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A Perspective of Teachers' Appropriation of Educational Innovations

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Abstract

Purpose – This paper proposes a framework describing teachers' affective and cognitive thought processes, as well as the sensemaking and decision-making ongoing within them, during the various stages of the appropriation of an educational innovation.

Design/methodology/approach – The Rubicon model of action phases, borrowed from psychology, is first used as a lens to understand teacher will. The model is subsequently adapted to reconcile it with existing literature on teacher beliefs, teacher sensemaking, and teacher resistance.

Findings – The proposed framework shows that teachers' appropriation of an educational innovation is multi-layered and multi-dimensional. This contradicts appropriation as simply a procedural implementation of research recommendations, culminating in only success or failure.

Originality/value – The paper sensitises policy makers, school leaders, and teacher educators to the complexity of the appropriation process. The proposed framework serves as a starting point for school and reform leaders, to re-examine their school's implementation of an educational innovation from a more human relations perspective.

Keywords Appropriation, Educational innovations, Implementation, Rubicon model, Teacher beliefs, Teacher sensemaking.

Paper type Conceptual paper

1. Introduction

1.1 Teachers: A critical (but often neglected) link in bridging educational research and teaching practice

In the lecture, *Teaching as a Research-Based Profession: Possibilities and Prospects*, Hargreaves (1996) highlighted the gap between educational research and teaching practice. In the lecture, besides calling for a shift in the direction of educational research, Hargreaves also alluded to teachers' reluctance to use research to inform their practice. Two decades have passed since Hargreaves' rallying call. Despite improvements in educational research and the increased use of research by policy makers and school leaders to inform reform efforts, educational research still has not had the same impact on practice as, for instance, in clinical research.

A case in point can be seen in research-informed educational innovations. Innovations can differ in their starting points (top-down vs. grassroots-initiated), scale, complexity, and nature e.g. introduction of new products, processes, or organisational arrangements (Earl & Timperly, 2015). The OECD Centre for Educational Research and Innovation (CERI) identifies four types of innovation: product, process, marketing and organisational (2008). In this paper, innovations will refer to process innovations which, in the educational context, would be "new or significantly improved" (OECD CERI, 2008, p. 2) pedagogies. The term *research-informed* confines the analysis here to innovations that are backed by research knowledge, supporting their potentially greater effectiveness over existing practices in the implementing school, and quantifying the term *significantly improved* in OECD's definition.

Governments, higher education institutions, and school leaders have sought to improve teaching by introducing to teachers, research-informed educational innovations. Examples of such innovations would be:

- Assessment for Learning (AfL) (Black & Wiliam, 1998a); and
- Self-Regulated Learning (SRL) (Zimmerman, 1990).

The translation of these innovations from research-informed concepts to teaching practice has, however, encountered limited success. Some teachers have sought to accommodate the innovations and transform their practices. Others have, however, superficially assimilated the labels, misconstrued the innovations, or resisted them. A brief account of the implementation challenges for AfL and SRL is provided below, to help elucidate the still-existent gap between educational research and teaching practice:

- On AfL, Black had recently, in reference to eight articles reporting on the large-scale implementation of AfL in their respective countries, said that "five of the articles show, at best, partial success [in implementing AfL] whilst two others are about situations which are seriously beset with problems" (Black, 2015, p. 163). The typical problems faced were (a) superficial understanding of AfL (Flórez Petour, 2015; Hopfenbeck, Flórez Petour, & Tolo, 2015; Ratnam-Lim & Tan, 2015; Wylie & Lyon, 2015); (b) discrepancies between teachers' conceptions of AfL or aspirations for AfL and classroom practices (Flórez Petour, 2015; Hayward, 2015; Ratnam-Lim & Tan, 2015); and (c) teacher resistance (De Lisle, 2015; DeLuca, Klinger, Pyper, & Woods, 2015; Flórez Petour, 2015; Hopfenbeck et. al., 2015; Ratnam-Lim & Tan, 2015). Misconceptions of AfL among teachers have also been reported elsewhere (Brown, Kennedy, Fok, Chan, & Yu, 2009).

- In the case of SRL, in a recent study on the occurrence and quality of SRL strategies among Dutch vocational teachers and students (Khaled, Gulikers, Biemans, & Mulder, 2016), it was reported that there was "considerable room for improvement with respect to occurrence and quality of teacher SRL promoting strategies and students' use of SRL strategies across the hands-on simulations" (p. 116). One of the explanations offered by the authors was that nurturing SRL was often not the focus for vocational education teachers. Teachers lacked commitment to SRL, and had the misconception that SRL meant minimal guidance. These were despite SRL is an important aspect of competence-based education which the vocational schools had embarked on following nation-wide reforms in 2010.

