Enhancements to a Vision of the Teacher for the 21st Century

By Collins, R., Findlay, M. & Huang, A. (University of Strathclyde: Sept 2018)

Abstract

BA (Hons) Primary Education at the University of Strathclyde

In 2011 Professor Graham Donaldson's seminal review of teacher education, Teaching Scotland's Future, identified a range of challenges for the education sector in Scotland. At the University of Strathclyde we used this review to successfully drive real change by phasing out the B.Ed. (Hons) Primary Education programme and replacing it with a BA (Hons) Primary Education degree in 2013. Since then the teacher education sector in Scotland has undergone significant reform in multiple areas. At the core of this reform, has been a key re-conceptualisation of professional learning, which stresses amongst other things, the importance of teachers developing ever more accomplished skills as reflective and enquiring professionals.

This document presents the subsequent enhancements to the BA (Hons) Primary Education degree by the School of Education, at the University of Strathclyde in light of this reform. It is hoped that this will further its contribution to national landscape of undergraduate initial teacher education provision in Scotland. While maintaining its original vision of establishing the 21st century teacher, it provides a rationale for a revised degree structure aimed at helping to do so ever more effectively, and explains the regulations and content that will define key modifications to the original degree.

The future of Scotland lies in its children. The University of Strathclyde maintains its clarity about the part it plays in providing the teachers that Scotland needs to ensure these children are highly educated, skilled, confident and creative individuals who understand the place they have within their own communities and the global community in which they live.

Enhancements to a Vision of the Teacher for the 21st Century

At its inception and successful accreditation in Academic Session 2012-13 the BA (Hons) in Primary Education at the University of Strathclyde sought to offer radical rethinking which moved beyond listing competencies, pedagogical actions or curricular practices as descriptor elements to encapsulate a vision of the teacher of the 21st Century. The proposed model envisioned the role of such a teacher as an intellectually aware individual able to reason flexibly in respect of the many necessary nuanced challenges experienced in the everyday situational dilemmas of the primary classroom. Subsequently, the desired capabilities referred to in its documentation promoted a definition of teacher as theorist, an agent in their own as well as other's learning and as a thinker. This vision was then one of the creations of critical practitioners, engendering the ability to discern key data related to any such dilemma, who would engage in useful theorisation in order to purport solution to this and subsequently be capable in supporting a sound degree of agency as regards learning.

From its inception until the present time the programme has been committed to achieving this vision. What is equally true, however, is that across the intervening years, the teacher education sector in Scotland has also undergone significant reform in multiple areas. At the core of this reform, has been a key re-conceptualisation of professional learning, which stresses amongst other things, the importance of teachers developing ever more accomplished skills as reflective and enquiring professionals. This message reflects a broader movement across European teacher education reform, where practitioner autonomy, reflection, professional enquiry and closer practicum partnership are often promoted as effective forms of ongoing vocational learning for both student and practising teachers. This current review towards re-accreditation of the BA (Hons) in Primary Education at the University of Strathclyde may be viewed then as a vehicle for the necessary refinement of the original programme influenced by such reform. In so doing, it takes cognisance of four fundamental areas of key re-conceptualisation for professional learning to help establish enhancements as regards efficacy of programme refinement. Attention to aspects of re-

determining the areas of reflective practice, professional enquiry, affordance and pedagogical knowledge will help not only to inform, but to perhaps better realise, the programme's original and ongoing vision regarding the valid creation of primary teachers of the 21st Century at Scotland's largest national Initial Teacher Education (ITE) establishment.

Enhancement 1: Reflective Practice

Reflection on one's beliefs, understandings, perceptions and experiences is central to all the activities that teachers do (Walkington, 2005). For teachers at the pre-service stage, reflective practice enables learning by thinking back and articulating the acquisition of knowledge and strategies- a process held as particularly powerful and even transformative (Kramarski & Kohen, 2016). In terms of the original vision of the BA (Honours) Primary Education programme an accomplished level of reflection is clearly deemed absolutely essential in the realisation of process of theorisation, fundamental in the operation of intellectual activity and in realising high levels of resilience associated with agency. While it is true to say that cognisance of the important role of reflection is evident in the existing programme, developments in the understanding of its place in ITE courses as it attunes to modified understandings of concepts such as teacher self-regulation offer important grounds for additional programme enhancements.

