Advantages And Disadvantages Of Research Methodologies: Qualitative Research

“Qualitative research is multi-method in focus, involving an interpretive and naturalistic approach to its subject matter” (Denzin & Lincoln 2000). The research aims at constructing empirically-oriented theories through an inductive approach. It illustrates multiple perspectives combining subjective and social aspects. Qualitative research acquires the data in-depth, without an external structure of responses from the research subjects. Thus, the data obtained is rich in detail, though in an unstructured format; which results in the complexity of analysis. The data collection significantly involves determining sample design as it’s the foundation. The data is obtained from certain qualitative methods –personal interview/ discussions, focus groups, case study research, ethnographic research, and qualitative observation. Meanwhile, the ethical dilemma is crucial in qualitative research due to the factors such as informed consent, confidentiality, justice to participant responses, and issues of harm while collecting data. Comment by Rony, Sidharth (2018): abstract

This study proffers a critical review of qualitative research, particularly in ‘case study’ and ‘focus groups. It analyses the advantages and disadvantages of the methodologies as utilized in the following papers. I intend to examine the papers, (Hengstler, et al., 2016) and (James, et al., 2013) Comment by HP: Add title of papers?

Focus Group

Historically, the technique was developed during World War II to examine the responses of the population towards radio programs (Stewart & Shamdasani 1990). The focus group is a small selected section of people, whose responses are studied for the purpose of research. It is led by a trained moderator who is equipped to garner information.

The groups include natural groups (existing in everyday lives), artificial group (selected for the research purpose), and real groups. Furthermore, it’s classified into homogenous and heterogeneous groups. The homogenous group is an analogous sample with the same background whereas heterogeneous contain dissimilar groups with different characteristics.

It generally consists of about six to eight participants (Guest et al. 2016), mediating discussions between the groups. It is imperative for the interviewer to possess the characteristics such as empathy, good listening, and flexibility. Such focus groups lead people into group discussions, in which the dynamics of the group will be of highlighted. The merit of such kind of group discussions allows opinions and thought patterns which are expressed in our every day lives unlike the interviews that are relatively formal and well-thought.

Advantages

- The group interviews are cost-effective yet produce data in large amount.
- The benefit of using “discussion stimulus” like relevant inventories, images, short film, PPTs, and lectures.

- The provision for audio recording provides an accurate summary. Technically, the selection of correct microphones enables high-quality record videos. The omnidirectional microphones are well-suited to record the focus groups.
- The dynamics of the group while developing arguments/ points as found in group discussion is an essential source of knowledge/ data collection.
- The heterogeneity of a group especially facilitates dynamics in the discussion with myriad perspectives at hand.
- The corrections by the group in terms of their viewpoints aid to polish the individual opinion and further validating statements.
- A discussion allows identifying the process of problem-solving.

Disadvantages

- The questions may be limited due to the inefficiency in taking notes.
- The problem of contradictory viewpoints during group discussion may cause confusion within the researcher, further adhering to conclude with subjective/ personal decisions.
- Severe heterogeneity may pave way for deficiency in ‘common’ discussions.
- The opinions/ views of a biased moderator may affect the discussions process and content of the group.
- The unfamiliarity of members with one another under the chosen discussion group may sometimes deteriorate the efficiency of the discussions. It also leads to domination of one member while others hold inhibitions to express themselves.
- Unlike the personal interviews, it is unfavorable to formulate a definite framework and pattern in the group discussions.
- It is also exasperating to elucidate the tasks and conducts for the moderators beyond single group.
- In a semi-structured interview, it is difficult to mediate between the course of the discussion and the moderator’s input.

Case study

Case study is a predominant research approach that emphasis on careful study of a unit/ section. It emerged in several disciplines as suitable for large studies in tracing the theories of individual perceptions and hegemonic discourses; and thereby achieving descriptive research goals. It majorly depended on time and even produced desired historical accounts. Qualitative researchers asserted case studies are identified in configuration context and path-dependent. The study utilizes a “case-centered” approach instead of “variable centered”, advocating in-depth strategies such as “thick description” and “process tracing” (ed. Given 2008). It also stresses on the internal complexity and nuances of a case as the researches may be influential to the real world.

Though the observation is highly focused on a single phenomenon/ unit, it doesn’t necessarily confine it’s observation towards a sole case observation. However, the case-study researchers are clearly aware of the observations’ limitations. The case studies usually exempt those research studies having temporal and spatial variations or limitations, allowing to research on a specific hostage population.

The case studies are categorized into naturalism, positivism, and constructivism types. The

naturalists attempt to produce pragmatic and elaborate knowledge whereas the positivist creates models or propositions enabling conjectures for the study. Constructivists focus at empirical evidence supplying to theoretical discourses. Thus, case studies principally offer a medium for theoretical constructions for many types of research.