Although AfL and SRL may differ, both appear to face similar challenges in teacher appropriation of the innovations. The recurring theme of teacher appropriation challenges in the preceding examples, suggests that teachers play a pivotal role in bridging educational research and teaching practice (Bakkenes, Vermunt, & Wubbels, 2010; Coburn 2001; Spillane, Reiser, & Reimer, 2002). It has been argued that the failure of many educational innovations could be attributed to the neglect of the role teachers play in translating research into practice; the innovations were often reduced to a script, expected to be faithfully reproduced by teachers in the classroom (Liberman & Pointer Mace, 2008). Such expectations ignore the complexity of teacher change (Black, 2015), and often occur when educational innovations are imposed top-down, as opposed to grassroots-initiated innovations. The analysis here will be on the former.

1.2   The aims and outline of this paper

Since teachers play a central role in the translation of educational research to teaching practice, we are interested in uncovering the invisible thought processes within teachers when they consider and appropriate an educational innovation i.e. to peer into the black box of teacher appropriation. The questions that this paper seeks to answer are:

- What are the affective and cognitive thought processes within teachers when they consider an educational innovation?
- Why do some teachers successfully accommodate the innovations into their practice, while others reject, misconstrue, or superficially assimilate the innovations?
- How does the social context influence teachers' appropriation of the innovations?

There is a broad body of research on teacher motivation (Gorozidis & Papaioannou, 2014), teacher beliefs and attitudes (Imants, Wubbels, & Vermunt, 2013; Pajares, 1992), teacher sensemaking (Coburn, 2001; Luttenberg, van Veen, & Imants, 2013; Spillane, Reiser, & Reimer, 2002) and teacher learning (Bakkenes, Vermunt, & Wubbels, 2010). Research on teachers' resistance to educational innovations is still growing (Cain, 2016). Each of these research strands contributes towards answering the questions above. However, a framework describing the affective and cognitive thought processes, and the type of sensemaking and decision-making ongoing within teachers, at various stages of the appropriation process does not exist yet. Such a framework would provide a holistic answer to the questions above. The framework could also sensitise policy makers and school leaders to the complexity of the appropriation process, providing clarity on the "feeling and thinking" of teachers when an educational innovation is introduced. This could in turn contribute to the better design of professional development programmes for teachers. In this paper, we have drawn on the rich findings of the abovementioned research strands, and the rich discussion on motivation and volition in psychology, to assemble such a framework (see Figure 1).
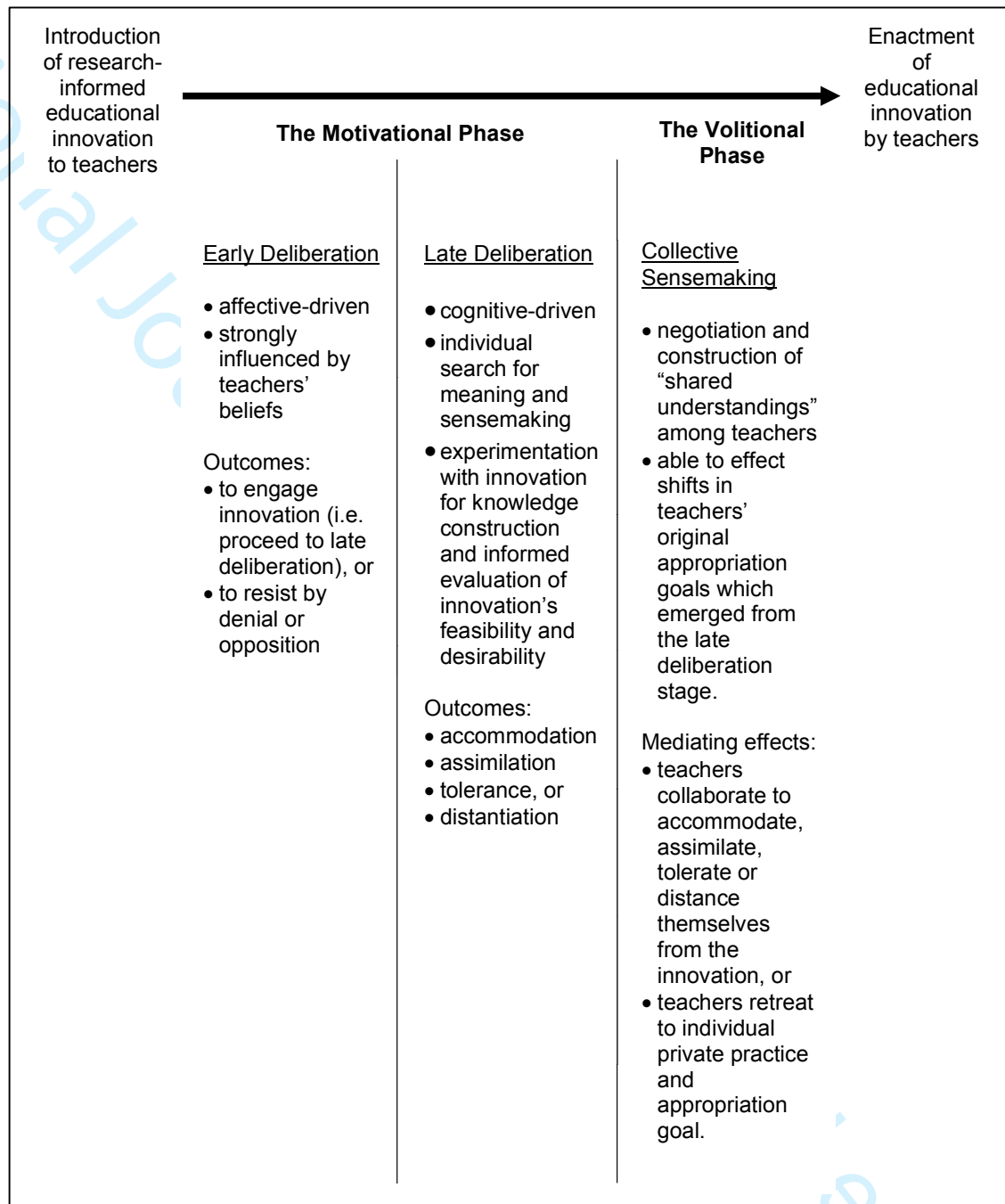
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Figure 1. This framework illustrates the three distinct stages of the appropriation process, and their characteristics and outcomes.