Reflective practice offers teachers the opportunity to challenge their existing beliefs, which is the prerequisite for change and subsequently appropriate nuanced refinement of practice where needed (Decker, Kunter & Voss, 2014; Philip, 2007). Whereas many student teachers have the ability to reflect spontaneously, it cannot be assumed that all have a predisposition towards meaningful reflection at a professional level and so should be introduced to this in ITE (Hatton & Smith, 2007). Neither can it be assumed that the depth of reflection required in meeting a professional teaching

standard is either easily or innately achieved. Despite the fact that rhetoric of reflective approach to ITE has dominated teacher education programmes in the UK in past decades (Furlong et al, 2000), current levels of pre-service teachers' reflective capacity can often remain limited (Mikalski & Kramarski, 2015). Similar assertions may also be clearly seen as reasoned underpinnings in detailed discussion as to the adoption of theorisation, agency and thinking as key precepts for educating modern primary teachers at the time of the existing programme's inception.

Advanced from a Cognitive Psychology (CP) perspective, the assertions mentioned above clearly espouse reflective practice as a tool for professional learning and for supporting the management of the demands of practice. Student teachers should therefore be supported to develop a habit of mind which involves scrutinising their teaching approaches in light of an understanding of the connections between theorisation and practice. An additional re-conceptualisation here would also suggest that, advancing from the same CP perspective, such reflection is also an important step for developing autonomous Self-Regulated Learning (SRL). A key component to teacher evaluation and ongoing Professional Update (PU) in Scotland – a compulsory process not established at the time of the last degree review - teachers' SRL is accomplished through constructive activity involving a cyclical process including goal setting, planning, monitoring and evaluating (Kramarski & Kohen, 2016). Within ITE, skills acquisition of this process of focussed, purposeful reflection then not only facilitates student teachers' articulation of tacit knowledge, but through the process of thinking back and ahead about their understanding and teaching practice, they become increasingly competent at orchestrating a range of learning and teaching strategies. The complementary notion of such reflection highlighting the intuitive processes of practitioners contributing ideas, questioning alternative views and supporting views with evidence, as they are engaged with teaching suggests that this reflective practice is also linked to a deeply social process (Schon, 1983). Immersion in SRL practices and a high level of sophistication as regards associated cognitive skills acquisition seem especially important to the immediate outcomes of success not only within ITE programmes, but also to the longer-term sustained capacity to practice teaching in a Scottish setting.

It would seem prudent then, that enhanced notice should therefore be taken within ITE programmes where, rather than a one-way communication with one-self, student teacher reflection is then privileged by means of a two-way dialogic process which enables work and talk with others about professional issues or problems encountered in practice. This too is a crucial point to recognise for the development of student teachers' SRL where a pro-active and flexible collaborative approach to learning is adopted when planning, monitoring, and adapting practice. And, although closely associated with the original vision of technical reflective practice in the practicum element of the BA (Hons) Primary Education programme, nuance in rationale for evolutionary change across the entire programme here is clearly evident. An update to the explicit integration of reflective SRL practices into the reviewed ITE programme materials will require teacher educators to not only raise student teachers' awareness of professional reflection, but to do so more flexibly, consistently, cohesively and collaboratively across all programme components and to a more acceptable intellectualised level . Emphasised development of SRL design in appropriately re-structured Curricular Studies, Education Studies and Practicum programme components will enhance and equalise access to authentic SRL skills acquisition in student teachers at a time of similar updates to formal PU processes and standards in Scotland.

Enhancement 2: Professional Enquiry

Closely linked to the concept of reflective practitioner, the teacher drawing learning from activity experience tied to theorising was also part of the programme's original vision. Since the time of the last review, however, the idea of the simple linear translation of theory into practice has been discredited (Furlong, 2013). Instead, the relationship is rather more complex with active research-based professional learning held as the foundation for high-quality teaching (Menter, 2017). In ITE the most effective modern approaches have been programmes which facilitate research into practice or vice versa. This allows theorisation and practice to be intertwined and mutually reinforced in all programme components (Teacher Education Ministerial Advisory Group, 2014, p. xiii). In a similar vein, Niemi (2008) makes a strong case for starting research competence and

research capacity-building from the pre-service stage in the European context. Indeed, the BERA-RSA (2014) final report of *Research and the Teaching Profession* also suggests that all three forms of teachers' professional knowledge, practical wisdom, technical knowledge and critical reflection, can be enhanced by teachers exploring deeper insight by interrogating their own practice informed by the wider research evidence.

