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Forensic Intelligence, Databases, and the Challenges of Forensic Investigations in the Nigeria Police Force: An Empirical Study

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Abstract. Forensic intelligence is the use of crime scene evidence such as DNA, fingerprint, and trace evidence to cross-reference within an indexed dataset and link together crime scenes, materials, and suspects. It is thus not practicable without databases. Certain factors could however hinder the reliability of the databases to serve the purpose of forensic intelligence. This study explored factors that could challenge databases and hence affect the realization of the benefits of forensic intelligence. Using the survey method, and with police investigators as respondents, seven challenges were determined, and hypotheses were tested to find out if the challenges have a significant association among themselves. Of the variables (that is, the seven challenges), three (corruption, lack of interagency cooperation, and undue interference in investigations) indicate statistically significant association with unreliable databases. It is therefore recommended that authorities should address the challenges to ensure reliable databases and effective forensic intelligence for the police to utilize.

Keywords: Forensic Intelligence, Databases, Nigeria Police Force, Forensic investigations, Policing challenge

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1. Introduction

From both linguistic and operational dimensions, intelligence is connected to knowledge and information (Brown, 2007). In policing circle, intelligence is a key to action based on raw information about crime and criminal activities, which was hitherto unknown and can be used to improve the efforts of a police investigation and crime management (Europol, 2003). Intelligence is, therefore, central to performing effective police core functions of crime prevention and control. The stronger the intelligence system in a police organization, the more efficient the organization is in terms of useful and usable data to carry out its activities (Ratcliffe, 2005). Accordingly, intelligence is built and maintained through continued accumulation and analysis of information contained in the databases.

The use of intelligence to identify crime patterns and even predict where criminal activity would likely. happen has been in practice for decades (James, 2013), albeit, in a rudimentary form. In some police systems, intelligence is so crucial in police investigative activities that the unit responsible for managing intelligence, though independent, works closely and assists the investigation department. This is the practice in Nigeria. Indeed, the popular idea of intelligence-led policing is largely rested on intelligence (Ratcliffe, 2016). Also, the emerging trend of world-class policing which is premised on the effect of globalization on social interactions can hardly be done without an effective intelligence system.

With the developments in forensic science and its application in various aspects of police work coupled with the advances in modern technology, the essential nature of intelligence in ensuring a more effective and speedy police service is becoming clear (Orebaugh, 2006). Thus, forensic data, usually stored in automated computerized databases, are now instrumental in planning police operations,

investigations and management of criminal activities (Mylonas, Meletiadis, Tsoumas, Mitrou, and Gritzalis, 2012). Some of the data related to forensic intelligence include footwear and tyre marks databases, DNA profiles (e.g., NCIDD in Australia and NFDD in South Africa), fingerprints (IDENT1 in the UK and IAFIS in the USA), and other biometric information of individuals.

Looking at what is embedded in forensic data, databases remain the only means through which forensic intelligence could be established and maintained to function and serve its purpose (Ribaux, Walsh, and Margot, 2006). By this argument, reliable databases are then the prerequisite for effective forensic intelligence. Consequently, police organizations should make efforts in establishing and maintaining databases for their forensic intelligence to function effectively.

However, the various challenges confronting police organizations, particularly in Nigeria, might have rendered the databases unreliable in producing the outcome needed to sustain the intelligence system. These challenges are seen to be generic in terms of their impact on police activities as portrayed by previous studies (see, for example, Bakare and Aderinola, 2019; Nte, 2011). Few attempts have thus been made to explore those that are specific to reliable databases vis-à-vis the utilization of forensic science, added to the fact that some assumptions regarding the challenges were not empirically established. The forensic aspect of police work needs to be treated and explored individually considering the sophistication of criminal activities and advances being made in criminal investigations. Indeed, challenges are not necessarily generic, they could differ from one facet of police work to another.

The expectation of the current study, therefore, is that its findings could be utilized by the government, police authority, and other stakeholders in having and maintaining reliable databases and functional forensic intelligence for use by the NP and other law enforcement agencies in Nigeria. Understanding the challenges could also assist in making appropriate efforts towards addressing them and thus improving the general functions of the police.

2. Forensic Intelligence and Databases

Forensic intelligence (Ribaux and Margot, 1999) refers to the use of crime scene evidence such as DNA, fingerprint, and trace evidence to cross-reference within an indexed dataset and link together crime scenes, materials, and suspects. According to Ribaux et al. (2003:172), it "is the accurate, timely and useful product of logically processing (analysis of) forensic case data (information) for investigation and/or intelligence purposes". The concept of forensic intelligence is gaining popularity within policing and security circles due to the increasing volume of data being generated especially through forensic technologies, and the fact that many police organizations can afford it. In forensic intelligence, the dataset is usually subjected to rigorous analyses, both quantitative and qualitative, to identify meaningful patterns of criminal activities (Legrand and Vogel, 2012).

Forensic intelligence permits a timely exchange of data and breaks the wall that creates relational difficulties among different forensic disciplines (Rennison, 2015). Forensic intelligence analysis is important as it directs several approaches to policing like intelligence-led operations, preventative policing, and resource allocation (Legrand and Vogel, 2012). In other words, forensic intelligence plays an important role in proactive policing. For example, from a collection of crime scene evidence, the place where an offender lives, when and where he or she may next commit a crime can be hypothesized, as a result of which police surveillance and or targeted patrol can be organized (Marclay, Mangin, Margot

and Saugy, 2013; Ribaux et al., 2003). Forensic intelligence is thus a concept and practice through which the aims of both reactive and proactive policing can be achieved.

Strong arguments (see: Rennison, 2015; Walsh et al., 2011; Ribaux et al., 2010) have been put forward for the value of forensic intelligence in policing. It is perceived that despite being expensive compared to traditional means, the benefits in terms of accuracy of identification, timeliness, objectivity, and methodological rigor are numerous. It is important to note, however, that the usefulness of forensic intelligence is realized when there is an integration of the different but relevant sources of data across organizations (Ribaux et al., 2010), which incidentally is one of the challenges faced by forensic intelligence. Another challenge and critique of the concept is its ambiguity (Legrand and Vogel, 2012). According to Ribaux et al. (2005), the concept remains 'fuzzy', making it difficult to be integrated into core police practice and training.

Moreover, forensic science of which forensic intelligence is a part; is seen by some people as a reactive effort used only after a crime has been committed (Mennell and Shaw, 2006). This tends to make it a culture different from the frontline policing cultures, though there is evidence that forensic intelligence is an obvious and important component in proactive policing (Legrand and Vogel, 2012). Another limitation of forensic intelligence, which forensic science as a whole also shares, is the timeliness and utility of data (Legrand and Vogel, 2012).

2.1. Challenges of forensic investigations

Studies have shown that the challenges hindering the effective utilization of forensic science in criminal investigations by the police varied from one police system to another. For instance, in cases involving murder, post-traumatic stress was found to be a challenge faced by investigators as it was influenced by years spent as a forensic science investigator, personality type, emotional intelligence, homicide experience, fatigue, and death anxiety (Yoo et al., 2013). Lack of strong forensic intelligence and reliable databases, which are especially relevant in proactive policing are challenges facing forensic science as utilized by the police (Crispino et al., 2015). This challenge seems to be common with police organizations around the world (Interpol Global DNA Profiling Survey, 2017).

Lee and Pagliaro (2013) had found that questionable results arising from wrong methods, contaminations, and un-standardized procedures; are problems faced in a forensic investigation by the police and other practitioners. In another study, the types of victims involved, the nature of the crime committed, the form an investigation will take, as well as cultural, economic, and political constraints; all affect police in using forensic science (Puerto and Tuller, 2017). Issues of policy and specificity, accuracy, and validity were also found to be challenges associated with fMRI-based lie detection (Farah et al., 2014).

Other authors cited problems in the existing policing system as challenges in applying forensic science. For example, lack of standard regulation as to the operation and application of forensic outcomes prevents police and even other supposed beneficiaries of forensic science, from realizing the benefits of the science (Edwards and Gotsonis, 2009; Giannelli, 2007; Jonakait, 1991). According to Kelty et al. (2018), interdisciplinary differences in the form of disharmony and misunderstanding during operations among investigation personnel from different fields are serious challenges to the police in utilizing forensic science. This is especially pertinent in criminal cases that are trans-border in nature, for example, human smuggling and drug trafficking.

This depicts a lack of congruence between forensic science practice and police work, which may negatively impact evidence collection and subsequently have implications on court proceedings. Specifically, the chain and handling of evidence as well as its forensic analyses and interpretation may violate recognized forensic science codes of conduct. It is for these reasons that the issue of challenges in using forensic science has to be addressed, as it can be seen challenges can vary from one situation to another, signifying the non-universality of problems that the application of forensic science faces. In other words, the above-stated challenges may or may not be tenable in Nigeria. There could be different challenges. Since the field of forensic science did not emerge at once in all countries, each country may have its peculiar challenges.

For instance, in Nigeria, inadequate personnel and laboratories were said to be the challenges affecting the police use of forensics (Aigbokhaevbo and Iyamu-Ojo, 2015; Obafunwa et al., 2015; Ladapo, 2011). Power outages, inter-agency cooperation, and corruption were also challenges faced by police in using forensic science (Aigbokhaevbo and Iyamu-Ojo, 2015). Although these authors have put forward their arguments about NPF utilization of forensic science, what they put forward were individual opinions, not the result of empirical studies, where first-hand and reliable information could have been directly obtained from the police themselves.

Anecdotal opinion and opinions not backed by evidence may not be reliable. More scientific and reliable studies are therefore required to fill the knowledge gap concerning the challenges in the application of forensic science as utilized by the NP. Hence, this study intended to empirically reduce the knowledge deficiencies. The study was, therefore, aimed at determining the challenges of reliable databases from the perspective of the Nigeria Police.

Null hypotheses were formulated and tested to establish whether the challenges determined in the study have any statistically significant relationship among themselves, and specifically on the unreliable databases. Thus:

H01: there is no relationship between unreliable databases and corruption.

H02: there is no relationship between unreliable databases and lack of interagency cooperation.

H03: there is no relationship between unreliable databases and undue interference in police investigations.

H04: there is no relationship between unreliable databases and questionable forensic results in police investigations.

H05: there is no relationship between unreliable databases and the complexity of crimes in police investigations.

H06: there is no relationship between unreliable databases and cultural /religious beliefs in police investigations.

3. Method

A sample survey method was used in this study. The locations of the study were the Criminal Investigations and Intelligence Departments (CIIDs) in Zone 1 of the Nigeria Police. The respondents were, the Investigating Police Officers (IPOs) serving in the zone's CIIDs. Zone 1 is one of the twelve zonal police commands in Nigeria, comprising of the zonal command headquarters and three state commands, that is, Kano, Jigawa, and Katsina states.

Based on the Investigating Police Officers (IPOs) population of 3,503, a minimum sample size of 347 was determined using Krejcie and Morgan's (1970) Table of sample size estimation. A potential 20%

dropout rate was added, making the sample size 416. Systematic sampling was used to select the respondents, with IPOs identification lists as the sampling frame. After ethical approval was obtained from the Human Research Ethics Committee (JEPeM) of Universiti Sains Malaysia and the NP authority, data were collected via a self-administered survey battery.

At the end of the data collection exercise, a total of 401 usable responses were obtained, satisfying the minimum sample size estimation to generalize findings. The inclusion criteria for the respondents were, 1) An investigator has spent at least two years in service, 2) he or she should have been in the location of the study on a regular posting and not on special assignment, loan, or operation and, 3) was also serving at the State or Zonal CIID in Zone 1 at the time of conducting the study. The responses from 401 respondents were analyzed using SPSS version 24.

4. Results and Discussion

4.1. Sociodemographic profiles of the respondents

This section presents data on gender, age, marital status, highest educational qualification, rank, years spent in service, and forensic science training attended by the respondents. Table 1 shows a summary of the data.

The majority (87.3%) of the respondents were males, while 12.7% were females. Respondents aged between '28 and 37 years' constituted the highest percentage (37.2%) compared to other categories of age. The category that follows in terms of frequency is the '38-47 years' category with 34.4% of the respondents. Very few (9.7%) fall in the youngest respondents' category of '18-27 years' category, and 18.7% of respondents belonged in the eldest respondents' category. In general, the mean age was 39 years while the standard deviation was 6.9 (Table 1 is referred).

Table 1. Socio-demographic characteristics (n=401)

Variables	n (%)	Variables	n (%)
Gender		Rank	
Male	350 (87.3%)	Officers	132 (32.9%)
Female	51 (12.7%)	Inspectors	125 (31.2%)
Age		Men	144 (35.9%)
18-27 years	39 (9.7%)	Years spent in service	
28-37 years	149 (37.2%)	2-5 years	73 (18.2%)
38-47 years	138 (34.4%)	6-10 years	72 (18.0%)
48-57 years	75 (18.7%)	11-15 years	73 (18.2%)
Marital status		16-20 years	94 (23.4%)
Single	78 (19.5%)	21-25 years	30 (7.5%)
Married	313 (78.1%)	26-30 years	54 (13.5%)
Ever married	10 (2.5%)	31-35 years	5 (1.2%)
Highest educational qualification		Forensic training attended	
Primary Certificate	16 (4.0%)	No training	257 (64.1%)
Secondary Certificate	101 (25.2%)	Attended once	96 (23.9%)
Diploma Certificate	141 (35.2%)	>1 training attended	48 (12.0%)
Degree/HND Certificate	115(28.7%)	*Note: Mean (SD) for age = 39(6.9); Mean (SD) for years spent in service = 14.3(5.3)*	
Postgraduate	28 (7.0%)		

Also, as the data in Table 1 indicate, the majority (78.1%) of the respondents were married, few were single, and a small percentage were ever married. In terms of educational qualification, more than one-third (35.4%) of the respondents were diploma holders, one-quarter of the respondents have secondary certificates (25.2%), and 28.7% have bachelor's degrees or their equivalent. A small percentage of respondents have primary (4.0%) or postgraduate (7.0%) qualifications as their highest education.

Concerning rank, each of the categories has more than 30% representativeness, namely, Officers (32.9%), Inspectors (31.2%), and Men (35.9%). Although the percentage of the Men category is a little bit higher, this shows that the CIIDs were composed of IPOs from all categories of rank (that is, higher, middle, and lower ranks almost equally) who were involved in criminal investigations.

As for the years spent in service, the '16-20 years' category has the highest percentage (23.4%) of the respondents. Categories '2-5 years', '6-10 years' and '11-15 years' have similar shares with 18.2%, 18.0%, and 18.2% of the respondents respectively. The most experienced categories of the respondents, i.e., '21-25 years' (7.5%), '26-30 years' (13.5%), and those

above 30 years (1.2%), have the lowest percentages. Thus, the CIIDs constitute IPOs who have less work experience and more years to spend in service; generally, the mean and standard deviation of the variable was 14.5 years and 5.3 years respectively.

According to the data in Table 1, close to two-thirds (64.1%) of the respondents did not have any training in forensic investigation. About one-quarter (23.9%) attended forensic training once. Only 12% had training on a forensic investigation more than once during their service years.

4.2. Challenges of forensic science application in the Nigeria Police Force

From the data displayed in Table 2, unreliable databases have been affirmed by 60.3% of the respondents as one of the forensic science challenges faced by the NPF. Corruption was second (59.9%); undue interference in the investigation (59.6%), and lack of interagency cooperation (59.4%) followed accordingly. Complexities of crimes (54.6%), cultural/religious beliefs (51.1%), as well as questionable forensic results (50.4%), were seen as challenges by more than half of the respondents.

Table 2. Challenges faced in forensic science application (n = 401)

Challenges	Yes	Not sure	No
	f (%)	*f* (%)	*f* (%)
Unreliable databases	242 (60.3)	125 (31.2)	31 (7.7)
Lack of inter-agency cooperation	238 (59.4)	115 (28.7)	46 (11.5)
Corruption	240 (59.9)	83 (20.7)	76 (19.0)
Questionable forensic results	202 (50.4)	141 (35.2)	54 (13.5)
Undue interference in investigation	239 (59.6)	116 (28.9)	43 (10.7)
Complexity of crimes	219 (54.6)	125 (31.2)	54 (13.5)
Cultural /religious beliefs	205 (51.1)	125 (31.2)	69 (17.2)

These findings support some of the claims of previous authors regarding issues affecting the proper application of forensic science in criminal investigations in Nigeria. For example, corruption has been a challenge as reported by Aigbokhaevbo and Iyamu-Ojo (2015). Similarly, the results agree with Crispino et al (2015) and Interpol Global DNA Profiling Survey (2017) regarding unreliable databases as a factor hindering the effective utilization of forensic science. Again, questionable forensic results, which were found by the current study to be a challenge of forensic science utilization, were earlier reported by Lee and Pagliaro (2013) as a problem faced by the police during forensic investigations. However, lack of interagency cooperation, undue interference on investigations, the complexity of crimes as well as cultural and religious beliefs seem to be the challenges not earlier reported by literature the current researcher was able to access.

