

Helping students to transfer challenging pedagogical ideas from university training to school: investigating a collaborative approach

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Abstract

Recent reviews of the primary curriculum point towards greater autonomy at school level in future. This suggests an opportunity, and perhaps even responsibility, for emerging teachers to evaluate and implement a wider range of pedagogical approaches. However, while challenging pedagogical ideas may be well received during university sessions, there remains the issue of effective transfer to the classroom setting. Apart from the need to make sense of concepts in a new context, some ideas may also be at odds with the prevailing classroom culture. This paper reports on a project to encourage Initial Teacher Education students to embrace and trial a challenging form of pedagogy through a process of collaboration and peer support. Steps to establish a form of community with a group of final year education students are described. The effects of this intervention on students' confidence in implementing new ideas within their mathematics lessons, as well as other outcomes, such as the construction of shared understanding and increased reflection, are also discussed. Finally, implications for future practice and a wider, sustainable use of this process are considered.

Keywords:

Community, collaboration, pedagogy, transfer, challenge

Context and rationale

The emerging primary curriculum of the early twenty-first century presents a number of distinctive challenges to teacher educators, as higher education institutions (HEIs) strive to equip students with the capabilities to deliver both the existing curriculum and the forthcoming revision for 2011. Both the recent Independent Review of the Primary Curriculum (Rose, 2009) and the Cambridge Primary Review (University of Cambridge, 2009) have advocated a new curriculum structure, with greater autonomy at school level. With these new opportunities come new challenges: teachers preparing to enter the workforce at this time need, arguably more than ever, to be able to embrace a potentially vast range of pedagogies in a discerning manner. The Cambridge review, for example, explicitly recommends that 'epistemology, pedagogy and discipline-based pedagogical content are given much greater prominence in Primary ITT.' (University of Cambridge, 2009: 55)

Hodgen and Askew (2007) show how a teacher's identity and attitudes towards a subject can be transformed by embracing new forms of pedagogy that expose themselves and their pupils to difficulty and challenge. The chosen focus in their study and ours was the enhancement of peer discussion and collaboration in mathematical problem solving in the primary classroom. This is based on social constructivist ideas, following a line of thinking established by Vygotsky (1986). The value of peer dialogue has been emphasised frequently (Lyle, 2001, Mercer, 2000) and its specific application to mathematical problems outlined by Ryan and Williams (2007) and Hodgen (2002) amongst others.

For their part, primary schools seem to see the potential for 'rejuvenation' through both the methods and the enthusiasm of students placed with them (Price and Willett, 2006). There is a suggestion, however, that the prescriptive, testing-oriented culture that has prevailed for the last two decades may have stifled this aspect of development. Stevens, Hodges, Gibbons, Hunt and Turvey (2006), for example, found a 'closing down' of creativity amongst their student teachers when faced with the constraints of the school environment.

The value of advocating challenging pedagogies to student teachers seems clear, therefore, but the means of eliciting a confident and resilient response, in keeping with the mastery orientation to learning described by Diener and Dweck (1980) needs some consideration.

Students learn about pedagogy in two main settings: the HEI and the school. If students are to be encouraged, through university sessions, to take new ideas into school and to 'refresh' these environments as Price and Willett (2006) suggest, an immediate issue is that of transfer of knowledge. This is reinforced by Philpott (2006) who characterises these two settings as different 'activity systems', each with their own goals. The best hope of transfer, he contends, is through matching affordances (or features) of these systems and attuning the students to these features. University sessions, it seems, would

need to offer opportunities for close replication of the learning experiences to be found in school.

Philpott also suggests that time to reflect on learning is crucial in moving from the specific to the general and that motivation, in terms of the perceived relevance of what is taught in the HEI, is sometimes lacking. This question of motivation to transfer learning is also addressed by Schuck (1998) who argues that Initial Teacher Education (ITE) students have three 'selves' and that teacher educators need to realise that the 'self-as-student-learning-to-teach' presenting before them is deeply influenced by the 'self-as-teacher' and the 'self-as-primary-school-student'. These latter two selves need to be convinced of an idea's merit, presumably through relevant experiences and the explicit discussion of connections, in order for the student teacher to be fully engaged.

