Denessen, 2000), that have been established through multitudinous experiences (Pajares, 1992; Woolfolk Hoy, Davis, & Pape, 2006). The findings of key research studies have shown that the nature of teachers' pedagogical beliefs are relatively stable and resistant to change (Hermans et al., 2008) and may act as a filter through which new knowledge and experiences are screened for meaning (Pajares, 1992).

Teachers' beliefs about teaching and learning are considered to be formed early in their educational experience and strongly influenced by the years of being involved in learning and teaching activity (Kagan, 1992; Smith, 2005). Nevertheless, teachers need to change their existing beliefs if their instructional practices are to experience sustainable change (Ertmer, 2005; Lim & Chan, 2007). In many cases, the attempts to change teachers' beliefs have not achieved goals due to the resistant nature of teachers' belief systems (Boyle et al., 2004; Lim & Chan, 2007). Pajares (1992, p. 324) claims that "beliefs are formed early and tend to self-perpetuate, preserving even against contradictions caused by reason, time, schooling, or experience". In the case of in-service teachers, their beliefs would be even more profound due to their years of teaching, and the more experienced they are, the harder it may be for them to change (Fullan, 2007).

The influence of belief on teachers' teaching practice and the persistence nature of beliefs make it important that teacher professional development is designed to bring about changes in teachers' pedagogical beliefs. Key findings in this area suggest that:

1. Teachers must have ownership of the change that comes from self-reflection and re-evaluation so that they may better understand their learning and goals (Fullan, 1999);
2. Long-term professional development is more likely to change teachers' pedagogical beliefs (Sang et al, 2010);
3. Collaboration promotes learning and change (Hu et al., 2012); that is, collaboration is a pivotal element in teacher professional development; and
4. School leaders' support and involvement are essential for effective teacher professional development (Rhodes et al., 2004).

Educational beliefs may be a hindrance or a facilitator in the transformation of teachers' practice (Ertmer, 2005). In the current study, we endeavoured to change teachers' pedagogical beliefs by drawing upon teachers' existing beliefs in order to give meaning to the new learning in context. The one-year professional development program, built upon the teachers' existing beliefs and practices, reinforced with the concept of ongoing inquiry as a facilitating tool to transform their practices (cf. Giovannelli, 2003). This approach is in line with other studies that stress the importance of professional development as a permanent process, aimed at extending and updating the professional knowledge and beliefs of teachers in the context of their work (see e.g. Sang et al., 2010). In this respect, Thompson and Zeuli (1999) argue that the implementation of an innovation is a process of learning, rather than just a process of design and engineering.

According to Van Driel, Beijaard and Verloop (2001) it is clear that there is not one ideal way to organize professional development in the context of educational innovation. They suggest that multiple strategies are necessary to promote changes in teachers' knowledge and beliefs. The program described in this paper was developed based on three major strategies: (1) action research, (2) peer-coaching and (3) leadership support. The elements shared by these strategies include an explicit focus on teachers' knowledge and beliefs, collegial cooperation or exchange between teachers, and strong leadership to build appropriate structures of professional development sufficient time for changes to occur (based on Lim et al., 2013). Below we discuss the three major strategies aimed at changing teachers' existing practical knowledge.

As has been previously stated, by engaging in *action research*, teachers are more likely to take ownership of their professional development (see Boulton-Lewis et al., 1996), through this process, teachers engage in cycles of planning, acting, observing and reflecting to improve their own practice and knowledge. The essential activities of action research are "trying out ideas in practice as a means of improvement and as a means of increasing knowledge about curriculum, teaching, and learning" (Kemmis & McTaggart, 1988, p. 6). Through action research, teachers engage in inquisitive reflection to become more confident and proactive, and may develop their habit and skills in inquiry (Zeichner, 2001). The social nature of action research makes it a collaborative activity (Somekh, 2006); that brings us to the second component of peer coaching.

Peer coaching may be defined as a confidential process through which two or more professional colleagues work together to improve upon existing practices, expand, refine, and build new skills, share ideas, teach one another, conduct classroom research, and/or solve problems in the workplace (Hu et al., 2012). Peer coaching adds the benefit of collaboration to reflective practice and reduces the solitary nature of instructional practices; as a result it promotes a healthy and beneficial relationship between teachers. Unlike one-off professional development sessions, peer coaching is long-term and ongoing, thus more likely to have an impact on teachers' beliefs and practices (Boyle et al., 2004).