Advantages

- The collected data was available for strong comparisons about the in-depth analysis, offering it a natural, empirical totality along the notion of theoretical consistency.
- The naturalist case study reveals the authentic nature of those phenomena or unit through a close analysis. Therefore, offering a descriptive narrative through an inductive approach.
- The positivist case study presents an objective reality, unveiling the correspondences between the individual case and the selected population. Example: - Cross case analysis, dividing multiple cases, temporal sequencing,
- The constructivist approach uses the interpretive technique, narrowing the disparities between the concrete observations and abstract concepts.
- The findings of those research generalizations could be later accessed by other researchers.
- The information collected can serve as questionnaires or schedules to later deduce conclusions.

Disadvantages

- The generalizations inferred may be false as the information collection do not follow any guidelines.
- It consumes time as it extends to longer time periods even including the history of the research topic and therefore, multiplying the expenditures.
- It inculcates various assumptions, holding a tendency to obtain unrealistic data.

Analysis of Focus Group: “The impact of automation on pharmacy staff experience of workplace stressors”

Rapid demands for health- care sectors have been flourishing due to an expanding aging population. However, the associated pressures led to the incapability of the staffs to deliver efficient services to the patients. The introduction of an automated dispensing system claimed to improve the nature of work among pharmacists. The impact of automation on the pharmacy staff experience was aimed in the paper by examining the effect of the installation of an automated dispensing system (ADS). Survey responses of pre-and post- automation were conducted on pharmacy staff in the National Health Service Hospital in Wales, UK. The paper identifies a quantitative relation and corroborates it with the qualitative focus group approach.

In order to observe the pre-and post- automation regarding staffs’ gender, mean age, and mean contracted hours of work, the quantitative method of questionnaire and surveys were utilized. Descriptive statistics was developed to analyze the respondent demographics using the occupational stressor questionnaire. This method mediated evidence that occupational stress to be less during post- automation in contrast to the pre-automation period.

The focus group methodology was undertaken to understand the opinions/ standpoints of the participants on the impact of automation. The study focused on four focus groups, 1. two groups allocated to check the technicians, 2. pharmacists, and 3. group based on post-automation staff experiences and occupational stressors. The homogeneity of the group having similar occupational backgrounds, i.e., pharmacists and accredited checking technicians (ACTs) aided to produce a large amount of information. The data were collected regarding the workload, dispensing errors, job autonomy, related stress and satisfaction, work-life con?ict, and discussion to enhance career growth. Such homogeneity benefitted upon concentrated attentiveness, which necessarily stimulated an effective group discussion. The discussions were audio-recorded and prepared into notes by an assistant moderator that later obliterated any kind of biased interpretations by the researcher. The transcribed audio-recording is an illustrative resource use throughout the research, beginning from data collection until its conclusion. However, audio recording is bound by ethical formalities. The ethics review board has made it mandatory that recordings are restricted of usage without informed consent from the participants. The recordings must be preserved safely. Further, no discussion can be recorded without the permission of respective participants and the researcher must hold an ethical obligation in case of denial of permission. Even it may affect the data quality, it must be necessarily avoided.

Furthermore, the information collected were further scrutinized under the ‘framework analysis’ since its approach focused on specific questions in a pre-designed sample within a stipulated time limit. Despite its merits, the anonymity made it impossible to carry comparisons between the responses of pre-and post- automation of the questionnaire data.

Importantly, ethics in research is significant as it’s fundamental in protecting the respondent/participants' information. The data collected through such techniques as sampling, focus groups, interviews must ensure voluntary informed consent and confidentiality. While transcription, the researchers maintained the anonymity of the participants as they shared public-sensitive and personal information. Though the primary interviewers were familiar of the respondents, its autonomy was compelled to censorship while transcribing. In the paper, the implementation of anonymity has provided authentic viewpoints as they could express without inhibitions or any form of threats. Simultaneously, what researchers perhaps fail to understand is that sometimes the respondents may want their information to be acknowledged and seek ownership of their contributions.

It is imperative for the qualitative research to receive an ethics certificate approved by the institutional review board for their research accessibility. The approval will specify the sites data collection, recruitment and benefits of participants, process of consent, and confidentiality. This study was approved by the North East Wales Research Ethics Committee and NHS Trust Research.

The major limitation of this methodology is its information being narrowed to a single focus group i.e. the experiences of pharmacy staff from a single hospital. The effect of ADS may be different to other hospital staff. In addition, the sample size was relatively meager as merely pharmacists from dispensaries were eligible to participate. The participation within the group was again reduced to less than 95%, which may also have caused the process and content to be slightly biased. Moreover, the reliability of both questionnaire focus group discussions may be questionable as the pharmacy staff remained reluctant to share their opinions on the impact of the ADS on occupational stressors.

Analysis of Case study: “Applied Artificial Intelligence and trust in the case of autonomous vehicles and medical assistance devices” by Monika Hengstler, Ellen Enkel, Selina Duelli

The emerging diverse applications such as autonomous vehicles and medical device assistance utilize the inherent artificial intelligence technology. The nine case studies were analyzed in the transportation and medical industries to illustrate trust as a main constituent of AI. The paper elaborates the symbiotic relations of trust towards technology, innovating firms, and its communications. The democratic development of the AI process is inferred by providing approaches to enhance trust. The paper has utilized case study as the main research approach and done a cross-case analysis of multiple case studies. The major strength of the case study is its flexibility to combine various such research techniques such as discussions and semi-structured interviews to further complement the data collection for the research.

