Resolving the quantitative–qualitative dilemma: a critical realist approach

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The philosophical issues underpinning the quantitative–qualitative divide in educational research are examined. Three types of argument which support a resolution are considered: pragmatism, false duality and warranty through triangulation. In addition a number of proposed strategies—alignment, sequencing, translation and triangulation—are critically assessed. The article concludes by suggesting that many of these ways of reconciling quantitative and qualitative methods and approaches are still deficient in relation to the development of an overarching and correct view of ontological and epistemological matters, and that critical realism offers a more coherent solution, where the reconciliation occurs at the ontological level.

Introduction

In a recent issue of the *British Educational Research Journal* (October 2003) eight articles are included, which represent for the editors a celebration of 'some of the best recent educational research' (Gorard & Taylor, 2003, p. 619). In their editorial they comment on the fact that 'six of the eight papers use and advocate combining the approaches traditionally referred to as qualitative and quantitative' (Gorard & Taylor, 2003, p. 620). Though the editors are deliberately not identifying a relationship between combining such approaches and either the quality of the pieces, or the quality of the research which their various authors report, they are expressing agreement with many of these authors that it is appropriate to combine the two. Indeed, this thesis is now generally accepted by large swathes of the educational research community, especially as it seeks to transcend the paradigmatic divide that it has been claimed exists between the two approaches (cf. Bryman, 2006; Dicks, 2006; Dixon-Woods *et al.*, 2006; Koenig, 2006; Mason, 2006; Moran-Ellis *et al.*, 2006).

Three types of argument have been put forward to support this thesis. The first suggests that paradigms are essentially epistemic, and thus focus on matters that do

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not impinge on the collection and analysis of data about the world. This is predicated on a belief that the researcher's task is to resolve those practical and ethical problems which prevent them from applying the most appropriate methods of collecting data, where 'appropriate' refers to the particular task that the researcher has set themselves. This is what might be called the pragmatic argument.

A second type of argument, in contrast to the above, makes the claim that epistemic positions are central to choices that researchers make about the methods and strategies they use to investigate the social world; however, the paradigm arguments are mistakenly constructed so that either elements of each are misrepresented or the opposition between them is illusory. In resolving these epistemic arguments, a further claim is made that qualitative approaches can compensate for deficiencies in quantitative approaches or quantitative approaches can compensate for deficiencies in qualitative approaches. There are two variants of this. The first suggests that, contra positivism, variables should not be treated as facts but as 'ficts' (expressed in a numerical form), which may not be true representations of reality, but are useful devices for warranted arguments developed by researchers who use statistics. A second variant suggests that intensional idioms which refer to intentional states can be reconfigured as extensional idioms so as to allow the researcher consistently to use extensional expressions in their description of reality. This is what might be called the false duality argument.

A third type of argument accepts that quantitative and qualitative approaches have different epistemic and ontological bases, but if both are focused on the same research problem and similar conclusions are drawn, then the researcher can have a greater degree of confidence in their findings. This is what might be called the warranty through triangulation argument.

This article will critically address these three arguments and suggest that: i) epistemological and indeed ontological issues are central to the work of the researcher; ii) the paradigm debate has been falsely conceived and consequently it is possible to develop an overarching and more correct view of ontological and epistemological matters so that choice of appropriate strategies and methods logically follows from positions that the researcher takes at these levels; iii) many of the ways of reconciling qualitative and quantitative approaches—triangulation, alignment, sequencing and translation—are still deficient with regards to i) and ii); iv) finally, a resolution is possible but this has to fit with i) and ii) and provide an alternative to iii).

The pragmatic argument

Ontological and epistemological beliefs have underpinned the adoption of strategies and methods used by empirical researchers. In contrast, proponents of a pragmatic position argue that it is possible to separate out these beliefs from the adoption of methods and strategies. Burke Johnson and Onwuegbuzie (2004), who argue in favour of this position, suggest that an appropriate justification can be found in the methods of the classical pragmatists, and this can be used to support both qualitative or quantitative approaches or a combination of the two on the grounds that research

should be judged by its practical applicability rather than its truthfulness or correspondence with an external reality. For example, Peirce's (1982) pragmatic maxim was that any theory of meaning takes as axiomatic that the content of a proposition is the experienced difference between it being true or false. Thus, truth is understood in terms of the practical effects of what is believed, and particularly, how useful it is.

