Inclusive Literacy Teaching: Raising attainment and equity by empowering educators and broadening the evidence they use

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Abstract

This paper describes the development and use of a tool designed to support educators to use a broad range of professional knowledge for inclusion and equity in literacy teaching. The tool encourages teachers to formally recognize, and act on a wider range of evidence about students and to adapt their literacy curriculum and teaching appropriately. The research adopted a Design Experiment approach in 48 schools, working with 650 teachers and 12,783 students. A paired sample T-test showed a significant improvement in standardized age scores. Further analysis indicated that the 'tail' of underachievement had shortened and Goodman and Kruskal's gamma showed a weakening of the relationship between poverty and attainment. This gives cause for cautious optimism that attainment gaps may be addressed by supporting educators to re-think how they address inclusion and attend to a wider range of evidence in literacy teaching. It suggests that local, bottom-up curriculum development may be more effective for inclusion than centralized top-down approaches, and that education research could develop and trial tools that support teachers in this.

Introduction: Poverty as an inclusion issue

Education policies have increasingly focused educators on issues around inclusion for children living in poverty. In Scotland, the policy aim is to raise general attainment and make schooling equitable for students from economically disadvantaged backgrounds. However, there is uncertainty about to translate this aim into curriculum design and content. Litercy, as a 'gateway subject' for other curricular areas has been a key concern and in many countries curriculum developments, influenced by psychology research, focused on the 'five pillars' of reading identified by the USA's National Reading Panel (NRP): phonemic awareness, phonics, fluency, vocabulary/language development, and comprehension (National Reading Panel 2000). These cognitive elements of reading form the backdrop for curricula reforms in the USA, Australia and England. A minority view in the NRP report by Joanne Yatvin urged a wider, more sociological, consideration of the evidence on learning to read (NRP 2000 p 7.1-7.7) was widely overlooked. More recently, to support schools serving disadvantaged families educators in England have been encouraged to locate evidence-based programmes by using the Education Endowment Foundation's Teaching and Learning Toolkit (Education Endowment Foundation 2019) and in Scotland, the Scottish Attainment Challenge: Learning and Teaching Toolkit (Education Scotland 2019a). These toolkits base recommendations on scaleable models, programmes and interventions identified as effective by systematic reviews and randomised controlled trial (RCT) methodologies.

However, it is not clear that such foci help literacy teachers frame an inclusive literacy curriculum. Other interpretations of inclusion (e.g. Sen 1979; 2005; Nussbaum 2011; Reindal 2016) focus on pupil agency, voice and identity, looking

beyond labels and programmes of content towards a 'Capabilities' approach in which the curriculum delivers agency and wellbeing by delivering the the freedom to achieve capabilities and to function in ways that allow people to do, and to be, that which they most value (Sen 1979). For capability theorists, becoming literate is one of the 'functionings' that are important if economically disadvantaged students are to achieve key freedoms. However, the compliance and accountability measures that often accompany centrally-determined, top-down, literacy programmes and interventions may unintentionally enshrine or even widen attainment gaps (Education Datalab 2015) and weaken pupil agency, engagement and curricula coherence by imposing a curriculum that is irrelevant to students' lives. Almost three decades ago, Haberman (1991) suggested that children and young people living in disadvantaged circumstances experience a 'pedagogy of poverty' characterised by tightly controlled routines in which teachers give information, ask questions and test students, assign seatwork, mark tests and homework, settle disputes and punish non compliance. He argued it was a pedagogy 'in which learners can "succeed" without becoming more involved or thoughtful' (1991 p.292) and that ultimately the '…pedagogy of poverty does not work. Youngsters achieve neither a minimum level of life skills nor what they are capable of learning. The classroom atmosphere created by constant teacher direction and student compliance seethes with passive resentment that sometimes bubbles-up into overt resistance. Teachers burn out because of the emotional and physical energy that they must expend to maintain their authority every hour of every day.' (1991 p. 291). More recent empirical studies support the view that rigidity is too easily confused with rigour, creating disenfranchised students. Keys Adair (2017), for example, reports children in one high-poverty school whose agency as learners was so confined that they were shocked by videos of students in another school freely asking

and answering questions. Carter Andrews, Bartell and Richmond (2016) note the importance of teachers fighting to maintain a 'humanizing pedagogy' and argue that high-stakes standards and accountability and the lack of professional autonomy in school curriculum and decision making make it harder for educators to address 'the challenge of meeting the needs of more diverse learners … in increasingly complicated contexts' (2016 p 170).

However, Reindal (2016) points out that simply adopting the intellectual stance of a capabilities approach will not necessarily deliver the high-quality practice or improved outcomes that inclusive practice requires. The practical problem is how to support educators to raise literacy attainment in ways that are responsive rather than restrictive, bottom-up rather than top-down and that prioritise pupil voice, agency and co-production. To this end, literacy researchers at [xxxx] University developed the *[UNIVERSITY] Three Domain Tool*, which was designed to facilitate teachers in thinking about literacy attainment as an inclusion issue by using a wider range of evidence than simply cognitive knowledge and skills. The tool was trialled with student teachers (Author 2017) and then trialled as a design experiment (Van den Akker, Gravemeijer, & McKenney 2006) with 650 fully qualified teachers working with just under 13,000 students in 48 schools in one local authority in Scotland. This paper describes the tool, outlines its role in staff development and the impact on literacy attainment in general, on students with previously low literacy attainment, on the attainment of students living in poverty, and on the literacy attainment gap between students living in economically disadvantaged and more advantaged homes.

