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Critical Review of Sampling Procedures in the Context of Sierra Leone's Low Literacy (and Under-resourced) Research Communities

Emerson Abraham Jackson

Doctoral Research Scholar, Centre of West African Studies, University of Birmingham, Birmingham B15 2TT, UK; Research Economist, Bank of Sierra Leone
e-mail: emersonjackson69@gmail.com; EAJ392@bham.ac.uk; ejackson@bsl.gov.sl

Abstract

This article has provided a critical review of sampling procedures in the context of Sierra Leone. The basics of the two major types of sampling procedures (probability and non-probability) have been explained, with a view of shedding light on their usage to assist researchers in their pursuance of addressing proposed hypothetical statements. Problems associated with low literacy rate in Sierra Leone have been highlighted as a major concern, more so in the process of ensuring ethical code of conducts are adhered to during the execution of sampling research. Research practices in the country needs a complete overhaul, particularly with its very low investment in 'Higher Education Institutions (HEIs)' to help support the backbone of research, and backed by investment in technology to assist with the enhancement of exploring sampling data in pursuit of addressing hypothetical postulates / research questions during research.

Keywords: *research methods; sampling; ethical issues; critical review; Sierra Leone*

JEL Classification: *B49; C80; C83*

Introduction

Sampling is a very important step in the epistemic pursuance of exploring hypothetical postulates / research questions during research undertakings. Sampling procedure is not only restricted to a single approach in the investigation of concepts, but can also be applied to both qualitative or quantitative procedures, and in some cases, triangulated (*within or across methods* - See Jackson, 2016c and Mays and Pope, 2000) as a way of increasing the scope for enhancing validity and reliability in research outcomes. It is even viewed as a step towards the development of the emergence of theoretical construct, for example, cases of *Theoretical Sampling* (see Dawson, 2002: 51), and also in a situation where grounded theory is to be the main study approach, and for which choices about sampling technique(s) is considered vital in enabling theoretical construct to be generated from data collected.

There are different types of sampling procedures, and these are grouped into two major categories, namely '*probability and non-probability*', considered key in setting the scene to critically exploring the way forward in the context of Sierra Leone. Sampling is a process in research whereby participants are selected from an identified population (see Dawson, 2002,

Gorard, 2001 and Gilbert, 1993). A more accurate approach in the application of sampling research (whether in a qualitative or quantitative environment) is through probability sampling, where everyone within the population has an equal chance(s) of being selected (Dawson, 2002: 48), and this include highlights of the under-mentioned *types*:

- simple sampling: this is the most authentic process of probability sampling procedure, but requires the input of highly qualified specialists in making use of the available population / census data to extract meaningful parameters needed;
- cluster sampling: this is normally a case of segregating the population, for example, grouped into characterized units, for example geographical region, gender, etc., and from which random samples are later selected from each cluster. In this case, the researcher will need to make sure that clusters are selected carefully so as to make it possible for random samples to be identified as the next step;
- systematic sampling: this is also referred to as '*quasi-random sampling*' as the researcher will need to develop system(s) from which samples are drawn; this for example, might involve selection of every third item from a list. It is obviously a highly problematic approach, particularly in the organisation of systems used in selecting items.
- stratified sampling: in this, the researcher commences the process by stratifying samples based on identified subject(s), and from which a random sample is then selected.

In a similar token, non-probability sampling (also referred to as *purposeful sampling*) which is based on some of the under-mentioned *highlights* is also commonly used in research undertakings:

- quota Sampling: in this, the researcher may decide to select quota or items based on identified characteristics, for example, certain amount of male and females in an area, or even smokers and non-smokers;
- theoretical sampling: in this procedure, the researcher makes decision(s) to develop some thoughts about emerging concepts affecting the population he / she intend to study. In this case, theoretical concepts may be about issues of corruption in an economy, and therefore, the researcher may decide to choose samples from those perceived to be engaged in corruptive acts. This type of sampling can produce biased outcomes, which is indicative of the manipulative process involved in the selection of samples.
- convenient sampling: this is commonly referred to as ‘haphazard or accidental sampling’ (Dawson: 2002: 51), as it is mostly based on the researcher's choice of familiarity with the research community in order to make the process quite easy to capture the required information. This has the advantage of information being accessed with ease, but can result in bias outcomes, and also non-representative of the population.