There are two principal problems with the adoption of such a position: first, if criteria for judging the aptness of a piece of social research are determined by practical considerations, then current ways of understanding and ordering the world necessarily take precedence over alternative conceptions; and second, this suggests a form of epistemic relativism where judgements about aptness are always relative to particular social and historical arrangements. Since a number of different and conflicting methodologies are in use at any one time, a belief in epistemic relativism does not allow a judgement to be made as to which of these is more appropriate. Furthermore, Peirce's pragmatic maxim suggests an epistemological warrant for determining the truth of a proposition, and, even if this is accepted, it can not be reduced to the solving of practical and ethical problems in the research setting.

If this is rejected, an alternative is required. The researcher's self-appointed task is to find out about something in the world. They are born into a world which is already resourced, and in the case of methodology, this consists of a series of conflicting arguments for the use of certain types of approaches. A choice therefore has to be made, though of course the researcher may not be aware of all the possible options and indeed some options which have not yet been invented. As a result, they may only be able to make a limited choice, but a choice nonetheless. They use particular approaches, and draw conclusions from the data they collect, and in doing so implicitly claim that their version of reality is better than other possible versions, even if they are not immediately confronted with them. There is of course the special case of the researcher not believing that they have discovered the truth of the matter, and acknowledging to themselves at least, that they have produced a distorted version of the truth; but even here, they are implicitly accepting that their version of the truth is inadequate in relation to a better or more correct version. Making methodological choices *per se* means that the researcher is formulating a belief that the choice they make is a better choice than the one they did not make because it will lead to a more truthful representation of what they are trying to portray.

However, researchers may accept that they are working to a truth criterion, but then define their search for the truth in a way which is different from that of other researchers. Bridges (1999) suggests that there are five conceptions of truth (there may be more, but they have not yet been invented, or codified): truth as correspondence, truth as coherence, truth as what works, truth as consensus and truth as warranted belief. These different theories of truth are so framed that they imply a relationship between a statement and a referent, so a researcher can say, if they adopt a correspondence theory of truth, that a statement is true if it corresponds to a state of affairs in the world: 'P is true if and only if p—i.e. it corresponds with an actual state of affairs or condition' (Bridges, 1999, p. 601). Again, a researcher can say, if they adopt a conception of truth as coherence, that a proposition is true if it is consistent

with a further set of propositions: 'P1….Pn are true if and only if they represent a coherent, consistent and comprehensive set of propositions' (Bridges, 1999, p. 603). It is also possible to suggest that the referent in each particular case is of a different order, so, for example, a correspondence version of truth refers to an ontological state, whereas truth as warranted belief refers to whether it satisfies an epistemological test to determine its value. Furthermore, some of these conceptions of truth allow for the possibility of a relativistic element whereas others do not. So, truth as correspondence would suggest that a belief in epistemic relativism is unsound, whereas truth as consensus is predicated on a belief that a universal a-historical warrant cannot legitimately be developed.

These different theories are so framed that belief in one precludes belief in another. Or at least this is true if a further set of assumptions is made that either belief in more than one of these theories results in a logical incoherence or that the individual holding such contradictory beliefs can compartmentalise aspects of their belief system so that one theory refers to one set of circumstances and another to a different set of circumstances. In relation to this last case, there is a temptation to say that the individual has in fact invented another theory of truth which takes account of the context of application and is thus acting in a coherent way. Even if it is denied that a theory of truth is a logical requirement of proceeding in the world as a researcher, or at least that there is no universal warrant for truth, this does not contradict the assertion that is being argued for here: that in making a choice between alternatives that already have been formulated, the researcher is necessarily making a claim that the choice they make is better than one they did not make, because a denial of truth logically presumes that this denial is better than its affirmation. The only way out of this dilemma is to deny that standard logic, and in particular, the law of non-contradiction, can effectively discriminate between different propositions or in the case that we are considering here between different versions of truth.