4.3. Relationship among the challenges of forensic science

A four-way Loglinear analysis was performed. To determine a hierarchical unsaturated model for the associations between unreliable databases, lack of inter-agency cooperation, corruption, and undue interference in investigations. The remaining three challenges (i.e., questionable forensic results, the complexity of crimes, and cultural/religious beliefs) were not included because they indicated no statistical interactions during the preliminary test. Eight cells were having expected frequencies greater than five, no outliers were found, and approximately normally distributed adjusted residuals for the chosen model were observed.

An unsaturated model was chosen using a hierarchical Loglinear model selection procedure with a backward elimination stepwise procedure in SPSS. This produced a model that included all main effects, three-way, and two two-way associations. That is: lack of inter-agency cooperation*corruption*undue interference, unreliable databases*lack of inter-agency cooperation, and unreliable databases*corruption

were statistically significant associations. Similarly, lack of interagency cooperation*corruption, lack of interagency cooperation*undue interference in the investigation, and corruption*undue interference in the investigation were associated pairs. However, the highest-order interaction, that is [Unreliable databases = no] * [Lack of inter-agency cooperation = no] * [Corruption = no] * [Undue interference], was nonetheless not statistically significant. The model had a likelihood ratio of $\chi2(5) = 1.872$, $p = 0.867$. The partial likelihood ratio $\chi2$ is presented in Table 3. The parameter estimates for the model are shown in Table 4. As can be seen, there was a significant association between lack of interagency cooperation, corruption, and undue interference (p=0.000). A significant association was also revealed between unreliable databases and lack of interagency cooperation (p=0.000). The unreliable database was similarly associated with corruption (p=0.000).

Table 3. Partial associations: unreliable databases, lack of inter-agency cooperation, corruption and undue interference

Effect	Partial Association χ^2 (df=1)	p-value
unreliable databases* lack of interagency cooperation* corruption	1.230	0.267
unreliable databases* lack of interagency cooperation* Undue interference	0.010	0.922
unreliable databases* corruption* Undue interference	0.098	0.754
lack of interagency cooperation* corruption* Undue interference	19.378	0.000
unreliable databases* lack of interagency cooperation	23.834	0.000
unreliable databases* corruption	17.583	0.000
lack of interagency cooperation* corruption	23.351	0.000
unreliable databases* Undue interference	0.086	0.769
lack of interagency cooperation* Undue interference	14.153	0.000
corruption* Undue interference	49.211	0.000
unreliable databases	18.730	0.000
lack of interagency cooperation	14.602	0.000
corruption	16.190	0.000
Undue interference	16.190	0.000

Table 4. Parameter Estimates for the Hierarchical Model

Parameter	Estimate	Z	p-value
Constant	4.899a		
[unreliable databases = no]	-1.472	-8.480	0.000
[lack of inter-agency cooperation = no]	-2.260	-9.611	0.000
[corruption = no]	-2.801	-9.554	0.000
[undue interference = no]	-2.061	-8.898	0.000
[lack of inter-agency cooperation = no] * [corruption = no] * [undue interference = no]	5.274	11.718	0.000
[unreliable databases = no] * [lack of inter-agency cooperation = no]	1.229	5.052	0.000
[unreliable databases = no] * [corruption = no]	1.140	4.677	0.000

Note. Z = Estimate/ Standard error; Sig. = p-value

The estimates of the effect among these variables were 5.274, 1.229 and 1.140 accordingly. In other words, the odds of having interagency cooperation in utilizing forensic science for criminal investigation,

for example, is 5.274 times when there is no corruption and undue interference. Similar interactions could be observed for each of the two variables (corruption and undue interference). The challenge of unreliable databases is 1.229 times likely not to be if there is interagency cooperation. Similarly, the odds of not having the problem of unreliable databases for criminal investigation was 1.140 times if there was no corruption.

5. Conclusions

Forensic intelligence remains one of the most important tools through which effective policing could be achieved although it largely depends on the reliability of databases. Databases, which are useful when data are obtained from different sources, could be affected by various challenges. In addition to unreliable databases as a challenge of forensic investigations, other challenges, as could be seen in the context of this current study, including corruption, lack of interagency cooperation and undue interference in investigations. The hypotheses related to these four variables vis-à-vis reliable databases were statistically significant. The remaining two hypotheses were not statistically significant. Thus, some challenges of forensic science application are mutually dependent. Consequently, addressing some of the challenges would likely improve the reliability of databases for the use of the police. In addition, other challenges, specifically, questionable forensic results, the complexity of crimes and cultural or religious beliefs could also hinder the utilization of forensic science in criminal investigations. These challenges should also be addressed for the effective application of forensic science by the Nigeria Police Force.

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A Study of Critical Thinking as a Mainstream Pedagogical Problem in Pakistan: The State of The Art

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Abstract. Critical thinking is an ability of a person to think clearly and logically. There is a traditional method of learning which promotes rote learning but as far as modern times are concerned, thinking critically is important. It helps a person acquire knowledge, improve theories and gain enlightenment. In Pakistan's discourse of education, critical thinking is not a practiced art. One can signal the blame on colonial history as well but the subject matter is more complicated than this. In this study, the researcher wants to find out the reasons why the country is lagging in critical thinking and why it is a less established and less practiced fact in Pakistan. Paulo Freire's Pedagogy of the Oppressed will be taken as a framework to connect the reasons with the causes. Especially, it will be studied how the banking concept of Education has influenced education and the study will then be related to the Pedagogy of Pakistan. For the study mixed-method approach has been chosen by the researcher. Through questionnaires and the mode of the interview, the facts related to critical thinking are researched out. Pieces of evidence collected from the research have proven why the country has not yet been able to develop a system of education that promotes the ability to think critically. And it has been recommended that critical thinking must be made part of the education of the country at every level.

Keywords: Mainstream, Pedagogical Problems, Critical Thinking, Traditional Method of Learning, Banking Concept of Education.

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1. Introduction

Critical thinking is the ability of a person to think differently. It is according to Bacon (1605) a desire to seek and a readiness to consider. It is related to human's quest for knowledge and it provides a platform to search out the truth of the world. Critical thinking allows a person to think logically and rationally. According to Sinfield S and Burns T (2016), Critical thinking is about formulating a clear judgment. It depends upon interpretation and understanding of knowledge and in due process one might gather information through the process of reading, observation, and experimentation. (p. 94). So, instead of relying on a traditional mode of learning, one should seek to develop the ability of critical thinking. This would enable a person to see the realities of the world. All the great philosophers in the world have one thing in common, they use to think and therefore they were able to develop a rationale. Critical thinking has created wonders for the man. Linda E and Paul W (2002) have written in their book, Critical Thinking, that due to the human ability of it, man has revolutionized the communicative ways of the world. It has saved time and provided services (p. 19) It won't be wrong to say that critical thinking has proven to be vital in the lives of humans.

Men have always used their minds to develop critical thinking and ability. The mind plays an important role; therefore, it should be properly trained. It is the mind which shows a person how to think. Even in the age of Puritanism, the great writer Milton (1667) in Paradise Lost talked about the ability of the mind when he says that the mind when it is in its place and itself, can make hell out of heaven and heaven out of hell, signaling the capability of mind in formulating experiences. The mind has every ability to think critically and if the mind has such capacity where it can think freely and critically, it can create wonders.

In all of the world, attention is now being paid to Critical thinking. Many universities and institutions make it their sole motto, not only this, some universities are investing in giving proper degrees and courses in this field. So, in no way is possible its importance could be denied.

In many countries like Pakistan, critical thinking is still a distant dream. Especially in the field of Education, there are many lapses. One is related directly to critical thinking. The country has a history of colonialization. Even after more than seventy years of independence, many aspects of the country's management are linked to the era of colonialization. The main concern which is associated with pedagogy is hardly being addressed. There is an unfortunate situation where at the primary and secondary level, outdated learning schemes are practiced. The focus is on rote learning. Critical thinking is far from the discourse of education which is posing a problem. In this study, the researcher has focused on Critical thinking and how its absence in the field of education is posing pedagogical problems. The researcher has studied the problem by keeping in mind the ideals of Paulo Freire (1971) in his book Pedagogy of the Oppressed. Freire has talked about the pedagogy of the world, how it has been constructed and how futile it is for the developing and third world countries. The researcher has tried to figure out the problems with Pakistani Pedagogy by keeping in mind this model of Freire.

1.1. Problem Statement

Critical Thinking is substantial when it comes to the education body of the world. It has been seen that developing countries like Pakistan do not have the mode of Critical thinking in the mainstream body. Instead, the country is led by traditional methods of learning. This is the reason that education is not fully hitting the levels of understanding in the minds of the learning or the students. They follow the practices of Rote learning therefore they are not able to translate their knowledge into practical use. This study will focus on the aspect of the absence of critical thinking in the education of Pakistan and will suggest ways to expand the quality of education in the country by the implementation of critical thinking.

1.2. Objectives of Research

This study researches to find out the part of critical thinking in the pedagogy of Pakistan. Also, it aims to study the ways in which rote-learning has become an important constituent of learning. The researcher targets to study the influences which have made the educational process in Pakistan a robotic procedure. The lack of creativity and critical thinking is remotely found to be present in the general body of pedagogy. Therefore, this study looks forwards to seeing how the educational system has perceived the idea of critical thinking and what could be the possible future of it in the pedagogy of Pakistan.

1.3. Research Questions

- What is the status of Critical thinking in Pakistan?
- Why the Pedagogy of Pakistan has been conducive to Rote learning rather than Critical thinking?

- Is Critical Thinking useful in the professional life of students in Pakistan?

1.4. Significance of the Research

This study is significant as it will promote the critical thinking process and will pave the way for the promotion of true education. it will lead to creating a system where minds and thoughts will be valued rather than degrees and marks. Also, this study will pave how pedagogy will be seen with a new perspective. Old ways will be devalued and ideas coming out of critical thought will be considered important.

2. Literature Review

2.1. Ability of Critical Thinking

Mind is for thinking and human beings are given the ability to think. Naturally, they think and thus they invent. The process of thinking is comparatively easy and straightforward as it is a natural ability. However, it is the ability of critical thinking which is complex and not easy to practice. It is because it requires a lot of background knowledge and critical study. Information makes a mind critical. Critical thinking comes from the brains of the thinking minds which also make use of rationale and logic. It is in fact the style of thinking about any content or about any subject in which the thinker expands the quality of his thought process by dexterously taking the command of the structures which are somewhat inherited to him and with the help of it he could impose intellectual standards and additional thinking upon them (Paul and Linda, 2002: 35) It is not a simpler phenomenon. It incorporates the involvement of skills. With the help of the required skills, a person can shape his thinking process and can become a critical thinker. Also, apart from the requirement of specific skills, it is the process of reasoning which is a requirement as well. According to Wood (2002), Critical thinking is a process of using reason and logic. One should be trained enough to discriminate from what is right to what is wrong.

2.2. Critical Pedagogy

Many types of research have been done on Critical Thinking in the past few decades. The goal is to highlight the discrepancies that are present in the educational system and to suggest a solution for it. Also, many studies have highlighted the importance of critical thinking in educational discourses and emphasis has been laid on this particular subject matter. There has been a recent study on the challenges of critical Pedagogy (Kulsoom and Mallick, 2020). The research has highlighted the fact that how the banking model is influencing the Pedagogy of the country. According to the study, the banking model is not empowering the learners and it is not contributing well enough in transforming the state of living of the learners. The major challenges were also discussed in the study. The major problem is that the traditional mode of teaching is being practiced in class (Kulsoom & Mallick, 2020) this traditional mode of teaching is a direct barrier to student-teacher interaction and therefore less communication is done between the teacher and the students. Also, there has been another reason and it is associated with the lack of appreciation for innovation. A student is not often appreciated when she does some work critically. The creative license is never being issued by the teacher to the students. And if the teacher is not ready to appreciate a student, it will lead to the situation of the creative block on the part of students. They will start relying on the material provided by the teacher and won't do any creative stuff on their own. Thus, according to the findings of the research, it was found out that there was more narration rather than liberation in the pedagogical schemes of the teachers. Although, teachers were enthusiastic at the same they were a bit

reluctant when it comes to practicing critical thinking in class.

2.3. Answer to Extremism

The concept of critical Thinking as the main priority in the educational system of Pakistan has also been studied by Farhan Akhtar (2019). He has not studied the trends in history but has tried relating the concept of critical thinking with it. He has studied the political era starting right after the birth of Pakistan and observed the social and political change over the decades. The country was seen in the prism of globalization and the progressive outlook was portrayed in the era of the '50s, '60s, and '70s. Then Akhtar (2019) studied the elements of extremism in the decades that came later. He studied how that decades lack a general sense of tolerance and patience. There was less progress and more extremism. And according to the researcher (2019) it is only the critical thinking which could cater the true education needs of the country. Because critical thinking has the true resources which could enrich the mindsets of the society. It could only be possible, when critical thinking is incorporated in the pedagogy of Pakistan.

2.4. Student Teachers Viewpoint

Lloyd and Bahr (2019) observed the students from the university and asked them about their perception of critical thinking. As the definition is not static and varies from person to person. Lloyd and Bahr (2019) therefore gathered the viewpoints on critical thinking to see whether they contribute positively to the achievements of the students or not. Students' responses were taken through questionnaires. They were asked to define their own definition of Critical thinking. They were also asked to share their own bit of experience in which they have to exercise the mode of critical thinking in order to appear in an assessment. And similarly, teachers were asked to comment on the ability of the students. Whether they exercise their critical ability and make use of it or not. And according to the findings of the study, there is a general sense of confidence which considers critical thinking to be an important part of education system at university level.

2.5. Theoretical Framework

Paulo Freire (1970) did revolutionary work in the field of education. The ideas he came up with within his book, Pedagogy of the Oppressed are thought-provoking, and in fact, it has paved the way in understanding the general body of education in an oppressed world. If it is looked at Practically, it will be understood that education is a basic necessity that should be given to all in the world without any discrimination. Everyone in the world must have equal opportunity when it comes to education. However, this is not the case with the world. Unfortunately, the ways of the world are not constructed in the way to benefit all. The dominant capitalist class takes advantage. As a result, there is a class that faces suppression. They became oppressed and consequently, they are bound to learn from the already prescribed system of education. Freire (1970) says that they never learn to unlearn. They have the insights of critical ability in them but they never make use of it. Therefore, they remain oppressed and they are not able to achieve wonders at the economic and social levels. Freire dissected the problem with the field of education and proposed some sound suggestions.

2.5.1. Power Relation Dynamic

Freire (1970) has explained the power relation dynamic at the level of education. And while describing this phenomenon, he talked about the fact how the social barrier between a teacher and student is widening. In a typical classroom environment, he calls a teacher to be a person who is somehow alien

to the students. And it is because teachers often don't bother to create a healthy intellectual environment within the class. While they deliver a lecture, a student sees them as the epitome of knowledge and therefore, he never tries to question the teacher. The words of the teachers are taken as the words of Reality. Students instead of understanding them relies on the pattern of memorization. They keep on repeating it unless they memorize it completely. Freire named this relationship and called it a depository relationship. In such a power dynamic relationship, the teacher is the depositor and the students are the depositories. This is the process; he calls mechanical memorization. Students become like empty bottle canes which are to be filled out by the educators. The difference in power status between teachers and students could be seen in the table below.

TEACHERS	STUDENTS
Teachers taught	Students are taught
Knows everything	knows nothing
Teacher talk	student listen
Exercise discipline	they are to be disciplined
They are the subject	They are the object

2.5.2. Creative Space and Thinking

Freire (1970) has talked about the Banking concept of Education and he has emphasized true knowledge. And according to him, true knowledge always comes from inventions and reinventions. Rote-learning and memorization take students to nowhere. They can only learn by knowing the true realities of the world. Therefore, the creative space is the need of time. And Critical Thinking must be promoted by the teachers so they could learn effectively.

The role of the teacher is very important in this regard. Previously, it was the teacher who mainly prompted the alienation of students in a classroom environment. It was the one who made students, the Others. And to make them more relatable and justifiable in the classroom context, they treated the students as others. A teacher is therefore the one who is an oppressive being in the pedagogical context proposed by Freire (1970). He says that reconciliation on the part of the teacher is needed. And for students to gain true knowledge, the role of the teachers comes in handy.

2.5.3. Problem Posing Model

This is where the debate comes at a stop. This model is presented by Freire (1970) and it suggests the ways of the ideal scenario when it comes to Pedagogy. Problem Posing model recommends the solution where students must directly engage themselves in the process of learning. They should initiate dialogue and must know their ways to learn the realities of life. There should be no creative block. Teachers and students must work side by side and there should be no power dynamic relation between the two groups.

3. Research Methodology

The research methodology for this research is described below.

3.1. Research Design

The mixed-method research design has been used by the researcher to conduct this research. Both quantitative, as well as qualitative research design, has been adopted to further this research. Quantitative data has been analyzed by using a window-based program called SPSS or Statistical Package for Social Sciences whereas qualitative analysis of the interview has been done by the researcher.

