
Exploring the use of mixed methods in research and evaluation of widening participation interventions: guidance for practitioners

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Abstract Globally, the need for evidence to guide widening participation (WP) practices aimed at reducing inequalities in higher education (HE) participation is recognised more than ever before. In addition, whilst it is also increasingly accepted that approaches drawing on the strengths of both quantitative and qualitative methods (mixed methods) are necessary to develop a more robust evidence base, their use is still not common practice. Given that there is limited guidance on how to combine divergent methods in the field, this may be impeding practitioners and researchers in using mixed methods approaches in WP research. This paper provides such guidance, describing the challenges and benefits of combining qualitative and quantitative methods within a single research design and discusses these issues in relation to epistemological approach, study design frameworks, methods of data collection, analytical approaches and issues of validity and reliability. We also present a mixed methods WP study to illustrate one approach that can be used to address these methodological issues. In doing so, we present new guidance and a framework that WP practitioners and researchers can use for conducting and integrating mixed methods studies.

Key words widening participation; evaluation; evidence; mixed methods

Introduction

Globally, socio-economic and demographic inequalities in higher education (HE) participation are a subject of on-going concern and debate

(Murray and Klinger, 2013). The United States (US) first proposed the imperative of addressing these inequalities with regard to race, introducing 'Affirmative Action' policies in the 1960s to compensate for historic injustices and discrimination (Mathers et al., 2011). Since then, many countries, including most European countries, South Africa and Australia, have devised policies and programmes aimed at extending access to HE to under-represented groups, mostly focusing on socio-economically disadvantaged and ethnic minority groups (See et al. 2012; Mdepa and Tshiwula, 2012; Gale and Tranter, 2011). Though terminologies and 'target' groups vary by country, this paper is relevant to researchers and practitioners in all countries seeking to widen access to HE in a fair and evidence-based manner.

The widening participation (WP) focus in the United Kingdom (UK) has mainly been on students from disadvantaged backgrounds (Boliver et al., 2015). Despite significant HE expansion, patterns of unequal access have not changed much since the 1960s and such students are still over two times less likely to enter HE, and over six times less likely to attend the most selective universities, than those from more affluent backgrounds (Office for Fair Access, 2016; Universities and Colleges Admissions Service, 2015). Reducing these differentials and ensuring that HE is accessible to all those with the academic potential to benefit is considered imperative as a means to reducing social stratification, raising skill levels and contributing to social mobility (e.g. Thiele et al., 2016; 2015). Pressure to ensure this and widen access in HE has increased with the substantial rise in university tuition fees in England in 2012 and the government's aim of doubling the proportion of students from socio-economically disadvantaged backgrounds entering HE by 2020 (Department for Business, Innovation and Skills, 2015).

In 2016, the National Collaborative Outreach Programme (NCOP) was developed to assist with achieving the UK government's WP aims. There is a long history of outreach programmes such as this, which have been considered to play a central role in widening access to under-represented groups in the UK and elsewhere in the world (Thiele et al., 2017; Tibbetts et al., 2016). These vary in nature but tend to involve working with schools and colleges to introduce students to, and develop their knowledge of HE, encourage them to apply and provide them with academic and pastoral support.

However, despite the prominent role that outreach programmes are considered to have and the increased pressure to widen access in HE, there is a problematic lack of evidence available to inform WP practice in a number of areas (Hayton and Bengry-Howell, 2016; Webb et al., 2016; Department for Education, 2014). In the UK, and further afield (perhaps with the exception of the US), this holds true for both the evidence considering the impact and value for money of WP interventions and the evidence in relation to university-level data on WP practice (e.g. Webb et al., 2016; Thomas,

2011). Additionally, previous studies have described methodological weaknesses/limitations in the existing evidence base, and highlighted the lack of controlled interventions, randomised trials (or trials or any kind), systematic reviews and meta-analyses in the field (Torgerson et al. 2015; Gorard et al., 2006; Younger et al., 2018).

Conversely, in the US, researchers have conducted numerous randomised experiments and trials to assess, for example, the impact of socio-psychological interventions aimed at improving belonging and academic outcomes amongst minority students (e.g. Tibbetts et al., 2016; Walton and Cohen, 2007; Cohen et al., 2006) and meta-analyses to look at collections of randomised trials on the same topics/interventions (e.g. Lazowski and Hulleman, 2016; Walton and Spencer, 2009). Proponents of such methods and quasi-experimental designs have argued that these are required in order to isolate the effect of specific outreach programmes, such as the NCOP (Woolley, 2017). These study designs however, present challenges of their own, and many contest the approach of denying a student a potentially life-changing opportunity for the sake of finding a suitable comparator and measuring efficacy.

Currently, there is still a dearth of UK-based evidence of this kind, and what little does exist is not in peer-reviewed journals (e.g. Groot et al., 2017). Furthermore, though feedback on discrete outreach activities is commonplace, there is little evidence that their outcomes are systematically monitored to assess their effectiveness (Dytham and Hughes, 2017; See et al., 2012; Younger et al., 2018). Harrison (2012) emphasised the importance of this, arguing that the absence of compelling evaluative research was one of the key factors that contributed towards the demise of one of the NCOP's predecessors, Aimhigher (extant between 2004 and 2011).

Faced with greater pressure to measure the impact of WP interventions, the NCOP has a strong focus on evidence-based practice and evaluation, offering fertile ground on which different approaches can be explored and used by its 29 consortium members. Developing a firm evidence base to guide WP practice is, however, challenging, not least because of the multiplicity of factors that may affect participation in HE. Bowes et al. (2013) corroborate this, noting that many HE institutions find it difficult to disaggregate the impact of activities on outcomes, particularly when there are multiple activities being delivered.