Both themes of teaching as a research-informed profession and practitioner enquiry as professional learning are evident in a recent analysis of General Teaching Council for Scotland (GTCS) standards and related documents (Forde, 2015). The former is concerned with teachers using research to inform the ways in which they plan, deliver and reflect on their professional practice. This idea relates to the building of professional knowledge as well as the development of a critical awareness of the wider educational and social issues. The latter relates to how teachers engage with professional learning through enquiry-based activities. It may be argued then that for teachers to become leaders of change, they need to develop expertise in using enquiry and reflection as part of their daily skill sets (Cochrane-Smith & Lyle, 2009). Similarly, in Toom et al.'s discussion (2010) about a research-based approach to teacher education in Finland for the last 30 years, they conclude that such approach improves teachers' autonomy because they are able to use research and justify their pedagogical decision-making based on research. Indeed, GTCS (2012) stipulates that all teachers in Scotland are expected to commit to 'lifelong enquiry' (p. 5), and ITE plays a crucial role in providing a solid foundation for prospective teachers to develop a disposition towards an enquiry-orientated professional learning.

In terms of the current review this aspect of the non-linear complexity of theorisation into practice evidences another subtle, but important, difference that must be recognised in the development of the revised BA (Hons) Primary Education programme. If the prerequisite acquisition of intellectual prowess for 21st Century teachers espoused in the original programme vision is to be realised, it would now seem necessary to evolve a more sophisticated process than the professional enquiry

stance originally authored. Instruction as to how this may be more pragmatically achieved may be sought in more current work and thought in this area. This then may be informative in asserting the means by which the reviewed programme may be suitably enhanced.

At the core of practitioner enquiry there is what Townsend (2013) summarises as a cycle of steps: plan, action, observe and reflect. Rather than adopting an instrumental approach to engaging with research, he argues that emphasis on investigating and developing practice should be more fluid and dynamic. In other words, there is a need for flexibility in active enquiry where the process of investigation involves defining, refining and re-defining ideas and questions through successive cycles of meaning-making (Elliot, 1991). This resonates with Kemmis and McTaggart's (2014) model of participatory active enquiry. Their model gives prominence to the vital role that discussion of curricular implementation amongst practitioners plays, which is a means of teachers developing and co-constructing a shared understanding of practice. Similarly, in Baumfield et al's (2012) model of practitioner enquiry, they highlight that the creation of supportive communities where practitioners share their experiences promotes a more collaborative enquiry process.

Another practitioner enquiry model which integrates theory and practice in professional learning is clinical practice models. Having gained its popularity in recent years in what is called the 'practicum turn' in teacher education (Mattsson, Eilertson, & Rorrison, 2011), clinical practice models were inspired by the medical model with the goal to deepen practitioners' professional knowledge and refine lesson implementation skills. The model emphasises learning in situ where student teachers learn from their interactions with the learners and experienced teachers. They draw on these experiences and synthesise classroom-based evidence and research-based understanding before making judgements about how and when to intervene to meet individual learning needs. This is what Hagger and McIntyre (2006) termed as 'practical theorising' – the notion that student teachers critically examine ideas derived from practice (p. 58). In Burn and Mutton's (2013) evaluation of the extent to which research-based knowledge is integrated in practical engagement in schools, they

conclude that clinical approaches have the potential to effect positive changes in student teachers' learning and confidence. However, they also warn that student teachers' professional learning depends on the quality of the clinical experience.

The most recent iteration of the practitioner enquiry model by Wall and Hall (2017b) proposes three key principles for doing practitioner enquiry: autonomy, disturbance and dialogue. The first principle, autonomy, refers to teachers' ability to formulate questions about their practice and to provide solid evidence when answering them. An autonomous enquiry process recognises teachers' secure grasp of pedagogic knowledge and skills and the fact that they are part of a wider community of enquirers. The principle of disturbance relates to the idea of practitioner enquiry as an iterative endeavour. As teachers seek to answer questions, they are likely to cause disturbance both in their own thinking and in their actions that follow. Therefore, this model calls for all teachers to become strategic and meta-cognitive in their own professional learning. The third principle, dialogue, resonates with a dialogic nature of reflective practice. The sharing of thinking and communicating the process of enquiry with the wider community subsequently increases the robustness of any type of enquiry. Members of the community offer supportive but appropriately challenging feedback, which then has the potential to refine and even transform the thinking and actions of the enquirer.

