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# Dialogues: QUANT Researchers on QUAL Methods

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## Dialogues: QUANT Researchers on QUAL Methods

### Abstract

Qualitative researchers commonly perceive that positivist hard-science researchers and policies of governments deprecate qualitative methods and approaches. Curiously though, we could not see anyone asking *quantitative* researchers 'What do *you* think about qualitative approaches and methods?' We did this in interviews with 17 assumed *quantitative* researchers in the fields of advanced materials construction, civil engineering, transport modelling, computer science, and geotechnics. Surprisingly, these researchers rarely described themselves as purely *quantitative*, and were rarely against the five qualitative methods discussed. Moreover, many actually used *qualitative* methods, often in ways we had not anticipated. Drawing on a Bakhtinian grounded framework, we present our analysis as a performed ethnographic dialogue between data extracts and research literature. We present evidence that the alleged qualitative-quantitative divide does not apply here, and suggest dialogic ways to see teach "qualitative" and "quantitative" and some associated terms.

### Keywords

Quantitative Researchers, Qualitative Methods

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## Dialogues: *QUANT* Researchers on *QUAL* Methods

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*Qualitative researchers commonly perceive that positivist hard-science researchers and policies of governments deprecate qualitative methods and approaches. Curiously though, we could not see anyone asking quantitative researchers “What do you think about qualitative approaches and methods?” We did this in interviews with 17 assumed quantitative researchers in the fields of advanced materials construction, civil engineering, transport modelling, computer science, and geotechnics. Surprisingly, these researchers rarely described themselves as purely quantitative, and were rarely against the five qualitative methods discussed. Moreover, many actually used qualitative methods, often in ways we had not anticipated. Drawing on a Bakhtinian grounded framework, we present our analysis as a performed ethnographic dialogue between data extracts and research literature. We present evidence that the alleged qualitative-quantitative divide does not apply here, and suggest dialogic ways to see teach “qualitative” and “quantitative” and some associated terms. Keywords: *Quantitative Researchers, Qualitative Methods**

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### Introduction and Approach to Data Collection and Presentation

Ostensibly, researchers in the positivist *hard sciences* tradition have little faith in, and sometimes deprecate, qualitative research (henceforth *QUAL*), as neo-liberal governments largely support quantitative research (henceforth *QUANT*) and fund it for the *solidity* and *evidence-base* they require (Barone 2007; Bloch, 2004; St. Pierre, 2004). We were curious to explore how researchers assumed to be dyed in the wool *QUANT* researchers reacted to a range of *QUAL* methods and key terms; how they conceived good and poor research; whether they would use *QUAL* methods; or mix *QUANT* and *QUAL*.

We contacted 25 experienced *QUANT* researchers for an interview: 17 responded positively. We settled on this number as feasible for data management and exploration, rather than saturation (cf. O-Reilly & Parker 2013). Professionally, participants included 7 professors, 1 reader, 2 senior research fellows, and 7 lecturers. Many had led UK Engineering Physical Sciences and Social Research Council (EPSRC) and European grants; some had co-authored patents; most averaged 4 journal publications per year; at least 5 were supervising PhDs and one had supervised 15 doctorates to completion. Their research fields were Fuel Cells (henceforth *FC*), Acoustics (*A*), Civil Engineering (*CE*), Solar Water Heating Systems (*SWH*), Transport modelling (*T*), Computing (*C*), Maritime Logistics (*ML*), Sustainable Timber (*ST*), Geotechnics and Soil (*GS*), Algorithm Development (*AD*), and Sustainable Development (*SD*).

We highlight here that, crucially, it is both what these supposedly *QUANT* researchers said, and what they *did not* say that is significant. Only two participants commented on our methods here (loosely structured interviews), commonly acknowledged as *QUAL*: one commented off record, “And you’re investigating this using qualitative methods?” Another remarked that researchers need

to demonstrate that that particular approach is appropriate for the questions they're seeking to answer... so in your case you think interviews would be an appropriate method of gathering data on people's opinions about qualitative and quantitative research.

The main body of our paper consists of an ethnographic dialogue between *questions* informed by the literature and the responses of the quantitative researchers we spoke to. Before presenting this, in a study design section we outline details about how we collected the data, and also about ethnographic dialogue and our rationale for using it here as a form of presentation.

## Study Design

Our data were collected with the use of individual face-to-face interviews. The interviews began by asking each participant whether they considered their own research as being QUANTitative. Following this, each participant was asked for their opinions on what constituted *good* and *poor* research, and then for their thoughts on five ostensibly QUALitative methods of interviews, use of focus groups, case studies, action research, and narrative. Participants were asked whether they knew anything about the methods, whether they had any opinion on them, and whether they felt any would be applicable in their own areas of research. Following this, each participant was asked for their thoughts on what constituted reliability, validity, and generalizability. They were asked how they would define these terms, what the terms meant to them in their own research, and also whether they felt the definitions of these terms would be the same in all areas of research. For each of the methods and each of the terms, participants were offered definitions from standard texts if they wanted to see them (see Appendix A). Finally, participants were asked if they would be receptive to someone approaching them with a suggestion for collaboration using QUAL methods. Interviews were loosely structured (see Appendix A for the interview schedule); reflexive and highly conversational, often with questions arising regarding the answers from participants. They were recorded and transcribed verbatim (cf. Poland, 2001) by one of the authors, both for anonymity and for the purposes of initial analysis (Bird, 2005), and then sent to each participant for verification. The average interview length was 29 minutes and 4 seconds, with a combined transcript word count of 81,199. The research was approved by the appropriate UK University ethics body and all data are presented anonymously (Christians, 2011). The analysis of the data was done through a diffractive continual reading of the data (Mazzei, 2014) and through using a constructivist grounded theory approach (Charmaz, 2011) whereby themes emerged inductively rather than having been predetermined, although this analysis was undoubtedly guided by the interview questions themselves, and is thus iterative, comparative and interactive within and across interviews (Charmaz & Belgrave, 2012).

Regarding our data presentation, we now present this paper as an ethnographic dialogue (cf. Saunders, 2008) between *questions* informed by the literature and *responses* in italics drawing on quotes from the interview data of the QUANT researchers we spoke to. This method of presentation aims to faithfully represent respondents' views in their own words, tracking the participants' research expertise. As an ethnographic dialogue, it is presented in a form that is envisioned to lend itself to performance ethnography, where excerpts can be read out in workshops on methodology, enacting a *creative analytic practice* with written interaction between enquirers-plus-literature and research practitioners (Richardson, 2000). It could even, we envisage, lend itself to the use of selected parts to be acted out in a research methods class. Such an approach sees dialogue and its performance as construction or *poiesis* (Conquergood 1998, cited in Denzin, 2003). Further, it sees such dialogue as a struggle or an intervention

(Denzin, 2003) that aims to challenge “sedimented meanings and normative traditions” (Conquergood, 1998, p. 32). In this case, we aim to challenge, through our presented dialogue, the sedimented meanings and perceptions of QUANT researchers’ and QUANT research as normatively perceived in the QUAL literature and to reach a new and multi-layered perspective of the contextually situated (Bakhtin, 1981, 1986) nature of such meanings. Such a perspective will, we argue, open new worlds and possibilities to QUAL research and QUAL researchers through giving extra weight to their research and opening their eyes to new understandings of the possibilities of how QUAL research is done.

