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Lesson Study and the Longitudinal Impact on the Development of Teacher Community

Presentation for the Collaborative Lesson Research Seminar Series

Centre for Research in Mathematics Education

at the School of Education, University of Nottingham

March 2022

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Assistant Professor at the School of Mathematics & Statistics

University College Dublin, Ireland

My educational background

- Mathematics and Physics teacher
- School designated as in an area with low socio-economic status (SES) (referred to as DEIS schools in Ireland)
- Wonderful teacher community



Thursday 15 August 2019

Syllabus for maths does not add up for teachers



Pupils should get 240 hours of maths over three years. Stock image

Thursday 15 August 2019

New Project Maths course causes multiple divisions

Critics claim the syllabus doesn't add up. Kim Bielenberg reports on the pluses and minuses



Working it out: At the Dr Maths Workshop in Engineers Ireland were students from Marian College, Rosal Ind. Edward Quinn (1st), David Quinn TD, Minister for Education and Skills, Jordan Dwan (1st)

Thursday 15 August 2019

Problems multiply as our students struggle with maths

Teachers say that Project Maths, the new second-level syllabus, is "too difficult, too vague and too long", reports Kim Bielenberg



Education Minister Ruairi Quinn at the launch of Maths Week

Days of “in-service” ...

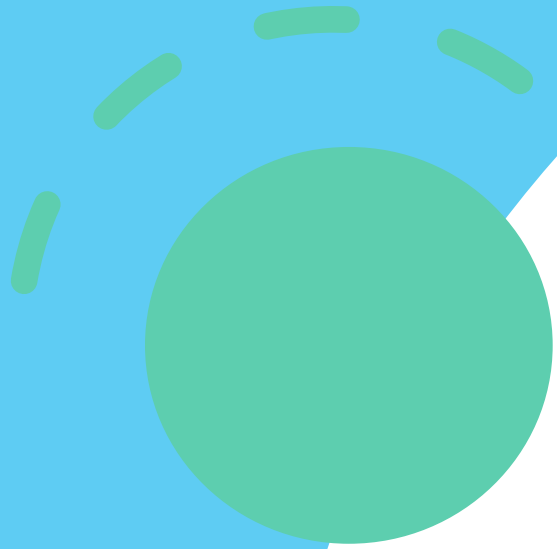


- *“It’s a bit like going to McDonald’s – in the moment you feel satisfied, you feel great, but an hour later you are hungry”* (White et al., 2021)
- Don’t see the resources in action (Remillard, 2004)
- ‘Implementation dip’ (Fuller and Johnson, 2001)

Days of “in-service” ...



- Even experienced teachers encountered difficulties implementing inquiry-based teaching by only modelling and collaboration (Ermeling 2010)
- Teachers’ underlying beliefs around teaching and learning only impacted after they see success with students (Guskey 2002)



What type of teacher professional development might work to support teachers in enacting curriculum reform?

Are teacher relationships or teacher community relevant to this work?

Teachers and Educational Reform

- Teachers are key to education and to reform (Darling-Hamond and Richardson, 2009)
- Strength of relationships between teachers within a school may influence the direction, speed, and extent of reform within that school (Daly et al., 2010)
- High-quality interactions among teachers enhance school performance (Hargreaves, 2003; McLaughlin & Talbert, 2006)...
- ...but this is dependent on the nature of the teacher community's shared beliefs (Talbert & McLaughlin, 1994)

Teachers and Educational Reform: Professional Teacher Communities

Professional teacher communities are a key feature of enabling, enacting and strengthening educational reform (Vescio et al., 2008; Little, 2002; Stoll et al., 2006)

- Build meaningful relationships and build concern for individual and minority views (Westheimer, 1999)
- Generate collective creativity and lead to shared values and vision (Hall, 1997)
- Retain teachers (Hord, 1994)
- Build teacher identity (Lieberman, 2009)

Teachers and Educational Reform: Professional Teacher Communities

Professional teacher communities are at the forefront in enacting educational change in schools (Vescio et al., 2008; Little, 2002; Stoll et al., 2006)

- Connect teacher learning to the lived realities in the classroom (Sargent & Hannum, 2009; Vescio et al., 2008).
- Provide teachers with a collaborative structure within which to engage with curricula and policies (Dooner et al., 2008)
- Impact teaching practice and student learning (Vescio et al., 2008)
- Support teachers to collaboratively and actively engage in their own learning (Grossman et al., 2001)