Research basis of the [UNIVERSITY] Three Domain Tool

The recent curricula focus on literacy as a set of cognitive knowledge and skills contrasts with literacy research that conceptualises literacy as an ideological practice, rather than autonomous knowledge and skills to be learned (Street 1984). Ethnographic research has detailed how literacy is woven into, and forged within, the social, intellectual, cultural and material norms of communities and families (Heath 1983; Barton 2007). The studies document systematic differences in the nature, purpose and quantity of literate events children and young people experience in everyday social settings. These shape the 'what, how, where, when and why' of literacy and literacy learning and relate to the cultural and social capital children bring to school. There are differences in the literacy artefacts, stories and texts that specific communities use and consider worthwhile (Heath 2008; Barton 2007), in how communities talk about texts and respond to stories, and differences in their unspoken beliefs and values about the point and purpose of being literate (Heath 2008). These community-based differences influence what children know of literacy and they inculcate children and young people to recognise different aspects of school literacy and to engage with school literacy in particular ways (Barton 2007; Gregory et al. 2004; Heath 2008).

Home and community experiences also influence what students know of the wider world and the 'funds of knowledge' they bring to school (Gonzalez et al 2005). For reading, this background knowledge influences the kind of topics particular students comprehend easily and which topics will require a longer stretch to be understood (Smith 2010; Luke, Woods and Dooley 2011). It means that skills-based approaches to teaching comprehension (see for example the reciprocal reading approach of Palincsar and Brown 1984) may be necessary but not sufficient. Teachers need to recognise and adopt pedagogies and texts that are inclusive of students' different

funds of knowledge, habits of mind about reading, and of the different social practices around talking about texts and stories children bring to school. They need to bridge carefully when topics are less familiar; be prepared to coach children and young people in new ways of thinking about texts or of talking about texts. They need to recognise that the discursive approaches, skills and entitlements often presumed in class discussion and classroom routines may unintentionally disadvantage children from communities that do not habitually respond to literate events in such ways (Lareau 2011; Hiebert 2017). They also need to be more thoughtful about providing texts on topics that allow all young readers to employ their 'out-of-school' knowledge to supplement and interpret the text. Out-of-school knowledge matters for comprehension and for reader identity; a reader's existing knowledge changes the kinds of internal conversations a reader has with the text, which in turn positions the reader differently in relation to it and to reading as an activity (Smith 2010). Pat Thomson (2002) suggests that every child brings to school a 'virtual schoolbag' of experiences, knowledge and skills. An article published by the Queensland Government succinctly explains why students' virtual school bags should matter to educators:

> 'Some children are able to open their school bags when they get to school and make use of what is in there – such as knowledge of the English alphabet, book language, computer experience, and family genealogy. Other children may find that there is little or no way that they can make use of their knowledge and experience – bilingualism, non-English folk music, family small business, sibling care and kitchen duties … There are, of course, many possible virtual school bags and many possible educational trajectories as Thomson points out. The problem occurs when some children's capacities,

interests, knowledges and experiences count for little or nothing at school, in comparison to their peers. (quoted by Wenger 2011)

Educators therefore need to adopt an overt, asset-based disposition towards difference that works in two directions: firstly, making positive efforts to celebrate and use the world-knowledge and literacy practices that such children and young people bring and, secondly, by noticing and bridging thoughtfully to school practices that may be less familiar. Their attempts to do this need to be evident in their teaching, timetables, resources and in the social and intellectual environment of the classroom if they are to create an equitable literacy curriculum which does not disadvantage children from families who engage in a different slice of life and who have forged a different knowledge about the world.

Sociological research also indicates that patterns of childrearing may bestow different ways of interacting with adults (Heath 1983; 2008; Lareau 2011). Lareau suggests that middle class parents' 'concerted cultivation' approach to childrearing sees them actively coach their children to talk effectively to adults in different social situations, and bestows an entitlement to be heard and helped by adults. These skills and entitlement make middle class five year olds more likely to ask teachers for help (Calarco 2011). Pedagogies that foster agency and welcome students' observations, connections, questions, requests for help or re-explanation are particularly inclusive.

Listing these issues is not to designate a fixed 'tick list' of items to be addressed, nor is it to deny the 'everyday realities' (Thomson 2002) faced by schools educating disadvantaged students. Rather, it broadens professional knowledge to encompass the existing knowledge, learning opportunities and networks in children's lives in ways that specifically position inclusive practice as being more accepting of, and making a

better 'bridge' between, the differing cultural and social capitals, generating broad reciprocities and shared information (Putnam 2000).

Another strand of literacy research that connects with, but is distinct from, cultural and social capital highlights students' identities as readers, writers and learners. Identity is complex, shifting and malleable, forged by individual experience and social context and acts as a 'heuristic means to guide, authorize, legitimate, and encourage … behaviour' (Holland et al 1998, p. 18). As such, it is a powerful determinant of how students think and act, both as literate beings and as literacy learners. Because identity is both positional and agentic, children and young people adopt and perform the roles and identities made available to them but are also active players who can define and re-define their identity through their actions, discourses and relationships (Gee 2000).