The use of any of the above means of sampling procedures (probability or non-probability) is all valid in the process of ensuring the extraction of vital data from research participants. There is never a situation where research can be conducted with the entire population of a country incorporated (except in the case of a census); in this vein, the planning process must be well thought through so as allow generalisations made to be truly reflective of the population from which samples are drawn, and with possible high scope of validity and reliability displayed at all time. As mentioned by Gorard (2001: 14), differences and variability in pattern of sampling data can be accomplished when the following *points* are considered by the researcher:

- sample size, a very important factor, and in most cases, in order for the researcher to able to influence the success of outcomes, a large sample size is normally recommended;
- the power of statistical testing: the type of testing procedure(s) applied will also be an influencing factor in the success of the researcher's chances of achieving a success with the proposed research question(s). Again, the point about sample size will also make it worthwhile for the researcher to apply sound testing procedure(s) with reasonably large sized samples.

- variability of phenomenon studied is also an influencing factor. A typical case of this can be explained in the case with educational achievement between the lowest and highest achievers in an examination, rather than focusing attention on gender differences.
- the effect size of the phenomenon: this will include a typical case of studies of impact of schools in results which may be attributed to students' prior attainment and the individual student.

As addressed by Dawson (2002: 4-9), the process of undertaking a research, and particularly when a sampling procedure is to be used, requires a lot of planning with the thought of applying the 5Ws - *what, where, who, where and when*? The *'who'* aspect is specifically concerned with the choice of participants selected as a way of obtaining relevant information in order to answer prescribed research questions. As mentioned earlier, a large sample is needed to make the research outcome a success, but serious thoughts will need to be given to the type of participants selected (for which issue about bias-ness as to whether a selection of probabilities or non-probabilistic sampling will also be brought to the fore). Therefore, thoughts will need to be given to accessibility and the type of medium or approach to be used in the process of accessing the right information, for example, Internet base medium of samples (an area of particular concern in countries like Sierra Leone to be addressed later).

Rationale and Objectives

The current state of Sierra Leone's education system needs complete overhaul; this is true as recent occurrences like a decade of civil crisis, and more lately the Ebola epidemic has accounted for a slowdown in the ability of the country to keep pace with the 21st century system of knowledge-based acquisition, more so in the area of research and development. The country has lagged behind its counterparts in the British colonised West African states (Nigeria and Ghana) in enabling data to be sought correctly (Braima et al, 2015 and Jackson, 2016b), simply as a result of problems inherent with poor management, and lack of planning in the direction of the future of education in the country as a whole. Students graduating from universities are deficient in basic research skills, which is simply due to limited or lack of research elements incorporated in 'Higher Education Institutions (HEIs)' curriculum for the exploration of vital ontological and epistemological grounding to promote research work. In this vein, it is with the intention of this article to unearth areas of pertinent concern on the basis of the under mentioned research *objectives*:

- provide a summarised explanation of basic sampling procedure for research work;
- assess fundamental problems faced in the country's capacity for research pursuance, and in particular, the identification of procedural approach to sampling;
- highlight recommended points for future research undertakings involving sampling procedures.

Sierra Leone in Focus and its Surrounding Issues Concerning Research and Data Acquisition

Sierra Leone is a small country, with an estimated population of just over 7 million people based on the 2015 census population result (precisely 7,075,641 million – UN, 2016). The country is divided into its constituent regions, namely north, South, East and Western Area; historically known for its influence in education around the sub-Saharan region of Africa (Athens of West Africa), where the classics of education courses (Latin and Greek) were once taught in schools and colleges, and with students all around the region opting to study at the famous Fourah Bay College, University of Sierra Leone (Jackson, 2016a).

The problem of poor governance in the post-independence era, more so during the periods around 1980-2000 (the civil crisis era of a senseless war waged by Foday Sankoh and his thugs) accounted for the massive decline in education standards; during this period, the country lagged behind in terms of keeping pace with standard in education as a result of poor investment in the sector - this, to a greater extent is indicative of the poor performance by the country in the international league tables (Jackson, 2015: 21 and QS Top Universities Online, n/d).

With the drop in standard of education as seen in the country, there is a need to question the authenticity and quality of (sampling) data captured for research purposes in the country - a critique of this is also true of my own study titled " *Deforestation on the Freetown Peninsula - A Case of Livelihood and Biodiversity Loss in the Goderich Community*" (Jackson, 2015c): the outcome of this was good (very well appraised as part of my doctoral progress assessment), but in reflection of the process / technique used, I am very well convinced that the preferred medium used (Internet Quota sampling) resounded some issues like "*limited sample size (100, but which should have been tripled), and the overall, low response rate received from respondents to questionnaires distributed electronically*".