In light of the complexities that surround this, approaches that draw on the strengths of both quantitative and qualitative methods (mixed methods) have been recommended for the effective development and subsequent evaluation of WP programmes (Dytham and Hughes, 2017; Hayton and Bengry-Howell, 2016; Gorard and Taylor, 2004). Indeed, while quantitative approaches have an important role in measuring outcomes, qualitative approaches can provide an understanding of the underlying factors that may influence these, and also

help to discern the extent to which outcomes are influenced by specific interventions. Moreover, though the benefits of using these divergent methods are increasingly recognised, there is a paucity of examples of integrated mixed methods studies in the field of WP (Plowright, 2011). Concomitantly, there is limited practical guidance available on how to conduct mixed methods studies, which can also be a barrier to WP practitioners and researchers (Office for Fair Access, 2017; Woolley, 2009).

This paper seeks to address these gaps in the literature, providing guidance and a working example of a mixed methods WP study to outline the steps that need to be taken when planning and conducting such studies. To this end, the following sections describe the benefits and challenges of combining different methods within one research design, and discuss these issues in relation to epistemological approach, study design frameworks, methods of data collection, analytical approaches and issues of validity and reliability. The authors have previously explored this issue in other research fields relating to inequalities (Stanistreet et al., 2015) and are now applying the methodology to WP research, including their own evaluation of the Merseyside NCOP (MCOP).

Challenges and benefits of using mixed methods for WP research

When it comes to mixed methods research, a key issue is whether the end product is more than just the sum of the individual quantitative and/or qualitative parts (Creswell and Clark, 2011; Bryman, 2007). As such, advocates of mixed methods research cite multiple motivations for integration, including: for complementarity, to explain convergences or divergences in findings and to gain a fuller picture of the phenomenon under study (Bryman, 2004; Gorard and Taylor, 2004). However, where studies do use mixed methods, the integration of findings is rarely exercised (Woolley, 2009; Bryman, 2007; 2004).

There are various practical and theoretical challenges that can impede researchers and practitioners from conducting and integrating mixed methods studies. One of the practical challenges that surrounds this relates to the lack of specialist knowledge required to undertake such studies, which has been found to be particularly problematic in smaller HE institutions (e.g. Bowes et al., 2013). At least in part, these issues may also be linked to the aforementioned lack of guidance and good examples of integrated mixed methods in the field (Office for Fair Access, 2017). Moreover, limited access to guidance and information can result in confusion, contributing to a still prevalent misunderstanding that mixed methods research simply involves the use of different (typically quantitative and qualitative) methods within a single study (Plowright, 2013; 2011).

Some of the theoretical challenges that can impede the use of mixed methods approaches also stem from the fact that qualitative and quantitative approaches have developed from opposing epistemologies or branches of philosophy that view knowledge and reality in different ways (Creswell, 2013; Guba and Lincoln, 1994). Discussions around this have generally focused on the distinction between positivist and interpretivist epistemologies, which traditionally underpin quantitative and qualitative approaches respectively (Johnson and Onwuegbuzie, 2004). In brief, though interpretivist epistemologies (e.g. social constructionism, phenomenology and hermeneutics) vary in foci, they tend to share a similar emphasis on context, interpretation and the subjectivity of human experience, rather than an objective measurable reality, which is central to positivist quantitative research (Denscombe, 2008). Due to such differences, some argue that quantitative and qualitative approaches cannot be used and integrated within a single study (Guba and Lincoln, 1994).

However, mixed methods researchers contend that differences in epistemological stances should not restrict qualitative researchers from using data collection methods that are typically quantitative or vice versa (Plowright, 2011; Johnson and Onwuegbuzie, 2004). To effectively increase the acceptability of mixed research studies in the field of education, Onwuegbuzie (2012) argues for the importance of viewing mixed methods research as a distinct and credible methodological tradition in its own right. For this reason, a range of paradigms for guiding mixed methods research has been developed (Shannon-Baker, 2016; Creswell and Clark, 2011; Teddlie and Tashakkori, 2009; Morgan, 2007).

Paradigmatic stances in mixed methods research

In this paper, we present four paradigmatic perspectives associated with mixed methods research, namely: dialectics, transformative-emancipation, critical realism and pragmatism (Tashakkori and Teddlie, 2010). These were chosen as they are particularly well-represented in the mixed methods literature and because of the contributions each make to mixed methods inquiry (Shannon-Baker, 2016). Table 1 outlines these four paradigmatic stances, their key characteristics, the purposes for using these and their implications for mixed methods research.

Table 1: Four paradigmatic stances for mixed methods studies

Perspective	Pragmatism	Transformative-emancipation	Critical realism	Dialectics
Purpose for using	Useful for programmes or intervention-based studies	Useful for enacting positive social/individual change for minority and marginalised group	Useful for evaluation-based studies; facilitates compatibility between quantitative and qualitative approaches	Useful for studies that need to address conflicting data/theoretical stances
Key characteristics	Emphasises communication, determining practical solutions/meanings	Focuses on addressing social inequalities and working with minority groups; requires strong understanding and involvement of the community that the research focuses on	Underpinned by belief that quantitative and qualitative approaches can work together to address the other's limitations; complete objectivity not considered possible	Dialogue is at the core of dialectics; focuses and addresses convergences and divergences between different paradigms rather than placing emphasis on 'joining'
Methods	Selection of methods is practically-based; dependent on research questions at hand; connects theory with data before and after data collection	Involves community in decisions around methods, data collection, analyses and reporting; theoretical framework from community's perspective must be used and connected to data	Process-oriented; emphasises perspectives, context and relationships (among people, events, and ideas)	Emphasises reflexivity throughout the research process; centres on ability to make comparisons and identify divergences between data/datasets
Implications for mixed methods research	Identifies practical solution for mixing characteristics of quantitative and qualitative approaches	Pays particular attention to issues related to power, privilege and voice; provides goals related to social justice to guide research process	Offers potential for establishing context-based validity and for drawing conclusions about causal connections that contribute to the occurrence of an effect (process-based causal inferences)	Divergences and convergences in results and data are addressed and highlighted directly