Three key aspects have therefore evolved in the dialogue pertinent to the key assertion for the need of practitioner enquiry underpinning the enhanced intellectualisation of the 21st Century teacher since the programme's inception. Firstly, the process of translation of theorisation in practice may no longer be viewed as linear. All models derived since that time equate to an involvement of more complex non-linear processes and are premised on the basis of the need for student teachers to be ever more pro-active, collaborative and reflective as learners. Secondly, although the assertion that student teachers' professional development is best nurtured within Communities of Enquiry (COE) remains, nuance inasmuch that there must be enhanced exposure to authentic practice communities, which in turn will be more frequently accessed by students as part of a cohesive

programme design, is relevant. Finally, and most importantly, students must be helped to view non-linear and non-transmission models of adopting professional enquiry as the most effective manner through which professional learning will occur. This transformational learning type, emphasising the use of COEs to enable expansive as opposed to restrictive self- reflective systems, must be established. Access in the form of authentic dialogue within any COE at the expense of leanings towards any older contrived formats or traditionally faculty-bound groups must be privileged in programme design. This invites a re-imaging to an architecture which again better affords aspects of established Curricular Studies, Educational Studies and Practicum elements in working more collaboratively with one another, in re-imagined interdisciplinary and non-traditional ways. Together with this enhanced interdisciplinary approach, a greater subsequent active involvement with authentic practice COEs in programme design shall be more prevalent than before.

Enhancement 3: Expanding Situated Learning Opportunities

As previously stated, the original BA (Hons) Primary Education programme was advanced in its authorship fundamentally from a CP paradigm. The existing programme also carries an authorship legacy from a time prior to much subsequent educational reform in Scotland and elsewhere discussed thus far. This is particularly evident as regards the role of acknowledged developments regarding the advantages brought via situated learning, now felt so fundamental to practicum and other forms of enhanced partnerships, and ensconced in proposed programme developments outlined as Review Enhancements 1 & 2 above.

In effect, if the enhanced reflection and professional enquiry dimensions proposed above are to be included within a reviewed programme, then the aspect of CP paradigm's assertion that the acquisition of knowledge is not specific to, or embedded within, any particular setting or activity must be addressed. The premise that reflexive practicum experiences, of whatever variety, are essential to the vocational teacher development (labelled as Situated Cognitive Learning (SCL)) has

been known for some time (Gruber et al, 1995; Philpott, 2006, 2017; Ellis, 2017). However, that is not to say that any automatic adoption of antithesis paradigm structure to CP, such as SCL offers instant immediate solution. The difficulties of vocational education knowledge acquisition (or reconstruction) and the ineffectiveness by which it is realised across University setting and practicum experience (and vice versa) has been known and accepted for some time (Philpott, 2006; Billet, 1996). This phenomenon is common across the spectrum of both CP and SCL and so exists regardless of either choice of cognitive paradigmatic lens.

Fundamental to this impasse is the key variable of identity formation; in this case a predilection for individuals to express salient behaviours associated to the often differing pervasive social cultures within the two settings of University and practicum. Whereas the ultimate outcome for students participating in these two settings may be viewed to be broadly the same (i.e. to successfully pass a module or course), the subject and object by which this is achieved within each system of activity, or situation, are not the same (Engestrom, 2001). Often expressing identity salience as a student of education at University (subject) , viewed to be achieved via purely theoretical study (object), is often seen as being at odds with pragmatic practicum settings where to express an identity of a successful beginning teacher of children (subject) via pragmatic lesson implementation (object) is more valued (Philpott, 2006). Similarly the juxta-position of salient identity expression between these two settings too is often fraught with difficulties for emerging student teachers (Engestrom,2001). This in turn offers clear questions for student teachers as to which element of their developing professional identities it is best to employ in either circumstance based on the often differing cultural values imposed by each setting. This is also not to say that one learning situation should be favoured over the other. Indeed, avoidance of restricted learning associated with single-setting environments in favour of a more expansive forms of reflection across pluralistic settings is preferential as regards professional vocational learning development (Wall and Hall, (2017b); Philpott, 2006; Engenstrom,2001).

