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Research paper



Review of Gathering Data Instruments and Methods in Children Research

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Abstract

Introduction: It is observed that people of different age groups might have different response to the same situation. Often in researches, involving school children data is collected from a guardian rather than from children. Traditional data collection methods like focus group, questionnaires, interviews and observations sometimes have been found to be ineffective with children and hence researchers are compelled to collect data from alternative sources. Conversely, studies have reported that children too have strong opinions and it could be different from their guardian's. Hence, the purpose of this research is to critically review previous literature regarding focus group method comparing with other methods that used in conducting research with children with particular emphasis on children studies. Methodology: Current and archival data from research papers have been analysed in this study. Findings: The study reports that the practical considerations and the time it takes to conduct focus group research may discourage many from attempting to collect data using this method. Contribution: This study recommends that adequate effort should be put in place to design suitable instruments to conduct research with children that is devoid of most of the shortcoming found in earlier studies.

Keywords: *Focus group interview; Questionnaire; Interview; Observation; data collection methods; Children; Data Collection*

1. Introduction

This paper discusses mainly the broad essentials of the instruments and methods for conducting research in several studies, for example, health investigation. Studies have shown that different populations can have different response to the same stimuli. People of different age groups, different genders and different countries may react differently to the same situation (1). Hence, the same study conducted on different demographics can have varying results. Of particular interest are studies that involve children. Researchers often avoid direct involvement of children in their studies. Usually data is collected from children's guardians. However, studies have shown that children's opinion can be different form their parents. This leads us to ponder the different techniques that could be employed to gather data directly from children. Commonly used methods like interviews, questionnaires etc. have found to be difficult to use on children and hence suitable methods are required (2). Therefore, in this study, we have critically analysed methods and techniques used in children studies.

2. Review of Extant Literature

2.1. The Need for Research Methodology

Ryan, Gandha (3) stated that the approach adopted by researchers in gathering raw information and important data for making policy and academic decisions is referred to as research methodology. Some of the popular research methodology techniques are questionnaire, observation, focus group interviews and, participant interviews (1, 4-8). In addition to the aforementioned methods, researchers also use current and archival data. All of these methods of gathering data are essential because they make available varying types of data that cannot be derived from a single method only. These different methods can be combined if required in order to get the best possible results.

2.2. Focus Group Interview

The term 'focus group interview' was defined by Morgan (9) as a method of analysis that gathers relevant data reports in the form of a dialogue. A prerequisite for this approach is its open purpose that the interviewer makes clear for the interviewee. Billson (10) argues that the method is suitable for both the 'exploratory' and 'preliminary' phases of the research. According to Race, Hotch (11), it can be applied simultaneously with the study when a specific target course or procedure is aimed at, or after the end stage of the research in order to assess its success or ensure further points for consideration. Focus group interviews go well on their own, as independent research method, and combined with other approaches, some of them being validity checking and triangulation (12).

The approach was very successfully embraced by Kennedy, Kools (6) with children of age six to twelve. It showed how important the focus group technique is and how much further its methodology can be exploited, especially where developmental principles assimilation is concerned. (6) argued that children's intuitiveness, acumen, and imagination could surface through this approach much more than during conventional paediatric analysis. They also pointed out how focus group interviews can be beneficial for data gathering in the field of medical science studies. In addition, it is widely used in investigating children's experiences in the adoption and implementation of information technology usage in

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schools. Kennedy, Kools (6) used focus group interviews to capture the opinion, perception, and thought of school children on the usage of personal computer in their studies. The authors chose this specific method because they needed an efficient process to come up with a research strategy, which was broad in scope, two-sided and developmentally adequate to fulfil and evaluate it. They found that focus groups presented a powerful way to collect strong, accurate information when dealing with children.

