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COMPLEXITIES OF SAMPLING IN SPECIAL EDUCATION RESEARCH: A ZAMBIAN CONTEXTUAL ANALYSIS

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Abstract:
This paper discusses the most likely challenges researchers may face in sampling respondents for study in disability related special education research. It discusses the sampling experiences from a Zambian perspective of research in disability. Thus, the paper first explains the concept of sampling, its relevance in research and a brief narration of each of the different types of sampling. It then discusses the challenges of sampling in special education research in the Zambian context and provides suggestions based on the discussion given in the paper.

Keywords: challenges/complexities, disability, research, sampling, special education, Zambia

1. Introduction

Special education research is research that involves the study of problems related to disability and education. Special education is a form of education within the general education system that aims at providing education suitable to individual needs of learners with different disabilities. This type of education addresses the special needs of learners with disabilities. Learners with disabilities include those with physical, emotional, sensory, social and mental impairments, whose impairments lead to disability to an extent that their learning is affected as a result of the impairment. Depending on the degree, Impairment can cause disability, which limits one's functioning (Muzata, 2019). A restriction caused on functioning of any part of the body is called a disability. When impairment graduates into a disability, a learner is more likely to be restricted in learning. For instance, impairment in vision makes one fail to see, (the visual function of eye/s is restricted or disabled). As a result, the learner would fail to see objects. In a classroom situation, the learner's learning is restricted to the use of other senses such as touch,

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hearing and taste**.** It then implies that a classroom situation for such a learner needs to meet appropriate learning needs.

Research in special education may have many concerns but a very important concern that novice researchers ignore but later has implications on data is sampling. Cohen, Manion, and Morrison (2000) advise researchers to make decisions quite early in their research to avoid distractive variables such as expense; time and accessibility interfere with data collection and data quality. Sampling is the selection of research participants with the desirable data for a study. Sampling is the choice the researcher makes about who should participate in a study (Mukherji & Albon, 2015).Samples represent the population being studied and the selection of the right sample adds to reliability and validity of any study. Thus, a researcher can collect data that is intended for a study when a right sample is chosen, and the data collected may be relied on in making decisions when it reflects the population characteristics. The choice of a sample size is dependent on the research paradigm and research designs. Quantitative researchers aim to generalise results and therefore samples should be reasonably higher to warrant generalisation of results to the population studied. For instance, Cohen et al (2000) postulate that samples of about 30 respondents can allow for generalisation of results in correlational studies while a sample of 100 or more can be generalised in survey studies. In qualitative research, where the aim is not to generalise, samples are usually chosen purposefully with a view to collecting in-depth and describable data. Scholars have suggested different numbers such as 5-6 (Cohen et al, 2000), 5-15 participants for phenomenological design (Padilla-Díaz, 2015) and even one person as in the case of some case studies (Mukherji & Albon, 2015).

In some case studies, observations of changes in a child's behaviour require limited samples. One of the main reasons for sampling is that not everyone in a population would be accessible (Mukherji & Albon, 2015) and also that not everyone may have particular information sought by a researcher on a selected problem of study. Cohen et al. (2000) puts forward four points of judgement in sampling. They say when sampling, researchers should make judgement about the sample size, how representative the sample should be, how accessible and what strategy one would use to sample participants.

Sampling can be probability or non-probability depending on the research approach or paradigm a researcher chooses to use.

2. Probability sampling methods

Probability sampling is used in quantitative research where the researcher's choice of respondents is done objectively by use of different strategies that aim at eliminating or reducing bias and error in the data generated. Probability sampling involves different types such as simple random sampling, stratified sampling, systematic, and cluster sampling.

2.1 Simple random sampling

This is one of the types of probability sampling that uses randomisation. Respondents are selected randomly giving each one a chance to be selected to take part in a study. The population in this context must be heterogeneous and contain a finite number of elements that can be listed or mapped for representativeness of the population. In this technique, a sampling frame is used to determine who participates in the study (Cohen, et al, 2000). One example is where random numbers are assigned to a frame for respondents to pick. It's possible to write the word 'yes' and 'no' on pieces of papers, place them in a box and ask members of a population to pick one piece of paper. The ones that pick the paper labelled 'yes' would be the ones to participate in the study. For instance, in a population of 200 potential respondents, the researcher wants 100 as the target sample, 100 papers would be labelled 'yes' and another 100 'no'. Those who pick 'yes' would be eligible to participate in the study. The use of this strategy overcomes bias in selection of respondents. This method is also called the lottery sampling method.