Optimisation of use of acquired professional learning between the University and practicum settings is however, enhanced through a view that this is best achieved not as function only of an individual's cognition, but also of similarities in shared socio-cultural value features between both the vocational situations experienced by the student (Greeno et al 1993; Philpott, 2017). Badged as affordances, these explicit expressions of shared values between settings is likely to lead to enhanced expenditure of effort and greater affect in the expression of appropriate teacher identity traits on behalf of vocational learners. In this way, the student teachers' wish to express salient learning behaviours known to be valued jointly authentic by both a University and practicum settings' pervading cultures is more likely to elicit meaningful vocational learning.

The significance for the review of the reviewed BA (Hons.) Primary Education programme here seems quite clear. A requirement to take fundamental cognisance of both the programme's CP legacy while valuing recognition of the benefits of SCL dynamic seems prudent. In pragmatic terms this speaks directly to a need to expand instances of affordance and for these to become deliberate in the design features of the reviewed programme. At the very least this expansion will once again require greater harmonisation between key elements of Curricular Studies, Educational Studies and Practicum components. This will help to instantiate authentic and cross-setting student tasks as a key component within enhanced review programme design. In addition to this measure, enhancements to programme architecture that will embrace increased opportunities for trans-institutional partnerships are also to be desired. This in turn will help maintain the existing programme's legacy and also secure inherent purposeful and useful learning within our signature undergraduate ITE course.

Enhancement 4: Pedagogical Content Knowledge

Pedagogical content knowledge (PCK) was introduced by Shulman (1986, 1987). Shulman's initial definitions varied, but can be summed up as "the ways of representing and formulating the subject that makes it comprehensible to others" (Shulman, 1986, p. 9). Grossman (1990) introduced the common tripartite division of PCK into curricular knowledge, (subject) content knowledge (sometimes known as subject matter knowledge) and general pedagogical knowledge. Since then authors have varied the number of components in PCK depending on the context of their study. Since Shulman initially introduced the idea of PCK as being the professional knowledge of *any* teacher, it has remained a lively and current research field (Berry, Depaepe, & van Driel, 2016).

Schulman's original concept was only recently re-developed starting at the PCK Summit in 2012, when researchers in the field developed a consensus model of teacher professional knowledge and skill (Gess-Newsome , 2015). Rather than working with the previously suggested components of PCK, the consensus model simplified teacher professional knowledge and skill into general Teacher Professional Knowledge Bases (TPKB), and particular Topic Specific Professional Knowledge (TSPK). This division suggests an important role for subject knowledge and knowledge of teaching a subject.

TPKB are the type of knowledge identified by experts and generally agreed to be an important element of knowledge for teaching, but with similarities across different subject areas. The model specifically identifies knowledge of assessment, pedagogy, subject/content, students and curriculum, although other types of expert knowledge could be included. This is the academic knowledge of education *for* practice (Cochran-Smith & Lytle, 1999) and is included in ITE programmes.

TSPK applies generic information from the teacher professional knowledge bases to specific topics and ages. This TSPK is not based on the ideas of a teacher, but is based on the common understanding emerging from relevant COEs of teachers and experts about a topic. Teachers can therefore develop specialist TSPK about a subject into their own personal practice. In this view, TSPK is freely available in pedagogy textbooks and so further enhances opportunities to students wishing to specialise in specific curricular or theoretical fields.

Thus this consensus model suggests a mechanism for the ways in which teachers can develop their personal PCK (Gess-Newsome et al., 2017). By also emerging from a CP basis, however, it is perhaps unsurprising that one of the areas missing from the consensus model is definition of the optimum context dynamic in which teaching and learning take place. Arguably, as before, acknowledgement of this context could be included as one of the amplifiers and filters on teachers' behaviour. What is known within the literature is that specialists in a field can find it difficult to empathise with learners and that this can be a problem for some beginning teachers (Yates & Hattie, 2013). Yates & Hattie propose that expert mentor teachers are highly sensitive to the interpersonal cues given out by learners as part of the teacher amplifiers and filters in the model. In effect, they draw on the same components of the model of teacher professional knowledge and skill as other less successful mentors but in a more effective way (Gess-Newsome, 2015). This would suggest further need for ITE programmes to immerse student teachers in forms of learning that support autonomy, such as SRL approaches, so that they may develop the necessary propensity to act as effective brokers for their own learning across vocational settings (Phillpott, 2006). Together with the fact that the evolution of the consensus model of PCK also makes clear expression of the significant role of wider COEs too, it is perhaps again instructional to reflect on the CP/CSL dynamic as regards ITE programmes' ability to supply such adequate instances of affordance by design (Phillpott, 2006).

