UNDERSTANDING PROFESSIONAL DEVELOPMENT FROM THE PERSPECTIVE OF SOCIAL LEARNING THEORY

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This paper considers professional development (PD) from the perspective of Social Learning Theory (SLT). While a single component of SLT, self-efficacy, is frequently referred to in teacher education research, the full theory has not been used in this field previously. In this paper SLT is evaluated in terms of the extent to which it is able to describe and explain the phenomena of professional learning. An example of reform-oriented PD is used for this purpose. SLT provides an integrated view of learning, accounting for individual, cognitive aspects of learning, such as knowledge and beliefs as well as social and participatory aspects of learning. This study demonstrates that SLT provides a potentially useful theoretical approach in the context of teachers' professional learning.

Keywords: Professional development, professional learning, self-efficacy, Social Learning Theory

INTRODUCTION

It is argued that theories of professional development need to include both cognitive and social aspects of learning (Borko, 2004). However, theory has tended to focus on either cognitive or social perspectives. Cognitive perspectives have centred on notions of changes in teachers' beliefs or knowledge. Social perspectives have considered professional learning through participation (Lave & Wenger, 1991). Social Learning Theory (SLT) (Bandura, 1977) provides a theoretical approach that integrates cognitive aspects and social effects in learning. While an important sub-construct of SLT, self-efficacy, has been used extensively in theorising teacher education, there are no examples, to the author's knowledge, of research that draws on the full theory.

In this paper the potential use of SLT is explored by interpreting the effects of a professional development (PD) programme that was designed to support teachers in using student-centred problem-solving (SCPS) approaches in their teaching. SCPS is an approach to teaching that is characterised by student collaboration and discussion in the process of solving open-ended tasks and activities. This contrasts with traditional teacher-centred teaching, which is characterised by the teaching of mathematical methods and routines, this is the prevailing approach in England's secondary schools (Ofsted, 2008, 2012). The importance of SCPS is in fostering deeper understanding of mathematics as well as in improving motivation and engagement (Rocard, 2007).

Schoenfeld's (2002) criteria for assessing a model or theory were used to guide the evaluation of the viability of SLT in the context of PD. The criteria used are based on

the qualitative assessment of the *descriptive* and *explanatory power* of the theory. In other words, to what extent can SLT effectively account for the observed phenomena? This is part of ongoing work in the development of SLT in the context of PD. Further assessments are being undertaken; this paper reports on the extent to which SLT can describe and explain PD. Schoenfeld (2002) explains *descriptive power* as the extent to which the theory captures '"what counts" in ways that seem faithful to the phenomena being described' (p. 488). *Explanatory power* refers to the extent to which theory provides a description of the way in which things work (p. 489). While Schoenfeld (2002) proffers further criteria, these two were chosen as the most important at this stage and are also consistent with Sriraman and English's (2010) functional criteria for theory.

SOCIAL LEARNING THEORY

From the perspective of SLT, the mechanism of learning and the formation of individual knowledge is through observation (Bandura, 1977). SLT posits a sophisticated mental modelling of observed behaviours and subsequent construction of novel behaviours, but this does not necessarily mean direct imitation of others' behaviours. Observational learning has been found to be an important mechanism in teacher development (Lortie, 2002), as has the importance of a mental model or a picture of the lesson as the teacher enters a classroom (Rowlands, Thwaites, & Jared, 2011). The way in which teachers choose and construct behaviours is influenced by the extent to which they believe they will be successful with a course of action in a particular context. This self-regulatory process within SLT is referred to as self-efficacy. It is the belief an individual has in the level of success they will experience when they act in certain ways in specific contexts. Self-efficacy reflects cognitive capacities and underlying skills, it also incorporates affective components such as confidence, motivation and willingness to innovate (Bandura, 1997). Previous research has found teachers' self-efficacy to be related to positive teaching behaviours and student achievement. Teachers with lower levels of efficacy are more pessimistic about student motivation and believe in strict classroom regulation and rely on extrinsic inducements and negative sanctions to get students to study (Woolfolk, Rosoff, & Hoy, 1990). Self-efficacy is an important dimension but it is the broader theoretical framework that is being considered in this study.