Professional Teacher Communities

Require

- Sustained inquiry of members of their community around their own practices
- Sharing inquiry within the group without trepidation of the implications on one's own knowledge or beliefs
- A clear goal to work towards





Teacher professional community

Professional learning community

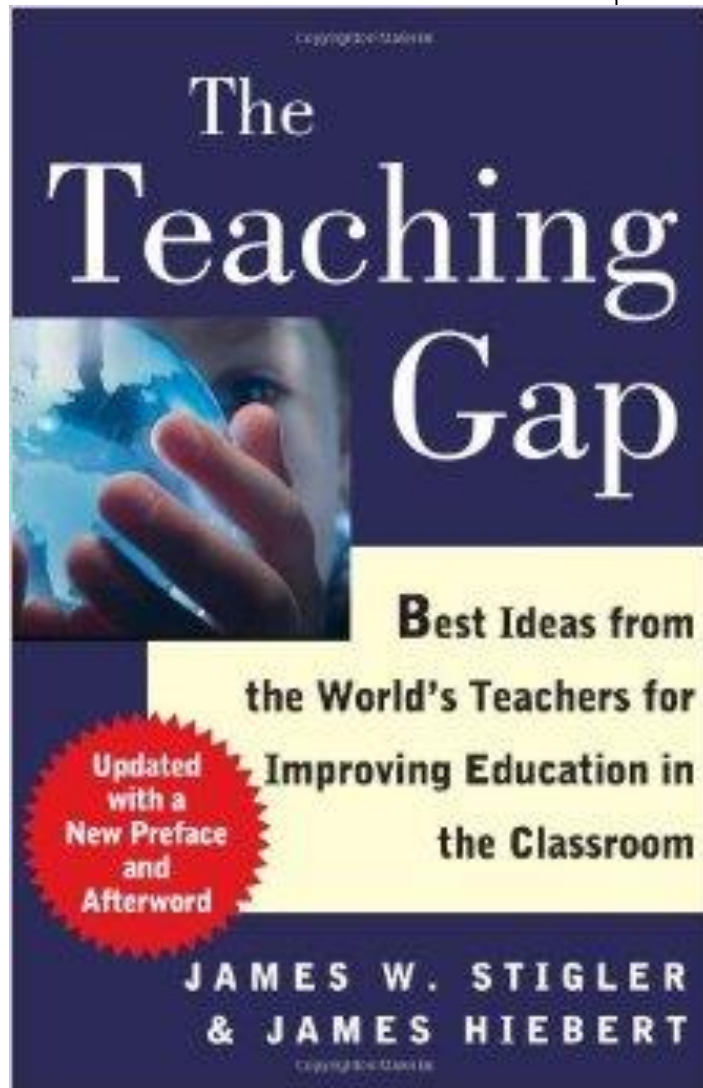
Teacher-based communities

Community of practice



Teacher community is collaborative work undertaken by a group of teachers and rooted in the premise of improving both teacher practice and student learning (Grossman et al., 2001)





Planned educational change in Japan: the case of elementary science instruction¹

Catherine Lewis and Ineko Tsuchida
Developmental Studies Center, 2000 Embarcadero Suite 305,
Oakland, CA 94606-5300, USA

Available evidence suggests that Japanese elementary science education has shifted, in recent decades, away from rote-style, rote 'teaching as telling' toward 'teaching for understanding'. How has this change been accomplished? Drawing on our ongoing study of innovations in Japanese elementary science instruction, we describe three features of the Japanese system that may facilitate planned change. First, we describe Japan's broad national goals for elementary education and the alignment of textbooks with these goals. We point out that Japan's national goals focus on the whole child (social, ethical and intellectual development), a breadth which, we speculate, may reduce the kind of pendulum swings between goals of academic and social development that have plagued some other countries' educational policies. In addition, we note that the national goals are abstract and are translated into classroom practice through the collaborative work of teachers. Second, we describe three routes through which the national goals are translated into classroom practice: research lessons, teachers' research groups, and national elementary schools. Finally, we speculate on some elements of the educational context (for example, collaborative habits and norms, beliefs about the pace and nature of change, and the practice of self-critical reflection) that may support planned edu-