2.2 Systematic sampling

This is a modified version of simple random sampling where a researcher decides to select every (th) number to participate in a study. For instance, from a population of 2000 people, only 200 are required. The researcher can apply this sampling to pick every 10^{th} member from a sampling frame which may be a list in a school register or from a naturally lined up population. Unlike simple random sampling, there is not an equal probability of every element been included in that elements are selected at a regular interval (Alvi, 2016).

2.3 Stratified sampling

This sampling type involves randomisation also. However, randomisation is applied to the population of interest to a researcher. The researcher divides the respondents according to the homogenous characteristics they possess and then applies simple random sampling. The idea is that there must representation from each of the groups that have similar characteristics. For instance, a population that contains equal numbers of males and females can be divided according to gender and then simple random sampling is applied on the two gender groups. At the end of the day, the researcher should have equal numbers of males and female participants. This helps in making comparisons in data based on gender. Other homogenous characteristics a researcher may consider are age, grade level, marital status and so forth.

2.4 Cluster sampling

When using this sampling technique, elements of a population should be spread over a wide geographical area. A cluster is a group of elements residing in one geographical region and sampling of clusters is called cluster sampling (Kothari, 2004). Homogeneity is required of the cluster involved in a study. For instance, a researcher can select schools within a certain geographical location and test all learners in the schools (Cohen, et al, 2000).

2.5 Stage sampling

This is an extension of cluster sampling but involves selecting samples from within the samples targeted (Cohen, et al 2000). For instance, schools can be selected randomly and in each of the schools, only certain classes (clusters) are randomly selected to participate in the study. This method is used when the selection process of respondents is made difficult because there are larger numbers in the population that the researcher would not have expected. Also called multistage sampling, this type of sampling also applies when the numbers are so high that even after the first selection; further sampling has to be done to reduce the number to the desired sample size for the study.

3. Non-probability sampling

Non-probability sampling does not involve randomisation in the selection of participants. Participants are selected with prior knowledge that they possess the characteristics and information required for a study. Non- probability sampling is applicable in qualitative research. Thus, in qualitative research, different non-probability sampling types have been forwarded. The major non-probability sampling types are purposive, convenience, snowball, and quota sampling.

3.1 Purposive sampling

Purposive sampling is also called judgmental sampling. This type of sampling targets participants known to possess the characteristics required for a particular study. Cohen et al. (2000) say participants are handpicked based on judgement of their typicality. In special education research involving participants with disability, this type of sampling maybe more appropriate when the sample is accessible. Different strategies can be used to locate the sample, either by snowball or by use of school registers.

3.2 Convenience sampling

This sampling is also called accidental or opportunity sampling (Cohen et al, 2000; Mukherji & Albon, 2015). Convenience sampling involves picking anyone available at a research site to take part in the study. Let's say, the researcher's target participants are marketers. When the researcher goes to the market to collect data, he or she will use whoever is found in the market selling because they have been found selling even when the most experienced marketers have absconded that day. Students, learners, prisoners, bar patrollers, and other captive like people are usually used as accidental respondents in many studies that involve this type of sampling.

3.3 Quota sampling

This type of sampling is equivalent to stratified sampling in quantitative research (Cohen et al, 2000). The researcher ensures equal or proportionate representation of subjects depending on which trait is considered the basis for the quota. For instance, if the basis for the quota is college year level and the researcher needs equal representation of 1st -

3rd year level. Other bases for quota are age, gender, education, race, religion and socio-economic status (Kasonde- Ngandu, 2013).

3.4 Snowball

This is another qualitative research sampling method. Snowball Sampling, also called chain sampling is most applicable in selecting small populations that are difficult to access (Taherdoost, 2016). When snowball is used, every participant helps the researcher by identifying another participant who is appropriate and willing to participate in the study (Mukherji & Albon, 2015). For instance, when the researcher knows the first participant, after interviewing the participant, the researcher asks where to find another participant with similar characteristics as the one just interviewed. Snowball sampling is difficult to use when the sample is larger (Etikan, 2017), hence making the technique appropriate for small qualitative sample.