The core component of SLT, as referred to above, is observational learning and the mental modelling of observed behaviours. Teachers (re)construct behaviours to implement in classroom. Much behaviour, according to Bandura (1977, 1997), becomes routine and does not require prior modelling and planning. Teachers at the beginning of their careers observe and model the practice of other teachers, adapt them and (re)produce them in the classroom (Lortie, 2002), this is consistent with SLT. Feedback and response as well as self-assessment by the individual teacher influence the formation of their teaching behaviours (Lave & Wenger, 1991). In time, practices become largely routine (Bandura, 1997; Cuban, 2009; Wake, 2011). As

teachers, we observe the largely traditional teaching of more experienced colleagues, we reconstruct this, knowing that it represents a safe and stable practice. Thus we enter into a well-established didactic contract (Brousseau, 1997) based on traditional and conservative teaching approaches. Wake (2011) argues that the introduction of SCPS approaches requires a change or renegotiation of this contract. According to SLT then, the facilitation of this renegotiation is reliant upon teachers having the appropriate pedagogical knowledge – in the form of mental models of possible and alternate practices, pedagogies and behaviours (Bandura, 1997) – combined with a level of self-efficacy in order to be able to implement such approaches (Guskey, 1988).

It is important to be reminded of the social and contextual effects that present a challenge to innovation. Within SLT these act in a regulatory way, mediated through self-efficacy. If our behaviours are challenged then we may begin to doubt their ultimate success, we may modify our behaviour. Similarly, as teachers, if we introduce an innovative pedagogy and it is challenged or it is responded to unfavourably by students, parents and colleagues, then it is likely that we will be less confident with the approach. Ultimately we may change our behaviour to an approach that we believe will be more acceptable. The kinds of teachers that persist with innovation have been shown to demonstrate high levels of self-efficacy in the context of teaching (Berman & McLaughlin, 1978). Beyond the effects of others in influencing behaviour, there are also the effects of the working conditions, the demands of the job, the nature of teaching and the institution in which is takes place. It has been recognised that these environmental effects also have a strong influence on the way teachers teach (Cuban, 2009; Leinhardt, 1988).

At a theoretical level, SLT appears to offer a useful framework for describing and explaining professional learning – from the above description it appears to have good *descriptive power*. In order to test this further and test SLT's *explanatory power,* a study involving a PD programme was undertaken. Three components were derived from SLT and through an iterative analysis of the data. These were, 1) *Teacher knowledge,* 2*) Teacher self-efficacy beliefs* and 3) *Social, contextual and environmental effects. Teacher knowledge* corresponds with aspects of data where the teacher refers to their knowledge and the effects on their knowledge in the context of the PD and their teaching. In terms of SLT, knowledge is conceived of as mental models of potential behaviours. If SLT provides a reasonable descriptive and explanatory capability then there may also be suggestion of observational learning and the modelling of behaviours. For *teacher self-efficacy beliefs,* examples might feature direct references to confidence, motivation or expressions of willingness to include innovative processes in their teaching. Alternatively, there might be negative effects on self-efficacy. *Social, contextual and environmental effects* refer to aspects of the PD and teachers' experience that are related to student, parent or colleague expectations that may have a bearing on what the teacher does in the classroom. In addition, the aspects that relate to the effects of the nature of the job of teaching are

also accounted for in this component. The three components provide the means through which data taken from the PD example can be related to SLT.