A possible way forward: developing a community

As one possible response to these difficulties in ensuring transfer of challenging ideas from HEI to school, the work of Wenger (1998) on communities of practice was examined. His contentions that, in such a community, learners 'contribute in a variety of interdependent ways that become material for building an identity' (Wenger, 1998: 271) and that students 'need experiences that allow them to take charge of their own learning,' (Wenger, 1998: 272) suggest that this approach might be fruitful. Lave and Wenger (1991) have described the process of learning alongside more experienced practitioners in such a community as 'legitimate peripheral participation'. Links between this model and the school-based components of ITE might at first seem plentiful, but Edwards and Protheroe (2003) have identified significant limitations, as the emphasis in school may be more on polishing performance, rather than developing 'interactive and responsive pedagogy'. Indeed, in an echo of Stevens et al (2006), they note that students, operating in relative isolation, are 'likely to close down on complexity.' (Edwards and Protheroe, 2003: 231) Wubbels (2007) shares these concerns, pointing out that genuine modelling of collaboration in school is in fact fairly rare.

The hallmarks of a community of practice are perhaps even less evident in the HEI setting. Wenger (1998) offers three characteristics of shared interest: the domain, the community and the practice and, of these, the shared domain of interest clearly exists in a group of students. The idea, however, of a community learning *from* one another, rather than merely alongside one another is one that could be further developed. In the same way, genuinely sharing practice, with a shared repertoire of resources, cannot be taken for granted in a university session. Indeed, Wubbels (2007) questions whether a community of practice is ever truly possible in university-based ITE, with, for example, its emphasis on personal reflection and the 'expert' teacher educator. He proposes instead a 'learning community', with the advancement of learning, rather than work, as its purpose.

Other variations include Jaworski's (2008) account of 'communities of inquiry', which seeks to address the issue that communities of practice could equally perpetuate bad as well as good practice. The drawback of these views, with their move away from practice, however, is that the central issue of transfer of pedagogical ideas into the school setting remains problematic. As well as communities of students that meet and interact face to face, communities may operate online. These can be used in different ways, any of which may have limitations as well as advantages. Wubbels (2007), for example, suggests that having a tutor involved in providing feedback as an 'instructor' is not in keeping with a community of practice.

These various models of community, imperfect though they are in this particular context, provide a useful reference and starting point for investigating purposeful student collaboration as a means of improved transfer of pedagogical ideas.

Methodology

Ernest (1994) makes a helpful distinction between a scientific research paradigm and an interpretative research paradigm. In his view, the latter 'is primarily concerned with human understanding, interpretation, intersubjectivity, lived truth' (Ernest, 1994: 22, 24). Berry (1998) opines that studies concerned with human interaction, are frequently conducted within an interpretative paradigm. She argues that qualitative research lends itself particularly well to school-based research where human activities and relationships interweave tightly with other.

Action research would seem to provide one possible model for an interpretative research paradigm. Cohen et al. (2000: 226) cite Kemmis and McTaggart's (2000) definition of action research as,

'a disciplined inquiry, in which a personal attempt is made to understand, improve and reform practice.'

This view of action research as a possible positive force for professional change is shared by, for example, amongst many others, Baumfield, Hall and Wall (2008). Equally well-documented is the view of action research as a cyclical process of self-reflection (Dick, 1997, McKernan, 1991 and Hult & Lennung, 1980) which is 'complementary to "plan-do-review" underpinning teachers' practice' (Baumfield et al. 2008: 4). Moreover, for Noffke and Zeichner (1987), action research is 'situated learning' and they interpret it convincingly as 'learning in the workplace' and 'about the workplace'.