According to Bagnoli and Clark (13), children participating in focus group gave clear indication of their constructive attitude towards an approach, which is otherwise lengthier than the average research. The analysis in question spans over 10 years and is a qualitative long-term program taking a very close look at the children's everyday life and how they communicate, mature, and undergo personality changes. It gives the young people who are a part of the project the choice to select one of several methods to be analysed through. A significant portion of the research was conducted through children recruited by holding focus group seminars with 13-year-olds from all parts of West Yorkshire. A youth club and six schools from both city and country parts provided the participants in 22 focus groups. After the interviews were conducted, it became clear that the children were likely to participate in a long-term research program voluntarily (13). The 13-year-olds realised the benefit their participation could have on social analysis and improvement, as well as personal advantages like introvert study and better insight on the people they were communicating with on daily basis. It was also concluded that the majority of the young people availed of the opportunity for method selection rather than having someone chose for them. They also communicated multiple ideas for better information exchange with the research workers.

Ryan, Gandha (3) highlighted several reasons why the focus groups approach in data collection is extremely useful. One of them is that it proves to be quite successful in gathering data on the members' background and select the most suitable questions for their survey. To that end, it is crucial to find out what defines the world of the participants, what factors have the most authority in their lives, and how their mind is inclined to draw conclusions. However, for children under investigation, the interview approach exposed some limitations, particularly with respect to the number of participants in the sample. Most of the researchers who used this method reported a maximum of seven children in a group. They also found out that preparation and considerable aptitude is required for focus groups discussions. The method was deemed not suitable for conduction of interviews on sensitive issues. Nonetheless, from the standpoint of the authors, focus group interview is not an appropriate method for interviewing school children for the purpose of data collection. The present study, for example, shows how in some cases this research method might be cost-inefficient and require more expenses and time due to the longer while it takes to evaluate the responses and communication of the participants. One such occasion would be applying focus group interviews on subjective, conceptual topics like stakeholder rates assessed by individuals from different race.

Among the scientists who doubted the efficiency of conducting interviews with adolescents were Janssen and LeBlanc (14) who found some functional and procedural flaws of such a research due to the disintegrated nature of their responses. For example, it is obvious that it is more cost-savvy to conduct interviews with children at school than it is their homes. Nonetheless, according to (2, 14, 15), this survey type is very similar to an actual interview because of the main leads it should be guided by, namely to provide the participants with as clear instructions as possible from the beginning, to conduct the interview in domestic conditions when this is achievable, to allow the child to answer "I don't know" when this is the case instead of providing a random answer, and to refrain from posing misleading questions.

2.3. Observation Method

Emond (16) opined that ethnography is a research technique that was originally developed by anthropologists as a way to understand and explain other cultures. This approach became very commonplace in the research community as time went by. It uses several tools like participant questioning and corresponding examination as part of its methodology. Its most prominent feature is group observation in everyday surroundings. According to Edmond (2005), ethnography successfully draws adequate conclusions regarding the lifestyle and way of thinking of the people subjected to the research, as well as their interrelation with their friends, family, and community.

Schoolroom ethnography, however, should be approached while being conscious of its limitations. The term was coined by scientists as a result of classroom activities developing towards the end of the 1960s and the beginning of the 1970s, which included teachings of conventional daily activities and descriptive, chronological educational disciplines. This is precisely where the term ambiguity stems from, as these same activities are characteristics of not only ethnography but some qualitative research methods as well. What differentiates classroom investigation from the traditional one lies in the fact that during classroom observation, the analysts participate in the process in the role of children, not inquirers. Those who go to unfamiliar study sites often conduct general classic observation (17). The study by Erickson (17) highlighted on the current classroom study, especially with regards to education in literacy, math, and science, which describe them as ethnographic.