In the ensuing sections, we will begin by exploring *teacher will*. Teacher will has been cited widely in teacher motivation and teacher learning literature, such that it is difficult to pinpoint the origins of its usage. Nevertheless, we will synthesise concepts from Van Eekelen, Vermunt, and Boshuizen (2006), Fullan (2016), and psychology, to resolve will into motivation and volition. These two constructs broadly identify the different phases of the appropriation process. We will then introduce and critique H. Heckhausen and Gollwitzer's

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(1987) description of the motivational phase. This would provide the basis for my adaptation of their monolithic conceptualisation into two separate stages i.e. early and late deliberation. For both stages, we will elucidate the thought processes occurring within teachers, propose possible appropriation outcomes, and offer suggestions for policy makers and leaders. In the penultimate section, we will explore collective sensemaking and show how it mediates teachers' goals which emerged after deliberation, and influences the enactment of the innovation. We conclude with a summary of the findings, a discussion on the potential limitations of the framework, and possible directions for further research.

2.   Resolving teacher will: motivation and volition

Van Eekelen, Vermunt, and Boshuizen (2006) have suggested that teachers' *will to learn* is necessary for the appropriation of educational innovations; defining will to learn as the "psychological state in which the learner has a desire to learn" (p. 410). Fullan (2016) alludes to a subtly different definition of teacher will by suggesting that underlying all successful change is "a bias for action" (p. 39). Van Eekelen et al.'s definition appears to be more focused on teachers' *uptake* of the educational innovation, as inferred from the word *learn*, while Fullan's definition seems to be more concerned with the *downstream* enactment of the innovation, as suggested by the word *action*. The words *desire* and *bias* have also been used to describe anything from a subtle predisposition to a stronger inclination. Reconciling the contrasting nuances within both definitions, teacher will could be seen as comprising two distinct phases:

1. a willingness to consider the innovation, and

2. a stronger commitment to appropriate and enact the innovation.

Psychologists have similarly sought to distinguish the different states of will with the constructs of *motivation* and *volition* (J. Heckhausen, 2007). Achtziger and Gollwitzer (2008) explains the distinction between the:

1. Motivation pertains to the decision-making process on whether to pursue a certain goal or the alternative goals.

2. Volition pertains to the commitment in putting into action the goal one had decided on. Comparing the two phases of will with motivation and volition, the willingness of teachers to consider an innovation parallels motivation, while the stronger commitment of teachers to appropriate the innovation parallels volition. For clarity, motivation and volition will refer to the two distinct phases of teacher will henceforth.

It is necessary to distinguish between motivation and volition because the two occur at different instances along the appropriation timeline, and entail different mindsets and thought processes.