In the Master Teachers and School Leaders Program, school leaders were also involved and attended a *school leader* professional development, which was conducted alongside the professional development for their teachers. The program was designed to prepare the school leaders to support their teachers. Teacher-initiated change would be hard-pressed to succeed without support from school leaders (Fullan, 1999). School leaders have the responsibility in instructional leadership, which includes program and student learning (Leithwood & Louis, 2012). They also need to encourage

teachers' professional growth, provide an encouraging school environment for collaboration and inquiry, accommodate teachers' needs for professional development and manage existing resources to support teachers' professional development as and when necessary (Tondeur et al., 2008).

Research Question and Context

The key research question driving the study was: How does the Master Teachers and School Leaders Program change the participating teachers' pedagogical beliefs and practices? By identifying and analysing the factors affecting the teachers' beliefs and how their beliefs and practices have changed, it was hoped that the findings might contribute to the design of future teacher professional development programs in Indonesia (cf. World Bank, 2004). The current focus of such programs in Indonesia has been mainly about getting standard academic qualification for in-service teachers. Programs that focus on continuous professional development of teachers, especially those who have fulfilled standard academic qualification to teach, receive less priority and interest from teachers, schools, universities and the government (World Bank, 2004). The one-year professional development program was developed for Indonesian educators from six schools in three provinces - Jakarta, Bali, and Bangka. It aimed to build the capacity of teachers and leaders to change their pedagogical beliefs towards more constructivist ones; in doing so, they would then be more likely to adopt more constructivist approaches. The authors of this paper were involved in the design, implementation and evaluation of the program; with the third author collecting data in the field.

There were three phases in the program with a "window period" of a few months between the phases. A window period was a time gap between phases to give the master teachers an opportunity to apply their learning. In the first and second phases, the master teachers engaged in workshops on the components of the program and in the last phase they arranged workshops for other teachers in their province in which they disseminated the components of the program and presented their action research plan as a model for other teachers.

The first phase, the master teachers and their school leaders were invited to go to Jakarta for the first round of workshops conducted by lecturers from Edith Cowan University (ECU). Before the workshops started, the master teachers were given Educational Belief Inventory (EBI) questionnaire (Northcote, 2005) to identify their existing teaching and learning beliefs. The first phase of the program consisted of alignment of understanding and familiarisation with the components of the program followed by workshops on reflection, peer coaching and introduction to action research. There were two parallel sessions in which the school leaders and master teachers attended separate sessions. The master teachers were given a more in-depth understanding of action research, while the school leaders attended two sessions on supporting teachers to reflect and transform their teaching and learning practices to improve student learning outcomes.

The master teachers then had a three-month window period to enact their new learning from the first phase. They were expected to start peer coaching groups and engage in reflective practice [with online mentoring from the ECU lecturers and support from a guidebook prepared by both Edith Cowan University (ECU) and Sampoerna Foundation Teacher Institute (SF-TI)]. After three months, the Master teachers attended another series of workshops that were conducted in their provinces. The Phase II workshops covered the rest of the program components which were more about peer coaching and action research. Following phase II, the teachers were again given a window period to develop their action research plans.

When the master teachers have prepared their action research plans, Phase III of the program was implemented in Bangka and Bali. The teachers were expected to peer coach other teachers on the main components of the program and present their action research plans as examples for 60 participating teachers in each of the two provinces. At the end of Phase III, EBI was administered for the second time, and interviews were conducted with the master teachers, and field observations were carried out in each school.

Research Method

Sample
The master teachers were full time teachers from four schools in two districts in Indonesia: Bangka and Bali. Table 1 describes the demographic background of the master teachers.

Table 1
Master Teachers' Background

School	MT/SL	Gender	Qualification	Year Level	Experience (yrs)	Subject
School 1 (Bangka)	MT1A	M	S1	10, 12	3	Physics
	MT1B	F	S1 (Edu)	10, 12	6	Economics
	MT1C	F	S1	10	1.5	Citizenship
School 2 (Bangka)	MT2A	M	S1 (Edu)	10, 11, 12	11	Geography
	MT2B	M	S1 (Edu)	12	5	English
	MT2C	F	S1 (Edu)	10,11	3.5	English
School 3 (Bali)	MT3A	F	S1	11,12	3	English
	MT3B	F	S1	10	3	Biology
	MT3C	M	S1 (Edu)	11	3	Chemistry
	MT3D	M	S1 (Edu)	11, 12	4	Mathematics
School 4 (Bali)	MT4A	M	S1 + Edu Dipl	3 - 9	5	Management + English
	MT4B	M	S1	5, 6	3	Biology, Civics, Character

S1 = Completed an undergraduate degree in a subject other than education/teaching
S1 (Edu) = Completed an undergraduate degree in education/teaching
S1 + Edu Dipl = Completed an undergraduate degree in a subject other than teaching and also a teaching diploma.