Teachers who recognise these dual identity processes can influence classroom opportunities, resources and networks to create the conditions for students to develop positive identities as readers, writers and learners. When reading becomes part of the social fabric of the classroom, student-to-student networks locate and legitimate new texts and new ways of responding to them. Student-driven reading and writing networks can develop a mutually supportive spiral of positivity that infects power-relations and the wider ethos, social and organisational structures in class (Putnam 2000). However, fostering this 'healthy' classroom ecology requires teachers who attend thoughtfully to how students see themselves as learners and readers, who notice the kinds of texts students want and how they are positioned as readers by others, and who can intervene sensitively so that every student develops a positive literate identity. It requires teachers who believe that it is not a matter that should be

left to chance or personal home circumstance and consider it their job to ensure opportunities happen on the ground in the classroom. They need the pedagogical and personal skills to work sensitively within these opportunities, to nudge every student towards a positive identity. Examples of the sorts of conditions this requires are: knowledgeable adults who can provide information about books students might enjoy (Marinak and Gambrell 2016); relaxed, non-performative opportunities for students to choose books, and to discuss books informally and semi-informally (Short et al. 1999; Chambers 1993). Students need to be offered spaces to read and books that they both can read and would want to be seen reading (Moss and McDonald 2004), which necessitates a high-quality, accessible book-stock. For the teacher, it requires a sensitive dance between supporting student-led opportunities for reading that are outwith the teacher's control and feeding demand by providing more teacher-initiated whole-class, group and individual reading experiences that are socially, emotionally and intellectually engaging (Allington 2005; O'Sullivan et al 2010).

Students' identities as literacy learners are also important. They are distinct from, but contribute to, their reader identities. Learner identity is influenced by how students are publicly and formally positioned as literacy learners in the classroom by such things as seating and grouping arrangements (Scherer 2016) and by their formal and informal conversations with adults and peers. These are influenced by the extent to which reading is positioned as a performative 'work' task in which individuals are judged and graded according to effort, application and performance (Moss 2007).

Knowing that literacy learning is not simply a cognitive matter but is affected by cultural and social capital and by literate and learner identity should prompt teachers to explicitly consider and respond to their students' literacy affordances and needs in

these terms, as well as in cognitive terms. Such attention is particularly important for equity. Yet although education policies and curricula advice consistently and explicitly detail the cognitive knowledge that professionals should notice and teach, the professional knowledge for these other areas is less salient and advice is more generic. It surfaces, for example, in learning theories on 'growth mind-set' (Dweck 2000), in pedagogical advice about task design (Wigfield and Guthrie 2017), and in advice on agency and inquiry (Keys Adair 2017) but teachers must articulate for themselves specific implications for literacy learning. The result is that they lack the profile, coherence and force of the cognitive advice teachers are given about reading.

Some education researchers have positioned this as a pedagogical problem, conceptualising methodologically weak horizontal knowledge frames around *how* to teach losing out to stronger vertical knowledge frames around *what* to teach (Morais 2002). However, Moss (2013) takes a broader view, suggesting that it reflects inequalities in the rights of different disciplines to define what counts as relevant knowledge. Her analysis suggests that policy makers working to create school-based literacy frameworks and policies afford a relatively high tariff to psychological knowledge and a relatively low tariff to sociological and anthropological knowledge. For literacy learning, this imbalance means that while professionals are expected to deliver a literacy curriculum that is equitable and addresses the needs of individual students, they are largely unsupported in bringing to their work, the socio-cultural focus that could help deliver this.

The [*UNIVERSITY] Three Domains Tool* helps class teachers and School Principals to re-think the import they accord to the different kinds of evidence. It acknowledges the importance of evidence about the cognitive aspects of reading as one domain of

learning, but places alongside this, evidence of the students' socio-cultural understandings and identities. In doing this it seeks to help educators adopt more responsive, socio-culturally sensitive and individually nuanced approaches to teaching reading. The theoretical stance on professional learning is taken from social theorists Wenger-Trayner et al (2014) who envisage professional knowledge as a socially defined and dynamic 'landscape of practice' which spans many communities of practice. Professionals develop 'knowledgeability' across the landscape by aligning knowledge from different communities to create a meaningful moment of practice. This reframes the 'problem' of professional knowledge as one of orchestration rather that simply depth of understanding about one kind of research. It binds professional knowledge both to its context of use and to a range of research communities of practice, explicitly acknowledging that knowledge is forged from distinct disciplinary insights, each with its own 'discourse of truth' (Foucault 1988). Professionals must learn to work with the different ideas about what constitutes evidence and standards of proof, combining these insights with other policy, management, regulatory, and curriculum practice communities. Knowledge generated within different communities may dovetail, conflict or exist in parallel but by aligning and re-aligning different kinds of knowledge in context, educators transform their experience of the whole landscape to develop professional competence, becoming a member of their own, teaching, community of practice (Wenger-Trayner et al 2014).

The [*UNIVERSITY*] *Three Domains Tool* supports this dynamic professional decision-making: communities often compete to define what matters and practitioners must adopt, disregard or re-shape knowledge to resolve tensions and create synergies in the context of use. By supporting evidence about literacy learning from multiple perspectives, it promotes fluid professional knowledge, reflection and metacognition;

each practical application redefines the connections and boundaries between different kinds of knowledge. The decisions practitioners make concern 'what works, for whom, in which circumstances, and why. New combinations of insights prompt alternative actions and pathways to impact, a process of alignment and re-alignment that has potential to drive professional learning, creativity imagination, identity and agency.