With the very low educational background of the population, it is a great concern when research tasks are undertaken to ascertain the validity and reliability of research outcomes, simply on the basis of authenticity of approaches used to capture data. The Post-2015 data test study carried out by Braima et al (2015) is also an attestation of challenges faced in the country, and more so, for researchers in their pursuit of deciding on choice(s) of sampling techniques, and the reliability and validity of outcomes of results produced from research undertakings. Access to reliable information system is problematic, which for example possess the potential of limiting researchers in their pursuit of accessing secondary data from institutions like the main central statistical office (Jackson, 2015b and Braima et al, 2015).

With the universities around not demonstrating enough evidence of quality in taught research elements to students, there is likelihood that research undertakings involving the collection of samples (be it probability or non-probability means), can be fraught with bias outcomes, and consequently questioning about their authenticity; this is true as researchers / enumerators used are non-qualified or insufficiently trained to enable the extraction of targeted information from the identified sampled community to be captured. The problem of experienced and trained researchers, and backed by on-going issues in Sierra Leone surrounding data *authenticity* in research processes (be it qualitative or quantitative, involving data sampling study) also leads me to throw light on Nyamongo's (2015: 157-160) highlights of Katz's (1983) '4 Rs' during research undertakings; these include representativeness, reactivity, reliability and *replicability*. Poor procedural approach / standard in the process of collecting data due to inexperienced researchers used during research may render outcomes very questionable.

Quality of the Researcher and Procedural Approaches

It is worthwhile for research work to be fully assigned to qualified research professionals, who at all time would be available to monitor the design and execution of selected / preferred sampling procedures. This is equally true for both qualitative and quantitative investigative studies involving the collection of sample data, incorporating both field and desk research (with the use of secondary sample data). In a country like Sierra Leone, research process(es) involving sampling procedures are fraught with issues identified by Katz's 4Rs, and this can be attributed to the inability of qualified personnel to handle specialist applications, and also inaccurate record keeping of information by institutions like the central statistical office (Braima et al, 2015).

The process of knowledge acquisition is in itself an ontological and epistemological journey, particularly when it involves the process of planning, with consideration given to the 5Ws. The

problem of accurate record keeping in a country like Sierra Leone where educational attainment is a challenge, there is an indication that the *'Who, Where and When'* components in the 5Ws would be hard to accomplish, as it can be a difficult process for respondents to come-by due to their lack of understanding of why a research needs to be carried out.

Successful outcomes from sampling procedures may sometimes have to be remunerated, as a way of making it possible to gain easy access to research participants, but there is an overt danger of it, which may sometimes unearth ethical concerns on the manner in which things are done (Grady, n/d). Therefore, adequate training on how and when to approach participants is very important. Participants' selection is very key and the medium of sample procedure is equally important as some participants may be easily approached via email samples due to their accessibility to information technology facilities like emails. The process of planning sampling procedures, supposedly very challenging in country like Sierra Leone will need to be well thought through, and hence require detailed study of the population from which sample is to be drawn

Sierra Leone is endeavouring to catch up with the rest of the world in terms of usage and application of information technology, and in this vein, approach like email sampling as a way of obtaining information from participants may not be a suitably recommended approach. This is due to the fact that Internet accessibility is generally low in the country (Jackson, 2015c), and there is all possibility that even if email sampling is to be used, response rate will be low as experienced in the aforementioned research exercise conducted by the author of this article.

The use of email can only be considered as an option in a situation where researchers are well conversant with the respondents, and more so, their ability to use and access ICT means of responding to electronic sampling method. The possibility of increasing overall response rate will need to be backed by other accessible means like face-to-face interviews, door-to-door (in-depth interviews and questionnaires), and where permission is granted, the process can also be supplemented through means like audio recording of participants (concerns with ethical issues to be addressed in the next section).

Ethical Considerations

Ethical consideration is more or less the backbone of any research venture(s); the process of authentic outcomes from an investigative research requires trust on the part of respondents to feel assured that whatever is expressed should be kept in the utmost confidence (Jackson, 2018a; Jackson, 2016c; and Jackson, 2016b). This has the power of impacting positively on Katz's 4Rs, and most important of them, *validity and reliability*. In comparison to the UK and other developed nations where the use of ethical codes on conduct with research is made legal for all research undertakings (particularly that stipulated in the academia, for example, the University of Birmingham -UoB, 2015), there is all likelihood that outcomes from research can produce positive outcomes in a bid to addressing propose hypothetical statements / research questions. In Sierra Leone, research undertakings in the academia, considered as the golden standard for scholarly exploration, is fraught with serious questioning around ethics, given the limited scope by HEIs to publicly manifest their views on ethical practices for research undertakings involving human participants and other living organisms, an area very well expressed in the Council for International Schools document titled '*Code of Ethics for Higher Education*' (CIS, n/d).