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3.   Limitations of psychologists' description of the motivational phase

H. Heckhausen and Gollwitzer (1987) suggested that motivation occurs prior to, and leading up to the emergence of an intention. It entails deliberation i.e. a careful consideration of the goal, in our case to appropriate the innovation, vis-à-vis alternative goals such as not accepting the innovation. This deliberation is performed against the criteria of:

- Feasibility i.e. the expectation of achieving the goal, which depends on one's skills, knowledge, available time, resources, and whether the situation is conducive or antagonistic to the pursuit of the goal.

- Desirability i.e. the value of the potential outcomes of the goal. This calls for an evaluation of the possible short and long-term costs and benefits of the goal.

At the end of this deliberation, an intention on whether to pursue the goal or an alternative goal is reached.

The deliberation process described above suggests an objective, systematic, detailed cost-benefit analysis of the goal vis-à-vis alternative goals. While the process appears logical, in practice, deliberation may not be so objective and detailed especially at the start. A detailed and objective deliberation has to be based on a firm understanding of the innovation and what it entails, which in turn, requires facts and knowledge. However, Fullan (2016) points out that teachers can lack the requisite knowledge and in-depth understanding for such a deliberation, and "may not know what they don't know" (p. 57) at the early stages of appropriation.

4.   Motivational phase: Early deliberation

4.1   *Early deliberation is heavily influenced by teacher beliefs and emotions*

If early deliberation cannot be objective and detailed due to the lack of in-depth information on the innovation and concrete experiences for teachers to reflect on, what would early deliberation then be anchored on? Fullan (2016) provides a clue when he argued that change is highly emotional. Caroline Cox provides a further hint when she suggested that teachers typically justify their current practices based on:

- tradition (how it has always been done),

- prejudice (how I like it done),

- dogma (this is the "right" way to do it), and

- ideology (as required by the current orthodoxy) (as cited in Hargreaves, 1996, p.7).

Such responses come across as affective and hardly "evidence-based", appearing to originate from teachers' beliefs. This contradicts the earlier objectivity and calculatedness suggested by H. Heckhausen and Gollwitzer. Hence, we infer that teachers' beliefs and emotions could play an influential role when teachers deliberate on the feasibility and desirability of the innovation at the start.

Defining beliefs has traditionally been a challenge, compounded by the term often "travel[ling] in disguise and often under alias— attitudes, values, judgments, axioms, opinions, ideology, perceptions, conceptions, conceptual systems, preconceptions, dispositions, implicit theories, explicit theories, personal theories, internal mental processes, action strategies, rules of practice, practical principles, perspectives, repertories of understanding, and social strategy" (Pajares, 1992, p. 309). This spectrum of aliases alludes to the highly varied and individualised origins of teachers' beliefs, which have not only enabled beliefs to elude precise definition, but have also made beliefs difficult for reform leaders to "pinpoint and grapple with it".

In this paper, we are concerned with teachers' beliefs about teaching and learning. We see teachers' beliefs as a product of the confluence of their past and current experiences as learners, educators, subordinates to school management, and participants of the public sphere. de Vries, van de Grift and Jansen's (2014) had proposed a similar definition, defining teachers' beliefs as "propositions about learning and teaching that a teacher *holds to be true* [emphasis added]…develop[ed] during the many years teachers spend at school, first as students, then as student teachers and teachers" (p. 339). The italicised words hint at an "emotional investment", as suggested by de Vries et. al. (p. 339). The subtle distinctions between de Vries et al.'s definition and ours are that first, we have avoided the terms *students*, *student teachers*, and *teachers* as learning and teaching could occur concurrently in these three roles; second, our definition transcends teachers' classroom roles, and considers teachers' engagement with policy, not only within school but also as a private citizen.

The distinction between beliefs and knowledge goes beyond their affective vs. cognitive natures. Beliefs have *greater immediacy* than knowledge during teachers' early deliberation. Here greater immediacy means beliefs being the *instinctive* decision-making tool teachers *first* turn to during early deliberation, where knowledge and experiences on the innovation are still limited. This idea is supported by Pajares' (1992) suggestion that when "unable to use more appropriate knowledge structures and cognitive strategies…the teacher uses beliefs and belief structures, with all their problems and inconsistencies" (pp. 311–312). Nespor (1987) likewise suggested that beliefs, relative to knowledge, were more suited for

dealing with *ill-structured problems* where it is uncertain what should be done and what could be done. Teachers' unfamiliarity with the innovation at early deliberation, makes the innovation an ill-structured problem at that stage.

Pajares' (1992) literature review provides a further understanding of the key features of teachers' beliefs. Pajares reported that beliefs were:

- Rigid and persistent. The affective nature of beliefs operated independently of knowledge. Accordingly, beliefs were less open to reason and hence change, compared to knowledge. Beliefs could also be inconsistent with one another, and defy accepted group norms and logic. Beliefs persisted even when it was logical for them to change.