Lethbridge, Sim (18) stress on the fact that in order for the gathered information to be adequate, the research process along with its query stage must be cautiously drawn out beforehand. The writers believed that the analysts should be very careful on the influence they might have on the research subjects during the process and that negligence on their end or puzzling wording of the questionnaire might result in untruthful responses of no actual value to the research. They also posit that the precautions are necessary because the method is costly and may alter subject behaviour instead of properly validating it; hence, the analysts themselves need to be well prepared. This view is also shared by Fagarasanu and Kumar (19), whose stand on the matter is that all instruments used in the gathering of information should be tested beforehand, so that their accuracy and efficiency are ensured. The reason behind this is that the researchers themselves might expose partial behaviour during the process, thus altering the session results. Therefore, careful planning of the research process is needed, as well as early hypotheses drawing and testing. Belzile and Öberg (20) highlighted the important features of observational data collection method that cannot be achieved through other forms of research methodology. According to them, the information gathered in the observation processes is as adequate as possible due to the characteristic surroundings of the research subjects. In addition to that, the data, which is collected during the operation, is not only reliable but thorough as well, and allows for further actions.

2.4. Questionnaire

There is no better source on children's behaviour, thoughts, and everyday activities than young people themselves Scott (2). They are found to be very responsive to questionnaires and provide all information they are asked of, especially when it comes to factors in their everyday life, which are important to them. The question types and questions themselves are especially efficient when the children are regarded not as immature subjects but as fully-fledged individuals. Scott also advocated that methods: interviews and questionnaires need to be adopted so that children are able to understand the meaning of the questions asked.

A survey called 'The Fun Toolkit' was introduced by Elias, Phillips (21), aiming to question young people about how they see

the role of technology in their lives. It embraces three qualitative information-gathering tools:

a) Smileyometer, which uses smiley faces meant for children of age 8 and 9 to properly indicate their response;
b) Fun Sorter, which is suitable for even smaller children, where separately presented concepts should be applied;
c) A table called Again - Again that can be applied to questionnaires for the youngest participants, especially when 'passing opinions' is required.

The Fun Toolkit extracts trustworthy opinions and is, at the same time, a prompt, entertaining methodology. Although it is originally devised for small children, it is equally efficient when collecting information from teenagers. According to Fujitani, Kitazawa (22), this type of questionnaire can be applied for other purposes besides just collecting children's perspective on various subject matters.

Lloyd and Devine (23) emphasised that despite a large number of ad hoc investigations conducted on the attitudes of primary school children for Internet to gather the information there is still a lack of regular and accurate survey in this field (who are between 4 and 11 years old). The authors go further to describe the background of the survey to be adopted and suitable research methods to give a voice to children's attitudes. The sample population targeted in the study were school children between the ages of 10-11 years. The study also investigated the adoption of the Internet in the survey of school children. The investigation carried out by the researchers was titled "Kids' Life and Times", it emphasized on school children in P7 grade in Northern Ireland. Lloyd and Devine (23) proposed that the questionnaire design should be visually attractive, interactive and full of fun for children. In view of this, cartoon characters, which are familiar to children of that age group, was used. The authors reported that about 50% of the participants said the survey was interesting; 41% thought the survey was very important to allow children to explain their opinion and 38% fun to complete. Moreover, 2% expressed that it was a waste of time and 5% was boring. This finding shows that survey opinion are often based on individual perspectives to issues in question, hence, participants are bound to have varying views to the subject of investigation.

The application of E-Books in the learning process was carefully analysed by Al-lawati, Al-Jumeily (24) after such E-Books were handed out to public school children of primary five and six by the Terengganu state government. Their observations were based on a research conducted in five Kemaman area schools in Terengganu, Malaysia. The district itself is home to no less than 30 primary teaching establishments. The subject matter of the survey was the usage of E-Books and the attitude with which they are met and exploited. A total of 101 questionnaires amounted to 100% feedback from the children. The reason behind these fantastic results is the proper organisation and effective information gathering procedure. The process was equally conducted in all five establishments with the surveys first being distributed and then each question read aloud by the analysts in which way they made sure that all children were figuratively and literally on the same page at all times.