In this sense, the *[UNIVERSITY] Three Domain Tool* (Figure 1) is designed to act as a 'boundary object' (Star 2010) to facilitate the process of "collecting, disciplining, and coordinating distributed knowledge" (Star 2010 p.607). As with all boundary objects it is weakly defined in abstract but becomes strongly defined in its context of use. This enables it to be used by different system actors working in different contexts. By fore-fronting the knowledge and evidence generated by diverse research perspectives the *[UNIVERSITY] Three Domain Tool* offers intuitive validity (Kahneman 2011) and allows educators to explicitly capture and use a wide evidence-base to inform professional decisions.

INSERT FIGURE 1 ABOUT HERE
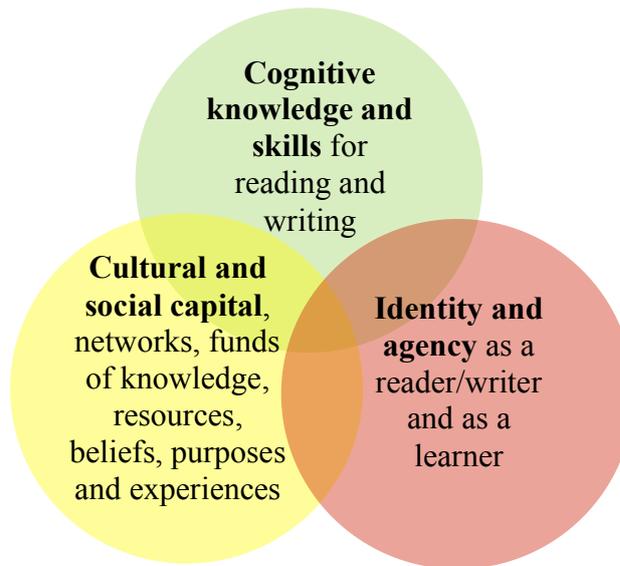
Figure 1: *[UNIVERSITY] Three Domain Tool* for Literacy Teaching and Assessment

Research aims and methodology

The data reported in this paper is drawn from a larger research study. The overall aim was to examine the practical impact and issues arising when teachers and School Principals explicitly capture data from the three knowledge domains and use it to inform curriculum design and teaching. We studied issues around teaching, student engagement and around educators' understandings of literacy teaching This paper reports the impact on attainment. We were interested in whether the *[UNIVERSITY] Three Domain Tool* could impact on attainment in general and the attainment of high-poverty students in particular. We use the terms 'educators' or 'practitioners' to refer to School Principals and teachers together and distinguish between these terms where appropriate.

In the study, we used the [*UNIVERSITY] Three Domain*s *Tool* with Scottish educators (n=670) working with just under 13,000 students aged five to twelve years. The study

was split into three Phases (see Table 1). Phase One involved School Principals (n = 43[1]) and a class teacher from each school (n = 48) undertaking four professional development sessions, each lasting one half-day. These outlined the *[UNIVERSITY] Three Domains Tool*, and then provided research and pedagogical advice on each domain, along with associated short readings and investigatory tasks designed to help practitioners scope the existing priorities and 'lived experiences' within their own schools and classrooms. The three investigatory tasks were: first, asking a low-attaining 10 year old reader to describe how reading was taught in the early stages of school and what it was like for them learning to read, what they remember reading then, and what they read now; second, doing a "school/classroom walk", noting the ideals about reading and readers embodied in the use of classroom space, wall displays, resources, organisation of book corners and timetables, and which domains these supported (or not*)*; third, engaging with to two low-attaining six-year old children as they read their 'reading book', checking the level of challenge, the range of cues and strategies used, and the kinds of comprehension and attitudes displayed in discussion. In addition to these, classroom teachers were asked to adopt any pedagogies and activities that they thought could make a difference in their own circumstances and report back on these to the School Principal.

Phase Two lasted six to eight weeks and involved these key educators using the tool in practical individual and class-based teaching situations [AUTHOR 2017]. They worked in *Literacy Clinic* teams of four, using the [UNIVERSITY] *Three Domains Tool* data in teaching one high-poverty, low attaining reader. The purpose of the Clinic experience was threefold: to build participants' understanding of what evidence in each domain actually looks like and how to respond to it in an asset-based way; to experience navigating across domains, balancing different kinds of evidence and

notice how an intervention in one domain causes ripple effects in others; to prompt questions about how well the existing curriculum and pedagogy had served this child and what could have been done differently. In the Clinic, each educator taught their child weekly for 30 minutes, using the [*UNIVERSITY*] *Three Domains Tool* to prompt and organise their observations, actions, speculations and discussions. Team members communicated regularly between sessions and discussed observations, actions, priorities, and wider implications for the schools fortnightly with researchers. At the end of Phase Two almost all educators had a clear sense of the tool and the changes in curriculum and teaching important for their own school. This data allowed the research team, local authority officers and some School Principals to articulate the overarching aims and develop a theory of change for the project (Dyson & Todd 2010).

Phase Three involved a wider roll-out to all teachers. Teachers had three half-day professional developments, delivered 'en mass', in quick succession. The content was framed by earlier experiences and allowed spaces for School Principals to discuss the ideas and changes most relevant to their school. School Principals thereafter used the *[UNIVERSITY] Three Domains Tool* as an organiser for development. They directed teachers to try particular activities and report back, tailored new professional developments, resources and support for classroom instruction. They built the *[UNIVERSITY] Three Domains Tool* into their systems of regular student progress meetings, classroom visits and reflective discussions. A period of trialling extended to the end of the academic year, with the local authority expectation of full roll-out from the beginning of the new year.