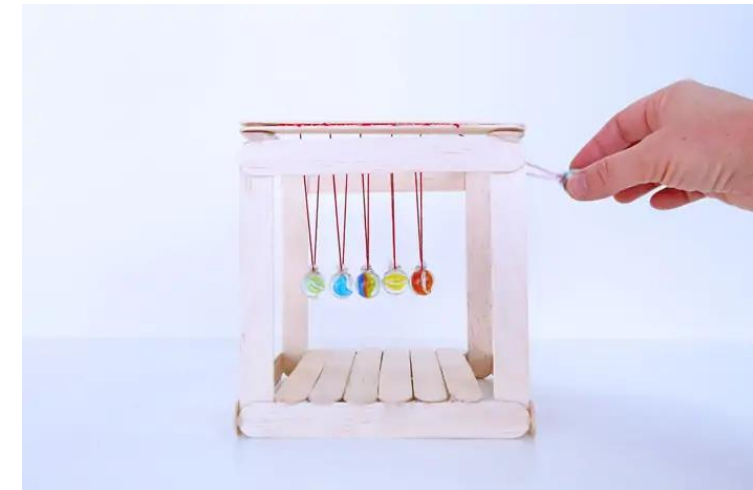
Lesson Study and Teacher Community

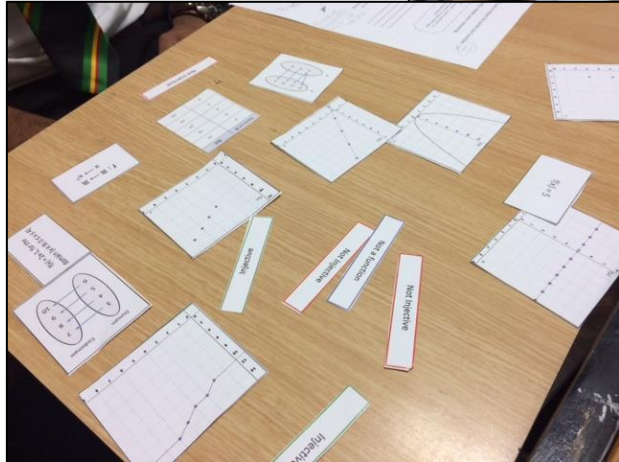
- Shared goal of engaging in the LS cycle is important in working successfully together (Chicibu and Kihara, 2013)
- Work of LS encourages teachers to make their implicit knowledge, beliefs, and practices explicit (Fujii, 2018)
- Participation helps establish a shared sense of responsibility for students' learning through collective decision-making (Lawrence and Chong, 2010)
- Encourages teachers to critically reflect on their practice (Takahashi & McDougal, 2016)
- Helps establish shared knowledge of the group (Lewis & Perry, 2017)

Lesson Study and Teacher Community

Bringing teachers together with a common enterprise doesn't ensure development of community (Rousseau, 2004)

- Important to have consistent collaboration of members of the group across all stages of the LS cycle (Chichibu & Kihara, 2013)
- Requires shared and supportive leadership (Hall, 1997; Ni Shuilleabhain, 2018)
- Important to have a shared understanding of the purposes of members' own participation (Rousseau, 2004)
- Voluntary participation is a key factor (Ni Shuilleabhain & Seery, 2020; Seleznyov, 2018)





Lesson Study and Teacher Community

- There are important aspects of jugyou kenkyuu that get “lost in translation”
- There is no such thing as a ‘perfect lesson’ – it’s the process, not the result, that is important
- Institutional structures and practices are important to maximise the benefits of LS
- Lesson study doesn’t work when it’s done in a hurry



(Fujii, 2014; Takahashi & McDougal, 2015)



Trust takes time
to develop

(Reina & Reina, 2006)

Lesson Study and developing Teacher Community: Stages of development

- Communities can undergo change over time
- A group working together can go from “beginning” to “high functioning” and sustaining
- Dissent and conflict need to be a workable part of the community
- Community needs to be able to adapt to members leaving and joining

Framework for Teacher Community Formation

D1

Formation of
group identity
and norms of
interaction

D2

Navigating
fault lines
(conflict &
differences)

D3

Negotiating
the essential
tension

D4

Communal
responsibility
for individual
growth

Beginning

Evolving

Mature



1. Formation of Group Identity and Norms of Interaction

Identification with subgroups

Pseudocommunity
(false sense of unity:
suppression of conflict)

Identification with whole group

Individuals are interchangeable
and expendable

Recognition of unique
contributions of individual
members

Recognition that group is enriched by
multiple perspectives (sense of loss
when member leaves)

Undercurrent of incivility

Open discussion of
interactional norms

Developing new interactional norms

Sense of individualism overrides
responsibility to group

Recognition of need to regulate
group behavior

Communal responsibility for and
regulation of group behavior

(Grossman et al., 2001)