Implications for the reviewed BA (Hons) Primary Education again seem clear. Much of the development of PCK reform may be seen to have occurred in the aftermath of original programme

accreditation. As a lively and contemporary area of intellectual focus, it would be improper either to ignore this debate, or to suggest that in intervening duration aspects of the consensus model have not quietly permeated into student teacher instruction within the existing programme. It must be equally accepted though that the original programme offers strictures in its architecture for the required interdisciplinary approaches between Curricular Studies, Educational Studies and Practicum components for a consensus model to be realised more fully, as well as affordances in task design to act as amplifiers to success within this. Refinement and enhancement towards greater collaboration across traditional components boundaries, as well as more dynamic and deliberate programme design to take cognisance of both student individual identity formation and associated optimisation of learning settings would seem to be efficacious in meeting the programme's original vision as regards creating the optimum 21st Century primary practitioner.

References

- Baumfield, V., Hall, E., & Wall, K. (2012). *Action research in education*. London: Sage.
- Berry, A., Depaepe, F., & van Driel, J. (2016). Pedagogical Content Knowledge in Teacher Education. In J. Loughran & M. L. Hamilton (Eds.), *International Handbook of Teacher Education: Volume 1* (pp. 347-386). Singapore: Springer Singapore.
- Billett, S. (1996) Towards a model of workplace learning: the learning curriculum,
- Studies in Continuing Education, 18(1), 43–58.
- Burn, K., & Mutton, T. (2013). *Review of "research-informed clinical practice" in initial teacher education*. London: British Educational Research Association. Retrieved from https://www.bera.ac.uk/wp-content/uploads/2014/02/BERA-Paper-4-Research-informed-clinical-practice.pdf?noredirect=1
- Cochran-Smith, M., & Lytle, S. L. (1999). Relationships of Knowledge and Practice: Teacher Learning in Communities. *Review of Research in Education, 24*, 249-305. doi:10.2307/1167272
- Cochran-Smith, M., & Lytle, S. L. (2009). *Inquiry as stance: Practitioner research for the next generation*. London: Teachers College Press.
- Decker, A. T., Kunter, M., & Voss, T. (2014). The relationship between quality of discourse during teacher induction classes and beginning teachers' beliefs. *European Journal of Psychology of Education*, 41–61. https://doi.org/10.1007/s10212-014-0227-4
- Elliot, J. (1991). *Action research for educational change*. Milton Keynes: Open University Press.
- Ellis, S. (2017) The Strathclyde Literacy Clinic: Developing Student Teacher Values, Knowledge and Identity as Inclusive Practitioners in Peters, M.A., Bronwen,C. & Menter, I. (Eds) *A Companion to Research in Teacher Education* (pp121-132). Springer Nature Ltd : Singapore.

- Forde, C. (2015) Research and Professional Practice in Scottish Education. In M. Baguely, Y.S. Findlay and M.C. Kerby (Eds.) Meanings and Motivation in Educational Research, Oxford, UK: Routledge pp. 116-132. ISBN: 978-1-138-81028-0.

- Furlong, J. (2013). *Education - An anatomy of the discipline: Rescuing the university project?* London: Routledge.

- Engeström, Y. (2001) Expansive learning at work: toward an activity theoretical reconceptualization, Journal of Education and Work, 14(1), 133–156.

- Furlong, J., Barton, L., Miles, S., Whiting, C., & Whitty, G. (2000). *Teacher education in transition*. Buckingham: Open University Press.

- Gess-Newsome, J. (2015). A model of teacher professional knowledge and skill including PCK: Results of the thinking from the PCK Summit. In A. Berry, P. Friedrichsen, & J. Loughran (Eds.), *Re-examining Pedagogical Content Knowledge in Science Education*. New York: Routledge.

- Gess-Newsome, J., Taylor, J. A., Carlson, J., Gardner, A. L., Wilson, C. D., & Stuhlsatz, M. A. M. (2017). Teacher pedagogical content knowledge, practice, and student achievement. *International Journal of Science Education*, 1-20. doi:10.1080/09500693.2016.1265158

- Greeno, J. G., Moore, J. L. & Smith, D. R. (1993) Transfer of situated learning, in: D. K.
- Detterman & R. J. Sternberg (Eds) Transfer on trial: intelligence, cognition and instruction
- (Norwood, NJ, Ablex).