4. Challenges of Sampling in Special Education Research

Deciding to conduct research in special education is likely to face numerous challenges especially where sampling of persons with disability is concerned. In this section, an examination of the challenges that restrict sampling of persons with disability has been made. Some of the challenges relate to the disability itself while others are more on the application of the different sampling techniques on people with disabilities.

4.1 Geographical factors

Zambia's population of persons with disabilities is estimated at 2.7 percent, only 256 690 persons have disabilities out of the over 13 million people (Ministry of Community Development, Mother and Child health, 2015). The National Disability Survey Report of 2015 puts prevalence of disabilities at 10.9% among adults of 18 years and above saying the majority are in urban areas while the prevalence for children between 2-17 years was at 4.4 % (Central Statistical Office & Ministry of Community Development and Social Services, 2018). The 2010 census of population and housing reports a 2 percent of Zambia's population as having disabilities higher at 2.4 percent in rural areas than 1.4 percent in urban areas. In a country with 10 provinces, the distribution of persons with disabilities according to Central Statistical Office – (CSO, 2012) is illustrated in the table below:

Table 1: Persons with disabilities in Zambia by percent

	Province	**Overall %/ province**	**Male**	**Female**
1	Western	2.9	3	2.7
2	Luapula	2.8	2.9	2.7
3	North Western	2.7	2.9	2.6
4	Northern	2.4	2.5	2.3
5	Muchinga	2.2	2.4	2.1
6	Eastern	2.1	2.2	1.9
7	Central	2.1	2.2	1.9

8	Southern	1.8	1.9	1.7
9	Copperbelt	1.6	1.7	1.5
10	Lusaka	1.3	1.4	1.2

Adapted from (CSO, 2012); 2010 census report.

Two percent is quite a minimal number spread across the country. This however does not suggest that disabilities should be more. Zambia is a sparsely populated country with 752,612 square kilometres with most of its population categorised as rural based (CSO, 2012). This has got implications for sampling especially for quantitative researchers who would want to use simple, systematic, stratified or cluster sampling methods to select respondents with disabilities. First, the researcher would find it difficult to find homogenous disabilities in one place to be able to apply stratified, systematic or cluster sampling techniques, even heterogeneous populations of persons with disabilities may be limited. Further, the researcher would face challenges to cover a wider area to meet the needed sample and that has cost implications on the researcher. Sampling is difficult to apply because not many respondents with similar disabilities can be found in one place. A restriction in probability sampling means that researchers should be compelled to conduct more of qualitative research than quantitative studies. This has implications on generalisation of results. This challenge denies effective and favourable policy formulation for persons with disabilities since numbers help more to provide guidance on specific needs for persons with disabilities. If a quantitative study has to be conducted, sampling has to cover a wider area, which is more costly on ordinary Zambian researchers and especially those conducting academic research. This entails that disability research can be construed as a costly activity requiring funding support by well-wishers. The geographical limitation can impact on the sample size; representativeness and accessibility of respondents, judgements that are critical in the selection of respondents for any study (Cohen et al., 2000). Even qualitative sampling techniques may also be restrictive in use based on geographical factor. For instance, the use of purposive sampling maybe restricted in terms of access where the targeted person with a disability is located faraway in far flung areas or when the persons with similar disability characteristics are found far apart from each other. First, they would be difficult to identify and second, it is costly to access them owing to long distances. This makes most research to be conducted in same places such as urban areas giving a very biased version of the experiences of persons with disability. Purposive studies conducted on same persons because of proximity lead to respondent exhaustion because they would be targeted by many researchers within short time intervals.

4.2 Disability factors

There are some disability factors that can affect sampling in special education research. These include the nature of the disability, degree of the disability, onset factor and overlap in the meaning of term ‘disability’, among others.