3.2. Research Tool

Both surveys and interviews have been conducted for this research. A likert-type structured questionnaire

was constructed and its reliability was first checked with thirty students through Cronbach alpha testing done in the SPSS program. It was then given to the 100 university students of Master level and M. Phil level. All the students belong to the public universities of Multan (Bahuddin Zakariya University Multan and Women University Multan). Random Sampling is done by the researcher for this purpose.

Similarly, five teachers were engaged for interviews. A semi-structured interview was conducted for this purpose and teachers were asked semi-structured questions. Teachers were asked questions related to critical thinking and its implication in a classroom environment.

3.3. Setting

The questionnaire was made online through google docs and spread and filled out via an online link. Description related to the topic was provided within the text of the questionnaire so that the students may be able to understand it fully.

Moreover, the interviews were conducted online on WhatsApp as well as on Zoom Meeting. Due to the restrictions and social distancing imposed by Government for Covid-19, it was impossible to conduct face-to-face interviews. Therefore, online interviews were conducted and recorded.

4. Data Analysis and Discussion

The data collected from the questionnaires was analyzed through a popular Software called Statistical Package for Social Sciences (SPSS). The data was converted into binary form and then the Reliability of it is checked through Cronbach Alpha test. The results of the test are given in the following Fig. 1.

Cronbach's alpha Test	Items
.693	15

Fig. 1. Reliability Test

As the study was conducted on hundred university level students, it is seen from the figure below that two groups were focused.

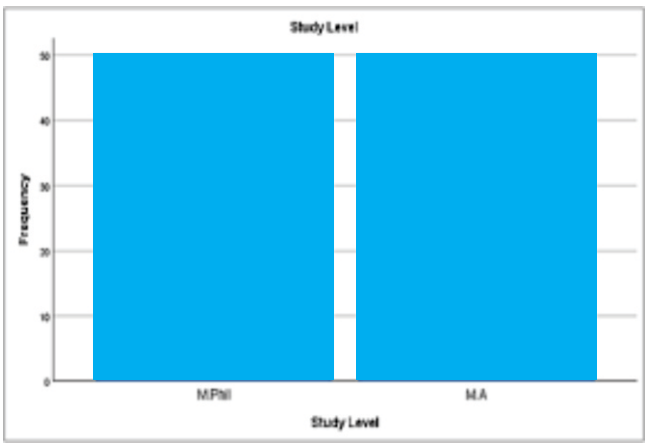

Fig. 2. Reliability Test

Total population considered for data collection belongs to the study level of Masters or M.Phil. The population and their study background can be evaluated in the figures below. It is both represented in bar chart form (Fig. 2).

4.1. Substantial Role of Critical Mindset

The substantial of critical thinking could not be ignored in the context of Pakistani Education. Almost 50% of the students strongly agree to the point that critical thinking holds a significant role in the education of a students. Moreover, 40% of the students agree. Thus, emphasizing on the matter of critical thinking.

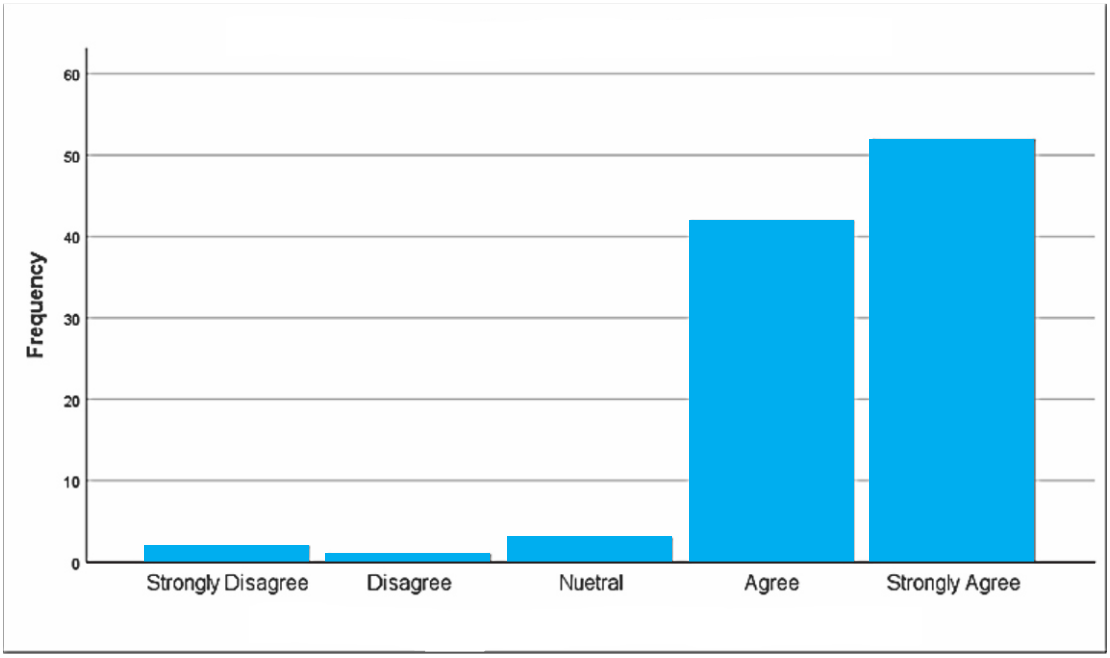

Fig. 3. Critical Thinking Plays an Important Role in Education

Same question when asked from the teachers was answered in a similar manner. But they justified their point. One of the respondents among teachers comment

"Critical thinking helps a student to think out of the box. You know, it promotes creativity. It is important in higher education. Basically, what I believe is, if a student is a critical thinker, then he will know to apply that knowledge and the application of knowledge is important because knowledge won't be of any use if you not know how to make use of it."

From a teacher's point of view, it is a vital concept and it holds an important role in the education of a student. If a student is well aware, he is a critical thinker, he will think more. Also, he will be able to translate his knowledge practically. He could make good use of what he already knows and can put sense into things.

Also, one of the teacher states; "It is important for the better understanding of the student, okay. We know students cram and in order to eradicate this practice we often make them think critically which is important."

There was another view on teachers' part which says: "Critical thinking enhances the political thinking in a student. A student gets to know what is going around in a society. Also, in my opinion, Critical thinking enhances the basic ability of thinking of a person. And if the critical thinking of a person in a society is sharp, he could solve the social, economic as well as political matters of the country. And also, it helps a person at individual level as well as it leads a person towards self-actualization."

These perceptions of the teacher clearly indicate the significance of Critical thinking in the education of the country. It is indeed an important fact as critical thinking works at different levels. From individual to societal levels, it has a role to play.

4.2. Practice of Rote-Learning: A Problem

Without any doubt, rote-learning is one of the major concerns in the education system of the country. The system is devised in such a way where the students feel pressure for appearing in their assessments and exams. They want to gain maximum weightage and therefore follows the technique of book cramming and rote-learning. It has been shown in the figure. 04-

that majority percentage of the students admit the use of this practice. They consider it to be far more common than the practice of critical thinking.

Teacher's response in this particular method also reflect to the gravity of the matter. All the teachers agreed that rote-learning is a common practice. However, they also devised the plan in which they think that they could tackle the problems. And most of them are breaking the educational stereotypes by introducing creative methodologies (Discussions and Quizzes) at classroom level.

"A student should be asked opiniated questions. Also, if a teacher is giving a lecture of 45 minutes, she should reduce her lecture timing to 30 minutes and should keep 15 minutes for discussion. And it would be far better if she discusses current affairs and newspaper affair during this time" One of the teachers responded.

Also, another teacher says, "I believe in constructive learning and by that, I mean there should be a discussion method rather than a lecture method. There is a more space for the students to learn in this way. First, they won't get bored and secondly, they will be actively participating in the discussions which will help them to learn".

The teacher's perspective clearly suggests the way towards right direction. There is a need to negate fall practices like rote learning and positive learning should be enacted at all the levels (Fig. 4).

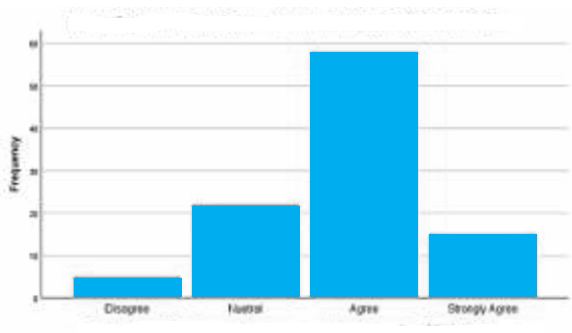

Fig. 4. Practice of Rote-learning

3.4. Addressing the Elephant in Room

As it could be clearly observed in the figures below that the Critical Thinking is not a strategic part of our educational system as majority stands with the perception that our educational system is void of critical thinking. There are number of reasons to that, these reasons are discussed below the Fig. 5.

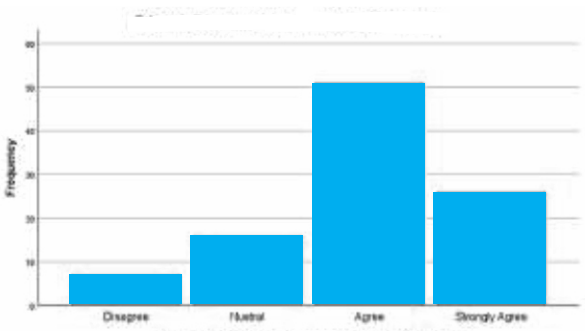

Fig. 5. Pakistan's Education System

It is a known fact that when Britishers came, they came for their own economic progress rather than for the betterment of the natives. They built their own kind of system in order to facilitate their own motives (Qayyum et al, 1815). They introduce an education system in 1835 and made English to be the mandatory part of the system in the country predominated by non-native speakers. In fact, English was the language alien to majority of the people at that time. This education system programmed by forced learning has the ripple effects in the centuries to come. Britishers made their style of education compulsory in order to get jobs at governmental level (Qayyum et al, 1815). This trend is common now a days as well. The jobs a person seeks have a set of conditions to meet. A particular design is followed which is fed by efficiency in the language skills rather than creative skills. This is the reason that the education system in the country is void of Critical thinking.

There is another reason to it as well. This reason is related with the curriculum design and the

authoritative system which forces a teacher to follow the particular system despite of the fact that she wants the other way around.

"A teacher is bound by the limitations that are set by the authorities. This is what it is."

Signaling towards the practice of traditional style of learning. "A teacher does not have much time. We have to prepare our students for annual examination.

Therefore, we are bound to follow the traditional practices in education. Also, a student is practiced to study in a particular manner from the time he has first been to school. It is his childhood practice. Anything related to critical thinking adds noting but extra pressure on him."

The response of another teacher was: "Unfortunately, this is the way a system is design. I will blame the system; The teachers and the students are not to be blamed for this."

4.4. Consequences

Rote-learning and cramming have eaten the brains of the students. 60% of the students agree and 22% strongly emphasize in regard to the statement that rote-learning is indeed consuming the education system of our country. The figures could be seen in the Fig. 6. The result of it is drastic. When asked from a teacher in the interview, she said:

"You see, how a troublesome practice is research for our students. They are never really into doing the research work. And the reason is obvious. They are never trained to do it in their life. They are always asked to learn by heart and cram the knowledge. And consequently, they don't know how to deal with the

Regarding the role of the teacher, another teacher opines: "She can always correct the student. She could tell them where they are not right. It is the role of a teacher. She assesses and gives feedback". Also, the students realize that the role of a teacher is creative work".

4.5. Practice is Important

Students as well as teacher agree that the practice of the critical thinking is important. It is important because the knowledge without its understanding is useless. And only the practice of critical thinking will allow the students to grasp the knowledge fully and completely. The results of the survey in this context are as follow and could be seen in the Fig. 7.

4.6. Role of the Teacher

A teacher holds a significant place in the education set up of any country. Her role in any circumstances could not be negated. It is the teacher, who inspires, who motivates and provide a platform where students learn and educate themselves. When asked about the role of the teacher from a teacher, a reply came from Respondent 04.

"A teacher is an initiator. The classroom is her territory, so despites of the pressures from the authorities or from the system, a teacher can make a change sitting inside the domains of a classroom because here, she could act beyond the limitations set by the authorities. So, it is important for a teacher to really understand her own role and she should really pay heed to the strategies with which she could make a change, even at a smaller scale."

Regarding the role of the teacher, another teacher opines: "She can always correct the student. She could tell them where they are not right. It is the role of a teacher. She assesses and gives feedback". Also, the students realize that the role of a teacher is important. It can be seen from the Fig. 08.

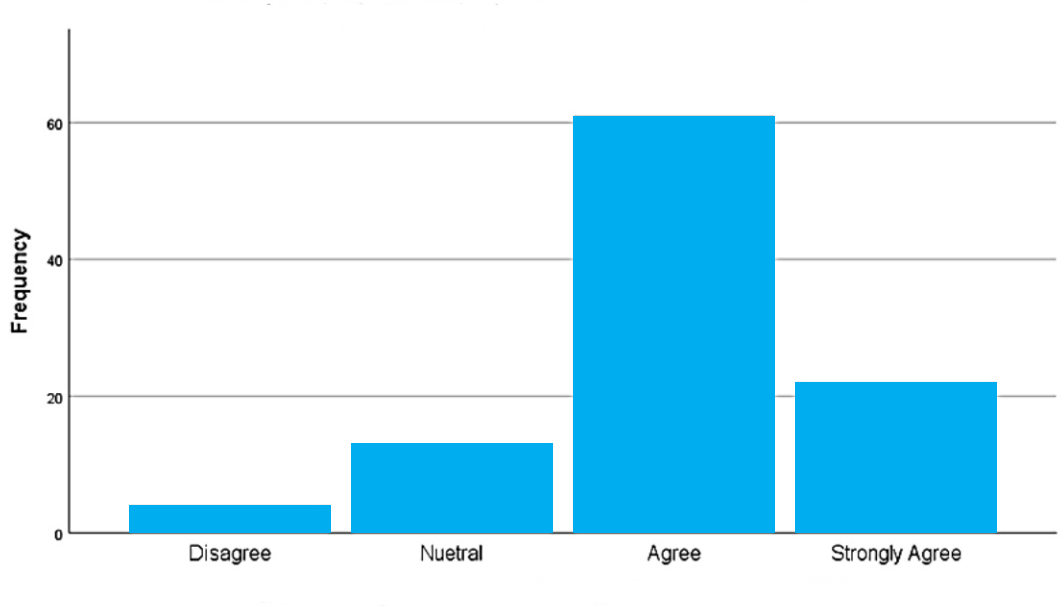

Fig. 6. Rote-Leaning in Educational Institutes

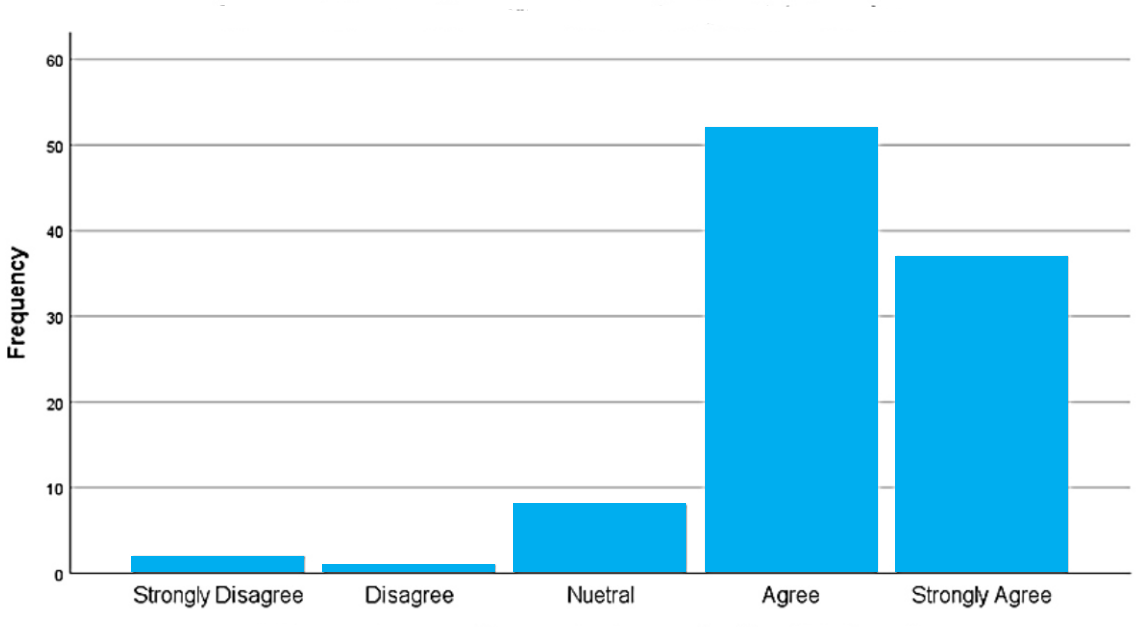

Fig. 7. Critical Thinking Must be Exercised

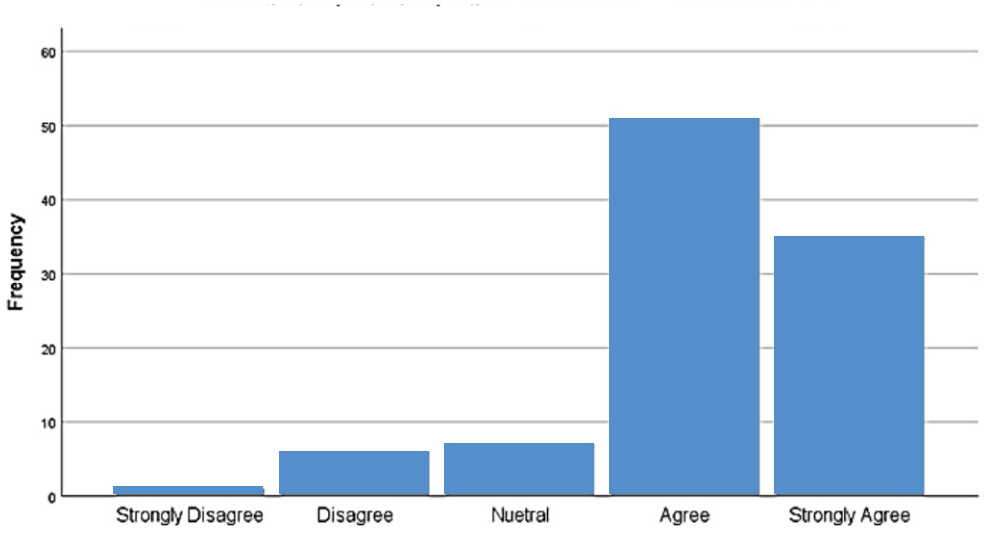

Fig. 8. Role of Teacher in Developing Critical Thinking

4.7. Future Life

When asked in a questionnaire that whether the critical ability is of any good when it comes to the professional and the future life of the student, the majority strongly agrees. They think that critical thinking certainly aides the student in their long run. The results could be seen in the Fig. 9.