INSERT TABLE 1 ABOUT HERE

Academic Year/ term	Phase	Staff development activity	Staff involved
Year 1/Term 1	1	4 Professional Development sessions (half day) with associated reading and tasks.	School Principals 1 Classroom teacher
Year 1/Term 1	2	Literacy Clinics; professional discussions	School Principals 1 Classroom teacher
Year 1/ Term 2	3	3 Professional Development sessions with associated reading and School Principal designated tasks	All staff
Year 1/ Term 3		Teachers trial ideas and activities, and report-back; individual school development programmes.	All staff
		Articulate aims and a theory of change.	Local authority officers; researchers; School Principals
Year 2 August-June.		Schools begin systematic roll-out supported by local authority officer and research team.	All staff

Table 1: *Staff development and implementation timeline*

Changes in pupil attainment were measured in two ways. 19 schools conducted

NGRT (Burge, Styles, Brzyska, Cooper, Shamsan, Saltini & Twist 2010) age-standardised tests

on children aged 7-13 years (n= 3727) using linked A and B tests taken nine months

apart (i.e. the beginning and end of the academic year in which the development was

'rolled-out') on pupils aged 7-13 years. This was a purposive sample representing a

range of school sizes and poverty profiles (measured by SIMD, free school meal

entitlement and uniform entitlement). Statistical analysis of this data allowed us to

examine the impact on attainment for the intervention cohort across the year. We also

used an existing authority-wide assessment, the *Progress Test in English* (PTE) (short

form) test (nd GL Assessment), which was conducted annually in June (the end of the

Scottish school year) for all pupils aged 8-9 years (n= 1784) and 12-13 years

(n=1774). This data allowed us to compare the attainment of the intervention cohort

with historical data on the attainment of previous cohorts in schools across the local authority.

Results and analysis

This section analyses the impact on attainment in general and for pupils in poverty. Table 2 summarises the impact on attainment in general. It shows the standardised scores for the within-cohort sample of pupils aged 7-13 years (n= 3727). The average Standardised Age Score (SAS) in NGRT A was 96.4 compared with 101.0 in NGRT B. A paired sample T-test shows that the difference between mean scores (4.6) is significant at the 99% confidence level (p value < 0.01).

Table 3 breaks down the attainment results for each year group. It shows that the differences in average scores were significant at the 99% confidence level for all stages of schooling but that the largest mean difference was in P3 (7.5) and the smallest in P6 and P7 (2.9).

INSERT TABLE 2 ABOUT HERE

Mean SAS NGRT A	Mean SAS NGRT B	N	Mean difference	Paired sample T-test	P value (two-tail)
96.4	101.0	3,727	4.6	30.7	0.00

Table 2: *Within-cohort differences between NGRT average Standardised Age Scores*

INSERT TABLE 3 ABOUT HERE

Stage	Mean SAS NGRT A	Mean SAS NGRT B	N	Mean difference	Paired sample T-test	P value (two-tail)
P3	89.3	96.8	734	7.5	20.4	0.00
P4	95.3	100.5	695	5.1	15.1	0.00
P5	96.5	100.7	950	4.2	16.1	0.00
P6	99.6	102.3	671	2.9	9.0	0.00
P7	101.9	104.7	677	2.9	8.1	0.00

Table 3: *Differences between NGRT average Standardised Age Score by Stage*

The Progress Test in English (PTE) data (Table 4) shows similar patterns of change in attainment across the age groups. This was a test for which the local authority had historical data and we compared the attainments of the intervention cohort pupils aged 8-9 years and 12-13 years with those of previous cohorts. An independent-samples T-test on this cross-cohort sample shows the increase in the average standardized age scores to be statistically significant at the 99% confidence level (p value < 0.01) for pupils aged 8-9 years and at a 95% confidence level (p value < 0.05) for pupils aged 12-13 years. The smaller shift among older children is consistent with the NGRT results (see Table 3) and may be because the older children had more entrenched, harder to shift, attitudes towards literacy, springing from their longer experience of less-satisfactory personal progress or a less-satisfactory literacy curriculum.

INSERT TABLE 4 ABOUT HERE

	Mean SAS 2015-16	N 2015-16	Mean SAS 2016-17	N 2016-17	Mean difference	Independent samples T-test	P value (two-tail)
8-9 years	100.3	1872	102.6	1784	2.3	4.4	0.00
12-13 years	97.2	1740	98.3	1774	1.1	2.3	0.02

Table 4: *Differences between PTE average Standardised Age Scores at 8-9 years and 12-13 years.*

Attainment of poverty and non-poverty cohorts

We were interested in the attainment gap between children living in poverty and those who were not. Families can move in and out of poverty and, because there is no single reliable poverty measure, we used an area-based measure, the Scottish Index of Multiple Deprivation (SIMD) quintiles, and a family income measure, eligibility for a School Clothing Grant. We could not use free-school meal (FSM) entitlement as a measure of poverty since Scotland has universal FSM provision up to Primary 3.

Table 5 shows the NGRT average SAS by SIMD quintile for the intervention cohort at the beginning (NGRT test A) and end (NGRT test B) of the academic year. The data show incremental increases in average SAS scores from quintile 1 (children living in the 20% most deprived areas) to quintile 5 (those living in the 20% least deprived areas). There is clearly a relationship between deprivation and attainment at both data points. Children in all SIMD quintiles did significantly better in NGRT B than A, making more progress than expected. These differences were significant for all SIMD quintiles (p value < 0.01) and the average size of improvement appears to be broadly consistent, although it may have been slightly larger for children in quintile 3.