Beginning

Evolving

Mature



2. Navigating Fault Lines

Denial of difference

Appropriation of divergent views by dominant position

Understanding and productive use of difference

Conflict goes backstage, hidden from view

Conflict erupts onto mainstage and is feared

Conflict is expected feature of group life dealt with openly and honestly

Beginning

Evolving

Mature



4. Communal Responsibility for Individual Growth

Belief that teachers' responsibility is to students not colleague; intellectual growth is the responsibility of the individual

Contributions to group are acts of individual volition

Recognition that colleagues can be resources for one's learning

Recognition that participation is expected from all members

Commitment to colleague's growth

Acceptance of rights and obligations of community membership (e.g. "intellectual midwifery," "press for clarification")

Investigating the development and sustainability of Teacher Community in Lesson Study

1. How does participation in lesson study impact the formation of teacher community?
2. How do teachers perceive the long-term impact of participating in school-based LS on their teacher professional community?

Research Methodology – Case Study Schools



Doone

- Single sex boys' school
- ≈ 550 students
- 5 teachers took part in LS 2012/13

Investigating the development of Teacher Community in Lesson Study

1. How does participation in lesson study impact the formation of teacher community?

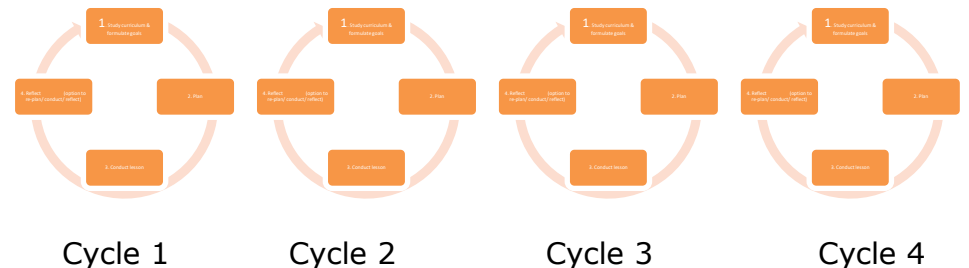


Doone

Participating Teachers and Years of Experience	
Kate	3 (out-of-field)
Lisa	7
Michael	6 (out-of-field)
Nora	30
Owen	1 (out-of-field)

Generating Data

- Four successive cycles of lesson study over one academic year
- Audio recordings of all teacher meetings
- Semi-structured interviews with teachers at three time-points during the year
- Participant observer or “cooperative fieldworker” (Bogdan & Biklen, 2007)



Data Analysis

- All audio recordings transcribed and uploaded to NVivo
- Multiple listenings before coding
- Utilised the Framework for Teacher Community (Grossman et al., 2001) as the codes of analysis



Doone

- No defined subject department
- No established culture of collaboration

Beginning: Formation of Group Identity and Norms of Interaction

LS Meeting

Undercurrent of incivility

Lisa We were thinking, rather than jumping in in the middle of all of this, that we'd do Pythagoras.

Kate Really?

Lisa (laughter)

Kate I think Pythagoras is really easy to do.

Lisa Right. You see...Ahhhh....we're going to be starting, we're going to be into algebra there all the way along.

Kate Could we just do, like, factorising

Michael yeah

Lisa Yes, ok.

Kate Like, it's going... it's easy to do, but it's hard to kind-of... I don't know. No, it is easy to do as well. We can do Pythagoras, that's fine.

Lisa Well, the other one is co-ordinate geometry. You see, this is where we're going to be by Christmas. So you could have... revise first year co-ordinate geometry, mid-point of a line segment. You could do that rather than Pythagoras.

Kate I, we'll do Pythagoras, it's fine

Michael It's getting a bit late.

Kate I'll just give you all my good ideas. (laughter)

Beginning: Formation of Group Identity and Norms of Interaction

Identification with sub-groups

Teacher Interview

Aoibhinn

Do other teachers regularly come in to observe you practice or has it ever happened?

Owen

With maths no. Actually I team taught last year... We were team teaching the double, so I started and she finished...we shared it. I enjoyed it, but it would depend on the person.

Aoibhinn

Okay, it depended on the person you were sharing with.

Owen

It would, like **me and Kate got on**. And she knew my strengths and I knew hers. So we were able to work together...But I think if I was put in a room with **someone different, then I mightn't...**

Mature: Formation of Group Identity and Norms of Interaction

Developing new interactional norms

Lisa And 100 upwards.

Kate A thousand, Lisa, a thousand.

Michael (laughter)

Kate Lisa! A thousand!