- Serve as a filter to knowledge. Beliefs could act as a filter through which new phenomena were interpreted, effectively screening, redefining, distorting, or reshaping subsequent thinking and information processing.

- Play an adaptive role. Beliefs help individuals understand and define the environment, and hence themselves. Pajares' description of the adaptive role of beliefs below suggests how a person's beliefs are, in effect, a reflection of his or her "self":

> [beliefs] provide personal meaning and assist in defining relevancy....People grow comfortable with their beliefs, and these beliefs become their "self," so that individuals come to be identified and understood by the very nature of the beliefs, the habits, they own. (pp. 317–318)

We infer from the characteristics and features of beliefs delineated in the preceding three paragraphs:

- The immediacy of beliefs, coupled with its ability to filter knowledge, make beliefs a powerful "gatekeeper".

- The association of beliefs with "self" implies that an innovation incongruent with a teacher's beliefs would also be incongruent with his or her concept of self, and could be deemed by the teacher as a threat to his or her self-esteem.

The corollary that follows from these two inferences would be that innovations which contradict teachers' beliefs, would likely be seen as a threat, and be *resisted* by the gatekeeping role of beliefs.

4.2   Beliefs prompting teachers to "shut out" an educational innovation: Denial and opposition

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Cain (2016) suggests that teacher resistance manifests as a *denial* or *opposition* of the educational innovation. One definition of denial is "the dismissal of well-established scientific results for reasons that are not scientifically grounded" (Lewandowsky, Oberauer, and Gignac 2013, p. 623). This definition works well in the natural sciences context, but the phrase *well-established* could prove problematic in the social sciences. Research findings in the social sciences are usually contextually situated e.g. a pedagogy demonstrated to work in one classroom, may not work in another. In contrast, well-established results in the natural sciences are often taken to mean that the "results" are generalisable. In view of the nature of educational research findings, we could contextualise the earlier definition of denial as follows. Denial could be seen as the dismissal of rigorous, relevant research evidence, which reasonably support the potential effectiveness of the innovation in the implementing classroom, through the use of non-scientific reasons.

To illustrate denialism, we have reproduced below a teacher's account from Bakkenes, Vermunt, and Wubbels' (2010) study on teacher learning of an educational innovation. The teacher was part of a group of 94 Dutch teachers who were asked to describe a learning experience related to student Active Self-Regulated Learning (ASRL) once every six weeks, for a year. A comprehensive introduction to student ASRL is beyond the scope of this paper. It suffices to say that (a) Bakkenes, Vermunt, and Wubbels had reported that there was strong research evidence supporting the effectiveness of student ASRL, and (b) student ASRL was a nation-wide innovation programme. In view of (b), the research evidence supporting student ASRL would likely have been made known to the teacher, or was at least easily accessible. Despite the research evidence supporting student ASRL, the account below shows the teacher "shutting out" the innovation as it was incongruent with his beliefs:

> From time to time I use a different teaching format, just to confirm to myself that all these new ideas are naive and idealistic. Last week I didn't give instruction. Instead, I let the students work on the assignments in their book, and when they had questions I told them to look them up on the internet or I reminded them that they had to find the answers in their book. In another, comparable class I gave my lessons as usual. At the end of that week I gave the students a test. The results in my experimental group were clearly lower than the results in my control group. This proves that there is *nothing wrong with my way of teaching* [emphasis added] and that new methods aren't good just because they are new. (Teacher of Mathematics) (Bakkenes, Vermunt, & Wubbels, 2010, p. 540)

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The italicised words suggest that the teacher had seen the innovation as a challenge to his beliefs and teaching efficacy. Accordingly, the teacher denied the innovation to protect his self-esteem. The teacher sought to "prove" that his methods were better via a "scientific" method. However, there is nothing scientific about the teacher's "proof". For instance, the students were not randomly allocated to the intervention and control groups. Although the teacher suggested that the two classes were "comparable", using separate classes as the intervention and control groups is often problematic. The two classes were likely to have been exposed to different conditions and stimuli which could have in turn, systematically advantaged one class over the other. For example, students in the better-performing "control" group may have acquired ASRL skills in another subject, applied the skills to their learning of Mathematics, thereby contributing to their better performance. The "intervention" group, on the other hand, were not exposed to ASRL in their Mathematics lessons (we return to this point later), and may not have been exposed to ASRL in the other subjects as well. There is a plethora of factors that could have contributed to the results observed. These factors may not have been apparent or controllable. This warrants the need for an authentic randomised controlled trial. The teacher's use of "comparable" classes is inadequate.