Each of the paradigmatic stances presented in Table 1 has individual strengths and the shared benefit of allowing researchers to draw on the different and in some ways conflicting philosophies that underpin quantitative and qualitative studies (Tashakkori and Teddlie, 2010). Though we do not argue for a single or 'best' paradigm for mixed methods research, in this paper we focus and endorse the use of pragmatism for WP application. Following the basic principle that research approaches should be selected and combined in ways that offer the best opportunities for answering research questions, we argue that pragmatism is particularly well-suited to the practicality of conducting mixed methods studies in educational contexts (Plowright, 2011).

It is worthy of note, however, that some researchers have criticised the use of a pragmatic approach precisely because it is practically-based, or for being an 'anything goes' approach due to its flexibility. Researchers who see pragmatism as 'too practical' tend to prefer the use of more theoretically-driven approaches such as transformative paradigms (Shannon-Baker, 2016; Mertens, 2014). While recognising the contended nature of pragmatism and reflecting on the approaches used is important regardless of the chosen paradigm, WP itself is a field in which utility is forefront. With this in mind, we argue that the relatively more straightforward approach offered by pragmatism is more likely to be embraced by WP practitioners and researchers and applied to their own evaluations.

Types of study design - integration at the study design level

There are various ways of classifying mixed methods study designs (Tashakkori and Teddlie, 2010). Table 2 summarises four commonly-used models that can underpin the mixing of methods, and presents brief examples of how these designs may be used in educational research or evaluative studies (depending on the focus of studies and the research questions posed).

Table 2: *Mixed methods study designs (below)*

Adapted from Creswell and Clark (2011)

Study Design	Description	Example	Priority
Explanatory Sequential	Has an initial quantitative phase, followed by a second qualitative phase. This design allows researchers to explore questions and findings from the first phase using qualitative data in a second phase.	Ivankova and Stick's (2007) study of the factors contributing to students' persistence at a HE institution is an example of an explanatory design. They started with a quantitative survey study and identified statistically significant differences which they then explored in greater depth by conducting follow-up qualitative interviews with respondents.	Priority quantitative
Exploratory Sequential	In this two-staged design the results of the first qualitative phase can help develop or inform the second method (quantitative). This design is well suited for exploring a phenomenon, developing an instrument when one is not available and generalizing findings to other populations (Tashakkori, & Teddlie, 2010).	Goldenberg, Gallimore, and Reese's (2005) study on predictors of family literacy practices is an example of an Exploratory design. They first conducted a qualitative case-study where they identified new variables and hypotheses about predictors of family literacy practices. They then conducted a quantitative path analysis study to test these qualitatively identified variables and relationships.	Priority qualitative
Embedded (or nested design)	In this type of design, one type of data (quantitative or qualitative) plays a supplemental or secondary role in a study based primarily around the other form of data. The component that plays the supplemental role, is embedded within a largely quantitative or qualitative study to address a research question, 'mixing' both types of data at the design level.	For example, a researcher could embed a qualitative component within a quantitative study to examine the process of a WP intervention, or to follow up the outcomes of the intervention.	Priority quantitative or qualitative
Co-sit	This model collects and analyses both qualitative and quantitative data separately and then the two strands of findings are converged (by comparing and contrasting the different results) at the point of interpretation in relation to specific research questions. Researchers use this model when they want to compare results and end up with validated and well-substantiated conclusions about a single phenomenon..	Doyle et al's (2013) study which examined the experiences of students with disabilities in their transitions from college to HE is an example of a convergent design. They concurrently collected qualitative data from an online discussion forum and quantitative college application and admissions data from one HEI and integrated findings at the stage of interpretation..	Equal

The classifications described in Table 2 above were identified based primarily on the work of Creswell and Clark (2011). While they were considered of particular relevance for evaluation and educational research, there are other classifications that could be used (for more detail and other options see, for example, Tashakkori and Teddlie, 2010).

Methodologies and data collection methods

In this paper, we refer to research approaches and 'methodologies' interchangeably, when referring to the overall strategy of inquiry, including the epistemology, methods of data collection and analyses (Creswell, 2013). In this section, we give an overview of different approaches that can be used within mixed methods designs, depending on the research question at hand. We then discuss the most commonly-used qualitative and quantitative methods of data collection for evaluating WP interventions.

As briefly discussed, quantitative research is an approach that emphasises objective measurements; this generally involves the use of statistical analyses through data collection methods such as polls, questionnaires, pre-existing datasets and surveys. While quantitative research can be viewed as a distinct positivist methodology in itself, there are a plethora of qualitative research approaches that researchers/practitioners can choose from (Creswell and Clark, 2011; Denscombe, 2008). In Table 3 below, we provide a summary of five approaches, depicting several dimensions for distinguishing among them. These were selected because they are particularly popular, and vary in foci at a fundamental level, which means they can be used to achieve different research goals. For more in-depth discussion on methodologies see Creswell (2013).