Lisa Oh sorry, a thousand of these... (laughter)

Mature: Communal Responsibility for Individual Growth

Commitment to colleague's growth

Owen I've never taught that before.

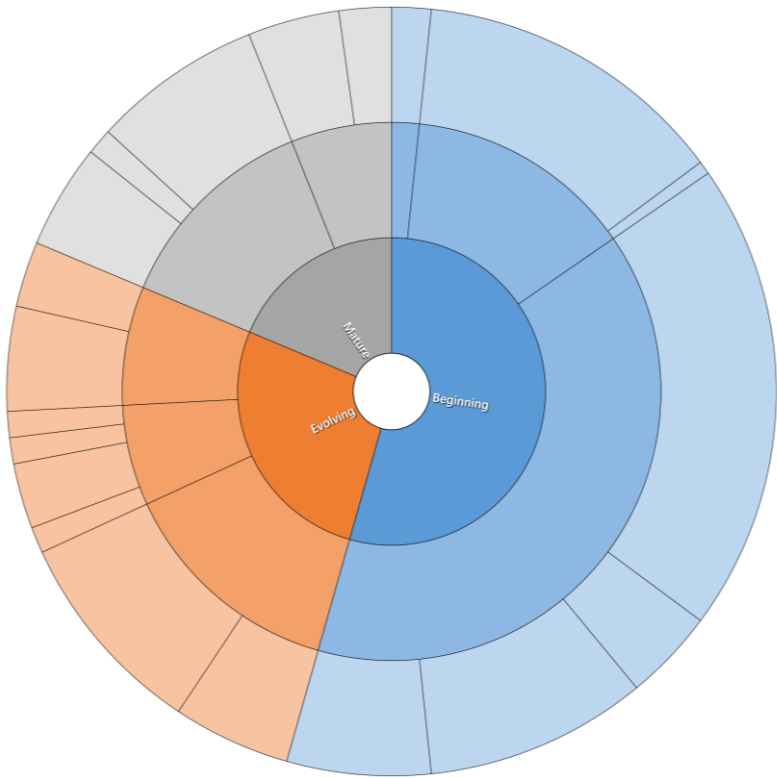
Kate Well, I love how you've chopped up the colours and showed them in the corners how they fit.

Lisa Yeah, I thought that was good.

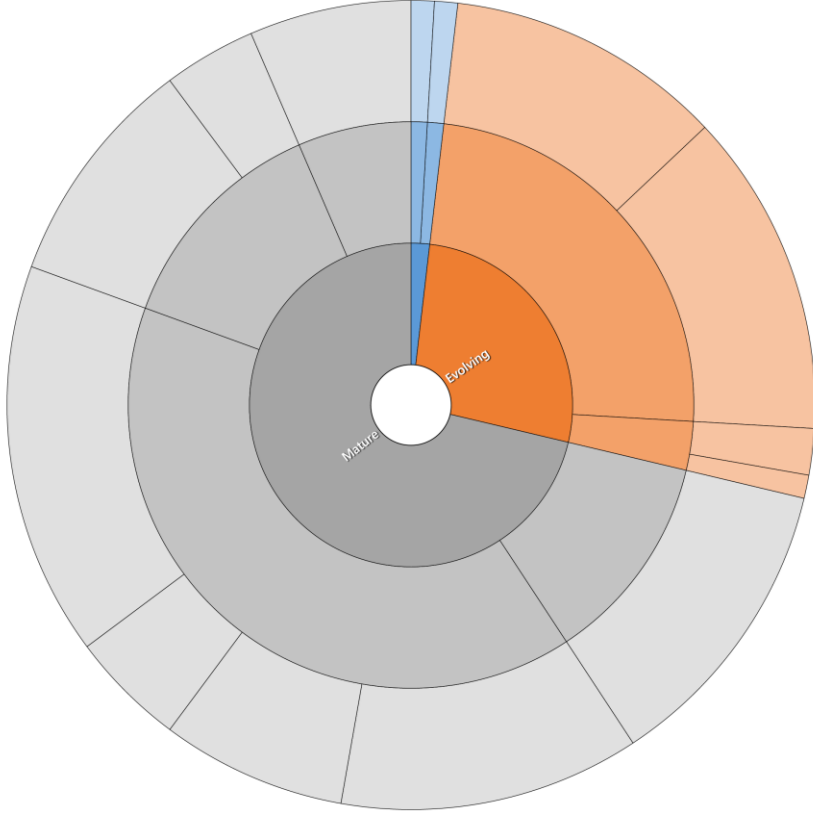
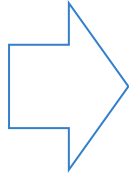
Kate I like that one . Very impressed.