- Grossman, P. L. (1990). *The making of a teacher: teacher knowledge and teacher education*. New York: Teachers College Press.

- Gruber, H., Law, L., Mandl, H. & Renkl, A. (1995) Situated learning and transfer, in: P. Reimann & H. Spada (Eds) Learning in humans and machines: towards an interdisciplinary learning science (Oxford, Pergamon).

- GTCS. (2012). *The standards for registration: Mandatory requirements for registration with the General Teaching Council for Scotland*. Edinburgh: The General Teaching Council for

Scotland. Retrieved from http://www.gtcs.org.uk/web/Files/the-standards/standards-for-registration-1212.pdf

- Hagger, H., & McIntyre, D. (2006). *Learning teaching from teachers: Realizing the potential of school-based teacher education*. Maidenhead, England: Open University Press.

- Hatton, N., & Smith, D. (1995). Reflection in teacher education: towards definition and implementation. *Teaching and Teacher Education*, *11*(1), 33–49.

- Kemmis, S., McTaggart, R., & Nixon, R. (2014). *Action research planner: Doing critical participatory action research*. Singapore: Springer.

- Kramarski, B., & Kohen, Z. (2016). Promoting preservice teachers' dual self-regulation roles as learners and as teachers: effects of generic vs. specific prompts. *Metacognition and Learning*. https://doi.org/10.1007/s11409-016-9164-8

- Mattsson, M., Eilertson, T., & Rorrison, D. (2011). *A practicum turn in teacher education*. Rotterdam: Sense Publishers.

- Menter, I. (2017). *The role and contribution of higher education in contemporary teacher education*. Edinburgh: Scottish Council of Deans of Education. Retrieved from http://www.scde.ac.uk/wp-content/uploads/2017/05/Report-Ian-Menter-2017-05-25.pdf

- Michalsky, T., & Kramarski. (2015). Prompting reflections for integrating self-regulation into teacher technology education. *Teachers College Record*, *117*(5), 1–38.

- Niemi, H. (2008). Advancing research into and during teacher education. In *Teacher education policy in Europe: A voice of higher education institutions* (pp. 183–208). Umeå: University of Umeå.

- Philipp, R. A. (2007). Mathematics teachers' beliefs and affect. In F. K. Lester (Ed.), *Second handbook of research on mathematics teaching and learning* (pp. 257–315). Charlotte: NCTM/Information Ages Publishing.

- Philpott, C. (2006). Transfer of learning between higher education institution and school-based components of PGCE courses of initial teacher education, *Journal of Vocational Education and Training*, 58:3, 283-302.

- Philpott, C. (2017) Teacher Agency and Professional Learning Communities: What Can Learning Rounds in Scotland Teach Us?(Ch. 18 , pp 269-282). In Peters, M.A. (Ed). *A Companion to Research in Teacher Education.* Singapore: Springer Nature

- Schön, D. (1983). *The reflective practitioner: How professionals think in action*. London: Basic Books.

- Shulman, L. S. (1986). Those Who Understand: Knowledge Growth in Teaching. *Educational Researcher, 15*(2), 4-14.

- Shulman, L. S. (1987). Knowledge and Teaching: Foundations of the New Reform. *Harvard Educational Review, 57*(1), 1-22.

- Toom, A., Kynaslahti, H., Krokfors, L., Jyrhama, R., Byman, R., & Stenberg, K. (2010). Experiences of a research-based approach to teacher education: Suggestions for future policies. *European Journal of Education*, *45*(2), 331–344.

- Townsend, A. (2013). *Action research: The challenges of understanding and changing practice*. Maidenhead, England: Open University Press.

- Walkington, J. (2005). Becoming a teacher: Encouraging development of teacher identity through reflective practice. *Asia-Pacific Journal of Teacher Education*, *33*(1), 53–64.

- Wall, K., & Hall, E. (2017a). Teachers as metacognitive role models. *European Journal of Teacher Education*, *39*(4), 403–418. https://doi.org/10.1080/02619768.2016.1212834

- Wall, K., & Hall, E. (2017b). The teacher in teacher-practitioner research: Three principles of inquiry. In P. Boyd & A. Szplit (Eds.), *International perspectives: tachers and teacher educators learning through enquiry*. Kielce, Kraków: The Association for Teachers Education in Europe.