Twelve master teachers agreed to participate in the study, five of them were female and seven were male. Six of the teachers had graduated from schools of education, one had taken a teaching certificate after finishing an undergraduate program and five had qualifications other than teaching. Most of them had less than five years of teaching experience. Three had five to six years teaching experience and only one had been teaching for more than ten years. All master teachers from School 1, 2 and 3 taught in year 10 through to 12. Only the two master teachers from School 4 taught year 3 to 9. Four of the master teachers taught natural sciences and mathematics, four were English teachers, three taught social sciences and a teacher from School 4 taught three subjects in natural and social sciences, which was a common practice in Indonesian primary schools.

Procedure and instruments
To gain insight to the impact of the Master Teachers and School Leaders Program on the master teachers' pedagogical beliefs, the study employed a mixed of quantitative and qualitative data collection methods: semi-structured interviews, an adapted Educational Belief Inventory (EBI) questionnaire (Northcote, 2005), and field observations. The EBI questionnaire was administered at the beginning and at the end of the program. Both the interviews and observations were conducted at the end of the one-year program.

The EBI consisted of 44 Likert-style items with responses ranging from "strongly disagree" to "strongly agree" and two open-ended items. The 44 items were statement about teachers' beliefs about teaching and learning. They included: "teaching is an activity aimed at changing students' understanding of the world", "teaching is concerned with increasing students' understanding of a

topic", "learning is about developing concepts", and "learning is about understanding". The questionnaire was administered twice, at the beginning and at the end of the program.

The semi-structured interview consisted of three main sections. The first section investigated the changes that the master teachers have had experienced with respect to their planning and teaching activities. This section was meant to encourage the teachers to reflect upon their experiences and perspectives that they had during the program by analysing aspects of their teaching such as curriculum, teaching practice, assessment, and collaboration with their colleagues. The second section was designed to examine how each main component of the program affected the teachers. The teachers were asked to elaborate their experiences and feelings during the program implementation and to discuss the difficulties that they might have encountered. The third section asked the teachers about their students' reaction to the changes that they might have made and about the obstacles they have encountered during the program implementation.

Observations took place in all three phases and several elements were observed by the lecturers from ECU and SF-TI. For example, observations included the master teachers' interactions with one another and their school leaders, their enthusiasm for and engagement in the dissemination of the program and their action research plan, and also their interaction with the lecturers. These observations were documented by the lecturers involved in their own journals.

Data analysis

The validity of the qualitative data analysis was taken into account by utilising methodological triangulation in the data analysis procedure. Methodological triangulation was done with the purpose to ensure the data from EBI questionnaire, interviews, and field observations consistently support one another (Cohen et al., 2007, p. 141). As depicted in Figure 2, data from the first and second EBI questionnaire were compared to get the total score difference in order to measure the change in the master teachers' beliefs during the program. The EBI scores and data from the interview and observation were then triangulated. The emerging themes from the data triangulation were then examined using the existing literature to derive a conclusion. At the first phase of the interview data analysis, the responses of individual master teacher were coded. Data from EBI questionnaire and observation journal were then used as comparison tools. The Cronbach's alpha for EBI was 0.9, after items with low reliability had been removed.

Results

In this section, first are presented the changes that the master teachers experienced as they proceeded through the program. Then the components of the program that facilitated or hindered the master teachers to change their pedagogical beliefs and transform their instructional practices are presented.

Observed changes in pedagogical beliefs and practices

The EBI questionnaire suggested that eight master teachers become more constructivist in their pedagogical beliefs (a negative difference represents a shift forwards more constructivist pedagogical beliefs), one did not show any change and three have become less constructivist (a positive difference represents a shift away from constructivist pedagogical beliefs) in their pedagogical beliefs (see Figure 2). This was despite their unanimous admission during interview that their teaching practices were more inclined towards constructivism after the program.