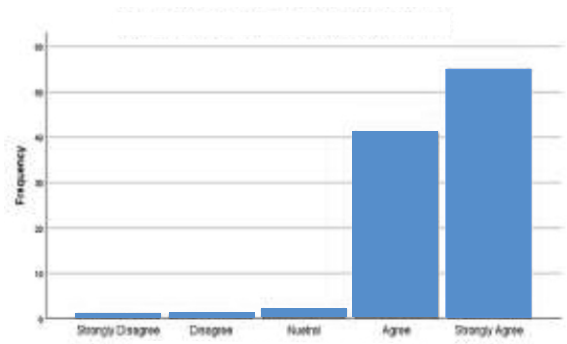

Fig. 9. Critical Thinking in Professional Life

This point is as important in teacher's view as well. When asked, the respondent 03 replies. "A critical thinker will be mindful of the realities of the life. When he enters in the practical life, he will know how to translate his education into practical use." She further adds, "A critical thinker will always know how to apply the knowledge. You know the levels of Bloom Taxonomy; we are stuck at level one and never moves from that position. however, it is certainly important to further the knowledge. A knowledge when is practically learned will be remembered forever and it will help in future."

The teacher was elaborative in discussing this concept. A bloom taxonomy sure does help a student to expand the knowledge. As clearly reflected in the Fig. 10, prescribed by Bloom (1956) himself.

Fig. 10. Blooms Taxonomy – Cognitive Domain

Not only Remembering is required, but also understanding is important so is evaluation and creation. So, it has been understood that critical thinking is vital in the discourse of education. Without it, the system is strayed. In the words of Freire (1970), Critical thinking must be promoted so that the shackles of oppression must be fully

eradication and true realities of the world must be exposed.

5. Research Findings

According to the findings of this investigation, it has been established by the author that the critical thinking is important in order to understand the general realities if the world. To seek political, social and economic awareness, one must make use of the knowledge he has. Critical thinking is crucial in this context. It sets the platform where the learner can think and practically implement the knowledge. Also, the pedagogy of Pakistan requires the need of Critical thinking in its system. It will not only liberate students but will also ease the pressure from teachers. When students will be able to think and discuss in class, it will not only give them confidence but will also help to listen and debate which will eventually be helpful to them in their long run.

6. Conclusion

A learner's ability to think critically is always vital for him. It doesn't only make him aware but also increases his knowledge and boost his confidence. This research has focused on the Critical thinking in the Pakistani education. It has been studied that, although the country's education follows the traditional path of education and learning but it strives for modern ways well. It looks to incorporates the technique of critical thinking at class room level so that it might help the student and improves the quality of education in the country. Freire (1970) has focused on the critical pedagogy in his book, Pedagogy of the Oppressed and taking help from his framework, it has been observed that in order to enhance the true knowledge of the students, it is important to implement the modes of critical thinking.

7. Future Recommendations

This study will help to see and understand the education of Pakistan. Is has been observed in the current study that there is a practice of traditional methods when it comes to impart knowledge at institution level. So, there is a space for future researchers to explore the dimensions of traditional education in Pakistan. They could see and research the ways to counter the traditionalist methods. Moreover, Critical thinking could be explored and studied furthermore. There are the areas when it could be seen that how critical thinking can aides the general understanding of the learner and how it could help them to apply the knowledge.

Appendix A

Questionnaire Queries

1. Name
2. Qualification
3. Critical thinking important in the educational system of Pakistan
4. The practice of critical thinking is appreciated by the teachers in class.
5. The practice of rote-learning is more common than the practice of critical thinking in the institutions of Pakistan.
6. Pakistan's Educational system is void of critical thinking
7. Rote-learning is consuming the minds of the students.
8. The exercise of rote-learning in Pakistan is due to colonial mindset.
9. Critical thinking must be exercised rather than rote-learning.
10. Critical thinking promotes creativity.
11. It is the role of the teacher to develop the sense of critical thinking in students.
12. General Reading incites the ability of Critical

Thinking.

13. Critical thinking must be incorporated in students right from Primary level.
14. Critical thinking helps students in their professional or future life.

Appendix B

The questions which are asked from the teachers in the interview are complementing the questions which were asked from the students in the interview. The respondents of the interview belonged to the public sector universities of Multan. Following questions were asked from them in the interview.

1. Why Critical Thinking is Important
2. Do you think Critical Thinking helps the student in long run?
3. How Often Students rely on the Material provided to them by the teacher?
4. Do Students follow the practices of rote-learning and cramming in class?
5. How critical thinking could be imparted in the students by the teachers?
6. How teacher counters the practices of rote learning and cramming?
7. What is the role of a teacher in the context of imparting the true knowledge in students?

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Social Isolation of Old Age People: A Case Study of Old Age Home (Aafiyat), Lahore

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Abstract. Senior citizens encountered many problems in their later age due to the abrupt increase in industrialization and economic dependency on their children. Pakistan is a developing country where aging is radially increased nowadays. Radical changes in family patterns lower the ratio of the joint family system in Pakistan. Young children are more likely to adopt a nuclear family system to avoid a bundle of responsibilities towards other family members. As a result, older people have to live alone or move to shelter homes to get the proper care. Although Islamic principles influence Pakistan, Islam preaches us to pay respect and care to elders. However, the ratio of older people in shelter homes is kept on increasing for some years. The present study is conducted in Aafiyat's old age home of district Lahore to determine various socio-economic factors which motivate older people to reside in shelter homes. For this purpose, a qualitative case study design is used to analyze the problem. The researcher carefully selected eight cases which were then interviewed and analyzed by thematic analysis. This study shows that older people of both genders face similar problems in their later age, especially in the case of children's attitudes towards single parents, economic interdependency, lack of decision-making power, and health issues. According to the findings, the researcher draws several suggestions to create appropriate policies beneficial for older people after they retire from economic activities.

Keywords: Social Isolation of Old age people, Marginalization of Senior Citizen, Aging in Pakistan.

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1. Introduction

Aging is mainly the process of growing old with time. It is confined to human beings, but all other living organisms also pass-through aging in their life cycle (Hussain & Manzoor, 2015). Although aging is a biological change in human bodily structure, it also creates few social, psychological, and economic changes in man's life (Susan M. Hillier & George M. Barrow 2011). Susan M. Hillier stated in his book, "Old age represent various things based on the chronological order, e.g., age 65". In the past few decades, there has been a rapid increase in the number of older people. It will keep increasing by 2050 (Department of Economic and Social Affairs, population division, 2013). Aging reduces the capacity of work in older people, due to which they are economically dependent on youth. The gradual decrease in income creates the risk of less access to a healthy diet and medical facilities; as a result, older people are prone to chronic illness (Sherlock, 2000). Stereotypes stigmatize aging with older people as they cannot produce more (Schwarz, 2003).

Family is the primary institution of any society whose essential function is to provide mental, physical, emotional, and economic support to the person in the hour of need. Any dysfunctionality in its functions creates a disturbance in its structure (Amato P. R.1986). The environment of family matters most for the healthy mental and social life of an individual. As people become older, they need .

more attention, love, care, and support from family. Elders hold a central position in the family whether they live with them or not; they should be respected and loved by other family members (Güven, 2006).

Low financial capital or financial insecurity hurts different aspects of the lives of older people, like the role of caregiver and social support is reduced. These all factors contribute to vulnerability among older people. Apart from industrialization, individualism and the desire for independence among youth significantly influence older people's lives (Abrams, Lachs, McAvay, Keohane, & Bruce, 2002).

Pakistani society is based on Islamic values and traditions where older people's dignity is considered more valuable. Islam puts much focus on taking care of older people, and it is the essential duty of children to remain respectful to their elders. The Holy Quran states: "Allah Almighty ordered to pay respect and kindness parents" (Surah Bani Israel). In Pakistan, caring responsibilities are performed mainly by family members of older people in late age, and older people in various families also exercise the decision-making power. However, due to industrialization, there has been a rapid change in family patterns from the past few decades. Older people have become a more vulnerable and marginalized part of our society (Ali, F. A., Israr, S. M., Ali, B. S., & Janjua, N. Z., 2009). However, the increasing number of old age homes in Pakistani society is itself a social dilemma.

Niazi et al. (2009) stated that limited social interaction and social support ultimately create negligence among older people. Older women are more vulnerable to old age changes than men as they are already a marginalized group of society (Tout, 1993). United Nations, 2002 reports that due to abrupt transition in regional and global demographic structures 10% of the world's population encompasses older people in 2000, which tends to increase about 22% in 2050. As far Pakistan, the trends of the aging population is reflected in the following:

Table 1. Pakistan Aging Trends

1990	2000	2006	2025	2050
4.6%	5.8%	6.0%	7.3%	12.4%

Source: United Nations (2002) World Population Aging 1950-2050.

The impact of demographic transition reflects life expectancy in two ways, i.e., improvement in medical science and fertility control, which ultimately increases the country's aging population. The primary cause of the increasing aged population in Pakistan is a consistent decline in mortality with a resulting rise in life expectancy and a reduction in total fertility rate in recent years (WHO, 2015).

Hence, the present study explores various socio-economic factors that motivate older people to reside in old-age homes.

1.1. Research Questions

1. What are the Problems faced by urban old age people while dealing with their families?
2. What are their experiences in old age homes and their point of view regarding particular issues?

2. Methodology

The present study is qualitative, conducted among older people residing in Aafiyat's old age home of district Lahore. Data were collected through an interview guide with a purposively selected sample of both genders living in old age homes of district Lahore. The researcher carefully designed themes for an interview that reflect several issues respondents faced while living with their families. All respondents agreed to cooperate with a researcher on the condition that their data will be kept anonymous and only used for educational purposes. Moreover

responses were recorded in collaboration with Aafiyat, a shelter homework under Social Welfare, and Bait ul Mal, Lahore. All the discussions and interviews were conducted in the local languages of respondents and were recorded by the researcher himself. The collected responses were analyzed by thematic analysis.

3. Results and Discussion

Several key findings and results of this study are discussed below under various themes of aging and family.

3.1. Human Capital and Aging

Human capital refers to "investment in education, training, skills, health, and other values that cannot be separated from the individual, which is a trait crystallized in an individual that cannot be expunged (Becker, 1993). Most of the respondents were engaged themselves in economic activities and focused on the provision of prestige. Due to excessive involvement in economic activities, they spent little time with their children, which ultimately weakened their social ties and faced horrible outcomes in late age (Deshmukh, P. R., Dongre, A. R., Rajendran, K. P., & Kumar, S. 2015). As a respondent expressed:

"We both have tried our best to educate them, but my husband was engaged in his job and other economic issues, and therefore he spent little time with children and with me. I was engaged in domestic work and children were busy in their study anyhow in every night I check out their study, in Eid vacations sometimes we all go for outing in our village, in leisure time I tried to spend with my children. Sometimes we visit my sibling's family."

In continuation of this sense, anything becomes a resource by the action of the human mind, by utilizing human conscious (Golden, J., Conroy, R. M., Bruce, I., Denihan, A., Greene, E., Kirby, M., & Lawlor, B. A. 2009). Humans can improve and preserve other kinds of capital like natural, social, financial capital. However, our focus in this study is to determine the interlink between human capital of older people and their social (time spent together to enhance the level of intimacy and interpersonal attitude) and financial capital (knowledge, skills, abilities) utilizing which can enhance parents' participation (Šlaus & Jacobs, 2011). The researcher also computed the experiences of social and financial capital. A respondent revealed:

"My husband and I also did not compromise on the education of children and their other desire, and we both participate at a home level in their education activities and enable them to get a good job and can able to spend a healthy life, we all go for an outing every holiday and eating together and spent our time, but we both were mostly engaged in job activities and cannot give our leisure time frequently to them either fulfill their all needs we considered that was our responsibility to provide sustainable and standardized life facilities."

3.2. Social Capital & Aging

Social capital as a multidimensional concept includes various parts of the social structure such as participation in the community, feelings of trust and safety, neighborhoods and family connections, and tolerance of diversity (Onyx & Bullen, 2000). Social capital is the sum of resources, actual or virtual, that builds up within an individual or group by creating a solid network (Bourdieu, 1986).

Most of the respondents were failed to pay the concept of self-compassion, but they were the victim of self-neglecting; Staudacher (1987) said that the death of a spouse is a life-altering event. It may impact their health and family financial affairs, which may cause financial insecurity, interlink with their health and children's education, and other

different matters (Deshmukh, P. R., Dongre, A. R., Rajendran, K. P., & & & Kumar, S. 2015). A respondent disclosed that

"I was received a hansom amount from gratuity of my husband. we accumulate our savings, our family financial capital was satiable, but after the death of my husband a big responsibility shifted on my shoulders, the marriages of children and continuity of children's education. Therefore, I suffer initially, and a spent my saving on my children's wedding and remained my assert was my husband pension as financial capital or dependent on my son's financial capital."

Another said:

"Initially I did a government job in judiciary 1965 to 1975 as an assistant, but unfortunately judge terminated me from a job because of our private business, he was against private business, either I was honest and devoted to my job and never had any kind of misconduct, but he considered the other leg-pulling tactics, I was indulged in the restaurant business with brothers. As I have mentioned above, my children were not educated, and they were disobedient. Every day they misbehaved with my brothers. Therefore, they left the business with us. Ultimately our business collapsed. However, I was saving hansom money for the future although, we left our hometown and purchased a house in Lahore. I purchase a car for my sons and provide everything which they asked, and I treated equally with my all children no gender-based discrimination and also fulfilled all desires of my wife but alas!"

(Scoones, 1998) suggested that there are different kinds to securing and saving livelihood strategies compromised range of activities that people undertake to achieve their goal. Based on their choices in a model of sustainable livelihood strategies framework suggested three modes of strategies. (Hamid, 1995) explored difficulties faced by a women-headed household in all spheres of family matters; for this purpose, the researcher used three factors as indicators (i) land owned by household, (ii) economic dependency, and (iii) age of the household and found the economic dependency.

3.3. Social relationships & Aging

Social relationships have a significant impact on the well-being of the individual. The finding of research shows that most respondents prefer the decision by their children, especially in case of marital status transition on their social relationship. Marriage is a culturally approved document (Brown, 1991); most of the time, people will marry at least once in the entire world (Epstein & Guttman, 1984). Bachand & Caron (2001) suggested that a happier marriage life depends upon the cooperation, tolerance, and patience between the spouse and the family member. A respondent stated that:

"In our family, basic decision power was exercised by my husband within a family-like children education and marriages and purchase even the continuity of relationship with relative and friends; information power also exercises by husband. In our family, status and role were determined on gender-based values accordingly socially approved in our society. In society, men were responsible for instrumental (breadwinner) and exercised decision-making power. I do the expressive task (caring for family and children), which roles were socially approved, particularly for a female. Therefore, my husband well knows financial affairs. My husband was a responsible person and caring; when I was pregnant, he looked after me and provided everything which I needed; he was passive and did not behave rude, although the decision power exercised by himself but ensure equality-based and believed in mutual consultation, if it realizes my suggestion is good also considered it"

Blood & Wolfe (1960) said that the structural role within a family is mainly performed by a husband or father (bread earning, decision making, etc.). In contrast, the wife or woman performed the expressive role (caring and looking after with emotional ways) and vice versa.