Inherently focussed on professional practice and development, this project was conceived as a piece of action research which, in the words of McNiff and Whitehead (2005: 1), aimed to challenge a group of final year ITE students 'to investigate and evaluate their work and to create their own theories of practice.' Kemmis and McTaggart (2000) refer to 'a spiral of self-reflective spirals' which incorporates planning a change, action, observation and reflection. In terms of exploring the potential of more challenging pedagogies in the primary classroom, a methodology was developed which sought, through a series of interventions and data collection, to generate a spiral of

learning for the students engaged in the project. Seeking to gather a balance of qualitative and quantitative evidence, the following schedule was designed (table 1):

Table 1

Stage	Intervention	Data Collection
1	University-based learning experience of a more 'challenging pedagogy'.	
2	Project group identified	Survey of whole group of 4 th year mathematics specialists
3	Focus group meeting 1	Focus group interview
4	Volunteers carry out project-focused lessons	Reflective journal Lesson observations On-line discussion board
5	Focus group meeting 2: 'de-brief'	Focus group interview Card sorting activity Questionnaires
6	Analysis of data (student experiences)	

Given the aim of the project to introduce students to a 'challenging pedagogy', it was felt important that the students should, in the first instance, gain a shared understanding of the kind of pedagogy in mind and also begin to recognise the potential benefits of collaborative learning. This was achieved at Stage 1 through a university-based session. Students were organised into groups of five or six, each with a *facilitator* and an *observer*. Primed in advance, *facilitators* worked collaboratively to generate a sound understanding of the problem to be solved for themselves and to plan their delivery. They were encouraged to promote dialogue and verbal collaboration in their groups as a strategy to scaffold learning and to enable their 'pupils' to trace pathways to solutions. Solutions were presented and discussed and a rationale for the 'episodic' nature of the approach explored. At the end of the session, all students were asked to complete a questionnaire which invited them to evaluate their learning experience and to offer their view on the potential of this approach to teaching and learning in the primary mathematics classroom (Stage 2). Additionally, the questionnaire asked all students whether they would be prepared to trial this 'challenging pedagogy' during their forthcoming school placement.

The questionnaire promoted self-selected participation in the project and was used as a methodological device to generate a sample of students, representative of the range of abilities of final year mathematics specialists. Issues of ethics with regard to collection of data and anonymity in dissemination were explored and addressed in a document which individuals committed to the project were required to sign prior to their placement. Students were also assured that neither their participation in nor the outcomes of this project would influence the assessment of their placements.

As exemplified in Table 1, interventions and a range of data collection strategies were employed to generate both qualitative and quantitative evidence. Interventions by the researchers served many purposes. The focus group meeting prior to placements (Stage 3) provided a further opportunity to scaffold understanding of the targeted pedagogy. Crucially, it also allowed the researchers to introduce the idea of an online discussion board as a vehicle for sharing experiences of trialling this pedagogy whilst on placement and as a mechanism for offering mutual support. Its potential for generating a community was highlighted and explored. In order to reduce the potential for bias, the researchers emphasised that their role on the discussion board was solely to observe and not to contribute. Furthermore, the meeting provided an opportunity for students placed in the same or similar primary year groups to begin the process of planning project-related lessons collaboratively.

Responding to the concept of 'a spiral of self-reflective spirals' (Kemmis and McTaggart, 2000), participants were provided with a 'reflective journal'. This aimed to record students' feelings about, and evaluations of their experiences at various key stages of the implementation process (Stage 4) and were collected for collation at the post-placement focus group meeting (Stage 5). Triangulation of outcomes and validity for conclusions were promoted significantly at Stage 5. A discussion-based activity was introduced which required participants collaboratively to prioritise possible definitions for a *community of practice*, as defined by Wenger (1998). This enabled the researchers to identify the impact of experience on interpretation and perception. Furthermore, students' reflections on their experiences as well as their views on the perceived benefits and limitations of this form of 'challenging pedagogy' were probed by the researchers in discussions captured on video.

Initial findings and analysis

1. How useful were the various forms of collaboration?

Feedback at all stages was very positive about the experience of collaboration: advantages such as 'if you're struggling, you've got other people to give you ideas' were identified. Significantly, some participants also recognised the additional value of preparing to collaborate with colleagues in their forthcoming roles when qualified.

Of the forms of collaboration adopted, the lunchtime gatherings were rated as most useful on the post-experience survey. Interestingly, informal discussion,

away from the events or forums that were organised, also featured very highly, perhaps suggesting that that such a 'community' is capable of self-regulation following the initial establishing phase. As one participant put it, [we were] able to talk things through with each other without pressure.' The online discussion forum also proved popular as a means of sharing ideas and receiving reassurance about being 'on the right track'.