From the interviews and field observations, most master teachers felt that they experienced changes in their pedagogical beliefs, instructional practices, and collaboration with their colleagues. Teachers from all schools reported that teaching and learning activities in their classrooms – and in some of their colleagues' classrooms - changed to more student-centred ones where the teachers gradually shifted their lessons towards facilitating the students' learning process. The program has acquainted the teachers to constructivist classroom experiences. MTIB expressed that "I changed my teaching from conventional methods and subject-oriented lessons to student-oriented ones, with focus

on the students' circumstances and I started using games to create a more supportive learning environment."

Figure 2. EBI Items on Constructivism Score Difference
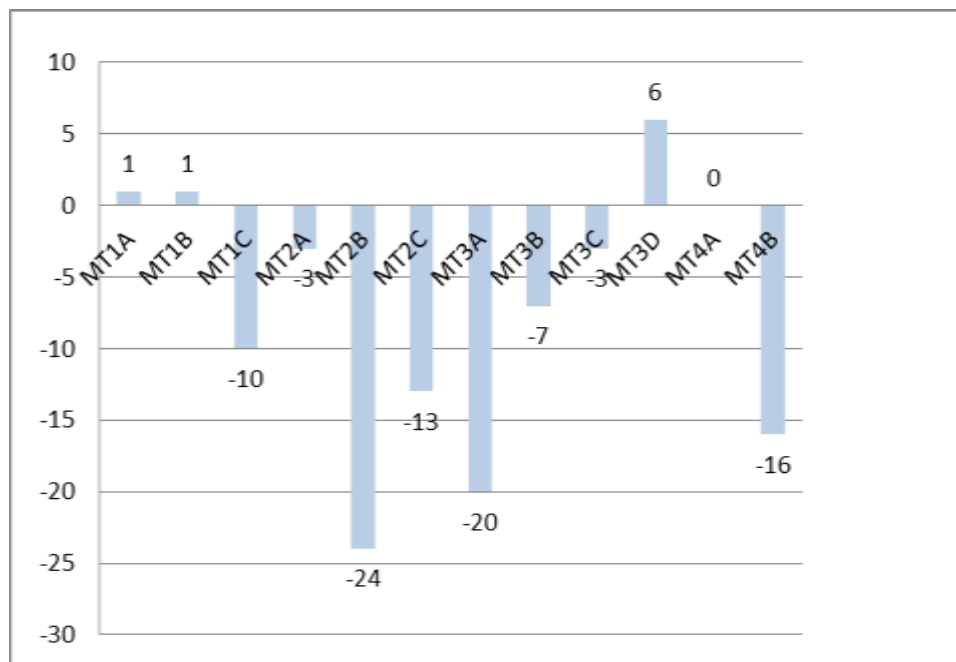
The interview data indicated that most teachers found participation in the program changed their beliefs about teaching and learning which have an impact on their instructional practices. MT2C (an EFL teacher) admitted that before she was involved in the program, she was a strict teacher who was not well-liked by her students. From the program, she learnt firsthand about how to connect with her students and how to be a more effective teacher. As her practices changed, she observed that her students were more engaged in her lessons, "My students' books are now full with highlights and notes and they rarely leave their dictionaries at home. From their textbooks I can see that they are studying and trying to understand their lessons."

From the EBI open-ended questions, some of the master teachers have become more specific in their definition of effective teaching. Table 2 shows the changes in MT1A and MT2A's responses pre- and post-program.

The interviews with MT1A also captured his enthusiasm and efforts to explore new teaching and learning strategies to engage his students. MT2A shared his observations that "the students became more motivated and enthusiastic as the lessons became less verbal and I used more visual teaching aid like computers". His students' response encouraged him to improve his teaching by researching and implementing new teaching methods, approaches and technology in his classroom. Nine of the 12 teachers who were interviewed mentioned reflection as a component of the program that they have found highly valuable to engage in. They had been using reflection as an instrument to improve their teaching practice. MT4B, for instance, found that reflection helped him understand that not one method would work for every class:

> As I started reflecting on my latest lesson I realised that the method I used might not suit this class though it worked well in another class. Doing reflection helped me understand more about the unique character that every class has.