Theoretically, our presentation of the data in this way is also framed by Bakhtinian ideas of *dialogue* and *Carnival* (Bakhtin, 1981, 1984, 1986). Bakhtin, although working in disciplines of literary analysis, encourages us to think of dialogue as the vehicle for the continual evolution of the contending meanings and understandings of words (1981, 1986). For Bakhtin (1986), a word exists for three owners: the addresser, the addressee, and nobody (i.e., a neutral dictionary meaning). As interviewers, we addressed the participants as interviewees, who gave us their responses, represented above in a dialogue. We compared these with the meanings given in the literature, which are often neutralised, and decontextualized from disciplines, projects and cases. For Bakhtin, key terms may well have different meanings for different participants, and thus are *heteroglossic* (Bakhtin, 1981). As we show in the dialogue below, key terms often have different meanings and applications for different researchers in different disciplines, projects and cases. We may think of a Bakhtinian dialogue not so much as a conversation or exchange of ideas, but as an inherently incomplete journey of discovery, with contending interweaving voices (Bakhtin, 1981). Such framing emphasises the importance of dialogue between opposing positions in the literature and our data. Moreover, the importance of Bakhtinian Carnival (1984) is that it questions assumed authoritative meaning through humour or role reversal, which may be seen in the way some of our participants’ comments question received ideas (see discussion later).

The dialogue now follows. In terms of presentation, as noted above, our dialogue is constructed whereby we frame our questions combining the literature, and our responses to these questions come from the presentation of our participants’ ideas. In both cases we weave these together ourselves. All our **questions to participants are presented in bold** to identify them for our readers, and they are usually preceded by our framing of them using the literature. All our *participant responses are italicised*: they are quoted as verbatim extracts from the interviews and each quote is coded to identify the speaker’s area of research specialty. This coding is the one detailed above in the introduction. Before engaging with the dialogue that immediately follows, readers might like to consider their own assumptions regarding QUANT and QUAL, and in particular, to consider what QUANT researchers might be expected to say about QUAL research.

### **Dialogue between Literature-Informed Questions and QUANT Participants’ Responses**

Now, you are all doing heavily QUANT research: fuel cells, civil engineering, transport modelling, computer science, geotechnics, etc. Interestingly, not much literature describes *disciplines* as QUANT or QUAL. History and anthropology arguably seem more QUAL, while psychology, epidemiology, and economics are more QUANT (Kumar, 1996). The scientific community emphasises experimentation and replication, which is rare in the social science community (Moore, 2006). Others simply focus on social research (Clough & Nutbrown, 2002) or people rather than on *disciplines* (Dawson, 2006; Rugg & Petre, 2007).

What it might therefore be more productive to do is to look at how some of your *disciplines* officially describe what you do. For geotechnics: “geotechnical engineering is a truly multi-disciplinary field offering training and research possibilities ranging from material

testing and analytical methods to nonlinear numerical modeling of multiphysics problems” (NTNU, 2014). In advanced materials construction, they “use cutting-edge characterization and modeling methods as well as analytics to elucidate the structure-property-relationships of polymers, additives and material systems” (BASF, 2014). Transport modelling, for example at the University of Newcastle, uses analytical methods such as: “Chi Squared; testing for differences between groups; examples of Chi square test; hypothesis testing; structure of a test; probability threshold; test statistic and p values;... covariance; standardisation” (University of Newcastle, 2014). With computer science, the University of Glasgow highlights four approaches: implementation driven research; mathematical proof techniques; empiricism and observational studies (University of Glasgow, 2014). Most of these appear quantitative. Civil Engineering also appears mostly quantitative, but areas like project management might use qualitative methods, but structural engineering often employs, “the combination of analytical techniques, laboratory experiments and measurements on real structures” (University of Bristol, 2014).

Anyhow, you use numbers, and much literature talks about number production as QUANT, in contrast to smaller in-depth QUAL studies (Hammersley, 2013). Further, QUAL research is value laden; researcher-researched meaning is co-constructed (Bryman, 2008; Daly 2007; Denzin & Lincoln, 1994; Denzin & Lincoln, 1998) compared to the value-free nature of QUANT (Denzin & Lincoln, 1998). QUANT researchers “abstract from this world and seldom study it directly” (Denzin & Lincoln, 1998, p.10), with the aim that “natural laws can be generated from structured and careful observations” (Liamputtong, 2010, p. x). Indeed, Denzin and Lincoln (1998, p. 11) note clear differences which echo this: “Qualitative researchers use ethnographic prose, historical narratives, first-person accounts, still photographs, life histories, fictionalized facts, and biographical and autobiographical materials, among others. Quantitative researchers use mathematical models, statistical tables, and graphs, and often write about their research in impersonal, third-person prose.” Indirectly, much research literature stresses the need to have congruence between clear aims (e.g., Clough & Nutbrown, 2002), methods and approaches for the task at hand (Hammersley, 1992; Silverman, 2010).

### **So, and Based on All the Above, Would You Describe Your Research as Quantitative?**

*“It’s probably more quantitative”* (FC). *“Essentially yes... developing models, concepts, schemas... quantitative techniques”* (SD). *“Yes total completely quantitative yes”* (AD).

### **That’s Exactly What I Was Expecting You to Say. How About Others?**

*“Predominantly quantitative although there are elements of qualitative in there”* (CE). *“The majority are quantitative yes... some elements... more qual than quant”* (T). *“It’s definitely quantitative, we also do a bit of qualitative but mainly quantitative”* (SWH). *“We do some qualitative stuff, but...80% I’d regard as quantitative”* (ST). *“It’s pretty quantitative... transport models... flows which can be described by numbers... my closest experience to qualitative research[was]... focus group...[which] was useful to understand... the main issues... to highlight topics let’s say... it was worth it”* (T).

### **Interesting, So Some of You Do Some QUAL, Even Just a Bit, Right?**

*“I do both quantitative and qualitative... it’s human computer interaction and interaction design... so... quantitative work....but also we... ask people what their opinions were about things”* (C). *“I’ve done a lot of studies involving subjective interviews with*

[housing] occupants and comparing that with objective measured data” (A). “My research areas should be classified as quantitative... but occasionally we do resort to qualitative research methods... especially when... dealing with... human factor... we can only gather information... using interview, using questionnaires we can never measure quantitatively to what extent... maybe we can give a Likert [scale] from 1 to 9 to what extent do you like it? But it is not true quantitative study... Likert is not a real quantitative study” (C).

### **HAHA! YES! I See Your Stance in Computing and Acoustics. Any Other Thoughts?**

“I would describe it as [said slowly] quaaaantitative rather than qualitative, why I slightly hesitate because quantitative to me always... you’re talking about positivism... so I would say yes it’s positivistic but...I’d probably question all this, I often wonder about lots of these things...a lot needs to be interpreted so I wouldn’t say I’m strictly positivistic if that’s not using too big a word” (T). “I’d describe the research I do as primarily quantitative and by preference I would choose to do quantitative research... because I think it’s easier to specify and quite often easier to actually do. I have engaged in... qualitative... though I have some difficulty... in differentiating between the two” (T). “It’s all quantities rather than qualities, well... qualities as well but we usually find difficulties in analysing qualitative data... quantities are easier because they are numbers” (T).