This position identifies a relation between a philosophical issue and empirical research; in the example above the issue is that of truth, but a similar exercise could have been conducted in relation to other philosophical concepts such as objectivity or ontology. It further suggests that any beliefs the researcher may have about the nature of the social world and even more importantly any beliefs they may have about how they can know it are so compelling that certain types of methods and strategies used by them are appropriate and others inappropriate. Thus, an experimental approach to the study of education can be adopted if the experimenter accepts a number of philosophical positions, which are justified and rationalised separately from their instantiation in the collection and analysis of data. These might consist of a belief that the social world is not mediated by consciousness so that it is possible to argue that controlled conditions replicate uncontrolled conditions in real-life situations even after they have been experienced by individuals outside of the experiment. Or, they might consist of a belief that a controlled setting can eliminate the values, preconceptions and underpinning epistemic frames of the researcher.

All that I have argued for here is that philosophical criteria are a prerequisite for the work of the researcher. No arguments have yet been put forward for any relation

between particular ontological and epistemological stances and particular types of methods and strategies for collecting and analysing data. This issue will now be addressed.

The false duality argument

Paradigmatic arguments are predicated on the presupposition that underlying onto-logical and epistemological positions taken by proponents of each are irreconcilable. This position equates quantitative forms of data collection and analysis with various forms of empiricism, and qualitative data collection and analysis with various forms of interpretivism. The two philosophical positions are so conceived that the one necessarily supports and rationalises a quantitative position and the other a qualitative position, with proponents of the one not accepting the ontological and epistemologi-cal position of the other and vice versa. A further distinction needs to be drawn between actual practice and ideal method. So, any reconciliation between the two may rest on impoverished versions of each and certainly on versions that are not acceptable to proponents of the other paradigm. A final problem is that the dichoto-mous paradigmatic model that underpins the argument so far may not represent all the available positions that can be taken with regard to ontological and epistemolog-ical matters.

However, Pring (2000) offers a viewpoint that characterises the paradigmatic model as a false duality. The two paradigms, equivalent to naïve realism and radical relativism, have the following characteristics. Paradigm A is: i) grounded in a belief in an external reality driven by immutable laws; ii) underpinned by a belief that the researcher is separate from that which they are investigating; iii) predicated on a correspondence theory of truth, with a corresponding denial of alethic relativism; and iv) supported by a belief that problem and solution can be generalised from one setting to another. In contrast, paradigm B is underpinned by the following set of beliefs: i) reality is concept-dependent and that reality is therefore constructed by the efforts of individuals and groups of individuals; ii) there is no context-free way of accessing that reality; and iii) alethic, ontological, epistemic and logical relativisms are not incoherent. Pring argues that many of these positions cannot be justified and that as a result the paradigmatic divide is unsustainable. It is not my intention here to rehearse these arguments (cf. Scott, 2005), but to suggest, as will become apparent, that dissolving the paradigm divide may also allow a dissolution of the division between quantitative and qualitative methods and methodologies, given that such a division is predicated on the adoption of epistemic and ontological positions, which it is being argued here are unsound.

It is therefore worth examining three strategies for reconciling quantitative and qualitative stances. The first of these, alignment, operates at the level of method, and a variant of it, sequencing, builds in a temporal element. The second, compensation, operates at the ontological level by allocating different purposes to quantitative and qualitative data sets because reality is multi-layered and the different layers require different types of symbolic systems to describe them. The third, translation, suggests

that quantitative and qualitative approaches use different epistemic frames for describing reality, each of which has a unique logical form, but it is still possible to translate the one into the other. For example, all scientific explanations are underpinned by a notion of extensionality, so that intensional idioms which refer to belief and intentional states of individuals have no place in such scientific explanations. However, the development of mathematical models does not preclude descriptions of intentional states; only that in order to operate through the scientific method, intensional idioms have to be reformulated or translated so that formal calculations can be made (Wilson, 1990). I will first set out the principles that underpin each of these three positions, before, in a later section, arguing that alignment and translation are flawed, but a notion of compensation can be legitimately developed so long as the reconciliation occurs at the ontological level—a principal tenet of critical realism.