"In our family, decision power was initially exercised by my mother-in-law. After her death, my husband was fully used authority; after one year of death of my mother-in-law, his attitude changed; he drank and gave abuses to us (me and my daughter) abuses, physical abuse, and emotional abuse. My husband was angry with me on the birth of my daughter; this attitude was harsh for me, he considered me guilty for all that, and this was the height of illiteracy of my husband. My husband doesn't care about us, and even last time he abused my mother-in-law, alas, my mother-in-law (anti) was the nice person she and my uncle when alive they cared for me and treated me as a daughter."

Ali et al., (2009) found that happiness in marital life depends upon collaboration and cooperation among both spouses. People do not try to hurt each other rather; they try to understand one another. Cooperation leads people in a smooth, healthy, and long-term relationship. Kposowa (1999) explored that failure behind a marriage life is the failure of couple incompetency. They are not enabled to develop trust between them.

Moreover, the spouse's attitude plays a significant role in the overall well-being of the family's interpersonal relationship. The active participation of both parents in socialization and human capital development as their participation in activities of financial capital plays a crucial role in successful aging and quality of life. This study shows that significant causes responsible for the social isolation of older people are lack of interpersonal relationships among family members, poor socialization of children, and parents' most minor interaction with children.

3.4. Children's Attitude toward Old Age people

The change in the marital status of older people, divorced, separated, widowed, and widowers in sense change in attitudes of their children, how they are marginalized and becomes vulnerable which directly or indirectly influence on their well-being and quality of life ultimately leads to isolation (Townsend, 1962). Many studies indicate a significant relationship between marital status and an individual's quality of life and life expectancy. It has a more significant influence on one's family resources, relationships, and system (Acock & Demo, 1994). A respondent disclosed that:

"The bereavement of my husband was very painful full, and it impacts negatively on my family. I suffered too much the economic, social problems. However, those moments were harsh for me when my children bypassed me. After my husband's death, my sons controlled the power and marriages their own choices. Due to my children's marriages in out of the family, my relatives were angry with my family left us and emotionally, financially, physically abuses me."

Another stated:

"The bereavement of my elder brother and my husband were very painful for me. Initially, children behaved with me well, I allowed my children to marriages on their choices, I bear which happened in my life unfortunately in the sense of their death, but that is moments were very painful full for me which was, my children just for the sake of their bridal interest, they neglecting me and at the end abuse me."

Another Research Participant expressed:

"Separation of my wife destroyed my family, and in

this continuity, my daughter decision played a role catalyst and destroyed myself and also herself (Daughter), she also still suffers here in old age home with two little kids (divorced by her husband), my sons physically and emotionally abuse me and financial abuse, I did blander to break my relation with my siblings for their (children) sake."

Many different studies show that the ratio of transition in marital status regarding divorced ratio is less than widowed like transition in marital status (Cooney, 1993). Almost all respondents said that the change of marital status badly impacts their decision power, which directly impacts their well-being and depresses them, which ultimately leads to isolation, especially in past old age women were right to exercise the decision power. Many studies indicate a significant interlink between marital status and his or her quality of life and life expectancy. It has a more significant influence on one's family resources, relationships, and system (Acock & Demo, 1994).

3.5. Exclusion from Health: Caregiver Role

"Caregiver refers to someone who provides unpaid support to a family member, partner. This could be because the person is ill, frail, disabled or has mental disability or substance misuse problems" (GSA, 1991). Some of the respondents said that economic conditions also impact the caregiver role. Reinhard et al. (2008) indicate that the relationship between caregiver (children or family member) and care receiver (parents) depend upon the willingness and love of a caregiver. Proper caring results in an increase in positive and emotional well-being. A respondent revealed that:

"My family members were considered me as burden family members ignoring, my son economically not developed and my husband was good caregiver person when he was alive. One day when I asked my daughter-in-law to give me medicine, I felt headaches; my son and his wife were extremely censured and abused me emotionally. I felt very heart my son says "OH! Boharya maazur hai kya khud utta Lao vo bhichary sunbath sae Kam kar rahi".

Another Disclosed:

"No one at home who care for me, I was resident in the guest room, I feel alone no one comes to me either my sons were engaged in their office and own family matters and ignoring me. My daughters-in-law degraded my image; he chided on me. My relatives were already angry with me because of exogamy marriages by my sons after the death of my husband. to seek this attitude by my daughter-in-law (educated ladies), they were scoffed on me."

Brodaty & Donkin, (2009) suggested many factors which encourage and discourage the role of caregiver by family and its members. The researchers suggested that love is a critical factor in motivating family members to perform the caregiver role in this study. The materialistic and individualism discourage this caregiver role and promote this duty as guilty and a burden.

3.6. Social Support & Aging

"Social support refers to that relationship among people that provide not only material help and emotional assurance, but as the sense of that one is a continuing object of concern on the part of other people" (Bonnie & Wallace, 2003). Due to the economic burden, people moved towards the nuclear system. However, that outcome was individualism and materialism increased, and caregiver to older people and their quality of life decreased (Silva, 2005). A respondent claimed that:

"My children not support with me except my younger daughter and our servant maid support with me and little bit emotional support with, whenever I felt uncomforted and hatred, I shared my sentiments

with my younger daughter, living in Karachi. I was using the mobile of our maidservant named Masi Khalida. She cooperated with me enough."

Another stated:

"No one who cares and respects me and give me any kind of support except my daughter, but she was bound from in-laws, and my spouse has broken me, due to his behavior my family destroyed and labeled myself"

Holmen & Furukawa (2002) suggested that support from others and family members gives a sense of care and provides an opportunity to interact and communicate with each other. It gives courage to individuals to share their sentiments and problems. Older people are more disturbed in case of death or loss of a close relative or spouse, weakening their ties with the rest of the family members. Holmen and Furukawa (2002) also explored a close relationship between social support and the quality of life of older people.

3.7. Elderly Abuse & Aging

"The term elderly is used to represent aged, elder and older people age 60 years or above" (Dannefer & Phillipson, 2010). The ratio of neglect abuse is greater than the financial abuses in western culture. It indicates that the financial abuse did not report by themselves because of this cultural privilege and duty to share financial resources with their extended families (Brown, 1989). Studies show that as older people are physically weak, they are primarily victims of elderly abuse (Keyes & Brown, 2009). Se'ver (2009) indicated that the life expectancy of women is higher than men; therefore, the ratio of old age widowed is high among women; hence they are victims of elderly abuse. As a respondent revealed:

"My husband was caregiver person, but my mother-in-law sometimes cried on me, but the moments were hard for me after my husband's death. I suffered too much and faced problems economically. However, I educated my children after the death of my husband. My sons made marriages own their choices; they became disobedient. They embezzlement my property means a house that I owned. Even my educated elderly daughter-in-law scolded me and promoted me as a psycho patient. Although my son abused me and emotionally abused me, that was a hard moment in my life. My son says me" "Ami meray pass itna paisa nhe k tumhary dress ley du mn tumhari puri karo yah apny bacho ki". I was not expecting the kind of behavior in which he was behaving with me. I felt as strange for them as I didn't have any relationship with him. I should not have come with him; she takes a long breath and says alas! My younger sons were also not willing to accommodate me with them. They thought of me as a psycho patient, one day, they brought me to a psychiatrist, he examined me thoroughly, he concluded that I was mentally fit but mentally upset or depressed a little bit. I was not psycho patient at all. Nevertheless, my children thought of so. I was internally broken when they left me at AAFIYAT (old age home). However, my younger daughter has strongly condemned this decision and disagreed with my sons and elder daughter. She tried to convince me to live with her"

Another respondent reported:

"One day, when they tortured me physically, my daughter-in-law pushed me towards the wall, left side hand fractured. I was asked patience; I will leave you alone and go to old age home in replied that they said (son and his wife) "Easey have kehti ho jaati tu nahe es ka Matlab wo mujhy nahe rakhana chatty that." I was saying that just for my sake, may they realize and stop to do wrong with me further, due afraid I move towards old age home they treated me well, but alas I was wrong they already decided about this"

A participant shared:

"Initially, termination from the job this was set back to my financial capital, but the incompetency of my sons destroyed our business not only break my relation with my brother. Due to the incompetency of my wife and disputes in our family, she ignored the socialization and education of our children. Although she was an educated lady, my wife disappointed me; in the continuity of this, my elder daughter's marriage on choice and my wife left me alone, these all factors increased depression and anxiety, and after marriages, my son's behavior had changed. My elder son had been tortured on me and broke my teeth. My sons stole my house land ownership, which I was owned. One day when I went back to the house, what I saw, I found the house had been locked. Then I called my son,' where are you? Through telephonic conversation, I asked him, oh! My son me waiting for you, my son, replied me (that was the most challenging day in my life). "Aaba jidr Jana hai chaly jao humaray pass naa tu tumhary leay jaga hai aur naa he paisy". I was weeping at the doorstep of my own house, and my tears were trickling down like pearls; I say to people that someone tells my children I'll never ask for anything from my children except their love please come back I am wanting to live with my children."

Roberts (1993) shows that do aging older people are unable to perform more social roles, especially related to physical work, and are unable to contribute. Society exploits older people in different modes like disrespect, economic abuse, physical abuse, neglecting abuse, and emotional abuse, which are frequently reported except sexual abuse.

WHO (2002) reports that the disrespect of older people and neglecting abuse are more frequently reported. Studies show that disrespect among old people is a significant issue among families and has enormous negative impacts on their lives. In many developing and under-developing countries, neglecting abuse and disrespect of older people become worse; therefore, researchers suggested that society should counter this evil which spread radically at all levels.

Alves & Wilson (2008) studies indicate that the decline in the quality of life among older people is the outcome of elderly abuse. These different kinds of abuses negatively impact their physical, mental, and emotional well-being.

4. Conclusion

Briefly, interviews and focus group discussions conducted in Aafiyat's old age home revealed that many older people are forced by their families to leave their homes. Almost all respondents were satisfied with old age facilities, but some of them demanded an encashment allowance to fulfill their bodily desires quickly during the study. Respondents agreed that although old age home is not alternate of their own family, at least faculty of old age accept them with their weaknesses. Respondents disclosed that they want to return to their families, but their families are not ready to accept them. They suggested a need to develop a sense of consciousness among family members and elders regarding family transition and problems of old age.

Suggestions

a. Replacement of self-neglecting attitude with self-compassion.
b. Discouragement of individualism and materialistic aspects in socialization.
c. Discouragement of stereotype aging.
d. State-wide public consciousness campaigns and policymaking should be considered old age problems.
e. Practices of religious principles.
f. Gender socialization should give preference to the morality system.

a. Chapter about moralities should include in academic.

b. Promoting and organizing the session and activities for intergenerational interactions.

c. Promoting the dignity of older people through media.

d. Family importance should promote among youth.

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A Morphosemantic Analysis of An Agent Theta Role in English and Sindhi

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Abstract. The goal of this research is to figure out and analyze the argument/thematic structure of Sindhi verbs. In Sindhi, it emphasizes agent thematic relations. The study aims to determine the agents' argument/thematic structure in English and Sindhi. The information is based on verbal/oral Sindhi. To analyze the agent thematic relations in Sindhi; their relevance and position in sentences, each verb phrase is analyzed in terms of argument/thematic structure. The data are analyzed using Carnie's (2006) "Theta Roles and Thematic Relations." The study finds that Sindhi agents are like English agents in terms of function and relevance. The sole difference is that Sindhi agents are more adaptable than English agents; they have more flexibility in terms of place and position in the verbal form of the language. It has also been seen that spoken Sindhi violates the position of agents. However, this violation does not affect the syntax and semantics of agents; it is equally well accepted. Such violations are very common in Sindhi, and they are grammatically accepted, and theta roles and thematic relations are realized in them. In contrast to English, Sindhi agents can be used at the beginning, middle, or the end of a statement in spoken Sindhi. Sindhi agents have a larger presence than English agents.

Keywords: Thematic Relations, Argument Structure, Agents, English, Sindhi.

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1. Introduction

Every language has a distinct structure that distinguishes it from others. They may have the same communication goal, but they will never have the same structure. The structure varies depending on the language. The structure of Sindhi, for example, differs from that of English, and vice versa. English has an SVO structure (subject, verb, and object), but Sindhi has an SOV structure (subject, object, and verb). Every language has its own morphological, phonological, semantic, and syntactic qualities that distinguish it from other languages.

In terms of the features mentioned above, Sindhi is one of the subcontinent's oldest and richest languages (Fahmida, 2012). Sindhi is written in three different scripts, all of which have identical pronunciation and vocabulary: (1) The Arabic-Sindhi script, which is used in Pakistan, (2) the Devanagari script, which is used in India, and (3) the Roman script, which is used on the internet, mobile phones, and tablets, among other things (Jatly, 2013; Tarachandani, 2011).

Sindhi grammar, morphology, phonology, and especially parts of speech have all gotten a lot of attention. Sindhi semantics and syntax, on the other hand, have received little or no attention. There is no detailed study of Sindhi syntax available (Pitafi, 2009; Fahmida, 2011). Sindhi is the oldest and most widely spoken language on the subcontinent. The major portion of syntax, on the other hand, is completely ignored. In general, there is good work on Sindhi grammar, but there is little or no work on syntax.

Stack (1849), Ernest (1872; 2011), Munshi (1925), Baig (1925), and Adwani (1926) were among the first to publish about Sindhi morphology, grammar, and parts of speech. Neither they nor their followers have written extensively about Sindhi syntax. It's either been overlooked, or these are current language phrases that they are unfamiliar with. Modern writers such as Fahmida, 2009; Rahman, 2009; Rashdi, 2009; Pitafi, 2010; Jokhio, 2012; 2013 & 2014 continue to ignore it. As a result, the study's goal is to determine Sindhi verbs' Argument/Thematic Structure in terms of Agent Thematic Relations.

2. Background of the Study

2.1. Verbs in Sindhi

The verb is a highly important aspect of a sentence since it depicts the activity of the phrase. The Argument Structures of arguments are established by verbs. Theta roles and thematic relationships are assigned to the arguments by verbs (Dowty, 1991; Oltra-Massuet & Castroviejo, 2014). Arguments are revealed through the nature of verbs. Transitive verbs, for example, are two-place arguments, whereas intransitive verbs are one-place arguments (Carnie, 2006; Radford, 2009). The verbs are referred to as the sentence's body (Jokhio, 2012a). A verb is a word that describes an activity or the state of someone in a sentence.

Maintverbstandttotbetortauxiliarytverbstaretthe two sorts of Sindhi verbs (Jokhio, 2012b; Zahid, A., 2016). Auxiliary verbs are subdivided into free auxiliaries and connecting auxiliaries, and main verbs are further divided into regular and irregular verbs. Sindhi verbs are developed from imperative forms (Baig, 2006). Sindhi imperatives are nouns in Sindhi, but they also function as verbs, and many other verb forms are derived from them, which is why they are referred to as basic forms in Sindhi. Nominative, accusative, and state cases of nouns are likewise derived from imperatives, according to Baig (2006). The objects of Sindhi irregular verbs do not appear in the sentences directly (Adwani, 1926 & 1985). Sindhi verbs are divided into two categories: intransitive and transitive verbs, which are further divided into subcategories (Allana, 2010; Jokhio, 2012; Khoso, 2005; Rashidi, 2007; Acuña-Fariña, J. C., Meseguer, E., & Carreiras, M., 2014; Agmon, N., & Bloch, Yigal. (2013).

2.2. Theta roles and argument structure

The theta criterion sums up the requirement of this approach: each predicate's thematic function must be allocated, and there must be no NPs without a thematic role. One and only one theta role is allocated to the Theta criteria. And each theta role has only one argument allocated to it (Haegeman, 1984). Internal theta role assignment, external theta role assignment, and prediction are the three types of theta role assignment. Agents are external participants, themes are internal participants, and prediction is an action (William, 1987). There can be multiple thematic relationships in a single argument (Jackendoff, 1990). Agents aren't verbal arguments; they're external arguments (Jackendoff, 1987; Williams, 1987; Grimshaw, 1990; William, 1995; Davis, 2009; Veesar et al., 2015a; Veesar et al., 2015; Veesar et al., 2016). Dowty (1991) also mentions in his work that a single argument might have multiple theta functions. Two arguments, on the other hand, cannot have the same theta role. Agents aren't verbal arguments; they're external arguments (Jackendoff, 1987; Williams, 1987; Grimshaw, 1990; William, 1995; Davis, 2009; Maisarah et al., 2016). Dowty (1991) also mentions in his work that a single argument might have multiple theta functions. Two arguments, on the other hand, cannot have the same theta role. Arguments can be Agents or Patients depending on their verbal entailments in the structure; roles are not distinct, but prototypes described by verbal entailments (Adger, D., 2007).