Given the high rate of poverty in Sierra Leone, interviews conducted (even by qualified / experienced researchers) may be inclined to being manipulated on account of the fact that payment is expected at the end of the interview process, more so a contractual type of obligation (see more on Kumar, 1989 report). In most cases this has the potential of creating biasness on the process and likely, invalidates outcome(s). On a similar note, the high level of illiteracy rate

in the country may also raise questions about assurances by researchers to keep respondents' anonymity intact in situations where sensitive data is to be collected - the power of respondents to exercise their right in requesting copy of research outcomes from researchers is also a concern, as the hegemony of researchers may tend to dominate respondents right to data access (Moini, 2011). This is no exception to the situation Sierra Leone faced, given all its problems with a lagged performance in the administrative management of HEIs in the country (also responsible for the poor standards of outputs manifested by graduates), and the structure of the political economy, capable of dominating citizens' right to freedom of expression (Jackson, 2015, Jackson, 2016e and Freedom House, 2016).

Analysis of Data: Technology Mediated Versus Routine Traditional Means

Data analysis is an equally important step in research processes, and the quality of how analysis is done will influence the manner in which research questions are answered. Sierra Leone, and in particular HEIs, are still faced with archaic means of doing things, and more so in the 21st century of information age (Jackson, 2015b and Jackson, 2018). Professionals in institutions are lacking in relevant skills to handle modern technology application to help with the ontological and epistemological journey of knowledge exploration, particularly so in answering questions pertaining to hypothetical postulations (Jackson, 2016d and Jackson, 2017).

With the emergence of information technology, applications like NVIVO and SPSS are sufficiently able to handle sample data to explore hypothetical statements - for example, through thematic categorisation of concepts when applying qualitative analysis tool like NVIVO (Welsh, 2002), and also, use of quantitative application like SPSS to conduct statistical tests to ascertain conformity of concepts with hypothetical postulates (University of Reading Statistical Service Centre, 2001). As mentioned by Gorard (2001), the use of ICT applications in the analysis of research sample data is very important, but needs qualified and experienced professionals to enable sensible use and extraction of information to ascertain judicious generalisations about the population from which samples are drawn.

In the present age of development in information technology, Sierra Leone and more so HEIs are lacking in their capacity in ensuring students receive the required skills to explore their full potential in the journey of knowledge acquisition. Students are barely able to handle basic use of commonly used application like MS Excel, yet alone specialist application like SPSS and NVIVO, for qualitative and quantitative data exploration. The problem as mentioned in a research undertaken by Jackson (2015), is attributed to low level of investment by successive governments, and also, poor strategic leadership in HEIs to prioritise research potential of staff around the country as a whole.

Conclusion

The article has provided exploratory information, and more so critical review of sampling procedures as applied in the case with Sierra Leone. Generally speaking, sampling technique is a good way for researchers to elicit rich information from research participants / respondents, but its success needs careful planning and where necessary, input of qualified (research) professionals in executing the process. The two main approaches to sampling procedure (*probability and non-probability*) have been explored, and to say the truth, each of them comes with their relative merits and limitations when applied in the practical world of research. The choice of approach used by researchers should be considered critically, with the main focus of ensuring the elicitation of relevant information to address proposed hypothetical postulates,

Given the situation of poor management of research processes, and also the low level of educational attainment of respondents, there is always a high degree of doubts about the validity of research results; this in most cases as already argued, is based on difficulties experienced by researchers in reaching out to participants in the wider community. Unlike the situation in developed nations like the UK and USA where the advent of technology is soundly making its way into people's lives, there is hardly any chance that the use of sampling procedure like email will yield fruitful outcomes in research exploration in country like Sierra Leone, where the basics of procedural approaches are not easily grasped by those engaged in the process of administration.

The situation of positive research outcomes in Sierra Leone can also be blighted by concerns surrounding ethical issues in the investigative process of sampling procedures. As already cited in some of the aforementioned references, research processes involving sample procedures with human participants need careful planning, so that those involved can receive the highest level of protection in terms of their anonymity or confidentiality when providing sensitive information. Even in the most developed nations (UK and USA), there is also possibility that researchers may feel the need to bi-pass ethical code of practices; the difference is the fact that most institutions, particularly universities and well established institutions in developed nations are mostly forced to adhere to strict ethical code of practices when planning studies involving the use of sampling, for example, this can be substantiated by the production of institutional ethical documents (UoB, 2015).