4.2.1 The nature factor

The nature of a disability is one of the factors that can affect sampling in disability research. There are different types of disabilities. These include but are not limited to persons with physical disabilities, intellectual challenges, visual impairments, hearing impairments, communication disorders, learning disabilities and those with a combination of different disabilities within an individual. Within some disabilities, there are also different types. For instance, physical disabilities include those with missing limb/s, those with motor dysfunctions, neurological related disorders such as microcephalus and hydrocephalus among others. Other impairments are difficult to categorise. For example, persons with autism have sometimes been placed under communication disorders and also under intellectual impairments. When one impairment is confused to mean the other, wrong sampling is likely to occur. For instance, within communication disorders are people who stammer, stutter, and those with difficulties in expressive language; who at times are said to be learning disabled. Learning disabilities include types such as dyslexia (difficulties in reading), dyscalculia (difficulties in mathematics and dysgraphia (difficulties in writing). There are other learning disabilities that are more specific such as hyperactivity, attention deficit and memory difficulties. These are only selected examples. There are so many other impairments in learning such as aphasia and dysphasia which relate more to learning disabilities yet they affect communication and language comprehension as well. Research in special education and specifically sampling requires sound knowledge of the different types of disabilities to avoid wrongful selection of respondents. With scarcity of specialised assessment facilities, tools and personnel to conduct diagnostic assessment for disabilities in Zambia, the likelihood that wrong samples are involved in many disability related research is high. For instance, research and subsequent sampling in intellectual disabilities can be very challenging because researchers may find it difficult to find correct samples due to lack of proper assessments for the nature of disability. Bwalya (2014) noted that one the limitations in his study of learners with intellectual challenges was that some pupils involved in his study were not formally assessed to determine whether they were mildly intellectually impaired to make the sample that was used. In Zambia, there are only three known assessment centres based in Lusaka at the University Teaching Hospital - UTH, Zambia Institute of Special Education- ZAMISE and at the University of Zambia - UNZA (Muya, 2017). If one is conducting research in intellectual disabilities, it would be difficult to find correct samples because such people may not have been formally assessed to determine the nature of disability they have. In the process, wrong samples may be picked only based on signs yet some persons with disabilities have a combination of impairments. Kachong'u and Muzata, (2020) noted this as a challenge in a study involving learners suspected to have learning disabilities in Kalabo district of Western province in Zambia. Similarly, a study by Kasongole & Muzata (2020) noted teachers' lack of knowledge of learning disabilities, a disparity that affected sampling of the learners within their classrooms. This affects the validity and reliability of data collected by researchers, where results may be questioned based on the nature of

disability sampled. Should wrong samples be used, service provision becomes misdirected. In any case, then, it affects ethical provisions in research.

Simui (2018) appeared to regret using Hermeneutic Phenomenology to study the lived experiences of students with visual impairments at Sim University in Zambia as the approach limited researcher creativity. According to Simui (2018), a longitudinal design was going to be the most appropriate but students studying special education at the University of Zambia could only report their experiences over a four year period of their study at the university. This limitation is caused by the limited number of students studying at university level mostly in education programmes such as special education and not in other programmes whose courses go up 5 and 7 years. In Simui's (2018) study, sampling was also affected by ethical emancipation that his study involved. This led the researcher not to engage all participants at all stages of the study. Where ethics become a critical consideration in studying humans, consent to participate in a study should be accorded in writing to the researcher and the participant's right to withdraw from a study at any time should be guaranteed. Participant withdrawal or denial of consent to participate in a study can seriously affect sampling in disability related special education research.

4.2.2 The degree factor

The other factor that may impact sampling is the degree of disability. The degree of disability entails the gravity or severeness of the disability. Within each disability type are different degrees of the impairment. As such, persons with disabilities should not be regarded as homogenous because their needs are totally different from one another. Degree of disability is characterised by whether one has a mild, moderate, severe or profound disability. For instance, a child with hearing impairment maybe said to have partial or residual hearing when their hearing is partially impaired to an extent that they would depend on hearing aids or sound amplifiers to be able to hear. However, there appears to be a generic use of the term 'hearing impairment' to mean deaf yet it is inclusive of other hearing losses. Likewise, intellectual disability is at different degrees. When disability is measured by its degree, it means that the experiences of those with different degrees of disability are different. Sampling should therefore follow a frame that selects respondents on the basis of different degrees. However, this may be challenging. With scarcity of assessment facilities, many children with disabilities have not gone through assessment. This challenge is more expected with children with disabilities from rural areas who have no access to professional assessment services that can determine the degree of disability they have. Sampling becomes problematic when a particular category of disability is generalised to portray certain behavioural qualities. It may also be problematic to find correct samples of respondents at the same degree of disability to provide similar experiences. Thus, the experiences of learners with partial loss of vision may be different with those who are blind.