### **WOW! I Wouldn’t Have Expected You to Say QUAL was Harder than QUANT, or That You Would Question Positivism. Can You Elaborate a Bit?**

“In many occasions even if you do use numbers you are trying to find some form of explanation to something that qualitatively can be described... so it could be qualitative... something qualitative is research of any form in which you try to find the effect of whatever factor on whatever it is you are looking at. In a qualitative way you... try to explain why that is happening... it’s soil mechanics... and we don’t really know what to expect in the behaviour of these soils at a very general level so that’s most clearly qualitative. What we are also trying to do in the tests... is to move towards a quantitative description... [as] until we’ve understood... the fundamental behaviours, we can’t really attempt to put numbers to those behaviours... we’re very much in the qualitative domain with a key eye on quantitative behaviour... so we’re dancing between qualitative and quantitative... what I mean by qualitative: it’s the direction of change rather than the magnitude of change” (GS).

### **OK, Fascinating that a Measurement can be QUAL, and That Interpretation of QUANT can be QUAL.**

I suppose my next question would relate to the notions of what makes “good” research. In terms of the literature, both the QUANT literature (e.g., Bryman & Cramer, 2009) and the QUAL (e.g., Bloor & Wood, 2006) say research must take place within a particular paradigm. Some argue ontologies and epistemologies can never meet or be chopped and changed, and that research foundations, whether positivist, realist or interpretivist are a skin, not a sweater you change everyday (March & Furlong, 2002, cited in Grix, 2004). Some comment on how the positivist nomothetic position does not consider how QUAL research is theory driven and value laden and interactive (Denzin & Lincoln, 1998). Yet, from the QUANT side, QUAL studies have been criticized, “because of their problematic generalizability” (Bloor & Wood 2006, p. 179). Even the value of the QUANT / QUAL divide is questioned, the suggestion is for “replacing it with a more subtle and realistic set of distinctions that capture variation in research practice better” (Hammersley, 2013, p. 99).

### **So, Based on all This, What do you Think is Good Research?**

*“Probably repeatability... repeatable set of results which can be true of qual research as much as quant research if it’s set up perfectly well, and I suppose validity” (T). “Well repeatability... obviously peer review... the fact that it’s been awarded patents in different countries... if it’s getting published in reputable journals and good conferences” (FC). “Scientific research that is repeatable” (AD).*

### **Yes, Repeatability is Exactly What I’d Expect You to Say from Reading the QUANT Literature. Interesting that you Mention Similar Aspects as Important in QUAL Research, and Also You Feel it is the Same in QUAL Research Too. How About Others?**

*“For me the key... is... if you don’t have a good research method... your outcomes will just be inaccurate or questionable” (SWH). “Insightful... methodical... has it got to be useful? I don’t know if it has to be” (T). “I think thorough, rigour, and ultimately...applied and taken into practice” (ST). “Abundant in evidence about previous study... and... the right methodology” (ML). “Quantities validated... that give you understanding... you can explain... and justify” (GS).*

### **OK, So Method, Data, and Applying Methods Rigorously are Key, that’s the Same in QUAL Research. Interesting that you Differ on Usefulness. Any Other Thoughts?**

*“I look at research as being the discovery side, the applied side, the demand-led side to solve a problem... and the fourth... of great significance is the tangential... the fifth side, is the horizon scanning which is... if something is coming in the future” (A). “I think research is like doing... a cryptic crossword, you just keep chipping away... at it and... the more of it you complete the easier it becomes because [of] the help from... the crossing clues” (GS).*

### **So There are Many Different Types of Research. The Process is Building up the Larger Picture Piece by Piece. So with Prediction, How Much Do you Control?**

*“Oh oh [laughs] very small perhaps [laughs]... we can always observe what happened in the past but we’re not sure if this can be extrapolated for the future... sometime I have the feeling our models are too sophisticated... we think... we’re able to model aspects of reality we can not... then you’ve politics involved... social issues... financial issues...” (T).*

### **So There is This Idea it Should be Applied but that Often it’s Abstracted from Reality. As a QUANT Researcher, you’re Aiming for a Very Complex or Rich (QUAL?) Description of Reality...Any Further Comments?**

*“I know not all research outputs can comply 100 percent with the scientific method but as an anchor I think it’s incredibly useful” (ML). “Independence, it should be completely disinterested...whomsoever was asking the question... there’s quantitative but it has societal impact and therefore becomes partly qualitative because it’s reliant on opinion... rather than measurable... I use the word in inverted commas measurable fact” (CE).*

### **OK, These Ideas Accord with “the” Scientific Method, that’s What I’d Expect you as QUANTS to Say, but “Measurable” is in Inverted Commas. So, Can I Now Ask you About Poor Research? What do you Think “Poor” Research Is?**



*“Poor research I would describe as a one off experiment, and immediately makes claims... without... due diligence as to what has been done before” (A). “Poor research is... very little background reading... too few results... one-offs” (FC). “Half-baked... it’s not fully thought out, it’s not fully developed” (T). “Sloppy... not thinking about it carefully, not using an appropriate method, using statistics badly, so using quantitative methods badly”(C). “No clear idea of what they want to do, just... they do some research a bit... briefly” (ML).*

### **OK, The Importance of Rigour and Method and Having Many Examples, those Apply to QUAL as Well. Any Other Ideas?**

*“A common flaw is where the conclusions of research as disseminated don’t flow from the analysis... there’s quite a lot of papers... that I feel... the conclusions could have been written before the analysis [whistles] and probably were [both laugh]”(ML). “One that has no argument or objective that is clearly defined” (GS). “In my own field it would be research that’s not well explained that you can’t repeat what somebody else has done, that has no data to back up the results, no statistics to show that the data is actually valid” (AD). “Irrelevant, ineffective, unreliable... is actually less relevant to the nature of the problem itself” (C).*

### **Right, I Would Say These also Applied to QUAL Research. Would Anyone Else Add Anything?**

*“Journalistic... poor research is relativistic... I don’t see the point of a reworking of a post-feminist perspective on Jane Austen... to be followed by a neo-con perspective on Jane Austen... it becomes very context dependent... that for me marks out danger territory because... you don’t know the context in which the answer’s been given, which is, in the hands of the public, dangerous, in the hands of big pharmaceutical companies with a so-called science research, terrifyingly dangerous... poor research also... lacks any treatment of the errors whether that’s quantitative or qualitative” (CE).*

### **Many of Your Comments Could Apply to Both QUAL and QUANT.**

In that case I wonder whether the difference is more on which approach or method is best. The literature is quite strong about this; it tends to say that basically, QUANT researchers are not at all keen on QUAL approaches, with much resistance to QUAL research from positivists, such that “qualitative researchers are called journalists, or soft scientists” (Denzin & Lincoln, 1998, p. 7) whereas “the positive sciences (physics, chemistry, economics, and psychology, for example) are often seen as the crowning achievements of western civilization, and in their practices it is assumed that *truth* can transcend opinion and personal bias” (Carey, 1989, p. 99, cited in Denzin & Lincoln, 1998, p. 7). It seems science *attacks* QUAL research in order to champion one version of truth over another (Denzin and Lincoln, 1998); that QUAL inquiry is perceived as unable to produce useful and valid findings (Sandelowski, 1997; Hammersley, 2007; Torrance, 2008); and is censored by certain outlets (Ceglowski, Bacigalupa, & Peck, 2011). Liamputtong (2010) cites many who say positivists think QUAL data is *soft* and interpretative in nature and therefore does not contribute any value at all (e.g., Guba & Lincoln, 2005; Hammersley, 2007; Torrance, 2008). What is more, this is much evidenced by government resistance to QUAL research and promotion of positivist research in both the US and Britain which is said to have support from mathematicians (Lather, 2004), even if such faith in QUANT results is argued to be misplaced given the types of questions asked (Donmoyer, 2012). Now, it gets pretty heated: QUAL researchers say, “the technocratic thrust of experimentalism and the democratic thrust of interpretivism gets at the political

dimensions of educational research” (Howe, 2004, p. 57). Reports by government bodies such as the US National Science Council report (2002) are deemed to pose a *danger* for knowledge and inquiry (Bloch, 2004) as are government demands for scientific-based research in education (St. Pierre, 2004; Barone, 2007). This is evidenced by the demands of Institutional Review Boards (Libbrett & Perone, 2010; Tierney & Blumberg Corwin, 2007) and the *No Child Left Behind* policy (Christ, 2014). Such movements are said to be international (Torrance, 2008) and generally, “qualitative researchers are agreed in their opposition to this [quantitative measurement, experimental method, and / or statistical analysis] definition of scientific research, or at least its application to social inquiry” (Hammersley, 2013, p. ix; cf. Galasinski & Kozłowska, 2009; Harman, 1996).