Alignment

The first of these positions, alignment, operates at the level of methods. This should not be conflated with triangulation where different methods, data sets, investigators or conceptual frameworks are used for the purposes of checking, validating or corroborating the research account. Alignment comprises the construction of instruments that are usually thought of as quantitative and qualitative so that they produce a data set that is coherent and can be analysed in one particular way. An example is the use of a closed-ended questionnaire delivered to a large number of respondents with, in addition, a focus group or groups, members of which conform to the sampling procedures used for the questionnaire. The subsequent data set is aligned because similar questions are asked of each set of respondents (questionnaire and focus-group); however, those questions demand more in-depth answers at the second stage than at the first. The procedure is asynchronous, with the former preceding the latter (cf. Weyers, 2006).

A further attempt at combining the two approaches involves various forms of sequencing, so that, for example, quantitative methods and approaches are used to identify cases for deeper investigation; or in reverse, qualitative methods and approaches are used to determine constructs that are then sequentially used in a qualitative way. For example, Siraj-Blatchford *et al.*, (2002) in their *Effective Provision of Pre-school Education* (EPPE) project collected a range of quantitative data about children, their families and their pre-school centres in relation to 3000 aged-three children in 141 pre-schools across England, and then used this data set to identify twelve effective pre-school settings for intensive, in-depth qualitative case study. This type of sequencing can be extended so that a cyclical mix is attempted, and this is where quantitative and qualitative methods are used in a cyclical fashion so that there is a qualitative dimension to the first cycle of research in order to map out the setting. In the second cycle this qualitative dimension is reconstructed as a quantitative dimension to allow examination of larger populations. In the third cycle, the quantitative dimension is tested in a small number of representative cases to confirm its validity.

Compensation

Whereas alignment seeks to reconfigure the different instruments, normally categorised as quantitative and qualitative, so that a database can be constructed which allows a coherent and consistent analysis to be made, compensation focuses on the development of different instruments and analytical techniques, again normally categorised as quantitative and qualitative, for examining the different levels or layers of social reality. Olsen (1996) provides an example of this approach in her study of grain markets in India, in which quantitative and qualitative data were collected to examine respectively the macro and micro levels of these markets, and where retroductive modes of inference were used to identify what must have been the case in order to bring about the observed events. Pring (2000, p. 259) offers a justification for compensation, when he argues that quantitative approaches are appropriate where the purpose is to examine the generalisability of objects and those structural forms which enable and constrain agents' activities, and qualitative approaches are appropriate where the purpose is to examine agents' unique intentions and beliefs or their 'subjective meanings'. If the object of study is an aspect of social life, then both types of approaches have to be utilised for a full or complete account to be developed. The one approach compensates for the inadequacies at the methodological level of the other.

  Nash (2005) provides a different approach in that he seeks to connect the two processes at the ontological level by developing a three-fold hierarchical model of structure, disposition and practice and then linking the three levels. His model combines statistical analysis of structural properties of objects with the use of qualitative approaches to explain causal relations between interacting objects and states of being. However, he acknowledges that statistical positivism, which he argues provides a realistic picture of reality in that 'there is no obstacle to the identification of systematic patterns of a kind that will allow the possibility of empirical controls for the purposes of scientific enquiry' (Nash, 2005, p. 187), cannot provide an adequate account of causal relations. I have suggested elsewhere (Scott, 2005, 2006) that both these approaches underplay epistemological transitivity and ontological emergence; that a new dualism between structure and agency is created; and that inevitably intensionality and extensionality are conflated with the consequence that some meaning is logically bound to be lost.