A well planned sampling procedure also have the chances of enabling rich data to be produced in the end, particularly when it comes to the process of analysing sampling data with the use of modern technology facilities like SPSS and NVIVO (quantitative and qualitative study respectively). Sierra Leone in particular as already highlighted, is faced with difficulties when it comes to accessing information technology facilities in research, and mostly with researchers (particularly at HEIs) not being fully equipped to handle basic application packages to assist with the analysis of data – instead of the manual process of analysing data, the use of the aforementioned applications, for example NVIVO can make it very easy for themes from research to be categorised in qualitative sample data, and which would have been very difficult otherwise.

On the basis of this, it is worthwhile for serious considerations in preparing the way forward to equip future generation of researchers in gaining requisite skills in forging ahead with their professional pursuit. As a practicing researcher, I am with the belief that intuitive skills concerning research undertakings can be gained with the right level of logistics provided, and backed by accessible information technology applications like NVIVO and SPSS to help with the coding, cleaning and analysis of data needed to confirm hypothetical postulation(s).

Recommendations

The undermentioned points provide highlights of some recommendations in forging research undertakings involving sampling procedures in Sierra Leone:

- Skilled researchers need to be trained, with the support and collaboration of HEIs across the country. This will address deficiencies associated with low skills in addressing key areas concerned with the preparation of sampling research undertakings and their shortcomings, and also ethical issues associated with trust. At HEIs level, and more so for those pursuing postgraduate studies, it is very important for core modules to be developed, so as to make it worthwhile for requisite skills to be gained; this will make it easier for graduate students to develop independence in their learning process. This will also serve as a way of developing the capacity of institutions across the country to support the advancement of good practices in research undertakings across the country.

- There should be an expansion in investments devoted to the purchase of relevant application packages (both qualitative and quantitative) so as to enable more researchers to be trained in handling information technology applications in analysing data. Once sufficient skills set is gained, this has the potential of improving the overall quality and prospect of researchers, in a bid to developing understanding of data exploration needed to answer proposed research questions. It is also important at this point to note that skills developed in the analysis of data with the use of information technology facilities must be well planned so as to make it worthwhile for proposed hypothetical statements to be explored fully. As expressed by Gorard (2001), the over-usage of data analysis tools must be treated with caution, and also ensuring attention is paid to the exploration of data needed to ascertain conformity of data with hypothetical postulations.
- Establishment of in-house 'Continuing Professional Development (CPD)' to update skills (this for example, would involve knowledge-based information support to assist with the improvement of IT skills for researchers through the use of specialist packages, and also training in research methodology and methods concepts) of professionals, particularly those engaged in research and development activities in HEIs across the country. Where necessary, a network of professional research group needs to be set up (spearheaded by the Tertiary Education Commission) to enable researchers to engage in on-going developments in the world of practical research. This will encourage the sharing of good practices amongst professionals, and also across institutions on developments and issues of concerns in the practical world of research sampling exercises – an area seemingly lacking in Sierra Leone's institutional settings. With the development of an integrated learning platform systems in HEIs across the country (see Jackson, 2016b), there is also a very high scope for confidential practice to be shared as user accounts can be kept secured, while at the same time, researchers are able to express concerns and issues pertaining to their practical engagement with research participants in the field.
- There needs to be a concerted effort by all HEIs and organisations engaged in research practices involving the collection of sampled data from human participants in developing (in the case with Sierra Leone) ethical code of conduct that can be strictly used by all concerned. The scope of a successful research, particularly where sensitive information is to be extracted from primary or even secondary sources need careful planning. Therefore, engagement with research communities will need to be carefully thought through, on how information is to be sought with ethical code of conduct, strictly adhered to at all time. In this vein, the establishment of an ethical code of practice for research undertakings must ensure that clauses for penalties are incorporated; this will limit cases of abuse to participants where researchers are constantly in the habit of deliberately battering the trust of participants in exposing sensitive information, even though an implied expression of keeping information confidential would have been expressed, in most cases by words and through signed documentation statement. A thorough review process should be set up (possibly annually or whichever is considered appropriate for the best in promoting good practice in the country) by a steering committee in HEIs and other organisations engaged in research to make sure cultural components are embedded into prescribed ethical documentations, particularly in the case with Sierra Leone, with its varied ethnic communities and traditions.

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