The teacher's "intervention", i.e. leaving the students to find the solutions by themselves without any guidance, suggests a literal interpretation of self-regulated learning. This interpretation is not congruent with prevailing notions of student ASRL. For instance, the roles expected of teachers in student ASRL are "to model metacognitive strategies for students, coach students in the acquisition of those strategies and fade their support when students become more proficient in their use" (Bakkenes, Vermunt, & Wubbels, 2010, p. 534). Using Hall's (1973) "Encoding, Decoding*"* model of communication as a lens, the teacher could be seen as operating with an *oppositional code*, decoding the research suggestions in a *globally contrary way*. Hall's model argues that events i.e. educational research findings in our context, are encoded by the researchers and meaning is conferred. The event becomes a message. The encoding process is shaped by meaning structures such as "professional ideologies, institutional knowledge, definitions, assumptions, assumptions of the audience" (p. 509). The audience i.e. teachers in our context, on receiving the message, will decode it using their own meaning structures (also shaped by their beliefs). As the researchers' and teachers' meaning structures may not be symmetrical, the teachers could read the researchers' messages in a way that contradicts the latter's intended meaning. Cain (2016) suggests that this might occur when teachers perceive their status, values or experiences challenged by the researchers' messages e.g. when teachers see the introduction

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of the educational innovation as "a matter of influential and powerful groups, telling them what to do" (p. 4).

The affective aspect of beliefs could prompt teachers to "shut out" research-informed educational innovations, either by denial or opposition, before teachers even study the research evidence. To avoid such outcomes, school leaders could consider framing their reform messages and professional development programmes in ways that are non-threatening to teachers' beliefs and statuses. For instance, by engendering cognitive dissonance within teachers, helping them realise on their own the internal inconsistencies of their beliefs. The more cognitive-driven late deliberation stage could then be positioned as a platform for resolving the dissonance, "nudging" teachers to consider more carefully the research evidence.

5.   Motivational phase: Late deliberation

5.1   *Late deliberation as a search for meaning by teachers*

Relative to the affective-driven early deliberation, late deliberation is presumably based more on teachers' knowledge and cognitive thought processes. However, it was argued previously that beliefs will continue to colour the knowledge and information processing of teachers long after early deliberation. Hence, late deliberation is characterised, not so much by its objectivity, but by (a) the more thoughtful nature of teachers' thought processes, and (b) an inclination by teachers to reconcile their *frame of reference* (i.e. their knowledge and assumptions) with the perceived demands of the educational innovation and situation (i.e. the innovation's frame of reference). Luttenberg, van Veen, and Imants (2013) conceptualised this reconciliatory effort as a *search for meaning*. Luttenberg et. al. further distinguished the different types of search for meaning along two criteria: the degree of agreement between the two frames of reference, and if the eventual frame of reference reached by the teacher is skewed towards his or her original frame of reference, or closer to the innovation's. The resulting four types of teachers' search for meaning were:

- Accommodation. The teacher successfully reconciles his or her frame of reference with the innovation's. The resulting frame of reference reached is closer to the innovation's frame. A restructuring of pre-existing knowledge occurs within the teacher to accommodate the new information (Piaget & Inhelder, 1969). The teacher experiences both a shift in his or her assumptions and a transformation in practice. This presents the ideal outcome for change leaders.

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- Assimilation. This is where the teacher successfully reconciles his or her frame of reference with the innovation's. However, the resulting frame is closer to the teacher's original frame. This means that the teacher interprets and enacts the innovation in such a way to "clearly fit into his or her own manner of thinking and acting" (Luttenberg et. al., 2013, p. 294). Spillane, Reiser, and Reimer (2002) described assimilation as "a conserving process" (p. 396). The downside of assimilation would be the loss of important innovation characteristics. For instance, teachers may superficially appropriate the labels. On a positive note, leaders could see this as a step towards the intended outcomes of the reform. Sceptical leaders would however view assimilation as a misappropriation of the innovation.

- Tolerance. No agreement is reached between the teacher's frame of reference and the innovation's. The teacher tries to put up with the innovation's frame of reference. Manifestations of tolerance could be the incomplete uptake of the innovation's features, the creation of parallel structures (Coburn, 2004) such as student-centred and teacher-centred teaching co-existing and occurring at different parts of the lessons. Tolerance could be seen as a step towards the realisation of the reform, but with teachers "struggling not to revert to old ways" (Bakkenes, Vermunt, & Wubbels, 2010).