THE PROFESSIONAL DEVELOPMENT

The PD programme was designed to support teachers in the teaching of SCPS. In England's secondary schools teaching is largely traditional – teacher-led and focussed on the teaching of methods (Ofsted, 2008, 2012). However, the English National Curriculum stresses the importance of problem-solving. This PD was designed to support the teaching of problem-solving. It was also designed to enable groups of teachers to work together with one teacher leading the PD. There are seven modules, each focusses on one aspect of pedagogy. Module themes include, promoting student collaboration and group work; developing questioning to promote student reasoning; and formative assessment – all in the context of using 'rich' and open-ended problem-solving tasks. All modules have the same structure: an *introductory session*, *into-the-classroom* and a *follow-up* session. In the *introductory session*, teachers consider the ideas in the module – for example, student collaboration – they attempt tasks and lesson activities provided with the PD materials, they watch edited videos of real lessons in which the focus of the module is exemplified. Teachers are encouraged to reflect on and discuss the ideas presented. They then collaboratively plan a lesson based on the tasks in the PD materials and teach the lesson in the *into-the-classroom* phase. In the *follow-up session*, teachers review and reflect upon their experience and look at further videos and materials. Each of the PD sessions lasts about one-hour. The professional learning theory underpinning the design is based on teachers' beliefs. The PD is intended to provide a supportive setting in which teachers can try out a different approach and have the opportunity to develop different beliefs – more oriented toward SCPS than traditional teacher-centred approaches (For more details about the design philosophy behind the PD materials see Swan, 2006). Observations made during a pilot study involving the evaluation of the PD indicated that this theoretical approach did not provide sufficient descriptive or explanatory power and a more sophisticated model was needed. This prompted the investigation of SLT as an alternative theoretical framework.

METHODOLOGY

The study took place in mathematics departments in four schools in England. The University of Nottingham has partnerships with schools for the purposes of pre-service training of teachers, 86 of the secondary schools were contacted and invited to take part in the study. Twelve schools expressed an interest in the project. After initial meetings with the schools, four schools agreed to take part. The PD programme took place over two terms. Schools completed a module (*introductory* and *follow-up sessions*) each term, all teachers in the department were encouraged to take part: most teachers (over 90%) attended the PD sessions.

This multi-site case study was guided by the need to address questions such as 'how' and 'why' in a naturalistic setting (Yin, 2009) and in the context of professional learning. The aim of the research was to develop an in-depth understanding of the effects of the PD on teachers' beliefs and practices. Data were collected through questionnaires, observations of PD sessions, observations of lessons and interviews with individual teachers and heads of departments. Eleven teachers were involved in the video-study, three teachers in three of the schools and two from the smaller of the four schools. At the start of the project the teachers were asked to teach a problem-solving lesson, they were interviewed before and after the lesson, it was videoed and student work also collected. As soon as was convenient the mathematics departments ran the introductory session of the first PD module, this was video recorded and the head of department and PD leader were interviewed. Teachers then taught the lesson they had planned in the PD, this lesson was videoed and a post lesson interview was conducted. The same procedure was repeated in the follow-up session. A final problem-solving lesson was taught by the video-study teachers and they were interviewed again. They were asked about the aspects of the PD they had used in the observed lesson and the extent to which the PD influenced their views and the way they taught. The same process was repeated with a different PD module in the second term. Eleven teachers were observed and interviewed five times through the project. Data were collected using questionnaires from over 90% of the mathematics teachers (n=37) in all four schools. The research design involved the mathematics department as a whole but observing a smaller number of teachers in more detail in the video-study.

The overall strategy was built around drawing conclusions form the large amount of data, which included interview data, lesson video, video of PD sessions and questionnaires. The primary source of data for analysis was the interview data. Unstructured interviews were used in the initial rounds of post-lesson interviews, these were transcribed and analysed and semi-structured interviews were developed at each successive round of interviews. In this way a constant comparative approach was used in the data collection. A method was developed for systematically summarising lesson content and PD session content (Watson & Evans, 2012). Analysis was conducted with reference to what was observed in lessons and in PD sessions. Analyses of teacher interviews were cross-referenced with observations of lessons and the analysis of interviews with the head of department. This provided a network of triangulation and enhanced the trustworthiness of results. The three components of SLT, 1) *Teacher knowledge,* 2*) Teacher self-efficacy beliefs* and 3) *Social, contextual and environmental effects* were used to code the data in order to analyse the PD from the perspective of SLT. The aim was to assess the descriptive and explanatory power of SLT in this particular context.