INSERT TABLE 5 ABOUT HERE

SIMD quintile	Mean SAS NGRT A	Mean SAS NGRT B	N	Mean difference	Paired sample T-test	P value (two-tail)
1 (20% most deprived)	91.1	95.6	873	4.5	14.1	0.00
2	94.4	98.8	707	4.4	12.3	0.00

3	96.1	101.2	755	5.1	16.1	0.00
4	100.1	104.5	596	4.4	12.4	0.00
5 (20% least deprived)	101.5	105.8	781	4.3	13.7	0.00

Table 5: *Differences between NGRT average SAS by SIMD Quintile*

The NGRT splits the 'bell curve' of scores into five stanine categories: 'low', 'below average', 'average', 'above average', and 'high' and we used this to analyse differences between SIMD quintiles in the pattern of movement of scores. Table 6 and Table 7 show an analysis of the attainment of each SIMD quintile by NGRT stanine score for NGRT test A (Table 6) and NGRT test B (Table 7).

INSERT TABLE 6 ABOUT HERE

SIMD Quintile	Low	Below Average	Average	Above Average	High	Total (n)
1 (most deprived)	13.5%	28.3%	51.2%	6.4%	0.6%	100% (873)
2	9.6%	25.6%	52.6%	11.3%	0.8%	100% (707)
3	7.5%	19.9%	58.9%	12.8%	0.8%	100% (755)
4	4.5%	14.5%	61.0%	18.0%	2.0%	100% (595)
5 (least deprived)	4.1%	13.9%	56.8%	23.0%	2.2%	100% (782)
All	8.1%	20.8%	55.8%	14.0%	1.2%	100% (3712)[2]

Table 6: *NGRT A: Stanine Group by SIMD Quintile*

INSERT TABLE 7 ABOUT HERE

SIMD Quintile	Low	Below Average	Average	Above Average	High	Total (n)
1 (most deprived)	9.6%	23.0%	51.4%	14.9%	1.0%	100% (873)
2	6.9%	17.0%	56.6%	17.5%	2.0%	100% (707)
3	4.5%	14.4%	54.8%	24.2%	2.0%	100% (755)
4	1.7%	12.1%	49.5%	32.9%	3.9%	100% (596)
5 (least deprived)	2.0%	10.0%	51.9%	30.5%	5.6%	100% (781)
All	5.2%	15.6%	52.9%	23.5%	2.8%	100% (3712)

Table 7: *NGRT B: Stanine Group by SIMD Quintile*

To assess the strength of the association between SIMD and attainment, as measured by stanine group we ran Goodman and Kruskal's gamma. Gamma is a non-parametric statistical measure that summarises the overall strength and direction of the association between two ordinal variables (Gans & Robertson 1981). We found a positive association between SIMD and attainment in both NGRT A and B but the gamma value in NGRT B (.279) was slightly smaller than the gamma value in NGRT A (.293). The smaller gamma in NGRT B suggests a slight weakening in the relationship between SIMD and reading attainment over the course of the school year. This allows cautious optimism that the attainment gap associated with poverty narrowed.

We also sliced the attainment data in a different way, examining in Table 8 the comparative attainment for children eligible for clothing grant compared with those who were not. The broad pattern mirrors that reported for SIMD: those eligible for clothing grant had lower average attainment than those who were not, and both groups did significantly better in NGRT B, showing significant gains above those that would be expected (p value < 0.01). The average difference in SAS between NGRT A and B was slightly larger for children claiming a clothing grant (4.9 versus 4.5), suggesting that, within a broadly similar pattern, the size of improvement may have been slightly larger gains among those eligible for clothing grant.

INSERT TABLE 8 ABOUT HERE

Clothing grant	Mean SAS NGRT A	Mean SAS NGRT B	N	Mean difference	T (paired sample T-test SPSS)	P value (two-tail)

Yes	89.3	94.2	607	4.9	12.6	.000
No	97.8	102.3	3,120	4.5	28.1	.000

Table 8: *Differences between NGRT average SAS by Clothing Grant Eligibility*

To examine differences in the patterns of shift for eligible and non-eligible children, we used the five stanine categories: 'Low', 'Below average', 'Average', 'Above average', and 'High'. Table 9 and Table 10 show the percentage of children in each NGRT stanine group for NGRT test A (Table 9) and NGRT test B (Table 10) by whether they were eligible for clothing grant or not. These show an increased percentage of children attaining 'High' and 'Above average' scores in NGRT test B, and a fall in the percentage of those whose scores fell into the 'Low' and 'Below average' category. This pattern was consistent both for children eligible and not eligible for a clothing grant and represents a general shortening of the 'tail' of underachievement, with a fall in the percentage of students with scores in the 'Low' and 'Below Average' attainment categories.

INSERT TABLE 9 ABOUT HERE

Clothing grant eligibility	Low	Below Average	Average	Above Average	High	Total (n)
Yes	16.9%	31.4%	45.4%	6.0%	0.3%	100% (617)
No	6.4%	18.7%	57.9%	15.6%	1.4%	100% (3110)
Total	8.1%	20.8%	55.8%	14.0%	1.2%	100% (3727)

Table 9: *NGRT A: Stanine Group by Clothing Grant Eligibility*

INSERT TABLE 10 ABOUT HERE

Clothing grant elibibility	Low	Below Average	Average	Above Average	High	Total (n)

Yes	11.4%	23.9%	51.9%	11.9%	1.0%	100% (607)
No	4.0%	14.0%	53.1%	25.7%	3.2%	100% (3120)
Total	5.2%	15.6%	52.9%	23.5%	2.8%	100% (3727)

Table 10: *NGRT B: Stanine Group by Clothing Grant Eligibility*

Figure 2 provides a graphic representation of these shifts by showing the percentage point difference between NGRT A and B for children eligible and not eligible for clothing grant in each category of attainment (i.e. the simple difference between NGRT B% minus NGRT A%). Where the bars representing students eligible or not eligible for clothing grant lie below zero, it shows a fall in the percentage of children from that group in that attainment category. Where the bars lie above zero, it shows a rise in the percentage of children in the attainment category.