Translation

The third attempt to reconcile qualitative and quantitative approaches, translation, allocates each of them to different epistemic frames with different logical structures. A distinction is also made between extensionality and intensionality, so that in order for there to be a reconciliation between the two approaches intensional idioms have to be translated or reconfigured as extensional idioms. If it is accepted that educational researchers have to engage with ontological issues, and more precisely with the relationship between structure and agency which characterises social life, then

explanations have to in part refer to beliefs, intentions, emotions and the like, and furthermore are contingent on lay accounts given by participants. Radical behaviourist research programmes have sought to by-pass such inner states and accounts of them by social actors, and have treated indigenous factors as irrelevant to social science explanations. In addition, those factors are not just the subject matter of social science but may also be implicated in subsequent accounts of social life. These beliefs and interpretations in short constitute what Giddens (1984) has described as the double hermeneutic, which though he accepts may allow structures and routines of social life to remain relatively stable, always has the potentiality for instability. Thus intensional idioms referring as they do to these inner states are integral to complete explanations of social life.

Extensionality, in contrast, is fundamental to standard logic, and may be defined as 'any two expressions true of the same objects, i.e. having the same extension,' being 'substituted freely for one another without changing the truth of the larger context' (Wilson, 1990, p. 387). Extensionality therefore refers to the reference of an expression and not its meaning. Since intensional expressions such as 'he believes that…'. and 'he wishes that….'. reflect the meaning of the proposition, then they have no place in standard logic. Mathematical modelling reflects the principles established in standard logic and thus is only concerned with extensionality. However, translation is possible if intensional idioms are reconfigured as extensional idioms; and this provides a way of linking quantitative and qualitative approaches; though the bias in this linkage is towards the quantitative with a relative neglect of the qualitative.

A variant on the translation argument is developed by Olsen and Morgan (2004). The first move they make is to disentangle method from methodology, and in particular to separate out the method of analytical statistics from the methodology of empiricism. For them, the use of analytical statistics is not necessarily underpinned by an empiricist philosophy, and furthermore, the data collected for the purposes of statistical modelling are fictive rather than factual. However, they can contribute to a correct explanation of social events and processes if they are understood as raw data yet to be interpreted, and it is this process of interpretation which allows their productive use in warranted arguments built up by researchers. So, for example, ethnic data (expressed in mathematical form) may be used to characterise a population, where it is accepted that not every case represents a true description of that individual's ethnicity. However, though the aggregate of all these data is literally fictitious, the subsequent interpretation of these data, including their fictitious nature, can contribute to a more complete picture of reality.

Each of these ways of combining qualitative and quantitative approaches (alignment, compensation and translation) is problematic. Alignment or sequencing suggests that qualitative and quantitative instruments can be reconfigured or used in combination over time so that the subsequent data set that is produced can be analysed in a consistent way. However, the use of these strategies cannot resolve the quantitative-qualitative divide because they operate at the level of method and as a consequence, epistemological and ontological concerns are neglected. Compensation, as will be suggested below, can provide a basis for combining the two approaches so

long as the reconciliation occurs at the ontological level. Translation, on the other hand, is deficient as a strategy because inevitably the reconfiguration of either element of the data set, so that it conforms to the other, logically results in some meaning being lost. Before I suggest a solution, a further strategy is examined, where the claim is made that a reconciliation between quantitative and qualitative approaches does not require a resolution at the epistemological and ontological levels, but the use of both types of methods and strategies in combination provides more certainty about the aptness and validity of the research account.