RESULTS

In this section, a theoretical analysis of the PD is presented from the perspective of SLT. The results are presented in terms of the three themes described above.

Teacher knowledge

The most important aspect of teacher knowledge was the development of pedagogic knowledge. This was often very specific aspects of pedagogy and was often treated as models that could be adapted and developed for use in the teacher's own classroom. As an example of this, two schools used the PD module which focussed on student collaboration, teachers who took part in the PD were interested in approaches to groupwork. They were concerned with how to promote the full participation of students working collaboratively on an open-ended and unfamiliar problem. Of particular interest were techniques to assign different roles to the group members or setting up 'ground rules' for discussion.

> [Students] do not always know how to work in groups. To have the rules was good because they all knew they all had to take part. It was not one person who could take over and one person sit back and not say anything. They all knew that they had to listen to each other. They were all clear on expectations so they knew what was acceptable and what was not. (Sally, Hilltown School, year 8, high-ability).

The introduction of pedagogic moves and techniques, as in the above example, was often related to structuring a more student-centred lesson. The knowledge that teachers most often applied in observed lessons were associated with techniques and pedagogic passages they had observed in the PD sessions or that was described in the accompanying printed materials.

There were examples of observational learning. Video examples of lessons were shown in the PD sessions. It was quite common to see teachers use elements of what they had seen. For example, in the PD module on questioning and reasoning, there is a video of a lesson where the teacher, having given students a little time to work on an open-ended problem in pairs, asks students to explain their approaches while she summarises each idea in a sentence or two on the whiteboard. This was recreated in an observed lesson. The way in which teachers' acquired models of teaching was not limited to the videos. Detailed lesson plans also provided them with models and structures, which they would follow to help them in developing their own approaches to SCPS.

Teacher self-efficacy beliefs

Teachers were asked about their experiences of the PD and how their perspectives may have changed as a result. A common feature of their responses was concerned with their confidence in connection with incorporating SCPS into their teaching. In many cases, the PD had supported increased motivation and confidence to include SCPS in their teaching. In some examples, especially where the teacher was working with lower ability groups, it was evident that the teacher had become less confident.

The self-efficacy of each teacher was explored, through the study, with individual teachers, however it was also valuable to consider the heads of departments' perspectives of teachers and compare these with individual explanations.

They were asked to consider which teachers would find it more or less difficult to use the ideas of the PD and what sorts of characteristics were important. The issues they raised were to do with confidence and motivation.

> [It] is the comfort-zone that is quite hard for them to break out of. To have things like children working in groups, that is quite difficult. Children may be diverging in the ways they are doing things and they can't plan for every way they might do it. The teacher can't have a written answer to give them confidence in what is going to happen. They are going to have to think on their feet and follow the way the children are going. (Anne, Head of Mathematics, Norman Fletcher School).

> I would have said Barry, me, Kate, Lizzie do these activities with a certain degree of confidence, because I think we like to try things like that. And we don't mind if it goes wrong. (Deborah, head of mathematics, Barrington School)

The efficacious teachers were more willing to take risks in their classrooms. This was also supported by observations of lessons, the efficacious teachers seemed more at ease with a student-centred approach. "Loss of control" or "out of my comfort-zone" were phrases used by teachers in describing how they felt about the approach. The video-study teachers, particularly with higher ability group, felt that the PD programme had helped them become more confident in giving students greater control over their learning. This was supported by observations of their teaching over the course of the PD – teachers became more comfortable with the approach. This was also consistent with the observations of heads of departments.