MT2A explained that, "(...) The program helped us become more aware that we have to consciously engage in reflective thinking all the time, followed by the rest of action research cycle so we can keep on improving our professionalism."

This brings us to the next section about the role of the professional development program.

Table 2
MT1A's and MT2A's Open-Ended Questionnaire Answers

MT	Q1 I believe effective teaching is …	Q2 I believe effective teaching is …
MT1A	Guiding and motivating the students in the learning process.	Understanding and motivating the students, reflecting, collaborating with other teachers, setting and achieving goals, conducting action research for professional improvement.
MT2A	Understanding the students' learning	Understanding and implementing methods, strategy and approaches to support the students' learning, reflecting and doing action research.

Role of professional development

The Master Teacher and School Leader Program was designed with components that were expected to facilitate changes in the master teachers' pedagogical beliefs and instructional practices. During the interviews the master teachers further explicated the components of the program that they have found to facilitate or hinder their changes in pedagogical beliefs. The program components were action research (AR), peer coaching (PC) and school leader (SL) support. Observing the lecturers during the lectures was also mentioned by some master teachers as an important factor that changed their beliefs. The obstacles that the teachers had during the program implementation were time constraints, the lack of information given by the facilitators and inadequate prerequisite skills of the teachers.

Action research

Action research was found to be the least influential component, with only five teachers agreeing that it was important in changing their beliefs. MT1A was one of the five teachers who commented that action research enabled him to examine more deeply his instructional challenges, "(...) The result would then help me change my priorities in order to improve my teaching quality to achieve school improvement as my final goal." MT3C added that knowledge about action research motivated him to try many new things. MT3B was particularly enthusiastic about her collaborative action research:

> Planning, conducting and presenting collaborative action research built my confidence. Along with my partner I learnt to overcome my shyness and presented our action research in front of more experienced teachers.

Other master teachers admitted that they had experienced difficulties in planning and conducting action research as it was new for them but they understood the purpose of doing action research as a part of their professional activities. The assistance given by the facilitators were considered to be valuable both for their confidence and their success in doing action research. These were expressed by MT3B, "At first I disliked being pushed by the facilitators. But as I finally tried to conduct action research, I found that the facilitator actually helped me by keeping me on track and on time."

Peer coaching

Ten of the teachers considered peer coaching to be influential in their professional learning. As they began to open their classrooms to their peers and learn from their feedback, the master teachers found that they have developed significantly as a teacher. However, the school culture could make it difficult for the master teachers to start peer coaching as highlighted by MT2B:

> I used to feel reticent about peer coaching because I did not want to accused of trying to find others' faults. But as I began by inviting his colleagues to my classroom and asking them to give me inputs to improve my teaching, they actually became interested and started to ask me and other teachers to observe their classrooms.

MT3B viewed peer coaching and peer sharing as beneficial, particularly in handling her classroom management issues. She began to realise that her colleagues dealt with similar issues, she learnt from their experience and drove strength from their support, as she shared during the interview, "Since I knew that I was not alone in my problems, I did not get as depressed as before. Peer coaching helped me realise that teachers could and should help one another."

School Leaders' Support

Four master teachers expressed their satisfaction with the support from their school leaders and further commented that the support had helped them to successfully complete the program. From the interviews and observations, it is apparent that the principal in School 1 was very supportive. The teachers had a good professional and personal relationship with the principal and they spoke highly of her. During the two days that the researchers spent in the school, the principal always tried her best to be involved in all aspects of the program despite her heavy workload and more importantly, she encouraged her master teachers to do the same. MT1B described how the school leader supported the program, "The school even arranged an English course to assist the teachers so we could better understand and implement the program. I can feel that the principal trust me so I am compelled to always try my best". This view was confirmed by MT1C:

> The principal was very personal towards us. She also gave us permission to be involved in various professional developments. We even have a day with light teaching workload that was scheduled with teachers from other schools so we can gather together in that day every week to have a discussion and learn from each other.

While supportive school leaders facilitated the teachers in improving their professional practice, unsupportive or incompetent school leaders could impede their teachers' professional development. MT2C expressed her dissatisfaction with her school leader and attributed the lack of support to the difficulties she faced in transforming her instructional practices to improve her students' learning outcomes:

> I cannot see how the school can help the teachers to improve and overcome the problems that they face from time to time. The principals are appointed by the district and very often they come to the position because of their competence but based on favouritism and nepotism.