2.5. Mixed Methods

According to Anthamatten, Brink (15), for the research to be effective and provide reliable results, the application of various information gathering techniques is necessary. The more comprehensive the questionnaire, observation, and informational analysis of the focus groups are the more objective and accurate the final result will be. In view of this, researchers have suggested some methodological aspects of gathering data from school children conducted at home using quantitative approach to data collection (25-30). Subsequently, the study addressed the advantages and disadvantages of these methods including interviews, observation, small group discussion and structured activities. The research concluded that interviews and self-complete instruments are more suitable for older children. Observation and small group discussion is suitable for children five to six year olds

Bakar and Cagiltay (31) in their study-collected data through observations and interview with children aged 10 – 14 years to evaluate the websites adopted in teaching and learning for school children in primary level education. The twelve children (5 female, 7 male) sampled for their study were chosen because of their familiarity with computers and basic skills of how to use computers. At the starting point, Bakar and Cagiltay (31) used an observation method to observe the participants while navigating the websites. Secondly, the participants were asked to carry out 10 tasks from websites with observation method at the same time. After the session, interviews were conducted with each participant. The Interview questions were designed to be easy such that participants were asked to indicate their likes, dislikes, and suggestions about the web pages' design. Qualitative approach to data collection was used in this aspect of the study with the aim of understanding the school pupil's experience while surfing the net for academic purposes.

In order to study the effect of Interactive Whiteboard (IWB) adoption for teaching, learning, teacher/pupils motivation and behaviour and attendance of pupils, Moss, Jewitt (32) used a mix of qualitative and quantitative methods such as case studies, survey of departmental IWB availability and usage and data analysis of pupil performance data. The data collected in the case study interview involved observation for a period of two weeks the delivery of curriculum in the core subject equipped with an IWB; video recording of two lessons; IWB text collection; two days of structured observation of curriculum delivery in other subjects. Furthermore, interviews with the head of department; observation and interviews of teachers of year 9 classes; focus group interviews with pupils from year 9 classes; a pupil survey; an extended teacher survey administrated to each teacher whose class had been observed was conducted. The respondents were relatively balanced among the teachers as new to the profession, experienced and very experienced. Finally, Moss, Jewitt (32) found that the survey and interview reported responses of teachers and pupils as useful and the aspects of technology that improve the teacher's role in the classroom were highlighted.

Downey, Hayes (33) conducted a more contemporary research on Irish children, aiming to show to what extent technology influences their games and everyday activities. Another target evaluation was the impact of technology on children's lives. The focus groups were divided according to age into 4-to-8-year-old and 8-to-12-year-old ones. The play patterns of both groups were observed and analysed in terms of children technology dependency. In order to give the study a broader perspective, the analysts questioned parents and teachers on the topic as well. Ryan, Gandha (3) defined the research as one applying both qualitative and quantitative approaches. The information of how technology reaches and influences children was gathered through a questionnaire-type inquiry. A total of 292 pupils aged 4–12 from various regions in Ireland comprised the focus groups the survey was designed for. Ryan et al. (2013) describes the final stage of the factual research as involving the focus group of older children and questioning them about TV patterns, favourite shows, and family policies regarding TV, computer, and console games. After evaluating the collected data, analysts came to the conclusion that, when given the opportunity, children prefer to devise their own entertainment rather than relying on technology.

Another survey was devised by Alsugair, Hopkins (34) involving children from Key Stage 3. The survey aimed at examining the learning sources of 74 children as the beginning of a larger study on how mobile device ownership affects the pupils. It was thus important to establish how the children receive desired information. A total of 74 Key Stage 3 pupils participated in the questionnaire. Two sessions involving focus groups of 34 children of matching age were also held. The results determined that the most common way for the children to establish new connections and friendships was through technology use, and more specifically e-

mail, Facebook, and SMS. On the other hand, it was found that whenever support in academic matters was needed, the children relied almost exclusively on their family and friends. It was thus concluded that the focus group method was the most effective one for this kind of evaluation. The researchers anticipated that the young people would seek their family and friends when in need of academic advice and help but did not expect that the family portion would tip the scale in this regard. This point is precisely where the survey results differ from the outcome of the first research, which used questionnaires to gather information. A possible explanation for this is that when children are placed in focus groups, they tend to be affected by other pupils' opinions, hence claiming that they would rather ask their family for help instead of their schoolmates and friends. Table 1 list the previous studies that dwell on instruments and methods for evaluating school children's perception of the adoption of technology in learning.