There was no reference to changes in beliefs about mathematics or the teaching and learning of mathematics. It appeared that many teachers did not see beliefs about teaching as a barrier to taking a more open-ended approach. In the following the head of department explained that she thought that many of the teachers had appropriate beliefs to teach in the way suggested by the PD. The barriers appeared related to self-efficacy.

> They come with a lot of the points [to do with questioning to promote reasoning in the context of problem-solving] that are there anyway. It's just a case of consciously thinking about it. A lot of the things we know we don't necessarily put into practice (Anne, head of mathematics, Norman Fletcher School).

There were two aspects to self-efficacy, the first is that the more efficacious were more willing to experiment with their teaching. Second, the data suggests that the PD had an effect on teachers' self-efficacy. Often this was positive but if teachers had a bad experience with SCPS as part of the PD it could undermine confidence and diminish self-efficacy.

Social, contextual and environmental effects

There were references to the social, environmental and contextual factors that limited teachers' capacity to incorporate student-centred problem-solving into their teaching. Teachers often referred to the having to 'cover' or get through the scheme of work or curriculum in order to prepare students for examination. In addition, they suggested that because students were not used to working in a SCPS way – particularly in the lower ability classes – this presented barriers to teaching in that way. Some teachers and most of the heads of departments also expressed concerns about parental expectations in what mathematics teaching should be like. The approaches suggested in the PD were often perceived to be contrary to the expectations of students, parents and sometimes colleagues in the wider school. In one school, teachers were particularly concerned how the inspectorate would judge their teaching if they were observed teaching in the ways suggested in the PD programme. However, teachers, particularly those in the video-study, acknowledged that the PD and lessons they had tried out had given them space to experiment with and explore different ways of teaching. It had given them 'permission' to do something different.

All heads of departments explained how difficult it had been to fit in meeting time to hold the PD sessions. One school had to hold the sessions during lunch breaks another had to do the sessions in scheduled department meeting time but found issues that had been put to one side for the PD still needed to be communicated and discussed. At the same time they all valued the opportunity that the PD created: to meet, discuss and explore teaching and learning as a department. They felt that being part of the project had made them, as a department, think and try out lessons and different approaches. However, in one of the schools it was clear that only the teachers involved in the video-study were actually trying out the planned lesson with their own classes.

DISCUSSION

This preliminary analysis demonstrates that SLT has both *descriptive* and *explanatory power* in the context of this PD. This could be further developed through more analysis. Schoenfeld (2002) describes *descriptive power* in terms of the theory's capacity to capture "what counts" *or* the extent to which the theory takes the right factors into account? (p. 488). It appears that teacher knowledge, self-efficacy beliefs and the social and contextual effects, represent the 'right factors'. Schoenfeld (2002) contrasts description and explanation: 'It is one thing to say that people will or will not be able to do certain kinds of tasks, or even to describe what they do on a blow-by-blow basis; it is quite another thing to explain why' (p. 489). The analysis of SLT presented through this papers suggests SLT offers a viable explanation of professional learning from both the cognitive perspectives of teacher knowledge and beliefs as well as the social and situated aspects of professional learning. SLT also addresses learning processes in terms of observational learning which appears consistent with other studies (See, for example, Lortie, 2002).

CONCLUSION

SLT appears to offer a useful theoretical framework that integrates cognitive and social aspects of professional learning. SLT accounts for teachers' pedagogic knowledge in terms of mental models of behaviour that have been acquired through observational processes. The way in which pedagogic knowledge is applied in the classroom is influenced by the teachers' level of self-efficacy as well as the social and contextual setting. SLT could provide an improved theoretical framework that has the potential to enhance the design and evaluation of PD. However, this is a preliminary exercise in testing the potential of SLT. SLT has been considered against two criteria: *descriptive* and *explanatory power*. Schoenfeld (2002) suggests further criteria, further research is required to assess SLT against these additional criteria. Although, at this stage it is reasonable to conclude that SLT has potential in theorising teachers' professional learning.

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