The warranty through triangulation argument

The third argument for resolving the quantitative/qualitative dilemma takes the form of developing a warranty through triangulation. The principle of triangulation rests on the assumption that particular events are being investigated and that if they can be investigated in a number of different ways and those different ways concur, then the researcher may then believe that their account is a truer description of those events. This is an adaptation of the scientific use of the term because in trigonometry and elementary geometry it is the process whereby a distance to a point can be calculated by working out the length of one side of a triangle and measuring the angles and sides of the triangle formed by that point and two other reference points. Here, an unknown is calculated from measurements taken from different points to the object. There is an actual relationship (this is an ontological matter), but for reasons connected with the observer's embeddedness in the world (this is an epistemological issue), those observers have to use a number of indirect methods and then infer from their coincidence or otherwise what the actual relationship is. Triangulation then in educational research is frequently used to plot a path to an unknown (the state of being in the world which the researcher wishes to describe) through the use of two or more indirect strategies which may or may not coincide. If they do, then the investigator can be more certain that their description is accurate. The underpinning principle is that the different types of activity are equally valuable.

   Denzin (1970) has identified four types of triangulation. The first of these is data triangulation, where different data sets are collected at different times, with different samples, and in different contexts, and compared. An assumption is made that these different data sets are comparable, in order for the confirming or disconfirming process to be a valid one. And in order for that confirming or disconfirming process to take place a number of conditions logically need to be fulfilled. First, the object that is the focus of the research needs to be the same in both cases, because if the two data sets refer to different objects, the comparison between them is invalid. Second, this form of triangulation suggests that there is a correct description of the object which can be better made through the collection of two data sets rather than one; and even if it is accepted that both data sets are fallible descriptions of reality, more than one fallible data set is likely to provide less uncertainty than one. No certainty is being argued for here, but only that two is better in a probabilistic sense than one. Third, that both data sets are equally fallible because if they were not then different values

would have to be attached to each in order for the comparison to be made. This can be put in a different way: if D_1 (where D refers to a data set) has a greater correspondence with the object of investigation than D_2, then more credence should be given to D_1 than to D_2 in the confirming and disconfirming process. However, the empirical researcher has no way of allocating different values to the two or more data sets, and thus in practice has to treat each of the data sets as of equal value.

The second type is investigator triangulation, where more than one data collector/analyst is used to confirm or disconfirm the findings of the research. This type of triangulation can be used at the stages of research design, data collection and data analysis. A different type of triangulation is in operation here because the investigator is now dealing with particular activities which resulted in a data set being produced. The object of triangulation is therefore the datum rather than the data set; however, the same problem is evident, which is that in practice both or more than two data collection or analysis incidents have to be treated as of equal value in order for the comparison to be made, whereas, since the use of triangulation implies fallibility, there is no assurance that the two or more observers are equally fallible.

The third type is theoretical triangulation, where more than one theoretical position is used in interpreting the data. This form of triangulation may be understood as a pre- or post-theoretical activity. In the first case, the design of the study comes directly from a pre-conceived theoretical framework, such as ontological feminism or critical realism; and in the second case, data collection takes place without a pre-conceived theoretical framework (cf. Glaser & Strauss, 1967), with a theoretical framework being imposed on the data post-hoc which emanates from the data themselves or from a position that has not originated from those data. In either of these two cases, triangulation cannot be straightforward because an assumption is being made that there are equally valid and different ways of describing reality which are incommensurable and thus cannot be compared; and this logically follows from the assertion that there are different theoretical positions that one can take that refer to the same aspect of reality. The comparison in this case is therefore not directly a comparison at all, but a transformative process which produces and is designed to produce a different theoretical synthesis.

Denzin's (1970) fourth type is methodological triangulation, where strategies or methods are mixed to confirm, disconfirm or corroborate the one against the other. As Hammersley and Atkinson (1995, p. 232) suggest, this form of triangulation cannot determine the correctness of the inferences made by the researcher because even if concurrence is established, it may be that both inferences from the two different data sets are wrong 'as a result of systematic or even random error'. Thus to draw the conclusion that two different data sets, or two different investigators, or two different strategies/methods can provide greater certainty about the eventual conclusions that are drawn is misplaced. Massey (1999) makes a number of other claims about triangulation. The first of these is that triangulation assumes a single end point, a correct description of reality, which can be accessed via a number of indirect methods, and that therefore multiple descriptions of the same object are incoherent. The second of these is that if a method or strategy is used, an assumption is made that this

can lead to true propositions being produced. However, if another strategy or method is then used to confirm or disconfirm the truth of the first, it would have to have the same truth value, and would therefore be redundant. Again, if an assumption is made that the first set of strategies and methods was inadequate as a producer of true propositions, then likewise the use of another strategy or method which again may be flawed cannot result in the identification of any inadequacies that may exist in the first set of strategies and methods. The third claim is that different methods and strategies may have different philosophical premises and if they do then the comparison between them is invalid.