**So, Based on the Above, I Assume You’re Going to Say Something About What is Delineated in the Literature, but, Based on What You’ve Told Me so Far About the Types of Research you do, and About Your Ideas on “Good” and “Poor” Research, I Want to Suspend this Assumption and Simply Ask “How do you Perceive the Relationships between QUANT and QUAL Approaches?”**

*“I was an avid reader of Popper... I found a lot of his logic to be quite persuasive... a number may be just a number... but where does a number come from? ... I accept... there is... a haziness about quantitative data...and you need to dig deeper than just...the set of numbers...but I do have a certain sense... there is a greater degree of unreliability about the qualitative techniques you... identified than some of the quantitative techniques” (ML).*

**OK, That’s What I’d Expect you to Say, though Popper’s Ideas of Numbers not Truly Representing Reality Resonates with the Difficulty About Facts Being “Measurable” and the Complexity in Modelling the World. Any Other Thoughts?**

*“The government’s drive away from qualitative into quantitative is going to land the country with one hell of a future problem, whether it be just the rationale for harmonizing certain test standards... the two go hand in hand” (CE). “What makes good research is to use what you’re doing to interpret things and maybe say something with it and try to give an insight... I’ve seen papers, just tables and tables of numbers and I think that’s useless it just doesn’t tell you anything... one criteria for [an economics journal] is that you just can’t understand anything that’s published in it, what good’s that?” (T). “Poor research is just... knee jerk responses to problems politicians or policy makers are experiencing... they can be quite... blinkered, dogmatic... it will not be embedded or integrated into... society or culture” (SD).*

**So, Both QUANT and QUAL are Needed, and Politically as Well. How About you Using QUAL Methods Yourself if Someone Suggested This?**

*“I would be interested... however I would still like to see a combination between quantitative and qualitative because... from my background...qualitative is not enough” (ML). “I’d be perfectly accepting... most of my PhD students engage in qualitative research” (ML). “If somebody from a related area thought this might be useful... in soil mechanics then... I’d be open to that idea” (GS). “I think I’d be perfectly happy because I’m already familiar with all of these methods, transport is such an umbrella discipline that we’re very familiar with... whole range of methodologies... you’d want... a good sound methodology rather than it being purely quant or purely qual. In fact something which is mixed is generally better” (T).*

*“I’m a complete... mercenary, in other words if that’s where the money is... I would be quite positive because... I have had a worry... I have taught students these things and I still do...but I’ve never really done any myself... so I would act very positively... to actually get some experience of them” (T). “Well I’d be positive towards it” (ST). “I’d be quite open minded about that I like the idea because it comes from different disciplines you’re drawing in different skill sets. I see too many students who are focused on numerical type things” (CE).*

**WOW! Given What is Assumed in the Literature, Not a Single One of You is Against the Idea of Using QUAL Methods, Even if in Combination. If We Widen This and Ask What you Feel About Some QUAL Approaches and Methods? According to the Field of QUAL Research they are Separate – Quantitative and Qualitative (Denzin & Lincoln, 1998). What About These Five: Interviews; Focus Groups; Case Studies; Action Research; and Narratives. First, What About Interviews? Do you Use Them? I’ve Got Definitions [typed on cards] if you Like...**

*“Interviews I... have not used... I don’t think they are common in my field” (GS). “I haven’t got any experience of... interviews... but I think it’s useful” (T). “I’d say (pause) these ones [interviews; focus groups; narratives; action research] would definitely not be applicable... I know a bit about them. I’ve never used any of them, they wouldn’t be relevant” (AD).*

**That’s What I’d Have Assumed, Has Anyone Used Interviews?**

*“Quite extensively... an interview although it may look a little bit qualitative, the analysis of it is purely quantitative... and in that it’s a very powerful tool” (CE). “Interviews are fairly standard in my field, I have applied [them]” (ML). “Interviews are very useful... you get people being quite honest and open... If we had only sent out a questionnaire, we wouldn’t have got even half the information... we got back” (A). “I have PhD students who do... interviews; I think works very well” (SWH). “I’ll be honest, we’d use interviews... I think the difficulty we have is knowing how to quantify the qualitative [laughs] you know” (ST). “We use lot of interviews supported by questionnaires sometimes” (C).*

**OK, Interesting, Interviews for a Wide Range of Disciplines, used Quantitatively, and you Find Difficulty Quantifying Them. Any Other Thoughts?**

*“Interviews can be qualitative and quantitative so I wouldn’t say that’s purely qual method of research... and the analysis can be almost purely quantitative” (T). “To be honest, interviews, I can only say I do that with my PhD students [I–they’re... almost meta-functions in the sense that they’re helping you to discuss] True that’s right [I – So they play a rolefacilitating the research] Yes [Rather than being a method you use to research] Exactly” (FC).*

**Yes, That Would Echo the Literature, Interviews are Both QUANT and QUAL; You Use Them Facilitatively to Help your Research. What About Focus Groups Then?**

*“I don’t like focus groups... the data collected from focus groups... and from interviews, is very much a function, unless it’s really heavily structured...of who’s doing them, so that makes...the data lacking in objectivity... difficult to interpret accurately” (ML).*

### **That's What the Literature Says the QUANT Opinion Is. Very Candid, Thank You. What Do Others Think?**

*"Focus group is a useful tool, we've used it... in sewer and sewerage projects.... you're wanting views on, for instance, a range of contractors round the table so you might get small drainage contractors and big contractors and water authorities... and you're trying to calibrate the difference between their response" (CE). "Of focus groups, we have a weekly meeting of our research group where we discuss everything and focus on what's been happening and what should be happening and future" (FC). "I had the chance to organise a random focus group... then we decided a questionnaire that we distributed... among customers so was useful to understand... the main issues arisen... it was worth it" (T).*

### **OK, for Fuel Cells you Use Them to Generate Ideas and Plans, and they are Used to Calibrate Differences, and Inform Questionnaires. Often in QUAL Research, it's Vice Versa: Questionnaires Generate Key Points for Focus Group Discussion. What About Case Studies?**

*"Case studies are fantastic we use them a lot to inform our teaching" (CE). "A case study... independently assessed by us on someone else's system... very useful" (A). "Case Studies are a very big methodological tool in transport" (T). "Case studies, we do use these quite frequently" (ML). "Case studies are useful in the case of something like... a major earthquake or landslide, to get in there and do some tests to try and understand what might have triggered the failure"(GS). "We use quite a large amount of case study... to identify success stories, successful application... what went wrong, how did it go wrong... avoid it going wrong again" (SWH). "Case studies, we do a fair bit" (FC). "We do a lot of work that... result in case studies... we're creating case studies" (ST).*