Lisa Interactive.

Findings: Beginning to Mature



Cycle 1



Cycle 4

- Beginning
- Evolving
- Mature

Mature: Formation of Group Identity and Norms of Interaction

Identification with the Whole Group

Kate I think what my long-term goal is, it would kind-of be linked to both. It would be, like, to have, let's say, two lesson plans this year, but then continue...

Lisa And this is for...

Kate for the next few years...

Lisa Yeah, right.

Kate so eventually we have, like, a library of these T&Ls, our own T&Ls...

Lisa Yes.

Kate that every lesson is, you know, even a little bit interesting...

Kate Yeah.

Kate and that every student, no matter how weak or strong, leaves the class feeling like they achieved something, even the weakest of the weak.

Aoibhinn Mmm-mmm.

Kate Strongest boys fly.

2. How do teachers perceive the long-term impact of participating in school-based LS on their teacher professional community?

Return to the schools 6 years later



Doonee

- Single sex boys' school, \approx 550 students
- 5 teachers took part in LS 2012/13
- 3 volunteered to participate in follow-up research



Crannóg

- Mixed gender cohort, \approx 900 students
- 7 teachers took part in LS 2012/13
- 3 volunteered to participate in follow-up research

2. How do teachers perceive the long-term impact of participating in school-based LS on their teacher professional community?

Return to the schools 6 years later



Doone



Crannóg

Crannóg		Doone	
Name	Years of experience	Name	Years of experience
Eileen	9	Kate	9
Fiona	37	Lisa	13
Walter	18	Nora	41

Semi-structured interviews (20-35 mins)
on perceptions of LS and impact on community

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graph TD; A[Semi-structured interviews (20-35 mins)  
on perceptions of LS and impact on community] --> B[Data transcribed and uploaded to NVivo]; B --> C[Data coded according to the Framework for Teacher  
Community Formation];
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Data transcribed and uploaded to NVivo

Data coded according to the Framework for Teacher
Community Formation



Doone during LS



Doone Post LS

Doone – 6 years on from Lesson Study

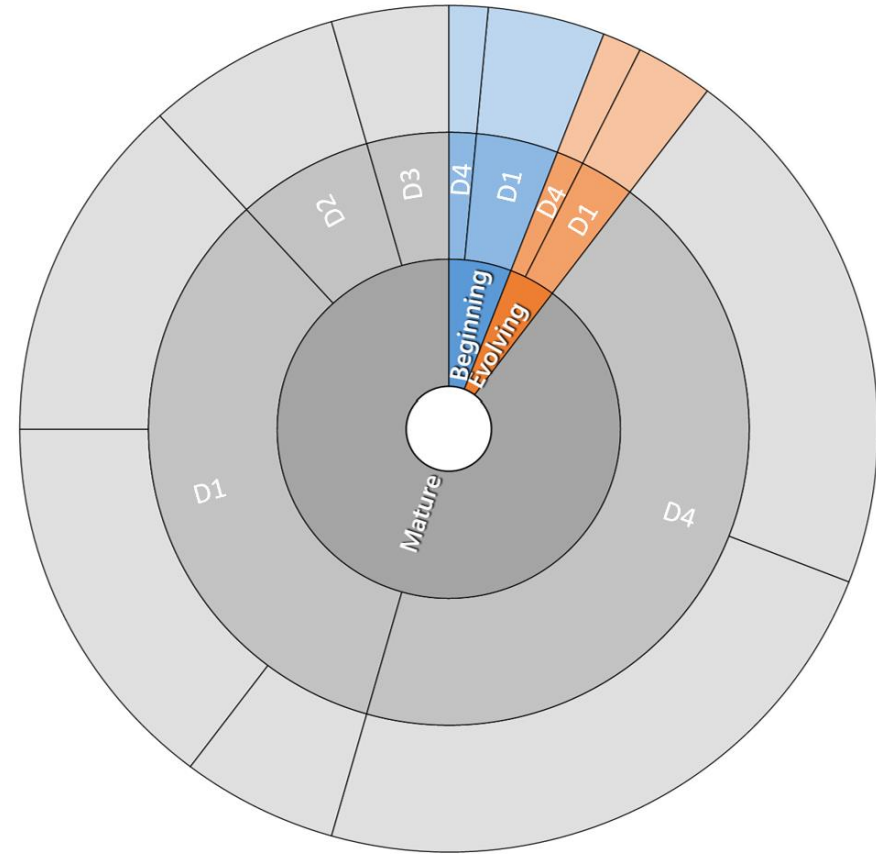
- Despite Doone’s limited engagement with each other prior to LS, they seem to have developed a predominantly mature teacher community during LS (correlating with previous findings)