External and internal parameters can both be used in an expression. Agents are subjects in English, while Themes are objects, and subjects are higher than objects (Baker, 1996). Some English verbs accept only one argument, while others accept two, and even others, such as 'give,' accept three. Baker, on the other hand, proposes creating a new widely agreed thematic hierarchy. Agent is higher than a theme, and the theme is higher than a goal, according to him. He disputes Grimshaw's (1990) thematic hierarchy hypothesis, in which Goal is ranked higher than Theme (Borik, O., & Mateu, Jaume, 2014; Luuk, E., 2009).

Semantic roles are examined on three levels: participant roles, theme roles, and syntactic relationships. Theta responsibilities are allocated based on the structure of the clause's phrase. The arguments cannot be analyzed in isolation; they are linked to other elements and can bear one, two, or three thematic relationships (Lehmann, 2005). Theme structure is a partial representation of meaning made up of thematic relations and their reasons (Wechsler, 2005). Various linguists have worked extensively on the argument of the semantic role, such as Panini's (cited in Dowty, 1989) semantic roles, Fillmore's (1968t&t1977) on "deep cases", and Fillmore (1968) claims that "If there is an A, it becomes the subject; otherwise, if there is an I, it becomes the object; otherwise, thetsubjecttistO."tIntlanguages, the arguments are arranged in a hierarchical order. Theta roles are allocated based on the structure of expressions, but they can also be based on content (Bierwisch, 2006). His theta role hierarchy is as follows: Instrument>Patient/Theme>location>Agent>Recipient>Experiencer/Goal>

The verbs and the arguments are linked together. The right roles for verbs can also be learned through the conceptual relationship between events, acts, and objects (Willits, D'Mello, Duran, & Olney, 2007). Linguistictexperiencetistinsufficienttfortlearningtthet propertroles for verbs. A collection of semantic roles is ranked in the thematic hierarchy (Rappaport & Levin, 2007). Because theme hierarchies are not universal, there are issues. The importance and frequency of theta roles vary by language. The semantic elements aid in the realization of arguments and the assignment of theta roles (Dowty, 1991). Fillmore's well-known subject selection paradigm is rejected by Dowty. He claims that each thematic hierarchy is valuable since it adds to our understanding of theta roles and their hierarchy (Veesar, Sriniwass & Kadhim, 2015b).

External and internal arguments are sandwiched between applied arguments. These arguments are beneficiaries, and they are always accompanied by ditransitive verbs, as seen in Hiaki. External arguments are introduced via causative verbs, and interior arguments are introduced by applicative morphemes in Hiaki (Harley, 2012). External arguments are simply arguments that are added to the verbal structure (Marantz, 2012). A syntactic feature of an expression is the displacement phenomenon, which can be overt or covert (Hackl, 2013; Filmore, C. J., 1968).

2.3. Theta roles and thematic relations

A theta role is a collection of thematic relationships related to a specific argument (Carnie, 2006). Three arguments in the following statement have five thematic relationships: agent, theme, recipient, source, and objective.

1) Ali handed Peter a present.

Ali is a representative who is presenting Peter with a gift. It also serves as a source in the sentence; the context reveals that 'a present' is passed from Ali to Peter. As a result of this, Ali is also a source in the preceding sentence. The theme of the sentence is 'a

present,' which is given to Peter as an action of the sentence. Ali gives a gift to a person named 'Peter.' As a result, Peter is the one who receives the present in the sentence. In the statement, Peter is also the goal; Ali gives Peter a gift. Peter is the gift's intended recipient. As a result, the three arguments (Ali, a present, and Peter) in the above sentence have five thematic relationships.

A semantic relation between the argument and the predicate is known as a theme relation (Carnie, 2006). It is verbs that demonstrate theta roles and thematic relationships, as well as their relationship to the sentence's predicate. The semantic roles of participants are described using theta roles and thematic linkages (Radford, 2009). The following example will demonstrate this.

2) He was apprehended by the cops.
(Representative) (Theme)
The agent who is arresting 'him' is represented by the argument 'the cops.' The second argument, 'he', is a theme that goes through the action of being arrested by the cops.

The use of what are known as theme relations is one technique of encoding selection limitations. These are specific semantic phrases that describe the role that the argument performs in relation to the argument. The names of the participant roles linked with a predicate are known as theta roles. The participant is commonly referred to as a predicate-argument (Carnie, 2006).
According to Carnie (2006), an agent is a person who starts or completes a task. The most common subjects are agents; however, they can also appear in various roles. Experiencers are arguments that feel or perceive events. Experienced people can be the subject or the object of an argument in a variety of ways. Themes are entities that undergo acts, are moved, experienced, or perceived. A goal is an object toward which motion is directed. The source is the opposite of a goal. A recipient objective is a unique type of goal. Recipients are only used with verbs that indicate a transfer of ownership. The location is the place where the activity takes place. The instrument is the object that is used to conduct an activity. The beneficiary is the person who benefits from a particular event.

3. Methodology

The current study is a qualitative one (Creswell, 2004; Kumar, 2011; Neuman, 2006). The purpose of this study is to look at the Sindhi verbs' Argument/Thematic Structure in terms of Agent Thematic relationships. The purpose of this study is to investigate and analyze the role, relevance, and function of agents in Sindhi. The research is exploratory and descriptive in nature. The oral Sindhi dialect was used to research the nature and function of Agents.

The study's data were gathered from native Sindhi speakers. The information was gathered through conversations with the native Sindh's. The participants were questioned about their personal lives, education, current position and status, family, present, prior, and future, and goals. The participants were provided an open and natural environment in which to speak freely and spontaneously, allowing them to express themselves more fully.

3.1. Analysis of the data

The data were analyzed via using Carnie's (2007) "Thematic Relations and Theta Roles." It also serves as the study's analytical framework. In Sindhi, researchers attempted to decipher the Agent theta roles. The study looks at how Sindhi verbs carry Agents and how arguments are assigned agent theta roles and thematic relationships. The Sindhi verbs' Argument Structure is constructed in order to

determine the location and relevance of Agents.

3.2. Theta-Criterion

Each argument has only one theta role given to it, and each theta role has only one argument assigned to it (Chomsky, 1981 & 1982; Haegeman, 1994; Carnie, 2007; Radford, 2009; Bobaljik, Nevins & Sauerland, 2011; Ouhalla, J., 1999).

3.3. Thematic relations and agent theta roles

Thematic relations link situations to the people who are in them; they demonstrate the relationship between people and situations, and they serve as a link between syntax and semantics (Davis, 2009; Fabregas, A., 2014).

One argument can have more than one theta role and thematic relations. Two arguments, on the other hand, cannot have the same theta role at the same moment (Dowty, 1991).

The agent is the person who initiates or performs an action (Carnie, 2006). Lear and David are agents in the following sentences. The most common subjects are agents; however, they can also appear in various roles.

3) Lear smacked John.

4) David was the one who shattered the bottle.

In example (3), the sentence's topic is Lear. Lear strikes John with his fist. Lear strikes John of his own volition. In example (4), David also performs the action of breaking the bottle.

Both Lear and David's arguments exhibit agent-proto characteristics (Dowty, 1991). As a result, they are the agents of the preceding cases.

Let's have a look at the following Sindhi sentences that show agent theta roles and agent thematic relations in the verbal form of Sindhi.

Table 1 is an example (5) of agent theta relations in Sindhi

Sentence Description	Sentence
Arabic script	گوٺ ڀڄي آيُس مان.
Roman script	Goth bhaji aayus maan.
Transliteration	Goth= village; bhaji=run; aayus=came; maan= I.
Translation	I came to the village.
Syntactic Analysis	(**Subj:** مان=*maan*=I, **VP:** ڀڄي آيُس = *bhaji aayus* = came, **AdvP:**گوٺ=*goth*=village)

Table 1 demonstrates the structure of a Sindhi sentence (example 5) in which the speaker uses 'مـــان= maan = I' as a subject/agent at the end of the phrase, 'گوٺ = goth = village' as an adverb at the beginning of the sentence, and 'آيُس ڀڄـــــي = bhajitaayus = came' as a verb in the middle. The structure of the sentence reveals that the verb is an intransitive verb that only requires one argument (subject) to make the statement complete. As a result, the Projection Principle and Theta-criterion are satisfied in the above-mentioned situation.

The first argument 'مـــــان= maan = I' is a first-person singular pronoun that replaces a proper noun (a person), and a person can do any action in the statement. In this line, the argument 'I' is doing the action of 'coming.' The phrase form indicates that the deed occurred in the past; an agent visited his village. As a result, this argument can be described as the agent performing a coming action (from somewhere to his village).

It has an agent theta role and an agentive thematic relation in the sentence, as well as a nominative case.

The other argument t'گـــوٺ = goth = village', indicates the location or place where the sentence's subject is heading.

As a result, it can be argued that it is a locative in the sentence because of the locative thematic relation and the locative case.

Table 2. Example (6)

Sentence Description	Sentence
Arabic script	اُنهيءَ کان پوءِ وري هليا ويندا هون آفيس ۾.
Roman script	Unhe khan poi wari halya wenda hon aafice mei.
Transliteration	Unhe=that; khan=from; poi=then; wari=then; halya=go; wenda=will go; hyon= are; aafice=office; mei=in.
Translation	Then (we) go back to the office.
Syntactic Analysis	(**Subj:** zero (null), **obj:** zero (null), **VP:** هليا ويندا هون=*halya wenda hon*=go, **AdvP:** اُنهيءَ کان پوءِ وري=*unhe kahn poi wari*=then, **PP:** آفيس ۾=*aafice mei*= in office)

The form of a Sindhi sentence is shown in Table 2 where the speaker utilizes zero-argument as the subject, 'آفـــــــيس = aafice = office' as a complement phrase, and 'ويندا هون هليا = halyatwendathon = go' as a verb in the middle position of the sentence. In the Phonetic Form (PF) of the sentences, the structure of the above-mentioned example demonstrates that it has zero arguments at the subject and object positions. However, because it is an intransitive verb, the Logical Form (LF) or deep structure of the sentence reveals that it has an argument at the subject position but none at the object position. The previous example's subject is omitted in the PF of the sentence, but it can be inferred and recovered by using the Recoverability Condition. In morphologically rich languages like Sindhi, the lost subject can be retrieved by verb inflections (INFL) and agreement (AGR) (Haegeman, 1994). In the aforementioned example, the inflections of the verb phrase reveal that the deleted subject is a first-person plural masculine (we). The subject of the statement is hidden in the surface structure; we won't know who the subject is unless we look at the deep structure of the sentence, because no unambiguous subject is expressed in the surface structure. The phonological inflection 'آ = aa = agreement' in the verb 'ويندا = wenda = will go', on the other hand, indicates that the subject in the phrase must be a first-person plural masculine (we), with an agent theta role. The argument 'آفيس = aafice = office' indicates the action's purpose and location in the sentence. It has aim and locative thematic relation as a result

Table 3. Example (7)

Sentence Description	Sentence
Arabic script	اسان کي بابا اسکول موڪليندو هو.
Roman script	Assan khy baba iskool mokleendo ho.
Transliteration	Assan=we; khy=have; baba=father; iskool=school; mokleendo=will send; ho=was.
Translation	Father used to send us to school.
Syntactic Analysis	(**Subj:** بابا=*baba*=father, **obj comp:** اسان کي=*assan khy*=us, **VP:** موڪليندو هو=*mokleendo ho*=used to send, **PP:** اسکول=*iskool*=to school)

Table 3 depicts a Sindhi sentence in which the speaker utilizes the subject 'بـــابـــا = baba = father' in the middle position, the object 'اســـــان = assan khy = (to) us' in the beginning position, and the verb 'هو موکلـــــيـــــندو = mokleendo ho = used to/would send' in the end position (SOV). The PP, EPP, and theta-criterion are all followed in the form of the above statement.

The first argument, 'بـــابـــا = baba = father', is a common noun that can perform an action within the sentence. This argument is the subject or agent of the nominative case phrase, which is performing the action of sending "them" to "the school." As a result, this argument can be defined as the agent in an agent theta role with an agentive thematic relation in the sentence. The direct object or theme of the sentence is the second argument, 'اسان = assan khy = (to) us' (Carnie, 2006). Because it is employed at the object position in the sentence, it has an accusative case. This argument is also the beneficiary of the sentence who takes benefits from the sentence. It benefits from the subject of the sentence's action (being sent to school). The third argument,' school', is a goal with a goal theta role and a goal thematic relation. It aligns with the studies of Sadler, L., & Camilleri, M. (2013), Ali, Z., Roonjho, Z., & Brohi, F. M. (2021)

Table 4. Example (8)

Sentence Description	Sentence
Arabic script	تہ آءُ اُنهي شيءِ کي هي فالو ڪندس.
Roman script	Ta aaon unhe shae khy he faalo kandus.
Transliteration	Ta=that; aaon=I; unhe=that; shae=thing; khy=have; hee=also; follow; kandus=will do.
Translation	I will follow only that thing.
Syntactic Analysis	(**Subj:** آءُ =*aaon*=I, **obj:** اُنهي شيءِ=*unhe shae*=that thing, **VP:** فالو ڪندس=*faalo kandus*=will follow, **conj:** تہ=*ta*=that, **AdvP:** کي هي = *khy hee* = also/too)

Table 5. Example (9)

Sentence Description	Sentence
Arabic script	جيڪو هي اسان جي گڏجاڻي آمي آن ۾ مان توهان جو انٽرويو وٺندس.
Roman script	Jeko hee assan ji gadjani aa una mei maan tahan jo interview wathandus.
Transliteration	Jeko=that; hee=this; assan=we; ji=of; gadjani-meeting; aa=is; una=that; mei=in; maan=I; tahan=you; jo=of; interview; وٺندس=wathandus= will take.
Translation	I will take your interview in our meeting.
Syntactic Analysis	(**Subj:** مان=*maan*=I, **obj:** توهان جو انٽرويو=*tawhan jo interview*=your interview, **VP:** وٺندس=*wathandus*=will take, **PP:** جيڪو هي اسان جي گڏجاڻي آمي آن ۾=*that this our of meeting have that in*=in this our meeting)

Table 4 presented above shows the Sindhi sentence structure where the speaker uses 'آءُ=aaon=I' as a subject at the initial position, 'اُنهي شيءِ= unhe shae = that thing' as an object at middle position and 'فالو ڪندس = faallotkandus =will follow' as a verb at the end of the sentence. The construction of the preceding sentence shows that it satisfies the Projection Principle by portraying the phrase syntactically, the Extended Projection Principle by having an overt subject and the Theta-criterion theory by theta marking the arguments (Chomsky, 1981).

The first-person singular pronoun 'آءُ=aaon=I' is the subject of the sentence and has the power to perform an action in the phrase. The function of this argument is to 'follow' something in the statement. The inflection 'pesh=u=phonological inflection' in the verb 'ڪندس=kandus= will do' indicates that the subject will act in the future (by the following something). It indicates that the sentence's speaker wishes to demonstrate that he or she will follow something in the future. As a result, this argument is the subject of the sentence in the nominative case, and it has an agent theta role in the sentence with an agentive thematic relation. The object of the argument 'اُنهي شيءِ = unhetshae = that thing' has an accusative case. It is the sentence's object or theme,

Table 5 depicts a Sindhi phrase in which the speaker utilizes the subject 'مان = maan =I' in the middle position, the object 'توهان جو انٽرويو = tawhan jo interview = your interview' in the middle position, and the verb 'وٺندس = wathandus = will take' at the end of the sentence. Because it is a transitive verb, it accepts arguments at the subject and object locations in order to provide a complete meaning. It also has another argument in the prepositional phrase '= our of the meeting have that in=in this meeting'.

The Projection Principle (PP), Extended Projection Principle (EPP), and Theta-Criterion Theory are all satisfied by example 9 in table 5. The example given above is syntactically sound; it has an overt argument in subject position and theta indicates the arguments (Haegeman, 1994).

The first argument is a first-person singular pronoun 'مان = maan = I', which is used in place of a proper noun and indicates the sentence's agent. This argument is the sentence's agent since it indicates that it will perform a function in the future (will take interview). This argument will interview someone in the future, based on the form of the statement. As a result, it may be argued that the agent in the sentence has an agent theta role and an agentive thematic relation. The argument 'توهان جو انٽرويو = tawhan jo

interview = your interview' is the one that will be subjected to the sentence's action (will be taken). As a result, the sentence's theme is thematically related to the sentence's theme.