- Distantiation. No agreement is reached between the teacher's frame of reference and the innovation's. The teacher rejects the innovation's frame of reference and distances himself or herself from it, continuing in his or her way of thinking and acting. This presents the second instance where the teacher could reject the innovation. The first instance being at the affective-driven early deliberation stage. This second instance for the teacher to reject the innovation, following a more thoughtful attempt to reconcile with the innovation's frame of reference, is important and necessary. This is because "teachers may have good sense in seeing through the reform as misdirected or unworkable for the local context and culture" (Luttenberg et. al., 2013, p. 290). In this light, distantiation appears to function as a fail-safe design, mitigating the consequences of an unsuitable educational innovation.

These four types of search for meaning by teachers could be seen as the array of possible goals. The selection of one leads to the emergence of an appropriation intention at the end of the deliberation process.

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5.2   Teacher experimentation is integral to teachers' search for meaning

H. Heckhausen and Gollwitzer (1987) had perceived deliberation as preactional. However, Weick (1995) suggested that the search for meaning is retrospective i.e. the construction of meaning occurs only after action. This perspective is echoed by Fullan (2016) when he suggested that "new experiences…give us something new to think and learn about" (p. 39). Spillane, Reiser, and Reimer (2002) offer further insights on this thinking and learning that follows action when they suggested that people "construct intuitive models from *experience* [emphasis added], apart from formal instruction" (p. 395); these mental models are used to predict outcomes in a situation. Putting Weick's, Fullan's and Spillane et. al.'s suggestions together, we arrive at the conclusion that action, or rather teachers' experimentation with the educational innovation, allows them to build mental models of the unfamiliar educational innovation. These models, in turn, enable teachers to predict the desirability and feasibility of the innovation when used in the classroom. The knowledge generated provides fodder for their search for meaning which culminates in an "informed decision" (i.e. the appropriation intention) on the innovation. Since we have argued earlier that late deliberation is predicated more on knowledge, cognitive thought processes, and "calculated" decision-making, and that teacher experimentation is necessary for the construction of knowledge and meaning, it follows that teacher experimentation is an integral part of the late deliberation stage.

Teacher experimentation with the innovation is important for teachers to "make sense" of the innovation. This could in turn shift their beliefs and attitudes. Accordingly, leaders should not short-circuit teacher experimentation, because of implementation efficiency.

6.   The volitional phase

6.1   *The volitional phase as collective sensemaking*

H. Heckhausen and Gollwitzer (1987) described the post-deliberation phase as one characterised by planning, on how to best pursue the chosen goal, and action i.e. enacting the plans made. This phase is driven by volition which was defined earlier as the commitment in putting into action the goal one had decided on. This description conjures the image of a steadfast pursuit of the chosen goal and assumes that the chosen goal is fixed. While the teacher would, by this stage, likely be more committed to enacting his or her chosen goal, the goal could still change following interaction with other teachers. The role of teacher interaction in the appropriation of an educational innovation is encapsulated in Werner's (1980) concept of implementation as "an *ongoing construction of a shared reality* [emphasis added] among group members through their interaction with one another within the programme" (pp. 62–63; as cited in Fullan, 2016, p. 108). The phrase *ongoing construction* suggests that the sensemaking which started in the late deliberation phase continues here, but with the distinction that sensemaking now occurs in a social context, hence the development of a "shared reality".

Collective sensemaking has been included as the final stage of the appropriation process, following individual search for meaning and sensemaking in the late deliberation stage, because:

- Implementation of the educational innovation is never solitary and teacher interaction is inevitable.

- It is highly unlikely that all teachers would have completely grasped the technicalities of the educational innovation, by themselves, during the deliberation phase. Teachers are likely to turn to their colleagues to discuss. Collective sensemaking allows teachers to learn from one another (Spillane, Reiser, & Reimer, 2002).

- In negotiating the practicalities of implementing the innovation, teachers are inclined to legitimise their view and chosen goal. They do so by seeking to normalise their views and goal into the group culture and routines. This is inferred from the observation that, in informal settings, teachers tend to seek out like-minded colleagues to discuss their practice, and often followed up in ways that "reaffirmed and re-enacted pre-existing practices and beliefs" (Coburn, 2001, p.160).