“When we were delivering the lesson there was no sense of ‘this is my lesson’; it was a case of ‘this is our lesson’” Kate

- Teachers in Doone work more with one another now than they did before participating in LS



Crannog during LS



Crannog Post LS

Crannog – 6 years on from Lesson Study

- Maths department meets for 40 minutes every week to discuss teaching and learning approaches
- Administration and planning have moved to online, to allow more discussion time for teaching & learning (pre-pandemic)

“We are a good team, so I think anyone that comes in realises that and gets involved, and kind of realises what our ethos is” (Eileen)

“We would have been one of the first departments to have met as a subject every week and then all the departments in the school meet as a subject every week. So, I think our participation in lesson study did sort of spawn off a number of benefits for the whole school as well” Walter

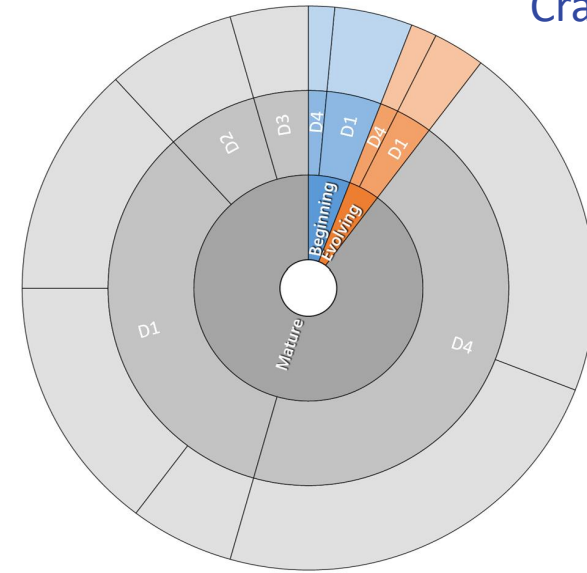
Research Findings

- Teacher communities in both schools went from ‘beginning’ to ‘mature’ over the course of one academic year
- Mathematics teachers in both schools had developed a predominantly mature professional community during their participation in lesson study.
- Six years on the community has been sustained in one school and further strengthened in the other.
- Participating teachers perceived their involvement in LS to be an enriching and worthwhile experience, which had long-term positive impact on their relationships with colleagues.
- LS may serve as a potential structure to foster the development of sustainable professional communities within subject-based teacher groups.

Research Discussion

- Continued support from school management (Stoll et al., 2006) and time provisions (Grossman et al., 2001) may account for the differences between the two teacher professional communities
 - Crannog: ongoing support and provisions in place so the subject department can meet as a group
 - Doone: no time allocations or opportunity for the subject department to meet as a group
- May be important that it was school-based and subject specific work undertaken over a number of successive cycles of LS
- Establishing features of a teacher professional community is a complex and long-term process
 - Development of shared goals and values (Westheimer, 1999)
 - Positive attitude towards self-development and strong working relationships (Stoll et al. 2006)

Crannog Post LS



Doone Post LS

How does this align with the literature on Teacher Community and LS?

