The effect of a combination of peer coaching and research lessons on
Physical Science teachers

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This paper describes one part of a long-term study aimed at developing and testing a model for holistic teacher development. Phase 1 involved obtaining baseline data, Phase 2 involved constructing the model and Phase 3 trialling elements of the model identified in Phase 2. Three dimensions, namely content knowledge, teaching approaches and professional attitudes were identified to develop simultaneously.

One of the proposed elements of the model was the need for peer support for teachers. This was found to be of particular importance for teachers studying by distance learning. In order to structure peer support, a combination of peer coaching and what is known as “research lessons” or “lesson study” in Japan were introduced. Teachers were asked to write out a lesson that was going to be observed by a peer, answer questions on how his/her experience of being observed by a peer and indicate what came out of the discussion after the lesson. The peer in return was asked to observe the lesson, give feedback as well as report on what came out of the discussion after the lesson.

When the teacher’s reflection on the lesson was compared with the peer’s reflection and the information on the teacher’s perception of the peer’s interaction, it was found that peer coaching is useful and in all the cases it was proposed that this intervention must continue. We proposed and found that peer support can help teachers in the classroom to use different teaching strategies, deepen their content knowledge and become reflective practitioners.

Introduction

Our long term aim is to develop and test a holistic model for the professional development of Physical Science teachers. The research is being done in four phases. In the first phase baseline data was obtained in order to identify areas for intervention. Problems were identified in three dimensions, namely content knowledge TIMMS (2000), teaching approaches (Taylor and Vinjevold, 1999) and professional attitudes (Grayson et al. 2001). In the second phase of study an initial model was developed to address all three of these dimensions simultaneously (Kriek and Grayson, 2002).

In the third phase of the research, elements of the model have been trialled on a new set of practicing Physical Science teachers. Data from the second phase indicated that the teachers need more contact. Since we are working with teachers enrolled for distance based courses who are distributed throughout South Africa, workshops are only feasible and cost-effective where there is a concentration of teachers. Another proposed element of the model was that teachers need peer support. This was found to be of particular importance for distance education teachers and can help overcome the isolation they experience. In order to structure peer support a combination of peer coaching and research lessons were introduced to 13 teachers. We proposed that peer support would help teachers in the classroom to use different teaching approaches, help them to deepen their content knowledge, and become reflective practitioners. The effect of this intervention will be discussed in the paper.

Theoretical background (framework)
There are two approaches to peer support that we thought might be appropriate, namely peer coaching and research lessons. Peer coaching is described by Loucks-Horsely et al. (1998) as follows:

“(peer) coaching and mentoring are professional development strategies that provide one-on-one learning opportunities for teachers focused on improving teaching practice. They take advantage of the knowledge and skills of experienced teachers, giving them, and those with less experience, opportunities to learn from each other.”

The drawback of peer coaching in our context, however, is that we are working with experienced teachers not beginner teachers. Nonetheless we believe that teachers can benefit from sharing experiences with one another and give input on one another’s lessons. That is the reason why we also introduced research lessons.

Research lessons or lesson study is a technique for teacher professional development that is widely used in Japan. In a Research lesson one teacher presents a lesson and several other teachers attend. According to Lewis and Tschida (1997), “research in this context means teacher-initiated, practice-based inquiry.” Research lessons can take a variety of forms. The general format is for one teacher to present a lesson to a class while several colleagues observe. The lesson may have been planned by that teacher alone or by the group of teachers. After the lesson presentation, the teachers sit together and discuss the lesson. Both the teacher who presented the lesson and the others reflect on various aspects of what happened, what went well, what did not, what could be improved, where unexpected opportunities arose or unplanned activities took place, etc.

In our research, it was not feasible to gather together groups of teachers, because the schools are small and sometimes only have one Physical Science teacher. It was not possible for the teachers to develop the lessons together but after the lesson the teacher who presented the lesson discussed it with his/her colleague, the good and the bad points, what did and did not go according to plan, what actually took place and what could be improved. In this way, the teachers were involved in a process of continuous professional development.

Although the approach appears to have development of quality lessons as its primary purpose, the process actually addresses several issues/problems simultaneously. Teachers work collaboratively which addresses the problem of teacher isolation and also shifts the focus of the observations to teaching, not the teacher. While participating in the process, teachers deepen their own science knowledge, adopt effective teaching strategies, and become reflective practitioners. For these reasons lesson study is viewed as a promising approach to teacher professional development that, if implemented correctly, can be an in-house system for promoting teacher growth and improving teacher quality.

Method

Currently we are offering ”Physics for teachers” modules by distance at Unisa. They are aimed at teachers presently teaching Grade 10 – 12 Physical Science. As part of the modules, the teachers submit assignments, fill in a confidence questionnaire, complete journals, write a pre-test, attend workshops and write exams. The teachers who are selected to participate in the research have additional tasks. They are asked to write out a lesson that is going to be observed by a peer, answer questions on his/her experience of being observed by a peer and indicate what came out of the discussion after the lesson. The peer in return is asked to observe the lesson, give feedback and report on what came out of the discussion after the lesson. The teacher also observes the peer delivering a lesson and reflects on his/her teaching and then a discussion follows. The reason why the peer was also observed is because we are working with experienced teachers, not beginner teachers and both the peer and the teacher can learn from each other.

For our study, teachers were selected from both rural and urban areas. Six classes with 224 learners were observed. We envisaged teachers that are geographically near each other would act as peers to each other and gave all the teachers in the same area the other teacher’s names and telephone numbers.
We even introduced the teachers to each other during workshops. However all the teachers that took part in the research chose a peer in their school. Although we thought it would be a drawback, this turned out to be very useful for the sustainability of peer coaching, because the teachers feel they have the opportunity to discuss situations with their peer during break. Unfortunately, of the 13 teachers selected to participate in this part of the study, only 2 rural teachers and 1 urban teacher sent in their peer observation forms.