Barriers

During the program implementation, some participants reported that they had encountered some barriers. Nine Master teachers found that time constraints were the most difficult barriers in program implementation. Their workloads made it difficult for them to allocate time and effort to the program, especially in conducting action research. Besides the teachers' workloads, coordinating the workshops

with other schools and the Sampoerna Foundation Teacher Institute was an issue, as was explicated by MT3D:

> Organising teachers from two schools [School 3 and 4] was very difficult. There was no clear timeline from the program or an agreement between the schools. Each school had its own schedule and coordinating the schedules was a big issue.

Another problem that was reported by the teachers was a lack of information about the program, and a lack of communication (and the facilities needed) with other stakeholders. As expressed by MT3C:

> Because there were no clear description and direction of the program at the beginning, my colleagues and I decided to withdraw from the program as soon as we could. But as we went along we started to benefit from it (...)

A few Master teachers also remarked that their limited pedagogical knowledge and English proficiency, hindered their progress in the program. Some of them needed their colleagues' help to understand the program resources that were distributed to them in English. Three master teachers mentioned their teaching skills to be a problem. MT3D explained that "Since I am not familiar with student-centred classroom, planning my lessons is difficult. I often don't know how to give my students stimulating questions to scaffold their learning."

Beside internal factors within the program, the master teachers' changes in beliefs and instructional practice were also influenced by factors from outside the program. Four master teachers mentioned that culture is a problem in their efforts to implement the program components, especially peer coaching and action research. The gap between experienced and new teachers was considered a big problem since the culture dictated that younger people must treat older people with deference, as was explained by MT3D: "The dichotomy between the experienced and younger teachers created a challenge for a good collaboration." MT3A explained her way to overcome the culture barrier:

> I used my inexperience to bridge the relationship between the more experienced teachers and me by asking them to let me sit in their classroom to observe their teaching. I learnt many things from the classroom observation and my relationship with other teachers grew.

Discussion and Conclusion

Teachers' pedagogical beliefs are influential in teaching and learning activities because beliefs influence behaviour (Ertmer, 2005). Teacher professional development programs then have to be a belief-changing experience if they are to transform teachers' instructional practices (Lim, & Chan, 2007; Sang et al., 2009). This paper has provided a descriptive and interpretive account of how the Master Teachers and School Leaders Professional Development Program has changed or not changed the master teachers' pedagogical beliefs. The change of pedagogical beliefs from traditional towards constructivist ones was the predominant impact of the program that the teachers have reported. More specifically, the findings have shown changes in instructional practices towards student-centred teaching approach and how the participants have become more open and enthusiastic about exploring new practices.

The master teachers took ownership of their own professional development by engaging themselves in action research cycles. They also built their confidence and motivation for doing research by sharing their experience, knowledge, and reflection and collaborating in their professional learning communities. Therefore, action research has the potential to improve the practices of both the individual and organisation through the participation of all major stakeholders (Kemmis & McTaggart, 1988). Collaboration among teachers was also an essential part of the program (cf.

Authors, 2013). School leaders then have to provide a conducive school environment for collaboration, accommodate teachers' need for professional development, and manage existing resources to support teacher development (see e.g. Vanderlinde et al., 2010). The findings in this paper demonstrate that master teachers from schools with supportive school leaders have demonstrated more interest and enthusiasm. These findings concur with the study by Rhodes and colleagues (2004) which underlined the importance of school leaders' support and involvement in professional development programs.

The key findings in this paper have highlighted the importance of (1) the clarity of both the content and the outline of the program, (2) the appropriateness and relevance of the professional development approach, (3) the modeling by the program facilitators, and (4) the collaboration among teachers for professional development programs which is in accord with the study of teachers' efficacy done by Bandura (as cited in Bruce & Ross, 2008) and in teachers' effort in reform by Rousseau (2004).

The findings have also identified teachers' (limited) resources, such as time, skills, and access to facilities, to be taken into account when planning for professional development programs (Armourand & Yelling, 2004; Wayne et al., 2008). Finally, findings from interviews and observations suggested that the master teachers were interested and willing to learn and try out new and innovative strategies to improve student learning outcomes. Although they might not be able to translate their changes in beliefs to transformation in instructional practices due to the context in which they were situated, the initial changes in their pedagogical beliefs might provide a springboard for a gradual change in their instructional practices.

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