### **So, Lots of You use Them. What I Find Interesting is your Differing uses, for Teaching in Civil Engineering, for Independent Assessment in Acoustics, to Contextualize in Transport, to Study a Particular Event in Geotechnics, to Create Case Studies in Sustainable Timber. What About Action Research? Where Would You Stand on this One?**

*"[reads definition] We do quite a lot of that... the vast majority of the industry, and that's where action research is good because that side, people are constantly trying to improve what they do" (A). "Action Research is normally research through doing so that's quite big in pedagogical research... of how your students are learning... that's quite useful there" (T). "I do action research but not in a deep way" (SWH). "Action research is very much doing... it's back to the old fundamental nature of research and I think the best research is where you have an idea, like, like Newton did and then... the results prove the theory" (FC). "Action research? ... yes... you will ask people... how were you be able to improve it what you suggest... that kind of conversation with colleagues or at a conference" (GS). "[reads definition] I suppose... process improvement and things like that, there's an extent of that... We run continual professional development, I've done that with an SME partner" (ST).*

### **Hmmm, the Term Seems to be Used, but Very Differently, this is Fascinating though that you Associate Action Research More with the Idea of Improvement than Strictly Pedagogy one (GS) but Also that Pedagogy is Important as Well (T; ST). What do Others Think?**

*“Action research I don't know... (pause) we would call that experiment design”* (CE). *“[reads definition]... I can draw a parallel with laboratory testing... we have an idea we run the lab tests we don't get the results we want and we look at the factors... and explore those so you're... revisiting... the form... or the structure of enquiry”* (GS). *“There's a lot of experiment, a lot of work in transport... which I think would qualify as action research... in order to evaluate or forecast... or predict decisions... made by individuals”* (ML). *“Action research, we didn't use that... this is [the first] time I heard about this kind of thing”* (ML).

**So it Means Many Different Things. There are Strong Links with Experiment Design and Lab Work. It's Not the First Idea I'd Associate with Action Research but I Can See the Parallels. I am Fascinated How Within the Same Field it Means Something to Some of you but Not to Others (ML). I Wonder How Much this is to do with Interpretations. How About Narrative?**

*“Much more applicable to non-scientific or non-engineering type research”* (FC). *“I've not heard of that one... if I was guessing a narrative's a bit like ethnography, right? So are they diaries? ... [reads definition]... right, not really”* (T). *“We don't use it, I think”* (ST). *“In terms of a flow of text... a stream of words, less familiar with that as a research method, I would prefer to get streams of words in more, tightly defined responses such as interviews focus groups”* (CE). *“We don't do this because as a scientific people we are not trained to do qualitative studies so we are not sure how to interpret stories. If we use a narrative study we gather these stories or statements from people, we have no idea how to find facts in there because quantitative studies always simple and you measure, it is 5 means 5”* (C).

**Hmm, Yes, I was Expecting you to Say These Things. Also, This Theme of QUAL Research Seeming More Complex Interests Me. I am Also Surprised that Not More of you Have Said you Wouldn't Use, or are Unfamiliar with Narratives. Do Any of you Use Narrative?**

*“Narratives were useful... one narrative no, two or three, if you join the dots you're going Ah! There is... an interlink, something is happening but we don't know what”* (A). *“Narratives, in some cases... you may have questions... from a particular story”* (GS). *“Narratives that's either part of interviews or case studies, I'm not sure which and...any eye witness reports might... provide some background to... the laboratory test programme which would take samples and try and measure some of the properties of the ground... fit in with our model of the failure process”* (GS). *“Narratives, yeh we use that sort of thing... you could say that travel diary information is quite narrative type information and it's the way you analyse it that can be more qualitative or quantitative... the way you do your analysis... so it doesn't have to be purely qualitative”* (T). *“No idea about the last one... [reads definition] yes we do... use that one”* (ML). *“Narratives is always important... you cannot directly use narratives to build models but for sure you can start from narratives... and then use more structure, more quantitative methods to see if what you hear in a narrative is something which is generalised or not”* (T). *“I suppose there's more the narrative aspect where they can provide more information... It becomes more open but we're still looking to get... quantitative data... quantify the amounts of... people's opinion so we're still in the quantitative type of approach but looking at gathering qualitative data”* (SWH).

**Ah! Some of you DO Use Narratives, but in Your Own ways for QUANT Analysis (T; SWH), as a Springboard to Generate Ideas (T), to “Join the Dots” to See What you Want to Investigate (A). Do Any of you Have Any Overall Comments on These Five Methods?**

*“I guess that if something is qualitative, doesn’t mean that it is bad” (GS). “I’ve either done these or had close association with these... I’m not anti-qualitative research: I just don’t do it... coz we’re not Einsteins or anything; we’re not, Oh no it can only be quantitative... I do what seems appropriate, pragmatic is the key word” (T). “With any of those ones I would say... if you’re interested in doing research and... to develop some novelty... then you gotta do it” (SD). “I think depending on the topic it will be just very different... you know if you’re looking at... the effect of cancer... narrative would be certainly a good way of approaching it because people can tell you how they feel... in law... interviews and case studies would certainly be good”(SWH). “We use all of those and... they’re all relevant... I’ve got a PhD student at the moment doing action research... another... doing... a number of design case studies... certainly we use focus groups, we use narratives in what we call scenario-based design... and... interviews, very generic method... and they can all be done well” (C). We use... all of them... quite often you need more than one... the quality of good research would be correlated with the number of these methods used together” (T). “I have a very good and real example that is ability and human factors study. We adopted two strategies, one purely quantitative, the other purely qualitative, and we compared results, both are really well managed, really well controlled, we use different focus groups 20 persons with a wide range of IT background.... and in the end the result comes out and they are not the same. Quantitative study reviews... Website A is more useful. Qualitative results says Website B is more useful, and... I think in this case qualitative study is more reliable because...their answer should be the truth: they should tell which one they believe is more useful” (C).*

**I See, So for Computing, Sustainable Development and Transport These Methods are Either Considered – and, Surprisingly, Even More Appropriate at Times. Any Further Thoughts?**

*“In my field it’s difficult to get a good publication using these methods... which is highly valued, so... I would be interested but I’d have to balance curiosity against resources” (T).*

**Well, Publications are Key in Much Research and you Have to Consider what Methods will Get you Published. Have Any of you Done Research Projects Where you Had Experience of a Mix of QUANT QUAL Being Particularly Valuable?**

*“Quite often we plan park and ride schemes [to] encourage car users to park their cars at the park and ride and get the bus, and we don’t even think or consider the public transport users. Then after you built the scheme you find that the bus users started to drive their cars, although they used to use the bus to the park and drive, and the car users they don’t even know about the park and ride scheme... I mean it actually generates and increases the car dependency... while you’re trying to get people off their cars so... lots of studies and lots of park and ride schemes in lots of UK cities have failed... [and]... because of the captivity in terms of the information available or the assumptions we set, or the type of models we do or whatever, we come up with not necessarily the results which will be revealed once the system is up and running, and that causes lots of problems on the transport system” (T).*

**Wow! You’re Confirming Through this Kind of Example the Value of Using a Mix of QUANT and QUAL, and in These Transport Cases the QUAL Element is Vital.**

However, many QUAL researchers are against mixing methods, and “it is probably the case that most qualitative researchers... regard quantitative and qualitative as incompatible

approaches, with the latter judged superior” (Hammersley, 2013, p. 19). Further, and in relation to QUAL methods being difficult to publish, “researchers engaged in mixed theory projects often face cruel and stinging rejection from their peers” (Koro-Ljungberg, 2004, p. 603). Of course, there might be practical issues in integrating QUAL and QUANT (Bryman, 2006) or even resistance from QUAL researchers to government supported “retrograde” (Howe, 2004, p. 42) and mixed methods experimentalism. Yet, many QUAL researchers believe methods can be mixed (Seale, 1999; Mason, 2006), that any method can be used (Howe, 2009, 2011), or equated with any approach (de Vaus, 2001). Some say QUAL research shouldn’t be fixed in set paradigms (Atkinson et al., 2001; Denzin, 2010), that arts and sciences are not so starkly separated (Eisner, 2001), that there are many advantages to using numbers in QUAL research (Maxwell, 2010) and that QUAL researchers should be flexible (Holloway & Todres, 2003).