Table 1: *Previous studies that dwell on instruments and methods*

Author	Domain	Context / Sample	Method / Instrument	Gap
(1)	Conducting focus groups with children to examine their experiences of living with asthma.	Children aged 7 - 11 years	Focus Groups	The study have faced a problem in large numbers for each group.
(35)	Primary school students' perceptions of IWBs.	Pupils aged 10-11 years	Focus groups	Focus groups is worth nothing because the sample is small for each group has six students. The control of a concern that focus groups might by one or two respondents, so if not effectively moderated resulting in more singular data
(36)	It describes briefly the characteristics of focus groups before focusing exclusively on the methodological and practical concerns when conducting focus groups with children and young people	Children and young people	Focus groups	This method suffers from challenges. It is recommended careful evaluation to ensure the taking part in research positively experience for children and youngsters. Moreover, preparation, considerable and aptitude are very critical and required for focus groups.
(16)	Researching Children's Experience: Approaches and Methods	Children	Observation method	The observational role where the researcher sits outside the activity and does not interact with the subjects under study.
(37)	The paper then investigates the use of survey methods in Child Computer Interaction and investigates the Fun Toolkit.	Children aged 7 – 13 years old	Survey	The questions of the questionnaire were in forms of questions and include very simple Yes/No methods like 'Did you like it', the use of more structured question and answer methods, and the use of toolkits.
(23)	Using the Internet to Give Children a Voice: An Online Survey of 10- and 11-Year-Old Children in Northern Ireland	School children aged 10 – 11 years old	Survey	There is still a lack of a regular and accurate survey of the attitudes of primary school children (who are between 4 and 11 years old). There are seventy-seven questions in the questionnaire, which designed for 20-25 minutes to complete. This makes the children-feeling boor in answering the questionnaire.
(38)	Empowering personalized learning with an interactive e-book learning system for elementary school students	Elementary School	Survey	The questionnaire consisting of 48 questions was designed to access the students' perceptions of the usability of the system, which were very long, and too much for school children to answers. Consuming time is the main drawback.

3. Methodology

Out of 110 articles, thirty two articles were selected using search engines such as ScienceDirect, IEEE Xplore, Springer, Elsevier, Taylor & Francis Online, Wiley and Sage using the keywords TAM and technology acceptation model for dates from 1997 to 2013.

These 32 articles were published in the journals listed in Table 1, which shows the journals for essentials of the methods and instruments for conducting research in the area of Information Systems (IS), and Information Technology (IT) based learning among school children research. These 32 articles were published in the journals listed in Table 2.

Table 2: Journals for Research Methods for Children

SNO	Name of journal	Publisher
1	Qualitative Research Journal	Emerald Insight
2	Survey measurement and process quality	Wiley
3	Educational Technology Research and Development Journal	Springer
4	American Journal of Evaluation	Sage
5	Mentoring & Tutoring: Partnership in Learning	Taylor & Francis Online
6	The Journal of Nursing Research (JNR)	The Taiwan Nurses Association
7	Journal of Pediatric Psychology	OXFORD University Press
8	Journal of Youth Studies	Taylor & Francis
9	International Journal of Behavioral Nutrition and Physical Activity	BioMed Central
10	Researching children's experience: Approaches and methods	Sage
11	International Encyclopedia of Education	ScienceDirect
12	Empirical software engineering	Springer
13	International journal of industrial ergonomics	Elsevier
14	Currents in Pharmacy Teaching and Learning	Elsevier
15	Society for Information Technology & Teacher Education International Conference 2013	SITE
16	Field Methods	Sage
17	International Conference on Developments in eSystems Engineering	IEEE
18	Oxford Review of Education	Taylor & Francis
19	Early Child Development and Care	Taylor & Francis
20	Journal of Computer Assisted Learning (JCAL)	Wiley