The factors found to be least useful in helping the students to implement the ideas in their classrooms were the pre-existing ones, notably their own independent research. For a self-selecting, motivated group of volunteers, this might seem surprising, but responses suggested that it was specifically the most challenging concepts that needed something more in order to make the transition from theory to practice: 'the research I conducted was a little broad. I found discussion with peers who were doing the same thing more beneficial.'

The initial input on the teaching method, through the taught session, was found to be interesting and enjoyable, but received a mixed response in terms of its usefulness in bringing the technique to fruition. Half of the participants reported a need for further clarification afterwards, for example. This underlines the initial feeling that, even with apparently successful university sessions, there often still exists quite a gulf between engagement and internalisation of ideas in readiness for practical application. Feedback on experiencing the group work technique for themselves in the session, with an appropriate level of challenge, was very positive, however: 'To experience the feelings of group work was beneficial'.

2. To what extent was a community evident?

As discussed above, the value of collaboration itself as a motivating factor (as opposed to its benefits for practice) seems clear. Participants referred to 'support in the background' and the realisation that everybody else was having the same problems. Indeed, the card sorting activity showed that 'meeting to share experiences' was rated the most valuable aspect of the project. The feeling of community was also evident in the online discussions, particularly in the sense of responsibility to inform peers about progress, rather than simply to ask for advice as we might have expected: several participants promised to report back on their experiences for the benefit of the group and later did so. As one of them noted, this forum 'brought a sense of responsibility with respect to participation'.

The card sorting activity also revealed that simply having shared interests, needs or expertise, which were most highly rated in the pre-intervention group were seen relatively as far less important afterwards: sharing and discussion had taken their place as the most beneficial aspects. While this might suggest a growing sense of community, it was notable that the position of 'learning from one another' had barely changed. The participants may have fulfilled Lave and Wenger's (1991: 35) idea of 'engagement in social practice that entails learning as an integral constituent' but it appears that learning took place with, rather than from, one another.

3. How confident were students in transferring the pedagogy into their own practice?

At the heart of this investigation was the issue of confidence and the response to challenge. A need for reassurance was a recurring theme, from students asking for more specific lesson examples 'just to make sure we're on the right lines' to seeking confirmation from peers online that their lessons were appropriate: 'Is this right? I am more than happy to try it again if I haven't approached it right. Let me know guys.'

The use of the reflective diary enabled levels of self-confidence, both in terms of the teaching method and in the participants themselves as teachers, to be tracked from the first briefing to the end of the placement. One student retained the same degree of confidence at the end (after a dip following the first teaching attempt) but all others grew in confidence by the end of the project. Many insightful comments were made at the final reflection point, such as 'If this style of teaching was used often with the class throughout their schooling, I feel it will benefit them to become better thinkers and more creative with problem solving.' Much of the positive testimony was undoubtedly a result of the successful teaching experiences themselves, but there is also a strong sense that the collaborative approach facilitated this process:

'I would feel more motivated and more aware of the expectations.'
'Discussing others' experiences and sharing ideas was very effective.'
'This helped in more of a confidence aspect: it was nice to feel supported.'

Discussion on the implications for practice

The thematic analysis of data gradually yielded three key findings with clear implications for practice.

1. Generating a shared understanding

Perhaps the most striking and powerful idea to emerge from the findings is the use of this form of collaboration as a vehicle for making sense of complex ideas. Some engagement with concepts and sharing of practical ideas was anticipated of course, but the benefits exceeded these expectations. There seemed to be genuine evidence of a construction of a shared understanding, in line with what Mercer & Littleton (2007) and others have termed 'interthinking'. Initial uncertainty following the taught session gave way to clarity through the collaborative process and at least one participant explicitly noted the parallel with pupils' experiences in the classroom, pointing out 'It helps to have a friend who could explain things in a different way' and 'If sharing with other people, it makes it clearer.' Another suggested that the discussions 'helped to clarify misunderstandings'

The collaborative process also contributed to making meaning by providing space (both physical and mental) for reflection. Personal reflection already forms an important part of the Q standards (TDA, 2007) for student teachers in England. However, the role of collaboration and dialogue with colleagues in this process, emphasised by Pollard (2008), should not be taken for granted and Harford and MacRuairc (2007) have shown the value of interventions to foster a more collegial environment for reflection. The discussion board, for example, offered a meaningful forum and audience and there were a number of posts of this kind:

'This often went over the Y1/2s' heads but they were exposed to mathematical language with visual support.'