### **So, Based on this I Would Like to Ask: What Do You Think About Mixing QUANT and QUAL?**

*“A mixture of the two and both are needed” (A). “In better case studies people will have a mix of approaches” (T). “Totally possible” (SWH). “I think as an engineer... the qualitative and quantitative research complement each other because you need to have a good understanding of what people say - and how - before you can... use a quantitative approach” (CE). “I always keep an open mind so...I will look for both alternatives whether quantitative is easier, or [if it] is more sensible to do qualitative research” (C). “I have seen, and more recently people using, visualisation type methods. So quite often in my field you’re dealing with masses of data that you can’t possibly understand, and you can’t possibly visualise... people are coming up with methods of visualising data... there’s clouds or all sorts of things... a qualitative way of interpreting data... definitely a communicator of what you did” (AD). “We delivered a useful healthcare service... immediate feedback from nurse and the GPs they say you are sending me raw data, the current heart rate, the current blood pressure, and there is an alarm... I prefer to see a more qualitative result like a red alert, an amber alert, green [or] something, so I want to see a traffic light. But that is really fuzzy logic, really qualitative, because from the data the software is not intelligent enough to do this kind of judgment... In the end... we teamed up with... a medical professor [who] implemented an algorithm for us... we feed in data... and [it] tells us red, amber, green” (C).*

### **OK – So in Algorithm Development and Computing, QUAL Methods Visually Present Data, According to Suitability.**

Now, the last area I’d like to focus on is some key terms: reliability, validity, and generalizability. In the literature, for reliability, there’s this idea that with QUANT research *consistency* is crucial, and external, over-time based reliability and internal, test-retest reliability are key (Bryman & Cramer, 2009). Yet, the importance of documentation (Silverman, 2010) and of replicability is mentioned for QUAL research, “the extent to which research produces the same results when replicated” (Bloor & Wood, 2006, p. 147).

For *validity*, in some QUANT literature *face validity* is “how far a measure really taps the concept that it purports to measure” (Bryman & Cramer, 2009, p. 80). Other types of QUANT *validity* are: concurrent (where people differ); predictive (using a future measure); construct validity (hypothesis deducing); convergent or discriminant (how one measure harmonizes with another) (Bryman & Cramer 2009). From a QUAL perspective validity is more, “the extent to which the research produces an accurate version of the world” (Bloor & Wood, 2006, p. 147), or something gained through confidentiality and informed consent (Liamputtong, 2010). There is also the idea of catalytic validity, which can “undermine

alienation and oppression” and is one kind of QUAL position on social change (Beach 2003, p.869) similar to *transactional* or *transformational* validity (Cho & Trent, 2006). For some QUAL researchers, validity is associated with positivism, which should be transcended, to avoid the need “to continually pose questions of validity” (Kvale, 1995, p. 38).

*Generalizability* is often not mentioned (e.g., Bryman & Cramer, 2009), or more appropriate terms for QUAL research are suggested such as *extrapolation* (Alasuutari, 1995, cited in Silverman, 2010) given “the secret seems to be to substitute theoretical cogency for the statistical language of quantitative research” (Silverman, 2010, p. 150). Nevertheless, QUAL methods have been criticised for a lack of generalizability (Babbie, 2001). However, others have tried to apply *generalization* to QUAL research through the lens of a shared culture (Fairweather & Rinnie, 2012), argue such terminology is used similarly across the disciplines (Grix, 2004), or differ with the researcher’s paradigm (Guba & Lincoln, 2005). Sometimes, alternatively nuanced terms are proposed: resonance and sincerity (Tracy, 2010), or trustworthiness, credibility and sincerity (Schwandt, 1997).

### **Given the Above: What are your Thoughts on These Terms? How Would you Define Them?**

*“Reliability relates to the consistency of the results obtained from an analysis. There’s a crossover with reproducibility which is a big part of the scientific method... validity is whether the results obtained are actually a reflection of the true situation”* (ML). *“Take reliability... reproducibility and repeatability... there’s even a British standard... reliability has to be set in context because what worked in the 1960s with lower levels of traffic... might not work today... although it may seem quite qualitative there must be quantitative underpinning... so you verify, not validate, its reliability”* (CE). *“Reliability for me is the issue of what we call repeatability, we use repeatability a lot in the assessment of products... and from that repeatability we then validate what we’re doing”* (A).

### **This is What I Thought you’d Say, with the Exception of What you Said About the Context of Time. Any Other Thoughts?**

*“I wouldn’t be able to come up with a concrete definition, I’m a mathematician, so asking for a definition of those would make me... shy off and not want to give you one really... but reliability I suppose is to do with it being repeatable”* (T). *“Reliable, I have to say, it depends on the context”* (C). *“Might sound a bit odd, the kind of algorithms we develop they don’t necessarily get the same answer every time you run them on a problem... so it’s very important...that you test the reliability of the technique... that you don’t just say OK I did it and here’s the result, it’s That I did it a hundred and I’ve got a reliable result”* (AD).

### **OK, From a Maths Perspective There is the Idea of Repeatability, Yet Unpredictability, and as a Mathematician, you Say, you’re Wary of Definitions. What About Validity?**

*“Validation’s an external moderation”* (CE). *“Validity is taken by what’s called a United Kingdom Accreditation Service or a European technical approval equivalent where it’s been validated by a body... they’ve got a whole series of quality assurance mechanisms in place”* (A). *“Is it valid? Have you carried out the research in accordance with the relevant codes of practice or can you justify why you haven’t”* (ST).



### **So Sometimes it's Dictated by Professional Codes of Practice. Any Other Ideas on Validity?**

*"It will only be valid if you have an appropriate research method, but also a right sample of... a population" (SWH). "In the numerical height of my research... many people confuse... reliability and validity... they will say... something is reliable... if they've done it many times and they have seen a trend or whatever... but I think that reliability is more, not necessarily that you can always get the same result but other people can also get the same"(GS). "Validity and generalizability I'd kind of wrap up together...a lot of the modelling work, you could argue about how valid it is, because you make assumptions about reality when you're doing numerical quantitative type research... Sometimes you could argue that it's valid in its own internal mathematical system of course but... does it reflect the real world condition? That's another question" (T). "I'd say the border between validity and reliability is probably a bit blurred in my case because for me a valid model is a model which is able to replicate what happens in [a particular city as a whole] for instance" (T).*

### **So, in Geotechnics There's a Confusion of Terms and in Transport a Blurring of Terms. Any Thoughts on Generalizability?**

*"Generalizability is... whether you can open out into other areas, yeh?" (FC). "Generalizability is something you have to build up through body of evidence" (C). "Generalizability basically relates to the relevance of what you've done to the wider population... I think of that very much in terms of statistics" (ML).*