Table 3: Descriptive breakdown of five qualitative approaches

Distinguishing characteristics	Phenomenology	Ethnography	Grounded theory	Case study	Narrative (biography)
Focus	Understanding 'lived experiences' of a phenomenon	Interpreting and describing shared patterns amongst cultures and social groups	Intended to generate a theory grounded in data from the field	Developing in-depth understanding of a single or multiple cases; 'real-life' research	Exploring the life of a single individual; chronological meaning of experience
Data collection	In-depth interviews, typically with up to ten people	Primarily involves observations and interviews; can also include collected materials (e.g. documents, audios, images, videos)	Interviews with 20–30 individuals to capture detail until point of 'saturation' is reached	Uses observations, interviews and reports (e.g. documents, archival reports, physical artefacts)	Mainly involves interviews and observations
Data analysis	• Statements • Meanings • Themes	• Analysis • Description and interpretation	• Coding (e.g. open, axial or selecting coding)	• Description • Themes • Assertions	• Stories • Historical content
Nature of narrative	Descriptions of experiences; reducing experiences to essence	Descriptions of cultural behaviours/patterns of groups or individuals	Describes theory or theoretical model that did not exist previously	Provides in-depth insight into a 'case' or 'cases'	Describes individual's life in detail

Based on Creswell (2013)

As with study design, and paradigm, the individual methodologies used in a mixed methods study are at the discretion of researchers/practitioners and their specific research aims. To evaluate WP interventions in particular, we recommend the use of before-and-after mixed methods studies (e.g. retrospective/prospective cohort mixed methods studies). For such studies, quantitative methods of data collection (surveys/institutional data) could first provide 'contextual' or baseline information on students prior to the implementation of a WP intervention. Qualitative methods of data collection (interviews/focus groups) could then be used to explore and understand individuals' perceptions/experiences with the intervention. Alternatively, randomised trials and/or quasi-experimental studies could be used to explore the impact of an intervention or interventions, and qualitative methods (and/or other quantitative methods) could be used after or alongside these to explore findings in greater depth. However, as discussed, considerable thought is required to establish suitable comparators when conducting such studies.

To provide further enhancement or clarification of the results from one method with the results from the other after the intervention, it is also possible to use longitudinal data to evaluate the impact of interventions. This can be achieved using secure tracking systems such as the Higher Education Access Tracker (HEAT), which can help HE institutions in England track students that have taken part in outreach activities, through to their achievement in HE (e.g. Office for Fair Access, 2017; Woolley, 2017).

Below we describe the most common qualitative and quantitative methods of data collection that can be used to develop and evaluate WP interventions.

Surveys

Routine and bespoke surveys can be used to guide and evaluate WP interventions. Quantitative surveys (e.g. for students, teachers, university staff) may be used to provide socio-demographic data, information concerning people's interaction with lifelong opportunities as well as information on student experience, and factors related to decision-making, participation and non-participation in HE (e.g. Gorard and Rees, 2002). These surveys may include baseline quantitative surveys and may be followed up by subsequent surveys or alternative methods of data collection (quantitative or qualitative) to assess the impact that WP interventions have on students' outcomes and their attitudes towards HE, aspirations, knowledge of HE and future intent.

Institutional data

Individual universities and various organisations (e.g. Department for Education, Higher Education Statistics Agency (HE SA) and Universities and Colleges Admissions Service (UCAS)) routinely collect a range of data, such as socio-demographic, attainment and educational background data. Large institutional datasets can be utilised to track and explore differences in student attainment and participation, in relation to age, sex, educational background, socio-economic status and other factors. This method of data collection can be embedded in mixed methods retrospective/prospective studies to guide and evaluate WP interventions. For example, institutional data could first be analysed to discern if and where there are inequalities in relation to participation of particular groups that require attention. This could be used to guide interventions aimed at widening access to the group of interest, which could subsequently be evaluated using qualitative methods (e.g. interviews, focus groups).

Institutional or, as discussed above, 'tracking' data from HEAT could also be used longitudinally to evaluate the impact of the intervention. Obtaining such data does however take time (i.e. with HEAT there is a time-lag of approximately 6.5 years for year 9 students and 3.5 years for year 13 students). It is therefore advisable to also use other data collection methods (e.g. surveys, interviews, focus groups) to assess the short- or medium-term impact of interventions alongside this.

Qualitative interviews

Unstructured or, more commonly, semi-structured interviews are used frequently in WP research and evaluation to explore individuals' views (e.g. those of students, teachers, WP practitioners, university staff) across various topics including perceptions and experiences with WP interventions, and also decision-making processes.

Focus groups

Focus group discussions allow participants to share their views on different topics including WP interventions, influence and outcomes, as well as reasons for participation in HE and views on education. Compared to individual interviews, they capitalise on group interaction and people can explore and clarify their views in a way that is not possible in interviews (Kitzinger, 2007).

Approaches to analysis - integration at the methods/interpretation level

There are various approaches to integration which can be applied at multiple time points, including: (1) when formulating research objectives; (2) at a methodological level to link data collection and analyses; and (3) at the stage of interpretation and reporting (Fetters et al., 2013). This largely depends on the overarching research aims and study design followed, which in turn also influences the approach taken to analyses and sets parameters for when integration should occur (Creswell and Clark, 2011). In Table 4, we present examples of three approaches to methodological level integration and two approaches that can be used to integrate divergent types of data at the stage of interpretation/reporting.