**Data collection and results**

The responses to questions on the observation forms the peers and teachers had to fill in are summarized below.

An indication of how well a lesson was can be how well the learners understood it. **How many learners according to you in the class really understand this lesson? Why?**

The teachers and peers indicated that the understanding of the learners varied between 40% and everyone in the class. But the reasons varied:

“Yes, 80% completed the worksheet excellently” which shows that there is a perspective if you complete a worksheet, your lesson is “excellent”.

“Yes because 40% managed to get the answers correctly.”

If the questions on the worksheet determine the learners’ level of understanding including conceptual understanding, we have no problem with the answer. But very often worksheets are constructed in such a way that it only demands basic recall from the learner, often as single words or short sentences. If the teachers then think by completing the worksheets, the learners understand, we have a problem.

One teacher indicated that “almost 95%, most learners showed much interest” but said …”although this lesson was good and successful; it was also time consuming. Little work was done over a long period. At this pace exam time might come with the teacher having not completed the syllabus”. This shows that teachers are more reluctant to teach for examination results, and it would be preferable if they teach for conceptual understanding and examination.

**Describe how you felt to be observed.**

The teachers seemed first uncomfortable, but later at ease, as illustrated by the quotes below

“I first felt anxious, but in time I started to gather confidence”.

“It helps me to be well prepared and organize my lessons. I would develop experience and friendship between us as they are our science teachers.”

“….. I felt motivated to do my best no one wants to be a failure in front of another person”.

“Comfortable and happy because I will be able to know were I went wrong and rectify my mistakes.”

The last remark shows that the teacher was glad that someone could help her with her lack of content knowledge.

**In what ways did it help you to have a peer?**

“It help me…..to be the best teacher I could.”

“…. now it is easy for me to contact her, if I am faced with problem(s) during the time of doing assignments.”
“Motivating, trying to impress both the peer and the learners to show learners that with cooperation
the lessons can be interesting and captivating.”

“We share a lot and gained a lot because our discussion was very fruitful, and aspects that I gained
helped me with my learners in class.”

Within the framework of the research lesson, peer coaching also took place. For example, a problem
that has been repeatedly experienced is the lack of teacher’s content knowledge. Two of the teachers
commented that their peers helped them with the content knowledge: “He taught me many things
which I was not familiar to” while another teacher said it helped her to have a peer “for enriching my
knowledge”. Another issue addressed by peer coaching is that it can encourage teachers to adopt
effective teaching strategies. This can be seen in the following remark: “By preparing more than the
way I used to and use different approaches.”

In what ways didn’t you like to have a peer?
The reason why they didn’t like to have a peer was that the “learners were unhappy, because the
classes are too formal. Some of the learners are afraid to say anything, they prefer to be quiet”.
“Learners stare at the new extra person in class, you have to work extra hard to capture their
attention”.

In the following answer the focus is on the teaching and not the teacher. “I thought he is going to look
at my mistakes, whereas he helps me a lot.”

Will you use a peer in future? Why or why not?
The teachers were positive about using a peer in future. One of the reasons was for self motivation.
They even said that although the learners were afraid the first time when the peer visited the class, next
time they will get used to them and would be actively involved.”

Discuss the lesson with the teacher. Write down what came out of the discussion (from your
viewpoint):
It seems as if both the teacher and the peer when they had to write down what came out of the
discussion after the lesson, reflected on what happened in their classroom for the first time. For
example:
“My peer advised me to organize my lesson in such a way that it be pupil-centered and not teacher-
centered. By this I mean that a teacher should do less and talk less and allow the learners to do more
and talk more. In this way it will help the teacher to find out where the learners are lacking or need
more emphasis. It will help the teacher to realize whether the objectives yet have been achieved and if
not and how to improve on it.”

Another remark shows they were thinking about the behaviour of the learners and the most interesting
is they were thinking of how to solve it as well. “In my class there are a group of learners who are too
passive during the presentation. So I was busy thinking about those learners”. They were reflecting on
the standard of the lesson, and the way he/she presented it. One teacher also reflected on the way the
learners were doing an experiment. But the most exciting comment from this question was …“it is
better to teach for knowledge not for examination”! (This came from the same teacher that previously
was worried about the finishing of the syllabus for examination).

The teachers were so excited about peer coaching that they proposed that this intervention must
continue: “We decided that from next year, we must implement it and involve all natural science teachers from
all grades as long as they are willing to work with us and interested in peer observation.” Another
teacher remarked: “I am happy and I was suggesting that we can do this once in a quarter next year as it is helpful and will enable us to get better results and be excellent in all topics and feel positive when
教学 every topic.”
Conclusion

We found that the combination of peer coaching and research lessons can help teachers in the classroom in a variety of ways. Rather than structure two different interventions, the format of research lessons we asked teachers to use allowed for peer coaching to take place where appropriate. The approach is particularly useful for teachers studying by distance education as it addresses the problem of isolation. All the teachers in the research indicated that it is very useful to discuss and reflect on their lessons and that the focus of the observations are on teaching and not the teacher. They all proposed that this intervention must continue because not only do they deepen their content knowledge, but it also helps them adopt effective teaching approaches and reflect on their practice.

Although we thought it would be preferable for teachers to find peers who are also enrolled in the modules, as it turned out there were advantages to having a peer from the same school, even if that person was not on the course. For this reason, and because it is hard for teachers to find a peer who is also taking the course, we have decided that in the future teachers can choose a teacher in their school. In order to have more teachers involved, the teacher - peer observations will be part of their assignment and not an additional task.

References