### **OK, This Confirms Literature Comments about Generalizability from a QUANT Perspective: Connected to Statistics and Building up a Body of Evidence. Do Others Agree?**

*"Generalizability's very hard, especially experiments involving soil or mixing phenomena or fluids, what may work perfectly well and repeatedly in the lab, often just doesn't happen at bigger scale... or vice versa... In engineering... most stuff we have are just models and approximations... No matter how advanced the theory, it is nothing more than an approximation with a factor of safety, and don't ever let scientists convince you it's any other... generalisability is a tenuous concept to try and pin down even in quantitative research, so, many papers you see in our fields are very hard to reproduce unless you have exactly the same circumstances as the researcher... and the more general it becomes the more useless it actually often is... Just because you put a symbol or a formula to it some concepts are not easily quantifiable [laughs] such as the infinitesimal or the infinite" (CE).*

### **Right, So, in Engineering, it's Mostly Models and Approximations. Also, I'd Have Expected Any Caveats to be More Linked to People than Materials! Any Comments?**

*"I think generalizability is losing its position as a gold standard for research, because it just turns everybody... into a number, an anonymous figure, where everybody wants to be recognised as a person now, in their own right. So... generalisation, that's too broad and open and driven by statistical law, which assumes that each object that is a part of that calculation is one and the same in terms of values, it's being, and all the rest of it...Put that aside as the dark excesses of positivism. If it's generalizable but it's 100% wrong, what's the point of it being generalizable, to say [laughs] that we end up with nought you know?" (SD).*

## **WOW! Generalizability is Actually Useless!? Probably Many QUAL Researchers Would Agree because of Their Conception of Context.**

*“In my opinion... especially in computer science, if the result is generalizable that result is trivial, it doesn't mean anything. When it cannot be generalised, it is so particular it applies to a specific group of people or group of objects, that result is really significant... You know why all the companies like IBM, like Dell, when they create computers they have so many series, one laptop designed for businessman, one laptop designed for homes? Because... you have to profile for a really particular group of people...and you try to create a product accordingly and that research outcome can never be generalised to the public” (C).*

## **So in Computing Particularity is Often What's Wanted! Any Other Comments?**

*“Valid is that I get the right answer, but reliable is more than that, it's that if I do it again I'll still get the same right answer and if I do it again I'll still get the same answer... So what you want to know is how reliable, it's not necessarily a bad thing that it doesn't get it right that hundred and first time [I – So reliability is not an absolute?] Yes, it's if I run it 200 times... is it OK 198 of them, and probably that's fine for me, or; is it only OK one time? Sometimes the one time is really specific to me, it's fine. If I do it 200 times and only one time it's right, because I might only want that one if I'm looking for one answer... so I design these algorithms... you could use them in two different contexts, one is where I wanted to design a new shape of aeroplane wing... in that case I don't really care about my algorithm how reliable it is... I've got a year to design that wing... and if once out of a thousand it comes up with a design that's better than anybody else's that's great... but; I can take the same sort of algorithm and I can apply it to let's say the...delivery driver wanting to find a route around town that is the most cost-efficient... every day of the week, in that case I really care about how reliable it is... If I run it ten times and I get ten different answers that's no good for me. So actually, having said the reliability matters, the reliability is... very much dependent on the context of the problem” (AD).*

**This Shifts ALL the Boundaries of the Terms! Their “Fixed” Nature Melts Away, is Purely Context Dependent and this is Fascinating to Hear from a QUANT Researcher Given that “Opinion is Divided Among Qualitative Researchers over Whether this Criterion has any Meaning Whatsoever” (Schwandt, 1997, p. 137). Moreover, in Algorithm Development, you said Earlier it is Related to Nature: Isn't Nature Unpredictable?**

*“Yes, well, that's exactly why... the algorithms are unpredictable, but it's also why they work paradoxically [laughs]... it's essential for a kind of smart trial, and lots of stuff I do is based on modelling and evolution, so evolution has evolved people that are smart answers... basically [as] a result of your DNA” (AD).*

## **Summary and Discussion**

Dialogue can reveal much, bridge much, and construct understanding, often through leading us to question our assumptions. Before interviewing our QUANT researchers, we assumed advanced materials construction, civil engineering, transport modelling, computer science, and geotechnics researchers would be highly QUANT. Actually, however, within QUANT orientations, most of the QUANT researchers we spoke to, were both receptive to and also used QUAL methods of interviews, focus groups, case studies, action research, and even

narrative, or supervised students who did. Very few were actually uncomfortable with QUAL methods, and even then often because they said they found them difficult to use (“*quantities are easier because they are numbers*” (T)). What is more, we had assumed our own interpretations of QUAL and QUANT were solid, but among these researchers they are not, and through dialogue we have come to share this view. We see numbers are often approximations requiring huge safety factors (CE), that there can be a haziness behind them (ML), that Likert scales are seen as not being truly QUANT (C), that a measurement of direction can be seen as QUAL (GS). We see that facts are perhaps only *measurable in inverted commas* (CE), that more than one of our QUANT researchers warned against positivism and its *dark excesses* (SD), and that the infinitesimal cannot be measured (CE). We see that the world can work perfectly well in a mathematical model but that this in itself may not represent the world (T). We see that many aspects of what would be thought applicable to QUAL also apply to QUANT, such as having the right method (SWH), and rigour (ST). We see voices amongst our QUANT researchers of opposition to government policy which champions purely QUANT research (CE) and others describing it as “*knee-jerk*” (SD).

Further, we see these QUANT researchers have many definitions and interpretations of QUAL methods and related key terms. We see action research interpreted as Newtonian (FC), as process improvement (ST), as experiment design (CE, ML), and as laboratory testing (GS). We see QUAL being used in ways we did not anticipate: to visually represent data (AD, C) and in a meta-way to describe research processes (FC). We see our QUANT researchers talk about QUANT as inappropriate to gather certain types of data (C), and of the need to have a combination of methods to support the success of more QUANT orientated research (T). We see a widespread championing of mixed methods research (T, SWH, A, CE, AD). We see the unpredictability of both the world (T, AD) and of the QUANT mathematical algorithms used to depict it (AD), and the paradox that it is precisely this very unpredictability is why, like nature, the numbers work (AD).

With regard to reliability, validity and generalizability, many of our QUANT researchers had their own subject guided interpretations (GS, ML, AD) or professional codes (A, CE). We see some blurring (ML) or confusion (GS) of terms. Reliability had to be defined by the context of the project (AD): *a one off result* would be acceptable for some projects, for others *large numbers* of repeatable confirmations were necessary. Some championed generalizability (FC, ML) but others conversely, and unanticipatedly, championed particularity (C), and were wary of generalizing, if we “*end up with nought*” (SD), or noted how generalizability is a “*tenuous concept*” (CE).

We do not see any received stereotypes in a single one of these 17 QUANT researchers. They show willingness to consider QUAL methods, openness to include them in practice, caution with purely QUANT methods, and rarely describe themselves as purely QUANT. On the contrary, despite a rare voicing of discomfort with QUAL methods, most said they would be open to using QUAL methods, but saw constraints with publishability unless they used QUANT methods.