Table 4: Approaches to integration/analyses of mixed methods studies

Approach to methodological integration	Description	Practical use
<i>Connecting</i>	<p>This approach is often used when mixed methods are carried out sequentially and one method is used to inform the subsequent data collection (e.g. interview questions, identification of participants to interview); integration occurs by connecting the analysis of results from initial phase with data collection from the second phase.</p>	<p>Qualitative interviews could, for example, be carried out to explore how students choose universities, which can provide insight that can be used to subsequently inform a survey exploring these choice processes further.</p>
<i>Embedding analytical approach</i>	<p>With this approach, data collection and analyses are linked at multiple points in time.</p>	<p>This would be an appropriate approach in a study for evaluating the impact of a WP intervention on the number of applications to a HE institution, while exploring students' views or interest in attending HE before, during and after the intervention using interviews and surveys.</p>
<i>Merging</i>	<p>Integration through merging involves analysing quantitative and qualitative findings separately and then combining them in relation to specific themes that were identified; typically occurs after the statistical analysis of the numerical data and qualitative analysis of the textual data.</p>	<p>For example, if quantitative data are collected to explore socio-economic differences in attendance/truancy, qualitative data can be collected using parallel or similar questions to examine reasons for not attending school, or behaviours related to attendance.</p>

Approach to integration at the interpretation and reporting level	Integration through joint displays	Weaving	Contiguous approach
<i>Integrating through narrative</i>	Involves bringing quantitative and qualitative data together visually (e.g. with figures, tables, graphs) to draw out new insights beyond that which could be gained from separate methods/studies.	Different approaches are available for <i>integrating through narrative</i> ; these indicate whether findings (quantitative and qualitative) are presented in a single report or a series of reports. <ul style="list-style-type: none">• The <i>weaving approach</i> involves describing quantitative and qualitative findings together on a concept-by-concept basis.• With the <i>staged approach</i>, results of each step are reported in stages as data are analysed and published separately.• The <i>contiguous approach</i> involves presenting quantitative and qualitative findings separately in a single report.	Tables or figures could be used to simultaneously display quantitative and qualitative data exploring students' knowledge of HE; joint displays can also be used to present results when integrating through merging. <i>Weaving</i> could be used to summarise key themes identified from national datasets and qualitative research focusing on individuals' educational outcomes alongside one another. A <i>staged approach</i> would be appropriate to enable the publication of papers on multiple yet related WP interventions delivered as part of a larger programme (ideally with a related overarching aim). With the <i>contiguous approach</i> , findings from a survey on students' future aspirations could be reported in the first part of a report. Qualitative results from subsequent interviews could be reported in the following part to explain quantitative findings in greater depth.

Table based on Creswell and Clark (2011) and Fetter et al. (2013)

The approaches to integration presented in Table 4 were selected as examples, as they can be applied to the previously described study designs and to different types of educational or WP studies. There is, however, no absolute consensus about how to integrate or mix methods and the degree to which the divergent (quantitative and qualitative) studies 'mix' varies (Fetters et al. 2013; Mason, 2006).

Validity and generalisability

Validity in mixed methods refers to the quality of a research study - its component parts, how appropriately these are combined and the accuracy of the conclusions drawn (e.g. in terms of how these relate to the constructs assessed) (Onwuegbuzie and Johnson, 2006). Though validity is a particularly complex, and frequently contested, issue in mixed methods research, it is possible for researchers to employ conventional quantitative and qualitative approaches to validation during data collection (Stanistreet et al., 2015). However, considerable thought needs to be given to addressing validity during the data analysis and interpretation phases. Various tools can be employed to strengthen validity during these phases, for example, triangulation to 'measure' phenomena from two or more different vantage points, in order to validate the accuracy of observations or findings (Mason, 2006). Validity may also be improved by returning to participants for verification of observations (also known as member checking). For further guidance and information on validity see, for example, Tashakkori and Teddlie (2010).

Generalisability refers to the extent to which results from one context can be generalised to other contexts, times, and individuals (Teddlie and Tashakkori, 2009). Differences in the generalisability of quantitative and qualitative studies require consideration in mixed methods studies. Quantitative studies tend to focus on assessing how generalisable the study findings are to the wider population (Guba and Lincoln, 1984). Conversely, qualitative studies tend to place emphasis on the individual, credibility (confidence in the truth of the findings) and confirmability (the extent to which findings are shaped by the participants) (Creswell, 2013). However, the distinction between knowledge that is context dependent (qualitative), and knowledge that is generalisable (quantitative) is contestable as knowledge is not usually specific to a particular context (for example to one socio-economically disadvantaged student), nor is it universally generalisable (representative of all universities) (Stanistreet et al., 2015; Morgan, 2007). Furthermore, though not all studies are intended to be transferred or generalised, researchers and practitioners who intend to make generalisable claims must carefully consider how findings can be transposed to wider and or different contexts, considering factors such as the variables involved in the

study, the mechanisms formulating the overall causal model, and the sampling strategy that is used (Tashakkori and Teddlie, 2010).

Integrated methods in practice; an example from a mixed methods WP study

The following example is from a study carried out at the University of Liverpool (UoL) (Thiele et al., 2016). The aim/objectives, research design, methods and the steps which were taken to combine results are briefly outlined to show how the integration of quantitative and qualitative studies can be achieved in practice. We then discuss selected findings from the study (as opposed to the main findings) to illustrate some of the insights that can be gained when quantitative and qualitative data are integrated.

Study overview

The overall aim of the study was to explore socio-economic inequalities in participation and attainment at the UoL, in order to provide insight that could be used to guide the University strategy in relation to WP.