An example from an actual research project can serve to illustrate these problems with triangulation. Blatchford *et al* (2003) focussed on classroom size effects. A range of methods was used and a number of methodological claims were made; for example, '(q)uite deliberately, the aim was to marry aspects of systematic observation (which emphasises the objectivity of the data), with professional and interpretative judgements by field workers (who were experienced teachers)' (Blatchford *et al.*, 2003, p. 715). Two methods are being assessed for their objectivity here. The first is systematic observation, which is presumed to be objective because the categories that make up the coding frame are pre-set, the researchers are trained in their capacity to recognise an instance of a behaviour that conforms to an item in the schedule, and inter-rater or inter-observer reliability protocols are rigorously applied. The purpose here is to eliminate professional judgement or interpretation by the observers or researchers, and thus fulfil one requirement of objectivity, which is that the personal biases of these observers are not significantly implicated in the production of a description about what was being observed. This is deliberately compared with professional and interpretative judgements by field workers about the topic in hand, which *per se* is deemed not to be objective. However, this is complicated by the fact that the research team have decided that an even better picture of what was happening could be obtained by a comparison between the objective and non-objective data sets. If the non-objective data set is to be influential and form part of the representation of reality, then at least in principle it must be allowed a role in amending and correcting the objective data set. Otherwise there is no point in making the comparison. Furthermore, if the non-objective data are merely being collected to confirm or at least to allow the research team greater confidence in the objective data, then the objective data, it is suggested, may be flawed in some yet to be identified way. But this is clearly not what is being argued for. What in fact is being argued for is that one method has a number of qualities which allow it to be more objective and thus better at its task, which is to allow an analysis of the data to be made.

If the researcher's aim is to produce an accurate view of reality, and epistemological objectivity (never perfect, but an aspiration nevertheless) is defined as a prerequisite of providing this accurate picture, and the researcher is comparing two different data sets, then logically they should give greater credence to the more objective at the expense of the less objective. If these data sets concur, then they can only conclude that the less objective data set was in fact more objective than they originally thought it was. The attempt at triangulation in this particular case has failed, and this is in part

because triangulation as a device cannot deliver what it promises, and thus cannot provide a solution to the quantitative/qualitative dilemma.

A critical realist resolution

The pragmatic or a-epistemic resolution makes a number of false assumptions. First, methods and strategies used by empirical researchers need not have any direct relationship to epistemic and ontological frames developed by philosophers. Second, decisions about methods and strategies can be made in relation to the research problem, without reference to the type of knowledge being produced and the view of reality that it espouses. I have suggested that philosophical concerns are central to decisions about methods and strategies, and in particular about how judgements can be made of the aptness of particular research accounts. Critical realism, however, in opposition to empiricist and positivist perspectives, makes an assumption that the resolution has to occur at the ontological level, though no argument is made that absolute knowledge of this ontological framework is possible. If this were so, then the researcher would be committed to the epistemic fallacy where ontology and epistemology are conflated (cf. Bhaskar, 1979, 1989). Indeed, critical realism is realist and critical for two reasons: objects in the world, and in particular social objects, exist whether the observer or researcher is able to know them or not; and secondly, knowledge of these objects is always fallible because any attempts at describing them needs to take account of the transitive nature of knowledge. This position therefore avoids radical constructivist and anti-realist assumptions that reality only exists by virtue of the active creation of the individual observer—a solipsistic position.