4. Discussion and Conclusion

This study reviewed mainly the broad essentials of the methods and instruments for conducting research with children in research domain. Researching children's studies remains at an exploratory phase. The review of the literature comprises of definition of main terms and the relationships among the broad elements as found in previous. Some of the findings show limitation in the use of particular research instruments and methods in surveying children. The study reports that all of the methods of gathering data are essential because they make available varying types of data. The data gathering approaches provide specific kinds of data that could not be derived with each method alone. The core advantage focus groups have over other types of research methods like interviews, questionnaires, and observation is that they result in accurate first-hand information about the participants' lifestyle, relationships with friends and family, beliefs, etc. Although these objectives are not in general related to the participants' social interactions, they are almost surely to be exposed during the communication involved in the focus group processes. In contrast to the interview style which stresses on the views, beliefs, and attitudes of a single person, focus groups entail fast, genuine results from multiple participants in different circumstances in the same time. A downside of the focus groups in this regard is that, unlike the interview style, they may sometimes be harder to control, especially when there is a want-to-be leader in the group. However, what these groups lack in control security, they make up for in time efficiency, as they take significantly less time than the methods of observation where the wait for something important to take place may take a while. Although this makes control groups an organised instead of a natural occurrence, there are situations when they can be extremely effective – for example, when the participants' leadership skills and desires lie on different parallels. Such cases involve control groups comprising professionals or employees standing higher in the hierarchy who are entitled to make informed decisions. Other examples given by Morgan (39) include the situations where opinion share within a group is sought, or when the subject of the study is daily language use or cultural issues. Despite, however, that the focus group methodology is entertaining, cost and time-savvy, and suitable for both children and adults, it does bear some limitations. Gibson (36) stresses on the importance of careful planning because in the cases when the participants are children, they need to be left with a positive impression. Also, sometimes the information gathered from this kind of research can be so much that it requires strenuous efforts to summarise and analyse. Still, it an easy to conduct process, appealing to all researchers. Practice, in the words of Kitzinger (40), is the best way to deem the focus group method suitable or not.

The choice of research approach is always easier when we have several options to choose from. However, this study finds that the focus group interview is unsuitable to interview children of certain age group. This is due to the established observation that some kids are prone to presenting untruthful view points because they are influenced by the opinions of their friends, i.e. they experience the 'bandwagon' efect. In this view, there is this thinking that the focus group have certain disadvantage of exposing other participants to responses provided by their peers hence, may hinder them from thinking deeper on their own to provide answers to questions asked. The main benefits of this method lie in the valuable communication and environment dynamics. A factor which may intimidate some of the analysts is the time they need to invest in the research but the end result of the focus group approach is almost always very satisfactory. Another advantage is that the participants are usually willing to cooperate and the information collection turns out to be an easy endeavor, which may be an exciting way for social scientists to add more data to their existing research or research prospects.

Observation methods are proven to be inappropriate in several cases, mostly because they are costly, demand highly trained professionals, and may involve bias. Among its known benefits, however, is the hypothesis derivation which is applicable in other methods as well. This research finds that there is still a lack of a regular and accurate survey of the attitudes of primary school children between the ages of four and eleven years old. This study recommends that adequate effort should be put in place to design properly suitable instruments to conduct research with school children that is devoid of most of the shortcoming found in earlier studies. There is also need to consider in future research the technology acceptance models when designing instruments for conducting research for school children. Although the focus group method to research authors perceived methodology as a common method for qualitative study due to the fact that it involve conducting interactive discussions with adults. It may not be properly suited for understanding the mind-set of children on certain area of investigation. Based on this scenario, authors need to pay more attention to the conducting of focus group interactions with children and young people as an important area of interests of the participants.

One of the objectives of this study is to show several elements of the observation methodology which are indispensable in the field of research. The observational approach involves information gathering in natural settings – a prerequisite for extremely useful type of information unlikely to be derived from other analytical approaches. What social scientist should also bear in mind, though, is that they need to be absolutely engrossed in the process and record every little detail. The observation method may not be economical or time-savvy but is essential for many studies due to its nature, capacity to extract valuable information and compatibility with other approaches.

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