'The LA really seemed to work as a team and, as such, took more from the activity'

These outcomes strongly suggest that offering even a limited opportunity to pause and 'digest' the most challenging ideas put forward, ideally with peers who have shared interests (such as a placement in the same key stage) is likely to pay dividends in terms of the depth of understanding and application in the classroom. In terms of conceiving of a sustainable model, it is also notable that the tutors' presence is by no means essential after the early phases: 'I found it easier to talk to my peers individually without being observed.'

2. Confidence to embrace more challenging approaches

Edwards & Protheroe (2003: 231) take the view that student teachers' developing expertise involves 'a capacity to complicate and respond to those complications'. The desire to see emerging teachers seeking out and embracing innovation and complexity was a driving force in this investigation. Even the early uncertainty evident in the reflective journals was offset by enthusiasm: 'I am looking forward to using a different teaching style'. It is clear that, given appropriate peer support, students are willing to push back boundaries within the classroom.

As final year students, the participants seemed particularly well placed to take this opportunity, seeing the benefits both of completing their school practice with a flourish and of preparing for their role to come:

'It's good to take a risk in the final year of our practice.'

'This style of teaching is something I would like to continue in my NQT year.'

Whether less experienced students would respond in the same way remains to be seen, but the likelihood is that a similar supportive structure would encourage the attitudes needed to meet the challenges of the Rose review's vision of 'a national entitlement with full scope for teachers to shape how it is taught and to supplement it' (Rose, 2009:14).

Despite the tension between students' intentions and curricular or other contextual constraints mentioned by Stevens et al. (2006), the schools involved seemed willing to allow a degree of pedagogical freedom. Some mentors initially conveyed warnings about the pupils' readiness to cope with

the proposed approach, but in almost all cases the outcome was positive. Some students had even managed to influence the mentor's practice: 'they are likely to incorporate [the activities] into their own teaching'

3. The benefits of collaboration whilst on teaching placement

A strong message emerging concerns the value of continuing, during the school placement, the collaborative practices established in the HEI. A number of studies point of a culture of isolation within schools internationally (Harford and MacRuairc, 2007; Gratch, 2000) and it seems reasonable to suppose that challenging this culture might support the transfer of ideas from university. Indeed, sustaining the community in this way seems to go some way towards fulfilling many of the conditions for transfer of learning suggested by Philpott (2006). For example, shared features (or affordances) between the two situations are emphasised and motivation and expectation of transfer are heightened.

The best method for achieving this is an area for further investigation. For example, despite the potential advantages, certain limitations with the online forum were clear. Chiefly this centred on the issue of time as, compared to established social networking sites, the university's platform requires an extra effort to access: 'time constraints limited me from using the online forum as much as I hoped.' A further angle to explore is the degree of formality desirable online. Gulati (2008), for example, cautions against expecting compulsory contributions to an online community, arguing that active and silent participation is equally valid.

Concluding comments: the way forward

Feedback from participating students clearly suggested that they valued the experiences gained through the project and recognised the potential for impact on their future practice. Despite the challenges presented by this form of pedagogy, a genuine sense of achievement and progress prevailed, particularly at the final focus group meeting. A clear commitment to the ideas explored during the project was expressed. Significantly, the students recognised that likely difficulties in maintaining contact with each other in any future engagement with these pedagogical approaches may present more of an issue for them than the absence of support from university tutors.

Reflection on the outcomes of the project leads the researchers to perceive future benefits for the ITE programmes in which they are engaged. There is scope to introduce and explore the idea and nature of more challenging pedagogies at an earlier stage of students' courses in mathematics and, potentially, other subject areas. In addition, it is hoped that the impact of the project may be enhanced by collaboration with school mentors and local authority colleagues who make up the Mathematics Steering Group. The outcomes of the Williams Review (2008) may well serve to galvanise interest in challenging pedagogies of this kind.

The real and practical benefits of the project are perhaps best encapsulated in the words of one participant, who declared; 'I felt like I was being of use by participating in the research project'.

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