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6.2   Collective sensemaking, and its impact on the whole-school appropriation of the educational innovation

The abovementioned reasons prompt one to envisage collective sensemaking as a conversation and negotiation between the teachers. Spillane, Reiser, and Reimer (2002) have described collective sensemaking as teachers coming together, focusing on problems of shared concern e.g. negotiating meaning and clarifying ambiguities about the educational innovation. In doing so, teachers are introduced to alternative interpretations of the innovation. Also, teachers in communicating their positions towards the innovation, articulate their tacit beliefs. Once made visible, these tacit beliefs provide the fodder for discussion and negotiation. A "successful negotiation" could be seen as one which results in the formation of "shared understandings", which Coburn (2001) defines as "workgroup-specific culture, beliefs, and routines" (p. 147). Spillane et. al. further suggest that these shared understandings subsequently serve as "a filter for ideas about revising extant practice" (p. 406), thereby influencing teachers' eventual enactment of the educational innovation. "Non-successful negotiations" on the other hand, could result in the teacher disengaging himself or herself from the group, and perhaps seeking out other like-minded groups in informal settings as Coburn (2001) had pointed out. The concept of "successful" and "non-successful" negotiations above, parallels McLaughlin and Talbert's (2001) differentiation of professional learning communities in schools into strong teacher communities and weak teacher communities. The former comprises of teachers who have successfully negotiated shared understandings and collaborate either to,

- on a positive note, reinvent existing practices e.g. accommodate the educational innovation; or
- on a negative note, strive to maintain status quo e.g. distance from the educational innovation; or
- adopt positions in between e.g. to tolerate or assimilate the innovation.

In the latter, teachers retreat to their private practice e.g. to innovate alone or maintaining their current practices.

Collective sensemaking is equally influential as teacher beliefs. It can sway teachers' original appropriation goals, and amplify both the positive and negative goals within the community. Collective sensemaking will always occur, with or without formal structures such as professional learning communities. Left to their own, teachers will seek out like-minded groups to affirm their views on the educational innovation. Hence, collective

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sensemaking presents a critical lever in the appropriation process for school leaders. Coburn (2001) suggested that collective sensemaking is shaped mainly by (a) the composition of the group, and (b) the extent to which the group conversations facilitate engagement and reflection. A lack of deep engagement would result in conversations remaining at a superficial level, never reaching a negotiation of the teachers' tacit beliefs. Not surprisingly, teachers would then retreat to their private practice and the conversations would have little influence on them. On this, Coburn's (2001) suggestion is to provide authentic activities that enable teachers to reflect on their classroom practices and draw connections to the educational innovation. Sufficient time is also needed for teachers to reflect, debate and negotiate. School leaders should also pay attention to the composition of formal teacher groups. It is impossible for school leaders to monitor how collective sensemaking unfold in the various formal and informal teacher groups, but school leaders could still steer the direction of the conversations. For instance, school leaders could introduce views from outside the community, frame the innovation messages, and privilege certain groups' interpretations of the innovation over others.

7.   Conclusion

Teachers' appropriation of research-informed educational innovations is both multi-layered and multi-dimensional. The process (see Figure 1) comprises two phases (the motivational and volitional phases), three stages (early deliberation, late deliberation, and collective sensemaking), six appropriation outcomes (denial, opposition, distantiation, tolerance, assimilation, and accommodation), with teachers' appropriation goals strongly mediated by two levers i.e. experimentation and collective sensemaking. This contradicts the singular, mechanistic view of innovation implementation as teachers "adhering to the script" prescribed by the innovation, and culminating in binary outcomes i.e. successful reproduction of the innovation vs. failure. Accordingly, we hope to encourage policy makers, school leaders and change leaders to desist mechanistic implementation and its accompanying false promise of a quick transformation. As suggested by Coffield (2012), such a view is "more likely to create *exam factories* [emphasis added] than communities of learning" (p. 145). Mechanistic implementation also presents a large opportunity cost as it dismisses the existing reservoir of cultural knowledge within teachers; both codified and cultural knowledge are essential for teacher effectiveness (Wilson & Demetriou, 2007).

The framework in Figure 1 could serve as a starting point for school and reform leaders to consider their school's reform journey from a more human relations perspective. The framework requires further testing. The messiness of teacher learning could mean that the three distinct stages may not always follow a linear progression. Teachers could also undergo multiple iterations of the various stages due to evolving pressures, and shifting innovation messages "from the top". The various appropriation stages also follow an arguably arbitrary progression, starting from a personal introspection to a collective negotiation of values, understanding, and practices. Collective sensemaking could conceivably occur at the affective-driven early deliberation phase, sometimes in an indirect manner, such as memories of a past reform, or experiences with a concurrent one.

Lastly, this paper raises further questions: what kind of school leadership and reform approach could better support teachers' appropriation of educational innovations, and more generally, school reforms? The traditional, and still popular concept of the single heroic leader (who knows what is best for the school) resonates well with mechanistic implementation, but both are clearly incompatible with the actual complexity of appropriation. A study of other approaches to introducing reforms, on how they engage teachers affectively and cognitively in the learning of the innovations, with special attention paid to the school

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context, would be a natural follow-up to this paper. It could also provide a test bed to determine if the framework presented here provides a viable and adequate conceptualisation for teachers' appropriation of educational innovations.

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