To identify an appropriate case study, the researchers were required to select certain participants depending on its criteria. As the study essentially focuses on trust and is mainly examined through case studies, the theoretical sampling or purposive sampling allowed to particularly selection such AI industries within the given criteria, unlike random sampling. Further, the nine suitable case studies were obtained through semi-structured Interviews that offered a detailed overview of transportation and medical industry case studies. It provided a description of the applications and status of the market introduction. The case studies included semi/ fully autonomous cars, Future Trucks project, Deutsche Bahn semi/ fully autonomous trains, VAG Nurnberg underground train, IBM’s Watson (cognitive system), HP’s automated fraud detection, AiCure, and Fraunhofer IPA. This diversified case study presented comparability and enhanced the potential of sub-methods utilized in the paper.

The semi-structured interview is advantageous as it enabled the ‘subjective theory’ wherein the interviewees held a complex amount of knowledge about their industry. The prior knowledge about their own sector allowed them to be informal in their language. The informality as innate is an important key in the method as it established a rapport and security wherein the industries weren’t threatened of the companies’ confidentiality, policies, and time pressures. It led to companies declaring their contribution for the research work, having nine case studies. In fact, the semi-structured interview allowed to structure the interviews into three main categories using questionnaires that were theory-driven or hypotheses-oriented questions, but fundamentally open-ended. However, each of the interviews took about 30- 65 minutes from March to April, showing a high level of time consumption. But, the provision of recording interviews eliminated this drawback and aided inaccurate data collection.

Importantly, the cross-case analysis serves the purpose of mobilizing between individual case studies to produce case knowledge, compare/contrast case studies, and thereby led to conclude the discussions. The cross-case analysis was performed in the paper in order to examine the trust-building strategies in the innovating firms. In this particular study, the analysis combines with a heuristic case study wherein a theory development was instrumental. It infers the concepts such as performance, process, and purpose that formed the foundation of trust in automation. The insights gained from a cross-case analysis included the notions of operational safety, data security, and privacy protection. Those three determinants were identified as major elements influencing trust in technology. This led to construct validity and especially allowing it as concretely reliable data due to its multitude number of case study evidences. Furthermore,

the cross-case analysis revealed the significant disparity between the applied technology and society, especially influencing the trust in technology. Techniques such as cross-case examination and within-case examination along with literature review help ensure external validity. Despite the biased tendencies of this research approach, it is an important tool to researchers.

This research puts forth a variety of ethical challenges as this type of research is directly associated to social policies and real-time activities. Here, the ethical issues are prominent with the methodologies as much as it is with the subject matter. For instance, the AiCure application used in the health care sector uses much sensitive health information of patients logged to it, therefore it provides video tutorials to narrate their privacy-related information of the application. Similarly, the methods like semi-structured interviews require confidentiality to be maintained along with identifying whom to acknowledge.

My research

Industrial revolutions have always been significant steps in a society's economic evolution. Starting from transitioning of manufacturing processes, industrial revolutions have changed society's way of life, thinking, and economic transactions. Each of these revolutions changed the way of life from that of their previous era but was not without its risks. The fourth industrial revolution, which focuses on cyber-physical systems which greatly enhance Industrial process automation, is expected to increase the efficiency of the manufacturing sector. But with large-scale affordable automation, the need for human labor has reduced. This can lead to a loss of employment opportunities. In the United States, within a gap of 17 years from 2000, even though production has increased by 30 percent, the number of manufacturing jobs has reduced by 20 percent. This anomaly makes it necessary to find ways by which the risk of unemployment can be prevented. Comment by Rony, Sidharth (2018): Harvard referencing

The Ph.D. project centers upon understanding the risks involved in Industrial Automation and strategies of the industry to mitigate those risks involved. It can be dealt with two-fold: Pieces of training can be provided by the industries to their employees to substitute or complement automation in the field. By training as substitution, I mean, some industries can choose to develop the skill set of human capital to improve the efficacy but not opt for automation. By training as a compliment, it intends that a different industry can choose to empower the human capital to adapt to automation. I wish to lead a case study research on those two different set of industries from the employees' perspective. In the first case study, I shall analyze the employee satisfaction when they receive training as substitution and the second case study looks at understanding the same when they receive training as a compliment. I shall further conduct a cross-case analysis of the two different case studies to compare the two different contexts of training and its effectiveness. Comment by Rony, Sidharth (2018): need to rephrase

Conclusion

The study aimed to critically understand the advantages and disadvantages of research methodologies based on two vital research paradigms, in relation to automation. The elaboration of case study and focus group enables to inform research designs, enhancing its visibility under the qualitative research study. It also discusses in length, of several methods and techniques of qualitative data collection, analysis, and its generation.

Although ethical aspects aren’t a methodology, it becomes an important element in research. The notion of ethics combines aspects of ethical inquiries, its approaches, ethical codes, and committees. Also, it was found how an ethical framework ensures equality among the participants and the researchers.

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