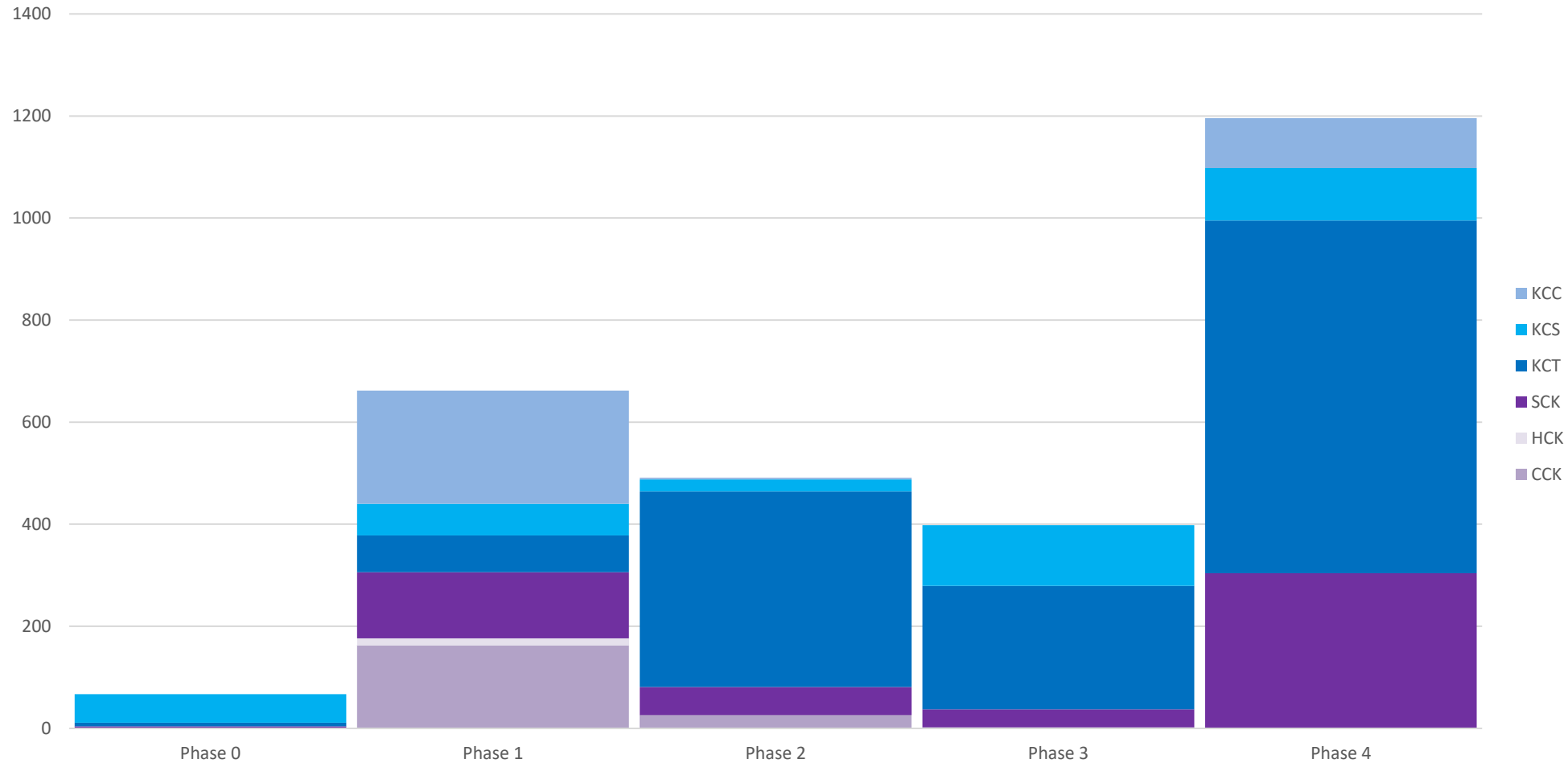
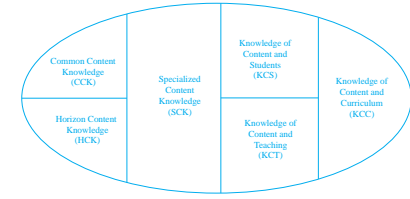
Teacher Community

- Collaboration increases teachers' sense of professional support and establishes their collective ownership of effective instruction (Louis 2006)
- Teachers obtain PCK through participation in teacher community (Shulman and Shulman, 2003)
- Correlation between PCK, CK and student achievement (Baumert et al., 2008)

Lesson Study

- LS can support teachers in educational reform (Takahashi, 2010; Ni Shuilleabhain & Seery, 2020)
- Teachers utilise their PCK through LS conversations (Clivaz & Ni Shuilleabhain, 2021)
- Discussions can include increasing amount of PCK over successive cycles of LS (Ni Shuilleabhain, 2016)
- LS can positively impact teachers' and students' knowledge (Lewis & Perry, 2017)

MKT expressed in one cycle of lesson study



(Clivaz & Ni Shuilleabhain, 2021)

Research Conclusions

- Evidence of the sustained impact of teachers' participation in LS over one academic year
- LS may be a viable model to support teacher professional community development in long-term
- Further research required on the analysis of the development of teacher community over one academic year
- Further research required into teacher community in schools where LS has been taking place over a number of years

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Questions and comments

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Take-home message

Teacher education requires a sustainable, school-based model which can provide teachers with opportunities for collaboration and an environment that supports their capacity-building and pedagogical improvement, for the benefit of both teachers and students.