The degree factor suggests that qualitative methods of sampling by especially extreme case purposive maybe appropriate in selecting samples on the basis that the researcher knows the exact degrees of impairment his or her participants have. Thus, the

need for authentic assessment records that place children with disabilities in their appropriate categories would help to provide purposive samples for qualitative study designs.

4.2.3 The onset factor

The onset of a disability also gives a number of limitations in deciding whether some categories of disabilities are eligible for inclusion in a particular study or not. Ordinarily, novice researchers in special education would take for instance hearing impairment as a homogenous group yet it is not. Hearing impairment is in types, degrees and also determined by the onset factor. On the onset factor, one is either born with some degree of hearing loss or acquires it as they develop. Some children are born completely deaf and have never before been exposed to sound and speech. They have pre-lingual deafness. Their experience with the environment may be different from those who were born with the ability to hear and learnt to use speech in their communication. Deafness acquired after learning speech is called post-lingual deafness. Children who may have learnt language/speech fully and later become deaf have had a different exposure to the environment from those that were born deaf. Sampling should consider the onset factor because the two examples give different experiences to research findings. A separation according to onset of the impairment would help provide research with the different experiences children with this disability have. Like has been explained as a result, application of cluster, and stratified sampling may prove to be problematic for such a category of respondents because numbers are most likely to be less for the application of the sampling strategies.

4.3.3 Communication factor

Some children with disabilities suffer from communication difficulties. Learners with hearing impairments have limitations in communication because they depend on sign language. Other children with communication related difficulties are children with autism and the intellectually challenged children. But on first sight, these are not the categories of children defined under communication disorders. The immediate understanding when we refer to top communication disorders is having difficulties in expressing oneself as in disorders such as aphasia, dysphasia, stammering, cluttering and stuttering. While all these are communication difficulties, they are independent disabilities that should not be regarded as homogenous. Even their communication difficulties vary. Communication difficulties may affect sampling because researchers have to choose based on the competencies, they have in communicating with the potential respondents they choose. In cases where researchers sample beforehand, they would usually get stuck while in the field because they find that the children or learners they wanted to interview do not talk or communicate in a language researchers do not understand. Purposive sampling of learners with autism does not help even especially when interviews have been planned to be used on them. Purposive sampling for such learners would work out well when observation is used to study their behaviour. Ethnography by observation and interaction using symbols may also be well applied in

studying learners with autism than when studying other learners equally with communication problems. But relying on ethnography has got its own limitations. One of the limitations is the length of time to stay in the field that research gurus say should not be less than 6 months. This is costly and too demanding. Even then, not all research can use ethnography. For instance, when we directly want to get the feelings of learners with autism and how they experience learning in an inclusive classroom, it's difficult to obtain such information since they cannot talk. This is further worsened by the degree of the disability.

4.3.4 Overlap in meaning of special education terms

Many terms used in special education can technically affect sampling. The key terms used in special education are impairment, disability, disorder and handicap (Muzata, 2019). In many cases the terms have been used interchangeably, apparently even in key local and international policy documents and laws (Hallahan & Kauffman, 2006). The definitions of the terms appear not to be universal. In some cases, the terms have been contextually applied. For instance, CSO (2012) defines physical disability as an abnormality relating to the loss of bodily limbs or any deformity in the bodily stature giving examples two examples as epileptics and lepers. Literature however places epilepsy under either neurological or health impairments (Mangal, 2012). Hallahan & Kauffman, (2006) define disability as an inability to do something or a diminished capacity to perform in a specific way. The World Health Organisation - WHO (2011) says a disability refers to difficulties encountered in any or all the areas of functioning. From the definition of CSO, (2012), it is clear that key terms in special education do not have universally agreed definition. A disability is not a loss of a body part or its deformity but a loss of function. Since this paper is solely on sampling, there is need to avoid a temptation to debate on the terms, but selected examples are provided. The term impairment refers to the structural loss or deformity in a body part. This in itself does not mean that one has a disability. A disability comes in when the gravity of the impairment makes one fail to perform some functions as a result and related to the lost body organ. This technical difference in the two terms can lure researchers to include everyone with a deformity in a sample and create a generalised conclusion about disability at the end of a study. Technically, having communication disorders such as stammering, stuttering and cluttering does entail that one has a disability. They can only be disabilities if the communication difficulties they have impact on their social functioning. However, the victims of such disorders may have special education needs resulting from such disorders. Their needs may include counselling to recuperate the loss of self-esteem resulting from negative attitudes in their communities. Unless they fail to function socially in society, they should not be labelled as disabled. The CSO 2010 census report provides the list of disabilities in the following table:

Table 2: Types of disability in Zambia by percent

	Type	**Percent**	**Author's Comment**
1	Physical disability	32.7	It's difficult to say which types were considered
3	Partially sighted	24.8	Persons with albinism also suffer from vision loss. it's not clear if they are part of this figure since a separate chapter has been accorded to them in the report.
4	Other disability	12.6	Not clear which categories this includes and why they were not categorised
5	Hard of hearing	9.2	Partially deaf but it is not clear whether they are at mild or moderate.
6	Mental illness	6.8	This is rather diagnostic, referring to a disease
7	Blind	4.6	Totally blind
8	Speech impairment	3.8	Has many categories
9	Mentally retarded	3.6	With change in terms, these are also intellectually change (MoGE, 2016)
10	Deaf/Dumb	2.5	This is a combination
11	Deaf	2.5	Cannot perceive sound with hearing aids or amplifications
12	Dumb	1.9	In many cases, the dumb are also deaf. How was this statistic arrived at?
13	Intellectual	1.1	It's not clear the difference with mentally retarded

(CSO, 2012)

From Table 2, a lot of uncertainties arise with regard to how the different types of disability are classified. First, it's not even clear whether all those with impairment but do not exhibit any disabilities are captured within the categories or not. For instance, from Table 2, it's not clear where persons with albinism, autism spectrum disorder, persons who are gifted, deaf/blind, and learning disabilities have been grouped. If they all grouped under the 'other' category, then this tells more of the challenges in sampling discussed in this paper. From the table, it is further observed that learners with intellectual disabilities have been separated from mentally retarded, yet this is the same category. Ndhlovu, Muzata & Mtonga, (2018) observed the interchangeable use of terms referring to persons with disabilities and how this has been changing over the years as from Zambia's independence in 1964. The same misunderstandings embedded in key documents affect researchers in their sampling when conducting research.

5. Conclusion

It appears sampling in special education research involving persons or children with disabilities maybe problematic due to various factors. Quantitative research sampling techniques appear more problematic because persons with disabilities in many cases are not a homogenous group of people that can be sampled to provide reliable generalisation of data. With the geographical space of persons with disabilities spread across the country, it is difficult to amass desired samples of respondents with disabilities for data that can be generalised. Accessibility is also problematic due to the fact that most persons

with disabilities reside in the rural areas. However, wide scale research can overcome such a challenge although it may still face the challenge with randomisation which is more characteristic in probabilistic research because even in the different districts, it's difficult to find representative samples of persons with certain or similar disabilities. Qualitative and non-probability sampling appear to favour special education research although it suffers from lack of generalizability, which in turn affects policy formulation that should favour persons with disabilities. The reliance of non-probability sampling techniques which have been known for bias may not provide the trust needed by readers and policy makers to implement the much needed support services for persons with disability, thereby always exposing persons with disability to the charity syndrome. Further, reliance on qualitative sampling can create respondent fatigue as same people are likely to be visited time and again to provide research data. From the outlook, a picture appears to emerge that special education research maybe more expensive to conduct than ordinary education research and requires the support of government funding and other local and international non-governmental organisations. It would be prudent to consider establishing a special research fund and the establishment of a research institute of special education research to support disability related research. An establishment of a decentralised data base of the different categories of disabilities in the 117 districts in Zambia would help provide easy access to sampling by researchers that want to target rural areas. The need to prioritise assessment for disabilities and providing evident records of the nature and degree of disabilities in disability data base in all provinces and districts would facilitate for easy and reliable research in the area of disability education.

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