The final argument is in the form of a prepositional phrase: 'اســـــان جي گڏجاڻي آهي اُن ۾= assanji gadjani aahy una mei= in this /our meeting'. It talks about the common word 'گڏجاڻـــي = gadjani = meeting', which is followed by the possessive pronoun 'اســـــــان جي = assantji =ours'. Because 'meeting' is an abstract term that cannot be seen or touched but can only be felt, it neither performs nor suffers any actions. The first argument, 'مـــــــــان = maan = I', is debating the third argument. This argument benefits the sentence's subject: the subject (I) benefits from this meeting since he records someone's language. Furthermore, the first argument, which is an agent in the sentence 'مان = maan = I' has a beneficiary thematic relation, since it benefits from the argument 'meeting', implying that the agent (I) benefits from taking an interview during the meeting. Thus, the argument 'مـــان = maan = I' has one theta role, namely, 'agent,' and two thematic relations, namely, agent and beneficiary. It is both an agent and a beneficiary because it performs a recording action and reaps the benefits of the meeting.

Table 6. Example (10)

Sentence Description	Sentence
Arabic script	هٽي آءُن يونيورسٽي مليا ۾ پي ايڇ ڊي ڪري رهيو آهيان.
Roman script	Hity aaon University Malaya mein PhD kary rahyo aahiyan.
Transliteration	Hity=here; aaon=I; University Malaya mein=in University Malaya; PhD; kary=do; rahyo=progressive (ing); aahiyan=am.
Translation	I am doing PhD here in University Malaya.
Syntactic Analysis	(**Subj:** آءُ=*aaon*=**I, obj:** پي ايڇ ڊي=PhD, **VP:** ڪري رهيو آهيان=*kary rahyo ahyan*= am doing, **PP:** يونيورسٽي مليا ۾ =*University Malaya mein*=in University Malaya, **Adv:** هٽي=*hity*=here)

Table 6 shows the Sindhi sentence structure, which includes a verb phrase (VP), two noun phrases, a prepositional phrase, and an adverbial phrase. The noun phrases with the agent and the theme theta roles in the sentence are 'آءُ=aaon=I' and 'پـــي ايڇ ڊي = Ph.D.'. The Projection Principle (PP), Extended Projection Principle (EPP), and theta-criterion theory are all satisfied by example 10 in table 6. The example given above is syntactically sound; it has an overt argument in subject position and theta indicates the arguments (Haegeman, 1994). The first argument (NP) 'آءُ=aaon=I' is a first-person singular pronoun that can be used in place of a proper noun. Because it is utilized for a person, a human, it can do an action in a sentence. The same is true in this sentence; this argument is acting in the sentence; it is doing 'پـــي ايڇ ڊي = Ph.D.' at the University. The phrase construction indicates that the subject (I) is pursuing a Ph.D. at a university. As a result, it can be claimed that the agent of the sentence, which has the agent theta and agent thematic relations and a nominative case in the sentence, is above this argument. The second argument, 'Ph.D.,' is the sentence's object, and it plays a theme theta role in the sentence. The sentence in this argument has an accusative case.

4. Discussion

The previous examples demonstrate that the Sindhi language follows a similar pattern of employing Agent theta relations. In the English language, agents are considered to be subjects or doers of activities. The Sindhi language follows the same pattern, with Agents serving as subjects in sentences. In English sentences, agents are positioned in the first position (both written and spoken forms). In the sentences "Ryan hit Andrew" and "Michael accidentally smashed the glass," we can see the placement/position of Agents (Carnie, 2006). Ryan and Michael are agents, and they are mentioned first in the preceding words. In passive sentences, where objects generally take the role of subjects, their

positions can be modified. According to our findings, Sindhi has the same pattern of inserting subjects at the beginning of sentences as English (Allana, 2010), although it differs in spoken Sindhi.

There are some instances where the spoken Sindhi language disregards the placement requirements for agents, placing them at the beginning, middle, and even conclusion of sentences. In Sindhi, adverbs are sometimes placed before agents that would normally be placed with the verbs. In Table 6, Example 10, an adverb is inserted at the beginning of the sentences, followed by the agent. Agents should be at the beginning of sentences, and adverbs with verbs should be in the center. Such agent and adverb placement errors, on the other hand, do not affect the structure or meaning of spoken Sindhi; it is equally accepted and grammatically correct. The theme argument is followed by the agent in Example 7 in Table 3, indicating that the theme is at the beginning of the phrase and the agent is in the middle. There are few instances in which agents are inserted in the middle of a spoken Sindhi phrase that should not be done in written Sindhi. In table 5, example 9, the subject (I) appears in the center of the sentence. Example 5 in table 1 demonstrates that the Sindhi agents can be placed after a sentence that should otherwise be placed at the beginning. In the surface structure or Phonetic Form (PF) of the sentence, there are a few other locations where agents are completely removed (see the example 6 in table 2). The deleted agents can be inferred and retrieved from the sentence's verb inflections (INFL) and agreement (AGR) (Chomsky, 1982; Haegeman, 1994). The data analysis reveals that the Sindhi agent placement is not followed in the spoken Sindhi language. However, it's worth noting that this breach of agent placement does not affect the structure or meaning of sentences in spoken Sindhi.

In English, agents perform an action in sentences such as (3) and (4) 'Lear hit John' and 'David smashed the bottle.' 'Lear' is in charge of 'hitting' John, while 'David' is in charge of 'breaking' the bottle. According to the analysis, Sindhi agents perform the same function in sentences. Agents are important in Sindhi because, like in English, they are the head words of sentences. The character of agents in sentences reflects the nature of activities; animate agents are particularly active in sentences, which is why they use action verbs to demonstrate specific acts. The Sindhi language primarily uses action verbs to depict actions; as a result, it employs active agents who are actively engaged in the activity. Sindhi verbs can be transitive or intransitive (Adwani, 1985; Baig, 2006); in both circumstances, they take agents, who are active with transitive or intransitive verbs.

5. Conclusions

The number of theta roles varies by language; each language has its own set of theta roles and thematic relationships. The purpose of this study is to investigate the agent thematic relations in Sindhi. Carnie's (2006) 'Thematic Relations and Theta Roles' was used to analyze the data.

It has been discovered that the Sindhi language follows a pattern of using agents that is nearly identical to that of the English language. Agents in English and Sindhi are placed at the beginning of a normal sentence. The written and spoken forms of English have the same pattern of word placement. Sindhi, on the other hand, varies from English in this regard because it has a fixed location (i.e., beginning) for agents in written form but none in spoken Sindhi.

In the spoken form, the placement and location of agents are more flexible; agents can be placed at the beginning, middle, or conclusion of a sentence. The current study's intriguing discovery is that such agent placement violations in spoken Sindhi do not affect the structure or meaning of the sentences.

Sindhi verbs are largely action verbs, which require agents to do acts in sentences. Agents have been discovered to be particularly active in the Sindhi language. Agents have a larger theta role in the Sindhi language in terms of prominence and frequency as a result of this.

6. Contribution of Study

This study contributes to the existing literature on morphology, syntax, and semantics of the Sindhi language. This study can be beneficial for researchers, students, teachers, and linguists of Sindhi as well as other surrounding languages of the country. This work can be replicated by other researchers into their mother tongues to see the application of agents and other theta roles in their languages.

7. Delimitations and Recommendations

There are ten theta roles in Sindhi (Ali, Z., 2016). However, the current study is limited to only agent theta roles. The study attempts to have the morphosemantic analysis of agent theta roles and thematic relations in Sindhi. Besides, it is only limited to the spoken form.

The study interviews only two native speakers of Sindhi for collecting the data. However, in the future, it can be extended to other theta roles. Sindhi theta roles can be compared with Urdu, Punjabi, Saraiki, Balochi, Pashto, Brahui theta roles and thematic relations.

It is also recommended to have a cross-linguistic and cultural analysis of thematic relations among Pakistani languages so that we may come to know the semantic and pragmatic variations through morphosyntax.

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(Re) Living the Partition Trauma: A Psychoanalytic Study of Gulzar's Footprints on Zero Line: Writings on the Partition

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Abstract. This study examines the trauma caused by the partition of the subcontinent as represented in Gulzar's selected short stories. The partition of the subcontinent is a historical phenomenon that affected the lives of the people in South Asia. This research tries to reveal how the things left behind resurface in new contexts. Freud's psychoanalytical concepts of the 'Conscious' and the 'Unconscious' have been employed to explore the disastrous effects of the partition on the lives of the people living in this region. It also uses Bernstein's notion of re-contextualization in analyzing how the Partition has been revisited decades later in Gulzar's selected short stories. The study illuminates the elements of loss and tragedies through fabrics of memory, melancholia, and (re)living the trauma in the selected short stories. The research concludes that the effects of trauma and nostalgia are ongoing on people's present and future lives. The study reveals how madness, death trauma, and fear of abduction due to the partition and modern contexts have both continuation and uniqueness.

Keywords: Partition, Trauma, Nostalgia, Memory, Melancholia.

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1. Introduction

Partition is central to modern identity in the subcontinent as it contains the unimaginable memories of violence. Jalal (2000) called the Partition a central historical event of the twentieth century in South Asia. Partition is commonly understood as the division of a state into two or more entities, where both countries make great boundaries and in which at least one is a successor state while the other state is in developing continuity. The Partition displaced between 10–12 million people on religious lines, creating overwhelming refugee crises in the newly dominions. Ishiyama (2018) writes that there was large-scale violence that disrupted the circle of normal life, with a great loss of lives, identities, honors, dreams that were associated with the partition. In the partition, dehumanization and honor-killing created an atmosphere of disgust and fear between India and Pakistan. It casts gloomy shadows on their past, present, and future.

The Partition of 1947 has influenced the works of a whole generation of writers and continues to do so. Veteran poet lyricist, Gulzar, is known for his selected short stories “Crossing the Ravi”, “Two Sisters”, “Fear”, “Partition”, and “LOC” -- all throb with the lived experiences of the partition. The parts of his newly published anthology Footprints on Zero Line: Writings on the Partition (2017) bring out the (re)living of trauma of the Partition 'painfully alive' by examining the status of refugees in the post-partition era. Footprints on zero line were originally written in Hindi but Jalil translated it into English. These selected short stories explain the horrors, madness, and consequences of the Partition that has been living with even after seventy-three years of independence. Gulzar does not remain a captive of

his memories because his creativity moved on with his selected short stories, films, television series, and songs. The personal and the real incidents of the Partition are never far from the remembrance of Gulzar's writings on the partition. Gulzar reappears in the partition to testify the pain of different traumas in people's lives.

They were willing to get believed that their loved ones were merely lost, not gone forever. Reading the contents of Footprints on Zero Line in a particular order, the reader feels that the Partition is not merely an act of severance but a historical event that is located in a certain time and place. The Partition of 1947 seems to rise above its time and circumstance that speaks to him, and not just once or twice but many times. It is a metaphor from cinema as a 'voice-over' for the work of Gulzar. This initial impression is reinforced when one takes into account this volume in its entirety.

The present research explores the Partition not merely in terms of the events of August 1947, but as an outgoing process that continues to show the political, cultural, emotional, and sexual life of the partitioned people in South Asia at the time of partition. The research analyzes the ways to locate the Partition and the attendant system of minorities and sectarian violence through the idea of beliefs as continuing, unfolding processes of the concept of postcolonial nation-building.

It examines the far-reaching presence of these formations in current configurations of politics, culture, and subjectivity by mobilizing the interdisciplinary scope of revisiting the trauma and memory studies in conjunction with literary analysis. This study of the Partition draws on a wide range of artifacts such as tropes of performance, mourning rituals, testimonials, archaeological ruins, short stories, and novels to develop a heuristic and re-organization of post-Partition South Asia

2. Literature Review

McMenamin (2006) has mentioned partition experiences and their impact upon people's lives. His paper deals with painful memories and experiences about partition. It provides an investigation into the rise of communal violence during the partition. Brass (1946-47) explains millions of people's displacement during the Partition in a chaotic two-way flight. He describes the women 'slaughter' scenes during 'displacement', 'sexual harassment', 'religious points', 'sectarian violence' 'rape' and 'hysteria' etc. in a delicate way. The writer also clearly explains the role of political leaders from the Muslim, Hindu, and British parties. Didur (2006) writes that the theme of the Partition of India shows human madness, silliness, child abuse, teenager's rape, companionships of Sikhs and Muslims, psychological imbalance, different beliefs that become the cause of trauma. Sidhwa's Cracking India shows the gender and minority rights' exploitations. The reason for the Partition is injustice towards minorities which makes them protest for their rights. The problems at that time of the Partition were critical. As we read the stories, we can develop the true picture of pain. The research deals with community struggles for their protection as in the story of “LOC” and “Fear”.

Masoodi (2017) writes that a complete community sacrifice of the beloved relations revolving in people's minds revises the context of the Partition. He also shows the struggles full of bloody experiences of the partitioned or migrated people. Besides, this experience recurs every day, every time, at every place with everyone and it overlaps across the context. To show this situation, the author has used special literary words like illicit love, sexuality, rape, violence, abducted, victims, etc. The writer is fully successful in showing the cracking of humanity during the Partition.

Gil (2013) writes about the Partition of India that is

based on the psychological conditions of the partitioned people. In this research, the problems faced by the displaced Hindu and Muslim people at the time of the Partition have been discussed. It shows the real necessary trauma. Gil uses some words such as 'displacement' 'nostalgia' 'quest for home' etc. that directly affect the way of thinking of the reader. Gunasekaran and Peruvallut (2012) also write on the historical trauma of partition in which the scholars have used the perfect wording to explain the 'history' 'politics' 'tragic effects' 'dual attitudes' 'violence' of the Partition time. The snippets of the 1947 partition of the Indian sub-continent grip us even today in these selected short stories of Gulzar. Its claims over South Asia's memories are fierce, its ghosts hang about in strange and everyday recesses. The emotional detritus of the Partition continues to shape psychic, political, and social formations across the region. Demetrius asserts: "the major traumatic event that can influence the system of references as in an entire society, and in the process, change established roles, rules, habits, and narratives" (Flinn, 2011, p. 145). Flinn notes in the context of post-war Germany to remember Trauma of Partition in these decades as during the 1940s, 50s and 60s as it is revisiting the memories of pre-partition life, worlds, and modes of affinity formed on especially contention site. Roy (2007) and Kasibhatla (2005) foreground the dissonant, fractured and anxiety-ridden political field through which the trauma of the Partition came to saturate the emotional and material life of the nation-state. So, the view of the state's margins was even more threatening to the Partition. Kasibhatla gives us the figure of the traitorous citizen, the potential insurgent and agitator against whom she claims much of the constitutional and legal apparatus of the Indian state was defined. Thus, the democratic institutions of modern India are rooted in the exigencies of the state of emergency which allows laws of protection to be suspended and places large bodies of its populations under constant surveillance and a threat of destruction. In a literature review on trauma and on community, Erikson (1995) argues that "trauma can damage tissues that hold human groups intact; it can also create social climates and moods of loss, mistrust, fear, and depression. These modes or conflicts share the effective refrains to help us navigate complex everyday revisiting trauma of the partition" (pp. 183-199). So, in the selected short story's themes of separation, sexual harassment, rape, and murders have been mediated as we have seen in partitioned people the quest for home and personal circumstances remains out of reach. In Trauma and Memory (2003), Huyssen argues, that memory is an active alive part embodied in the social and individual groups and nations. They also comment on the political exigencies of the Partition.

3. Research Methodology

In the present research, the qualitative methodology has been used which includes analysis of the selected short stories of Gulzar's book Footprints on Zero Line. It includes the 'trauma', 'tragedies', 'nostalgia', elements of loss and retelling and remembrance in it. The study analyses the non-fiction subject in this work by descriptive epistemology. The Partition contains the elements of 'trauma', 'loss', 'tragedy' and 'nostalgia'. Therefore, historical research methodology has been applied here. Gulzar's selected short stories add textured interdisciplinary fields to find out the situation of revisiting trauma through different paradigms. Rothberg (2014) argues that Carruth's work, Trauma: Explorations in Memory (1995) borrows from Freudian frameworks to provide "a powerful theology for linking events of extreme violence, structures of subjective and collective experience of discourse and aesthetic forms". The present research examines the Partition of 1947 and its ongoing tearing effects on sexual and individual fabrics as a beneficial site to study how

'memories', dreams, 're-telling' and 'remembrance' are alienated by ruptures. The 'nostalgia' in the selected short stories is a subject to re-examine the entrusted effects of re(living) trauma that disrupts the worlds by new clusters of tropes.

The re-contextualization theory develops an inter-disciplinary framework from psychological and literary methodologies. It locates how mourning under the political system is mimetic representation in dissident selected short stories. The selected short stories undergo a radical transformation by refusing healing as an outcome. This theory is used to examine the effects in vernacular genres of the Partition. The elements of loss have been depicted in “Partition”. Gulzar represents himself from a partitioned family that wants to meet because they lose their beloved young son and daughter while after twenty years, they meet their daughter but they do not find their son and someone informs them that their son is alive and his name now is Gulzar. But according to this Partitioned family, his name is Samporn Singh.