We took a pragmatic approach and had three main objectives. Our first objective was to examine associations between UoL students' socio-demographic and educational background characteristics and participation and academic attainment (at school and university). Our second objective was to investigate the extent to which school grades capture students' academic potential, by comparing group differences in students' school and university attainment. This evidence was deemed necessary to guide decisions around the use of contextual data alongside school grades, which has increasingly been recommended as a WP dimension in university admissions processes (Thiele et al., 2016; 2015).

Contextual data refers to comparative school and socio-economic information that can be used to situate school grades within the context in which they were achieved, thus helping to make a more contextual assessment of students' academic potential (e.g. Thiele et al., 2016; 2015). Our final objective was to provide deeper insight into how and why socio-economically disadvantaged (WP) students' contextual background characteristics may contribute to differences in participation and attainment. This was considered important as a means of further informing the use of contextual data in university admissions processes and providing guidance that could be used to inform practitioners delivering WP outreach activities at the University. Data collection included two institutional datasets and semi-structured interviews.

Study design

The study followed an explanatory sequential mixed methods design consisting of two distinct stages: a quantitative phase followed by a

qualitative phase (Creswell, 2013). The rationale for using this approach was that the findings from the quantitative phase would provide a general understanding of the research problem that could subsequently be explored in greater depth by examining participants' views (Creswell, 2013; Ivankova and Stick, 2007).

Procedure: First phase - quantitative

In the initial quantitative phase, two retrospective cohort studies investigated associations between the educational and socio-demographic background characteristics of students on three-year programmes (Study 1) and the medical programme (Study 2) and participation and attainment at the VoL (objectives 1 and 2) (Thiele et al., 2016; 2015).

Table 5: Description of independent variables (below)

"Deprivation: based on IMD

Table adapted from Thiele et al., (2015)

<i>Independent Variables</i>	<i>Description</i>
UCAS Tariff Points	UCAS Tariff points are a system used for allocating points to post GCSE qualifications in the UK (e.g. for A levels, A=120, B= 100, C=80 etc.). Study 1 uses Total UCAS Tariff points as a measure of prior attainment as this enables comparison between applicants with different volumes/types of achievement. In study 2, UCAS tariff points were based on students' three highest A-level grades, and used a measure of prior achievement for entry to higher education.
School Type	The type of school students' attended for their A-levels were organised into five categories including: independent schools, state grammar schools, state comprehensives, sixth form colleges and the category labelled state other (includes voluntary aided schools, voluntary controlled schools, technical colleges and adults colleges).
School Performance	School performance data were used to contextualise prior attainment, represented by the overall percentage of students gaining 5A*-E or more at A-levels or equivalent.
Neighbourhood Participation (POLAR 3)*	POLAR 3 data were matched to the Census Area Statistics (CAS) wards to illustrate the typical HE participation profile within which students were domiciled. POLAR 3 data is reported as five quintiles: ordered from '1' lowest participation to '5' highest participation in Higher Education. A binary classification was created to compare performance of students residing in areas of lowest participation (1 and 2) to others (3, 4 and 5).
Index of Multiple Deprivation (IMD) ^v	The IMD (2010) was used to identify multiple facets of total deprivation. Students' postcodes were matched to Lower Layer Super Output Areas (LSOAs), which contain an average of 1,500 households. These were then used to append IMD scores provided that students had a valid English postcode. There are 32,482 LSOAs in England. IMD ranks LSOA with 1 as most deprived and 32,482 as least deprived. For the analyses IMD scores were divided into quintiles, where quintile 1 includes the most deprived areas and quintile 5 includes the least deprived.
Sex/ Ethnicity	Sex and ethnicity were self-reported by students during the university application process. Students' ethnicities were categorised as one of the following: White, Asian, Black, Chinese, and Mixed and Other.

* POLAR 3 residing in neighbourhoods with low/high participation in HE

Data for Studies 1 and 2 were obtained from the VoL central student database, which includes all necessary student background information and tracks performance from the point of application through to graduation. In addition to socio-demographic data (sex, age, ethnicity, disability, domicile), school attended and prior attainment (based on UCAS tariff points), both datasets also included HE performance information. Table 5 describes the independent variables in greater detail. The dataset examined in Study 1 contained data for 5369 students (with an English home postcode) who had completed full-time three-year degrees. The dataset examined in Study 2 contained data for 571 students (with an English home postcode) who had completed the full-time five-year Medicine and Surgery programme at the VoL.

We independently analysed the quantitative data for Studies 1 and 2, to explore differences in HE participation and attainment amongst students based on their background characteristics. Statistical significance of associations between the independent and outcome variables was initially assessed using conventional hypothesis testing for categorical (Chi-squared) and continuous (independent t-test) comparisons. Both univariable and multivariable statistical procedures were then used to analyse individual datasets.

Procedure: Second phase - qualitative

A phenomenological approach, which views subjective lived experience as central to understanding, was followed to provide deeper insight into possible factors that underlie the trends identified in the quantitative phase (Study 3) (Finlay, 2009; Moustakas, 1994; Schutz, 1972). Hence, whilst the quantitative phase was needed to identify factors that were significantly associated with differences in participation and attainment, the phenomenological study was designed to complement this, providing a more nuanced understanding of how and why these may be influential. This approach was used to explore the subjective lived experiences, differentiating barriers and facilitators that a purposive sample of high-achieving students from socio-economically disadvantaged backgrounds perceived as influential throughout their educational trajectories from primary school to the VoL (Thiele et al., 2017).