INSERT FIGURE 2 ABOUT HERE
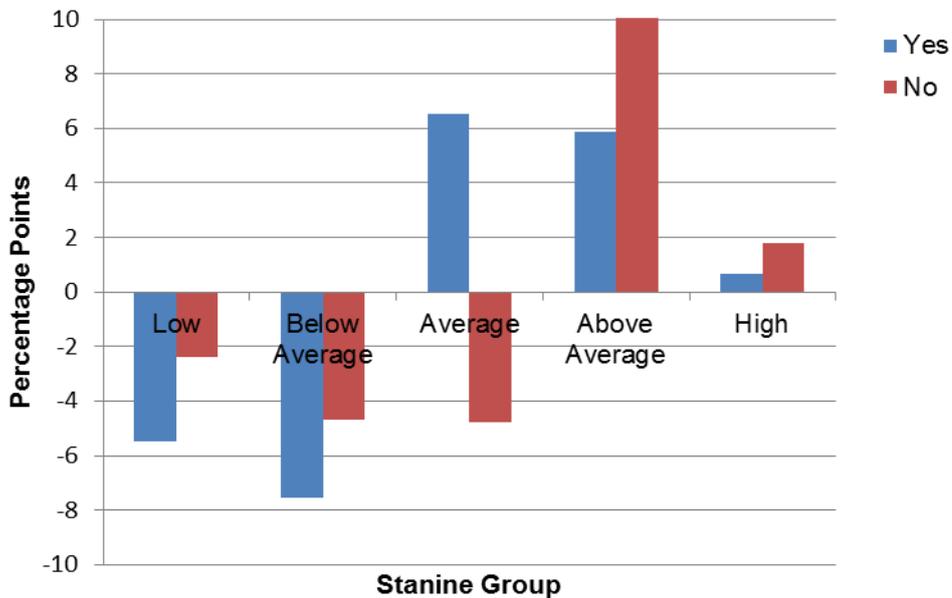
Figure 2: *Percentage point difference in NGRT Stanine Groups by Eligibility for Clothing Grant*

Figure 2 illustrates the shortened 'tail' of underachievement, indicating shifts for all children out of the 'Low' and 'Below Average' attainment categories, with the biggest percentage shift in students eligible for clothing grants. It shows that the percentage of children from these families achieving 'Average' scores increased whereas the percentage of children from non-eligible families in this attainment category decreased. Both groups increased the percentage of children in 'Above Average' and 'High' attainment categories, but the bigger rises were for economically more advantaged students who were not eligible for clothing grant. Overall, the pattern indicates that children receiving a clothing grant may have made a greater shift from getting 'Below Average' and 'Low' scores than more advantaged children, with a consequent rise in the percentage of this group achieving an 'Average' score. The larger shift for economically advantaged students was from the 'Below Average' and 'Average' scores and moving into the 'Above Average' scores. It is important to understand what these numbers may mean for the real-life chances of children, however: literacy is a gateway to other curricular areas and any shortened tail of underachievement represents an increase in the percentage of students with sufficient literacy skills for full curriculum participation. This is important for students' wider experiences of schooling whatever their families' economic circumstances. That the bigger percentage shift from the 'Low' and 'Below Average' attainment categories was for students eligible for clothing allowance is encouraging data if reducing the attainment gap associated with poverty is a specific inclusion aim.

Discussion

Addressing poverty is a thorny issue, one that affects all schools and all educators. The attainment gaps associated with poverty arise from complicated situations and are

clearly not going to be solved by one project or within one year. The root causes of poverty are not of schools' making, and 'gap talk' has been positioned as an example of political and policy communities unfairly loading the education community with narrow, reductivist approaches that suggest schools close the attainment gap in unreasonably short timescales (Milner 2013; Gillborn 2008) . We have sympathy with this view, and with Ladson-Billings (2006) argument that the 'gap' be reframed as an education debt that is at once moral, sociopolitical, economic and historical. However, there is clear evidence that some schools and some education systems are better at addressing the equity issues associated with poverty than others (Strand 2010). The popularity of this journal is clear evidence that inclusion and equity matter to educators and it is right and proper that researchers develop and trial tools that will help them do this. Any ways forward must acknowledge that education is complicated and the issues around attainment and poverty are multiple, deeply entwined, context-specific and need careful scoping. Centrally-determined, top-down policy or curriculum solutions are unlikely to work, especially if they encourage educators to prioritize evidence from just one research perspective or distract them from considering the evidence of the students sitting in front of them. This study has shown that it may be possible to offer new ways forward, and that doing so can both raise attainment and narrow the attainment gap.