It is productive to consider the implications of all this from a Bakhtinian perspective (see also above). Such a perspective can frame some of the insights to help consider relationships between QUANT and QUAL methods and the teaching of these in research methods courses. We may apply his thinking to key research terms, or at a different level, to a dialogue between QUANT and QUAL researchers and their trends of thinking. Thus, a dialogue inevitably has contending forces, some are *centripetal*, drawing others in and moving towards a single understanding or shared authoritative voice. Others, in opposition, may be *centrifugal*, as a force of meaning moving away from that shared point of understanding towards a variety of peripheral, multi-voiced positions. For Bakhtin, such processes never end (1981), the dialogic voices are not in equilibrium but reflect “the ceaselessly shifting power

relations between words” (Vice, 1997, p. 5) that tend to create or sustain inequalities. Such inequalities may reflect the conventional perceived status of QUANT research as authoritative, dominant, evidence based, while QUAL has at times been seen as a minority voice of difference, resistance and change that seeks interpretative understanding rather than numbers. In such confrontations and tensions between voices moving in different ways, Bakhtin sees the role of the carnival (derived from Rabelais) in which laughter challenges authority, iconoclastically giving space for unofficial emergent voices to speak out and break conventional images. The carnival is an unofficial liberating force challenging the voices of authority and received positions. In a similar way, it seems that our 17 QUANT researchers as a group, in the carnival of the ethnographic dialogue above, express voices that do indeed break many of the conventional images both as portrayed in research methods handbooks, and as held in our own previous assumptions. As a group, through voices sometimes contending with each other, our QUANT researchers show a dynamic tension and uncertainty in the balance of the practices of QUAL and QUANT research and approaches. This seems a productive form of insight for research methods courses. For example, we envisage some of these dialogue extracts being used in research seminars and workshops for dramatized role-play and discussion of key tensions and interpretations. Further we envisage the use of some of the QUANT researchers’ comments juxtaposed with research literature extracts to create class dialogue around research practices and choices of approach and to fruitfully challenge “sedimented and normative” (Conquergood, 1998, p. 32) meanings of the terms involved.

### Conclusion

This dialogue has shown these QUANT researchers to be pragmatic, practical, open-minded, and flexible about using QUANT, QUAL, or interesting combinations of these in their established research practices, “*dancing between qualitative and quantitative*” (GS). Their comments certainly challenge some received, and arguably unhelpful, stereotypes regarding QUANT research, and the stances they take towards QUAL methods, mainly in their research but also, evidently, in their teaching. We wonder how a similar analysis of interviews with established QUAL researchers might portray relevant key terms and actual practices regarding *their* perceptions of QUANT research. Further, we see the potential of an ethnographic performance orientated dialogue and a Bakhtin orientated dialogue between researchers, literature extracts and resources, research students and research contexts regarding the choices, combinations and differential understandings of methods.

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## Appendix A

### Interview Schedule: *Quantitative* Researcher Perspectives on *Qualitative* Methods

#### Overview

This study aims to explore the perceptions and beliefs of a number of *qualitative* methods and approaches, and of key concepts such as reliability, validity and generalizability. To do this specifically with researchers (about 15) who use and are familiar with *quantitative* research methods. In particular I am interested in their perceptions of the uses and appropriacies of particular types of methods and their opinions regarding the evidence they produce. I want to explore what actual quantitative researchers think as no one has done this and I am curious and believe it will generate some insights of real value and novelty.

#### Questions

*What do you consider to be good research?*

*What do you consider to be poor research?*

#### Here Are a Few Methods that Qualitative Researchers Use:

- Interviews
- Focus Groups
- Case Studies
- Action Research
- Narratives

*Do you know anything about them?*

*Do you have any opinion on them?*

*Would any of them be applicable in your area?*

### **Key Issues**

- Reliability
- Validity
- Generalizability

*How would you define these?*

*What do these mean to you in your research?*

*Would you think their definitions the same in all research?*

### **Possible Definitions to Draw on:**

#### **Interviews**

**“...conversations in which a researcher gently guides a conversational partner in an extended discussion” (Rubin and Rubin, 2005, p. 4).**

**Rubin, H.J and Rubin, I.S (2005). *Qualitative Interviewing; The art of Hearing Data* (2<sup>nd</sup> ed.) Thousand Oaks: Sage**

#### **Focus Groups**

**“The contemporary focus group interview generally involves 8 to 12 individuals who discuss a particular topic under the direction of a moderator who promotes interaction and assures that the discussion remains on the topic of interest.**

**Experience has shown that smaller groups may be dominated by one or two members, while larger groups are difficult to manage and inhibit participation by all members of the group. A typical focus group session will last from one and a half to two and a half hours.” (Stewart and Shamdasani, 1990, p. 10).**

**Stewart, D. W., & Shamdasani, P. N. (1990). *Focus groups: Theory and practice*. Applied social research methods series, v. 20. Thousand Oaks, Calif: Sage.**

#### **Case Studies**

**“Case study refers to the collection and presentation of detailed information about a particular participant or small group, frequently including the accounts of subjects themselves. A form of qualitative descriptive research, the case study looks intensely at an individual or small participant pool, drawing conclusions only about that participant or group and only in that specific context. Researchers do not focus on the discovery of a universal, generalizable truth, nor do they typically look for cause-effect relationships; instead, emphasis is placed on exploration and description”**

**(Colorado State University 2012)**

**<http://writing.colostate.edu/guides/research/casestudy/pop2a.cfm> accessed May 2012**



### Action Research

“Action Research is a form of self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of (a) their own social or educational practices, (b) their understanding of these practices, and (c) the situations in which the practices are carried out.” (Carr and Kemmis 1986, cited in innovate online 2012)

<http://www.innovateonline.info/extra/definition2421.htm> accessed May 2012

### Narratives

- (i) “A narrative may be oral or written and may be elicited or heard during fieldwork, an interview, or a naturally occurring conversation. In any of these situations, a narrative may be (a) a short topical story about a particular event and specific characters such as an encounter with a friend, boss, or doctor; (b) an extended story about a significant aspect of one’s life such as schooling, work, marriage, divorce, childbirth, an illness, a trauma, or participation in a war or social movement; or (c) a narrative of one’s entire life, from birth to the present.” (Chase, 2005, p. 652)
- (ii) Chase, S.E (2005) Narrative inquiry: Multiple lenses, approaches, voices. In Denzin, N. K., & Lincoln, Y. S. (2005). *The SAGE handbook of qualitative research*. Thousand Oaks: Sage Publications. Pp 651 - 680

### Reliability

“The extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable.” (Joppe, 2000, p.1)

Joppe, M. (2000). *The Research Process*. Retrieved February 25, 1998, from <http://www.rverson.ca/~mjoppe/rp.htm> cited in

Golafshani, N (2003) Understanding Reliability and Validity in Qualitative Research *The Qualitative Report* Volume 8 Number 4 December 2003 597-607  
<http://www.nova.edu/ssss/QR/QR8-4/golafshani.pdf>

### Validity:

“Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are. In other words, does the research instrument allow you to hit "the bull’s eye" of your research object? Researchers generally determine validity by asking a series of questions, and will often look for the answers in the research of others.” (Joppe, 2000, p.1).

Joppe, M. (2000). *The Research Process*. Retrieved February 25, 1998, from <http://www.rverson.ca/~mjoppe/rp.htm> cited in

Golafshani, N (2003) Understanding Reliability and Validity in Qualitative Research *The Qualitative Report* Volume 8 Number 4 December 2003 597-607  
<http://www.nova.edu/ssss/QR/QR8-4/golafshani.pdf>

**Generalizability:**

“The extent to which research findings and conclusions from a study conducted on a sample population can be applied to the population at large” (Colorado State University 2012).

<http://writing.colostate.edu/guides/research/glossary/> accessed may 2012

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