A cohort of 76 students, who had been admitted to the VoL after taking part in WP programmes targeted at high achievers from disadvantaged backgrounds, was initially contacted via email. Thirteen students took part in the study after responding to the email to register their interest in the study. These students had all been screened to ensure they fulfilled the eligibility criteria required for participation in WP programmes and thus came from disadvantaged backgrounds (low-income families with little or no experience of HE). We specifically selected students who had taken part in WP outreach activities delivered by the VoL because we also sought to provide guidance to inform WP practitioners delivering these.

Phenomenological studies primarily rely on in-depth interviews to collect data (Creswell, 2013). Hence, a semi-structured interview schedule was designed as a means of eliciting individuals' personal stories and developing an understanding of lived experience. The interview schedule contained ten open-ended questions that were structured chronologically around the key stages of students' educational trajectories, to help guide them through their experiences in a logical progression. Interviews were recorded and transcribed verbatim.

Thematic analysis was used to analyse students' narratives of their experiences from primary school to HE. A peer-review process was used to verify the validity and reliability of codes and themes in terms of their applicability to the data. This study identified themes at a latent or interpretative level, focusing on the significance of patterns, and their broader meanings and implications (Braun and Clarke, 2006). Specifically, an inductive or 'bottom up' analytic approach to thematic analysis was used whereby analysis was guided by the themes that emerged from the data, rather than by prior theoretical accounts. An independent researcher then reviewed the coding procedures from initial codes to themes in more than half of randomly selected transcripts ($n = 7$). In addition to intercoder agreement, the verification procedures included triangulating different sources of information, member checking, reviewing and resolving disconfirming evidence (Creswell, 2013).

Procedure: Integration

In the example study presented in this paper, methodological integration of the quantitative and qualitative phases first occurred at an intermediate stage through 'connecting' as the findings from the quantitative studies were used to inform the focus of a subsequent qualitative study. Mixed methods studies with a phenomenological component frequently use quantitative findings to inform the phenomenological focus within the second phase of the research (Mayoh and Onwuegbuzie, 2013). This approach was useful for first drawing generalisable conclusions, and initially uncovering phenomena, which could then be explored in greater depth in the phenomenological phase of the study by focusing on participants' rich experiential accounts.

The integration of the findings of the mixed methods studies subsequently occurred at the stage of interpretation. Firstly, we interpreted and discussed the results that helped answer the study's major quantitative research objectives. This involved looking at factors predicting differences in participation and academic attainment (at school and university). Then, we discussed and interpreted the findings that were aimed at addressing the aim of the qualitative phase of the study, namely: the experiences, and barriers and facilitators that students from socio-economically disadvantaged backgrounds perceived as influential throughout their educational trajectories from primary school to the UoL.

We then presented the quantitative and qualitative findings together on a concept-by-concept basis (integrating findings through weaving). This approach involved writing both qualitative and quantitative findings together and grouping them together by themes (Fetters et al., 2013). Overall, this process allowed for the findings from the qualitative phase to clarify and explain some of the statistical results from the quantitative phase, which reflects the overarching aim of the mixed methods sequential explanatory design (Creswell, 2013; Ivankova and Stick, 2007).

Example findings

In this section, a few selected findings are presented to illustrate some of the insights that were produced when quantitative and qualitative data were integrated. Table 6 presents a selection of findings from the quantitative studies alongside qualitative findings on a concept-by-concept basis.

Table 6: Integrated findings (concept-by-concept table)

Concept	Quantitative Findings	Qualitative Findings
Deprivation (based on IMD [^] and POLAR 3*)	Students from more deprived socio-economic backgrounds entered university with significantly lower grades than those from more affluent backgrounds. They were also under-represented compared to those with more affluent socio-economic backgrounds.	Students described facing a number of challenges related to their financial circumstances from early stages of their educational trajectories. The issues they discussed are likely to contribute to the continuing poorer performance and recruitment of socio-economically disadvantaged students to HE. These included: their families' lower levels of education, mental/physical health problems, and poor economic circumstance/material disadvantages in general.
School Attended	The type of school that students attended had a significant and differential impact on school achievement compared to university achievement. Students from independent schools performed less well than students from comprehensive schools despite being more likely to enter university with higher grades.	Students' narratives provide insight into various sources of disadvantage associated with the schools/colleges they attended, highlighting barriers that can prevent others from similar educational backgrounds from achieving their maximum potential. Issues that were commonly discussed included: low expectations, conflicting advice, difficulties with peer groups, lack of guidance/support and material resources. Students' narratives also highlight the complexities which surround the associations identified in the quantitative studies. In particular, the sources of disadvantage students discussed related to their schooling were linked to multiple socio-cultural and interpersonal issues. These did not act independently but were interlinked with one another, their identities and their educational engagement in different ways.

* POLAR 3 Residing in neighbourhoods with low/high participation in HE

[^]Deprivation: based on IMD

The quantitative findings in Table 6 focus on the associations between socio-economic background (based on two neighbourhood measures of disadvantage, namely POLAR 3/IMD) and school type attended and participation in HE and academic attainment. Though these quantitative findings depict associations and broad trends, they do not tell us about how or why these characteristics were influential. Conversely, the qualitative findings presented in Table 6 help to address these questions and explain the quantitative findings, by providing insight into some of the ways in which students' background characteristics may act as barriers and sources of disadvantage that contribute to differences in participation and academic attainment. As such, students frequently described difficulties, and challenging social situations in relation to their family backgrounds and schools, which affected their educational outcomes, directly and indirectly. Thus, by integrating findings, it was possible to address different aspects of the research question and explain some of the quantitative findings.