Critical realism then has a number of distinctive features: i) 'a revindication of ontology, as distinct from' but '(ultimately containing) epistemology' (Bhaskar & Lawson, 1998, p. 5); ii) 'a distinction between the domain of the real, the actual and the empirical and a critique of the reduction of the real to the actual in "actualism" and then to the empirical in "empirical realism"' (Bhaskar & Lawson, 1998, p. 5–6); iii) a belief that objects and generative mechanisms in the world have causal powers which may or may not be exercised, but still exist independently of human perception or of the individual's ability to know them; iv) a distinction between the transitive world of knowing and the intransitive world of being; v) a belief that the social world is stratified, incorporates mechanisms at different levels and elements of these mechanisms cannot be reduced to those of the level from which they emerged; vi) a view therefore that objects have emergent properties which interact with each other and as a result new properties are created or emerge from old combinations of objects; and finally, vii) the designation of the relation between structure and agency as the key framing device at the ontological level.

If it is suggested that this relation is not central to an understanding of the social world, two arguments can serve to counter this. First, all empirical researchers or observers of the world make ontological assumptions and thus it is incumbent on those researchers/observers to foreground such issues so that they can choose the most appropriate methods for their enquiry. Second, every social situation embodies

assumptions about the ability or otherwise of individuals to act in the world in the context of structural or situational enablements or constraints (Cruikshank, 2002).

However, there is a need to avoid understandings of the relation between the two which in Archer's (1990) terms lead to upward, downward or central conflation, so that agency and structure are granted independent powers even as they work on each other. Furthermore, this suggests that complete explanations of social events and processes cannot be reduced to the intentions of agents without reference to structural properties or to structural forms without reference to the intentions and beliefs of agents. Methodologically, this implies that any investigation can only take place at the intersection or vertex of agential and structural objects, and thus indicators that researchers use have to reflect this close relationship between the two.

If this is accepted, then critical realism has significant implications for a resolution of the quantitative/qualitative divide. Any strategies and methods that are used can only be chosen if they conform to this overarching frame, so that accounts which focus on either structures or agents to the exclusion of the other cannot account for the totality of the social experience, and it is the interaction between the two which needs to be the focus of the research. I have already suggested that quantitative approaches and qualitative approaches are different symbolic systems, with different logical forms, for describing the properties of objects; however, if each is focused on different properties of social objects, then it is possible to reconcile them. A mathematical or statistical explanation may be appropriate if the property of the object can be expressed extensionally; and likewise a qualitative approach is appropriate if the property can be expressed intensionally. This precludes translating the one into the other because whichever way the reconfiguration is carried out, a neglect of the other is bound to occur. A notion of compensation, however, can still be retained, where the use of both approaches is necessary for a complete explanation of the social setting to be made. The reconciliation therefore occurs at the ontological level and the focus of investigation is on the vertex of agential and structural objects, or the intersection between the different levels or layers of social reality.

A detailed philosophical rationale for a critical realist stance and its distinctiveness from empiricist and radical relativist stances must lie outside the scope of this article, as does a full explanation of the relation between ontology and epistemology. However, what this article has sought to do is to provide a rationale for combining quantitative and qualitative data sets, methods and analytical frames, and locating this at the ontological level. To do otherwise is either to restrict the focus of research to the empirical, with all its concomitant weaknesses (cf. Bhaskar, 1979; Archer, 1990), or to limit research to textual exegesis. With the former, thought and reality are conflated, so that, as Sayer (1992, p. 47) argues: '(t)he illusion of the appeal to facts in popular discourse involves collapsing statements into their referents, thought objects into real objects. It thereby appears to appeal to the facts themselves, the way the world is, in an unmediated fashion, but is actually an appeal to a particular way of talking about the world in some conceptual system…'. With the latter, reality is collapsed in reverse fashion into text. The alternative, critical realism, paying careful attention to the emergent but real nature of the world and equally to the transient nature of how it can be known,

does allow the possibility of making statements about the nature of reality, though these statements are qualified in a number of distinctive ways, and further to this, it does suggest a means for resolving the quantitative–qualitative divide, the focus of this article.

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