Moss (2013) argues that the holy grail for researchers seeking to deliver social justice in teaching is to "…grapple with which forms of knowledge are appropriate in which contexts and how they can be strengthened through use" (2013 p. 238). But doing this requires that everyone -researchers, policy makers and practitioners- attend to this as a core issue. On one level it seems obvious that everyday home and community

practices sculpt what students believe, what they know and how they think, that this inevitably shapes what a student 'takes' from school literacy lessons. It seems obvious that the knowledge students bring should be used in asset-based ways to inform curriculum content and design. It also seems obvious that how students feel about themselves, how they are positioned as literacy learners, their vision of the kinds of texts they want to read and produce, and of the kind of readers or writers they want to become, will influence their learning in school. Yet there is much in schools to distract educators from these core ideas. Interviews with some of the teachers engaged in this project (Author 2017 p. 48) showed searing honesty about how their professional noticing had been skewed to focus almost entirely on the cognitive domain. One said:

> *I immediately identified the cognitive domain. That's what I focussed on. Didn't pay attention to other two, certainly not consciously. Not in planning or teaching. I may have been aware of children who didn't go to library or parents not getting so involved but I didn't do anything with that information. I didn't really think about it. (Teacher 6, interview)*

This design experiment reinterpreted the 'professional knowledge problem' as one of orchestration and alignment of different forms of knowledge. The *[UNIVERSITY] Three Domains Tool* helped to make this knowledge visible. This supported and encouraged educators to engage with different research perspectives and to attend to the evidence of the students and schools in front of them rather than the evidence of disembodied research from elsewhere. Obviously the tool did not do this alone, but it did support the process by shaping the work of local authority officers, informing the

theory of change and the actions and reflections of School Principles and teachers. The data reported in this paper indicates that, taken in the round, this impacted positively on attainment. However, we are aware that attainment is just one narrative to emerge, and there are others (Author 2017a; 2017b; 2019). This is the nature of design experiment research (Anderson & Shattuck 2012; McKenney & Reeves 2013).

The project prompted a general shift in attainment away from scores in 'Low' and 'Below Average' categories and an increase in 'Average' and 'Above Average' scores. Every student making such a shift is an important success story: whether rich or poor, students who struggle to read find it harder to achieve their potential. In policy terms it means such students face better long-term prospects for wider educational achievement but in personal terms it impacts on their confidence, well-being, friendships and agency. These are the elements that feed a capability approach (Sen 2005). When teachers, education systems and curricula fail to address the social and cultural debt owed to students living in disadvantaged circumstances, schools can appear alien and unwelcoming spaces (Heath 1983; 2008; Goudeau and Croizet 2017 Davies and Rizk 2017). In becoming more noticing of students' diverse cultural and social capital and their identities as learners, readers and writers, educators created a kinder, more welcoming ethos in schools. A recent local authority inspection by Her Majesty's Inspectors of Education (HMIE) praised this 'innovative approach to improving . . . attainment in literacy', noting the 'very positive impact across the authority . . . [with] raised attainment in reading and writing, and a narrowing of the gap between the least and most deprived groups'. The report recognises the 'positive effect on the ethos of schools' and the 'strong influence on other areas of the curriculum [such as] aspects of numeracy.' (Education Scotland 2019b p. 8).

The evidence as to whether this design experiment narrowed the attainment gap between children from economically advantaged and less advantaged backgrounds is mixed, depending on the indicators used to identify poverty and the measure of attainment. The NGRT results by SIMD quintile suggest that in its first year of full implementation, attainment improved for all students, regardless of background, and that the size of improvement was broadly consistent across differing levels of deprivation. However, the average size of improvement in NGRT scores for children claiming clothing grant was slightly larger. In addition, the non parametric Goodman and Kruskal's gamma statistic suggests a possible weakening in the relationship between SIMD and attainment in NGRT B. These findings suggest that although there is clearly still inequality in the system there is evidence that use of the [UNIVERSITY] *Three Domain Tool* in this context had a greater impact on children from poorer families.

This is still early days for this design experiment. Educators will inevitably face challenges specific to each stage of the cycle of initiation, development, maintenance and renewal. The evidence in this paper however, indicates that this is a promising start and that continuation is worthwhile. We do however make no claims for long-term success and will need further cycles of research to understand how the attainment narrative plays out against the professional knowledge, leadership, staff development and policy narratives at each stage of the cycle. In the same way that literacy needs active and nuanced nurturing in class, so too does literacy teaching and curriculum development.

The project benefitted from the initial framing , funding and leadership provided by the local authority's Poverty Commission (Renfrewshire Council 2014), which drew on expertise from Universities, the Joseph Rowntree Foundation, Shelter, Police Scotland, Children in Need, Child Poverty Action Group and the Trussell Trust. It took place in Scotland, where the curriculum is advisory rather than mandatory, and where public services are obliged to collaborate, report progress against a common set of national outcomes to deliver a common purpose: to create a more successful country; give opportunities to all; increase wellbeing; create sustainable and inclusive growth; reduce inequalities, and give equal importance to economic, environmental and social progress. This obviously provides a particular landscape for both education and education research. Thomson and Hall (2008 have shown that other education systems have different contstaints and affordances. But this does not detract from the central issue: if schools have an important part to play in delivering social justice we must all seek to understand what schools need to focus on to do this, the nature of the professional knowledge required, and the kind of support that will help educators use their knowledge to enhance inclusion and equity for pupils in poverty. To be truly inclusive places for children and families in poverty we need deep consideration of how to support schools, the curriculum architecture and educators' practices in developing more socio-culturally sensitive and nuanced teaching approaches. The [UNIVERSITY] *Three Domain* Tool is one specific suggestion, explored in one specific context. To this extent, it offers some promise.

Footnote:

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