The use of mixed methods and integration of findings also helps to provide a fuller picture of the phenomenon under study, as qualitative research provides insight into individuals, their differences and social contexts, which are not captured by quantitative studies. Indeed, students' narratives depicted their own dispositions for self-improvement and their motivations for pursuing HE, which they described in the context of escaping adversity, moving away or just generally wanting to 'do better'. In doing so, these narratives facilitate greater social understanding and help to convey some of the factors that may help individuals from disadvantaged backgrounds beat the odds that are stacked against them. However, it is important to remember that while these individuals' negotiated barriers and were successfully admitted to university as a result, it is highly likely that many more working-class students, who did not attend university, failed to do so.

Advocates of mixed methods research emphasise complementarity as a key motivation for mixing methods (e.g. Bryman, 2007). However, going beyond this, the pragmatic mixed methods design and integration of findings also contributes to the overall interpretation of findings, by providing insight into some of the complexities and subjectivity associated with the identification of disadvantage. Indeed, while the quantitative studies highlight a number of factors that can objectively be associated with disadvantage, students' narratives varied widely in content, reflecting the subjectivity and heterogeneity of what it means to be disadvantaged. Hence, though individuals who took part in Study 3 shared similar background characteristics, such that they could all be considered 'disadvantaged', their narratives depict how this may be experienced and how this impacts on educational outcomes in different ways.

Strengths and limitations of the study

In the previous section, we described various ways in which the pragmatic mixed methods approach and integration of findings contributed to the overall interpretation of findings. In doing so, we sought to capture the main strengths of the example study, showing how different approaches complement one another and together expose different perspectives and forms of knowledge and raise different implications. As social experience and lived realities are multi-dimensional, by only viewing phenomena along a single dimension our understandings may be limited (Mayoh and Onwuegbuzie, 2013). By mixing methods using a pragmatic approach it was possible to capture factors that were influential at a group and individual level, providing a more nuanced evaluation of phenomena than could be possible with one method alone.

It should, however, be borne in mind that the example study presented in this paper focused on disadvantaged students who were successfully admitted to university, and did not provide insight into those that do not attend HE, or those that opt to attend less-competitive institutions despite attaining the high grades required by more selective universities. Mixed methods approaches should also incorporate these groups and be extended to include other groups to offer a better understanding of the issues surrounding access and participation in HE. That said, though we promote mixed methods as an approach that can be used to develop a more robust and credible evidence base in the field of WP, we do not intend to imply that this approach (or pragmatism and the design used in the example study) is necessarily better than other study designs, for all WP research.

We have previously discussed criticisms that have been raised against pragmatism, of which researchers and practitioners should be aware. It is also important to be mindful of the challenges presented by sequential designs when considering which study design might be most suitable. One challenge relates to the additional time required to collect and analyse data sequentially rather than, for example, concurrently, as is the case with convergent designs. With sequential designs, there is also a risk that findings from one phase can bias the next and undermine the trustworthiness or rigour of results. Biases like this can be somewhat mitigated by approaching data with an open mind, or, if appropriate, by using alternative types of study designs (e.g. convergent or embedded designs). Greater exploration of this, as well as consideration of how other designs or approaches might have shaped the described study, would be valuable, and is warranted, but outside the scope of this study. It should, however, be noted that regardless of the chosen design or approach, the process of integrating mixed methods findings does involve human interpretation, which is subjective and not 'value free'.

Due to issues like these, some would contend that quantitative and qualitative approaches should be used and kept separately, drawing on each of their individual strengths (Denscombe, 2008). Doing so would have

benefits and bypass some of the aforementioned practical and theoretical challenges (i.e. around the integration of opposing positivist or interpretivist perspectives). While this would still offer useful insight, we would argue that it would not provide the same benefits or level of understanding conferred by the integration of different approaches.

Conclusion

Despite widespread agreement that WP initiatives should be evaluated and grounded on firm empirical evidence, there is little evidence that this is the case (Hayton and Bengry-Howell, 2016; Department for Education, 2014). Additionally, the existing evidence base has various methodological weaknesses, and has been criticised for offering only a limited picture of the impact of WP interventions (Webb et al., 2016; Gorard et al. 2006). In this paper, we provide insight into how a mixed methods approach can be used to overcome some of these challenges and thus help build the more compelling evidence base that is needed in this field. We offer practical guidance for practitioners and researchers, outlining the processes and techniques that require consideration when planning mixed methods studies, and discuss the challenges and limitations that surround this.

Although there is no gold standard or absolute consensus about how to integrate methods, we have provided a practical example of a mixed methods WP study to illustrate one approach (pragmatism) that can be used. The use of a pragmatic approach proved to be both practical and effective for enhancing our understanding of findings, but should be selected at the discretion of researchers or practitioners and their objectives. Because this paper covers relatively uncharted territory, aiming to address an important gap in the literature, further methodological discussions around the use of mixed methods approaches are required. These are also warranted to inform the applied use of other approaches and methods, including randomised control trials, meta-analyses and systematic reviews. These have all been recommended for understanding the impact of outreach programmes, but are rarely used, and present challenges, including ethical dilemmas (in the case of randomised control trials especially) of their own (See et al., 2012). More published examples using these different methods, but also guidance and applied frameworks that are accessible to WP practitioners, are needed (Office for Fair Access, 2017). Alongside a comprehensive research agenda, these could promote their use amongst practitioners as well as academic researchers and enable them to provide best evidence for future practice.

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