Many people suffer from post-traumatic stress during the Partition. Migrants' symptoms often bear palimpsest hallmarks of suffering, they also truly depict the images of a traumatic history, which review the moments of fear, uncertainty, and identity loss crisis. These elements of loss are allegories of a dispossessed past and can be interpreted as inter-crossed memories. The trauma symbolizes the keep returning of dark events of a past, and that is why it is considered a particular form of historical partition consciousness.

4. Analysis

The title cover of the book Footprints on Zero Line depicts a pen touching the borderline that makes the title more meaningful. It is mentioned in his poem, “Zero Line” that once Gulzar was standing in his country India near the border while his shadow was falling in Pakistan outside the border that depicts the concepts of Zero Line. This line itself represents the concept of zero because on one side is India and on its other side is Pakistan. Gulzar has said that we were one but now we were two by this line of live wire of 'LOC'. Gulzar migrated from Pakistan to India with his family. He remembers that time as it reflexes the memories of Gulzar's footprints on that line. They met each other when they crossed the zero line because zero is the central point of this line.

4.1. The Feelings of Tragic Loss

"It wondered that Darshan Singh did not go mad. His father died, his mother was lost somewhere in what remained of Gurdwara and his wife gave birth to two babies at the same time. Twins … both boys! Darshan Singh did not know if he should laugh or cry. Fate had dealt him a strange hand ...taken away with one hand what She had given with the other" (Gulzar, 2017, p. 57).

In the short story Crossing the Ravi, Darshn is the main character or the protagonist of this story and he lived in Lyallpur. All aspects of the story are connected to him. The above lines are from the first paragraph that shows the wonder of Darshan's mind. All tragedies take place in front of him such as the sudden death of his father and the missing of his mother somewhere. However, at the same time fate becomes kind to him and he is blessed with twin sons. Darshn's mind becomes confused as to what he should do: mourn or rejoice in the conditions. It was a situation of unfavorable circumstances for him and he was suffering extreme sorrow. The situation was not normal as owing to the Partition disaster, bloodshed started on both sides of the border and this affected many places and burnt the houses of the people as well as burnt their dreams. The Sikhs were going to Lahore where they stayed in the camps. At this time, people faced many complex tragedies and traumas in their life. It is the tragic flaw of this story

on which its tragic plot depends. All these situations show the circumstances that become the cause of losing everything during the Partition in a traumatic way. It was the consequence of the Partition that affects the lives of the people and changes their visions of life. The situation of Shahni in Crossing the Ravi represents the mental shocks or fragments of psychic disorder because of the death of her child. Owing to this reason of fear of cruelty, her husband Darshan pushed the basket from his side so that he might pick up his dead son. The terrifying condition of Darshn represents the loss of his control because he becomes helpless in front of fate when he hears the cry of a baby. Despite all these circumstances, he remains in his senses. He faces all alone tragedies and loses his family during this mass migration.

In this story of the Partition that manages to capture the right essence, madness or psychological trauma is present. The above lines explain the large number of people who are sitting as there is no space vacant even for seed. The bridge is a symbol of support that provides a clue to the people for their life because they are under the pressure of death but here Darshn loses his sons. The stories are based on the immaterial length of the journey of displacement as in the story of Two Sisters. In the story 'Two Sisters', two virgin sisters left behind from their caravan, trust a truck driver for the sake of their protection. But they are raped by that truck driver. Both sisters are from Campbellpur, a tiny village settled down in obscurity in British India. In this story, characters are caught in a nervous hysteria amid talks of an imminent partition round. It is evident but no one is quite sure where he or she would be brought and what outcome of it he or she would face. Moni is considered a young widow with a sister Soni. All find their lives caught in the whole fabric of the Partition. Due to the mass migration of humans across the border in search of a new home and a new country, the world goes into a new invert. Many people are downcast, most lose their family members through death or detachment but spend their lives as before the Partition as the character of Babe. It takes people decades to settle down and come to terms with trapping memories. It is the first important strand that follows the struggle with their diminished lives in the post-colonial era. Moni and Soni are haunted by the recurring violence of rape. Both are prisoners of their memories whose consequences come in the form of complex trauma and psychological disorders, and dislocation of pain causes the hyperactive reality that was not accepted by the people. According to Freud (1917), this text contains the historical trauma as these sisters are raped, that unfolds itself in doses because there is a vast body of literature that is affected by the Partition and its consequences are still the part of people's memories, consequently creating madness in different characters as the resemblance of Loki with his father who was a rapist who not only raped them but also destroyed their lives due to his lust. When Soni enters the room, “Soni, does the look exactly like the man who used to rape us every day?” (Gulzar, 2017, p. 61). There had been a strange sort of madness in her eyes. It had scared Soni. “Don't be silly! Soni had picked up Loki and taken him out of the room. Soni had not been able to forget the look in Monies' eyes. Fear had crept into her heart"(Gulzar, 2017, p. 61). A fear arises with a threat of harm that can be emotional, physical, psychological, and real or imaginary. It is due to some attack of dark memories, and its results are alarming in the form of some dangerous happening as in this story when Moni speaks of Loki's resemblance to that rapist and Soni recognizes that fear, actually that is the point of Freud's psychoanalytic theory of phobias: Moni is under the 'repressions' and becomes the patient of the 'unconscious' mind. Moni and Soni both are facing a task that they cannot share their rape story with Bebe because no one can feel their pain of helplessness

4.2. In a Shadow of Hillock

Kulwant recalls old memories that interfere with everyday life. "After some days later, he decided to contact Mushtaq and Kulwant with his Junior officers went in the back of beyond from the camp, in the shadow of a hillock, he contacted to Mushtaq by wireless. Superfluous to say, 'Mushtaq was taken aback" (Gulzar, 2017, p.79).

By reading such lines we develop the true images of the past. Kulwant and Mushtaq are excited when they just hear each other, and in their initial surprise, they exchange feelings of excitement in the form of choicest abuse. This is a time of enjoying old companionship, they, in just a kidding manner or a sense of good humor or showing their love for each other, use the choicest abuse. It is a tone of their keen friendship as after a long time they talk to each other. They use no formal language for their communication; they use the word, 'Tou' to show their closeness. It is due to 'External Friendship because it shows their long-term relationship with collective struggle. Here Gulzar contextualizes these lines due to eternal friendship, it does not merely revise history but develops multiple contexts. It is exploring the compelling personal story of friendship and tells the nature of both persons. It is a climate of the plot that they contact each other after a long time of "18" years. Gulzar uses Hindi or Urdu language or words that contain multiple meanings, all depending on the situation or accent of that person. In one of his poems, he recalls the mad character Bishan Singh from Manto's immortal short story Toba Tek Singh who refused to cross the border. He stood there relentlessly until his body could not take it anymore. He fell and died with the line.

Kulwant asks about Phatto Masi, Mushtaq tells him that ami is too old; she wants to travel to the shrine of the Sufi Khwaja Moinuddin Chishti and wants to fulfill her desire, day and night she is praying for the fulfillment of her wish. But Rabia cannot leave the children to go with her. He wants to introduce Rabia, while it is shocking for him that he knows about her because Majeed has already introduced his sister. It is more expletives for him. Then these two friends decide that somehow Mushtaq will send Ammi Ji to Wahaga and Kulwant's wife will pick her up from Delhi. So, Kulwant is busy making arrangements for Phatto Masi and his wife Santosh will bring her to their home. All arrangements are in place but on this day, hell breaks their planning.

On the first of August, Pakistani forces attacked Chamber and crossed the LOC. On the twenty-eighth of August, Indian forces captured Haji Pir. On that very day, 28 August 1965, in Saharanpur, Phatto Masi was cooking meat with black gram and Biji was boiling the black gram when the news arrived, eleven soldiers had been killed on the 'LOC' … one of them was Major Kulwant Singh. (Gulzar, 2017).

All the planning becomes meaningless in front of death trauma. Phatto Masi remains on the other side, and then both families never meet each other. The death of different characters breaks the silence and creates a different context. Gulzar's this short story contains the layers of pain that are dislocated in different forms of characters. Gulzar's reliving of entire trauma through different characters' traumas, and writing about that situation mean to develop that mysterious situation for which he suffered a lot.

The reflection of trauma and tragedy is the main context of all the selected short stories. It is the nature of human beings that they never forget those persons who leave them alone in problems or the persons who help him in the settlement as the character of Yaseen who is blessed with the help of Bahu. At the time of segregation, Bahu pulls him towards a tea-seller shop for the protection of his life. He asks him why he saved him from that attack, while he knew he was Muslim, Bahu replies that these attackers become crazy for blood and do not

bother whether you are Muslim or not. At this time, they just want bloodshed. Bahu tells him that a crowd does not wait to ask one's religion when it is thirsty for blood. Its thirst can only be quenched with blood or fire. “Burn! Kill! Destroy! Its anger is cooled only when nothing remains in front of it" (Gulzar, 2017, p. 98). At the end of this story, Yaseen tells this story to Fatima that he just wants to save his life from that person; he just wants to get rid of this trouble. Where he cannot take his breath normally, he loses all his positive senses. He loses his trust in religion or the social contract. He just defends himself against that fear that he develops from his imagination and their past few days' incidents. His memory is full of fear, as according to his situation, he hides under the seats of the train. He sweats because of fear of death and the death traumatic scene. He gathers all his efforts and holds the legs of a man and pushes him out of the train. As the man fell, he speaks 'Allah'. This voice or word makes Yaseen ashamed of his behavior. All this story he is telling to Fatima by his remembrance and in his last line of text, he defends himself in front of his wife Fatima saying that if he had not done that, he might have been demanded from him to prove how he was a Muslim by opening the stripes or becoming naked. As from this text," That night he told Fatima…. If I had not done so, what proof of being a Muslim could I have given him? Should I have stripped naked?" (Gulzar, 2017).

The story Fear is also read as an oblique way of narrating by Gulzar. Through the character of Yaseen, other conflicts arising from a 'religious point of view' have been highlighted: if that person is a Muslim, he will not harm me; if he is a Hindu, he will surely hit me. So, for the sake of his life's safety, he pushed that man. The histories confront the scene development of trauma that has been written as an anguished response to the violence in 1947, and it is so in the stories of Gulzar. Gulzar explores the question: 'how one remembers the dark past'. Here the focus is also on the narratives he wants to represent with the help of the multiple characters and embodiments of memories in the particular traumatic memory of partitioned people. In Empathetic Vision (2005), Bennett posits “art as a kind of visual language of trauma and the experiences of conflict and loss explores what art does” (p. 220). 'How do other people's stories become our own?' asks the narrative over and over again because people were one before the partition -- an exploration of the politics of transacting with the trauma of other people that might offer the response. These short dialogues in the selected short stories are interpreted in an affective sensorial and play the role of vital importance. In addition, it gives the regimes of impunity and democidal rape of culture that evokes the pain of 1947. This is like the pain of Kashmir today, and it is the context of selected short stories. Baxi (1988) writes how 'the cries of the violated' did not "penetrate the soundproofed air-conditioned chambers of the parliament”.

Gulzar summons the creative space of fiction to make insights into the field of trauma and depicts the pain of that period. Besides this, the mass migration of two communities, Muslims and non-Muslims, sparked violence. The scholars focus on computing the destructions like the Partition of 1947. Gulzar is an eye-witness to the Partition that analyzes the violence that was mostly due to the policy of impunity granted to right-wing Hindu activists. Gulzar draws a parallel context between the short stories that tell us ethnocidal rape, abduction, and murder with events of the anti-Sikh program in 1984 under the Indian National Congress government. It is interesting that artist Nilima Sheikh, living in Ahmadabad during the violence, had to stall her work on miniaturizing Agha Shahid Ali's poetry on Kashmir's complex traumas and returned to it with a weighted urgency after. Thus, linking Gujarat and Kashmir in the same radius as in the story of “LOC”,

Kulwant remembers the days of his companionship and at the borderline, both sides' military sharing the couplet of poetry that is in their mother tongue creating the strong vernacular effect in English.

The textual analysis examines sections of the text, closely intercepts with the imagery, and draws out its exteroception and somatic aspects. The engrossment with 'nakedness' and 'vulnerability' allows the researcher to conclude the text's enlargement of a sensorium of vulnerability in the last line of "Fear". One of the key contexts in this short story is the temperament that was the witnessing and representation of the trauma of psychoanalysis. Gulzar mainly focuses on the visual representation of developing the scene of that fear and terror which the characters are facing, as continuously Yaseen is facing the imagination of death trauma. Through Yaseen, the study draws his imagination that lineages from the text as a loss of physical and emotional strength, the sense of good and bad, loss of positive thinking. Owing to fear, he indulges in self-questioning. He has the fear of what Fatima will be observing. He is not even in a position to give the answers to his self-questioning. He is much too afraid of that person, he is sure that the person will kill him after some time, he is frightened by the consequences of his imagination. The title of this story is a suitable match for this story. It is the nuanced explanation of the Muslims that were in the 'minority' under the Hindustan government and were frightened due to bloodshed. The lines on Moni, a virgin girl in Khorda Zilla Campbellpur, locate an irony in her arguments with her sister that she has no repentance on her crime that happened due to her dark memories. These memories convert into some madness or trauma whose consequences are shocking because the word 'madness' creates its effects and destroys the lives of three persons. While Loki becomes the victim of death trauma, Moni becomes the patient of mental illness and the life of Soni is also disturbed because nobody accepts her except a kindhearted person. Abdul Salam Qureshi takes responsibility to bring her into confinement. Besides this posting of the collective memories and complex trauma, this also focuses on the importance of holocaust survivors. "Bennett used the terms from 'the sense of memory' or 'deep memory' as comparative to 'common memory' sense memory is not narrative, it has the depth that mentioned the physical imprint of the memory" (Bennet, 2005. p. 25). The layers of meanings have generated the effect of text on the reader and dehumanization or honor killing is a prominent figure in the story of 'Two Sisters" as it creates the empathetic vision. Bennett writes that "shame cannot itself be an objective, except insofar as it promotes a form of seeing oneself seeing. She posits how visual and performing art evokes the possibility of both the artist and the viewer as spectators of one's feelings" (Bennet, p. 23). The psychological trauma for healing the wounds of the Partition is the component for the representation of Moni for the women who were abducted in her refugee colony. We find ways to reconcile this need with the failure of narrative models of healing in conditions of state-sponsored violence, where the political dimensions of loss remain unfinished. In my recon, revealing the truth of their abduction is very humiliating and no one considers the pain of their helpless situation, so the people of their surroundings never 'accept' them, so they have no choice but to cry about their past. When Bebe asks her husband, she becomes barren and her situation makes the story more meaningful as Gulzar's stories through his sketching of text make the gestures as a watcher feels the pain and puts this pain on the paper because he witnesses all the inflected warriors with sensorial and personified arrangements.

Psychosomatic Symptoms of Depression are found in every selected short story that indicates the

depression and anxiety in the multiple characters and shows their crisis, and later it is diagnosed. Soni watches her helplessness when she is in jail. A crucial part of this narrative involves Soni coming face to face to meet Moni who responds to her in her mental disorder, which means she had signs of madness. She is filled at first with fear, even revulsion; she gradually gets to the point where she recognizes her sister, including the face-to-face vulnerability. Butler addresses her theory of grief as formative of political community through Levin Asian ethics," how others make moral claims upon us, ones that we are not free to refuse" (Butler, p. 131). "To respond to the face means to be awake to what is precarious in another life" (Butler, p.134). It is one of the unfinished needs. We feel it, although it remains inscrutable and irreducible, in the selected short stories. Moni's trauma is represented through her anxiety and hyper-vigilance as she charges her past from the truck driver. Through her perceptions and immersion in the space of the city, an affective map of the city is created by her when Babe asks her about their partition experiences. Her trauma is registered through ruptures of memory, proprioception, psychological disorder, navigation, and other forms of embodied perception. This is mirrored in her failure in the present situation or she does not want to think about her past but due to Loki, her past becomes her mirror. It has become the subject of history that partition creates long-lasting effects that disturb the present and future of partitioned people, especially the life of destroyed women and men. Moreover, through this preoccupation with traumatic memories, flashbacks, and ruptures, Gulzar wants to reopen space for psychologization. The selected short stories describe the ghettoized Muslim neighborhoods and relief tenements across the border because the Partition has put up maps and borders.

5. Conclusion

(Re) living trauma is marked by violence, imaginaries, and tragedies in selected short stories of Gulzar. The Partition of 1947 reshaped everything. The story "Fear", reshaped Yaseen due to the fear of death. The story "Crossing the Raavi", changed the track of lives. The story "Two Sisters" was reshaped by the murder of Loki and the madness of Moni. "LOC" reshaped the character of Kulwant as in front of his junior Majeed etc. The exile of Hindu, Sikh, and Muslim communities create these troubles in the selected short stories of Gulzar. The trauma theory is used to point out the melancholia's rejection that allows setting out the lost objects as in the selected short stories of Gulzar. In all the selected short stories all the characters lost their beloved family members. It is a realistic point of the Partition. I have found (re) living the trauma is closely related to the theme of violence that indicates the different traumatic elements that people faced during the Partition. The combination of fiction and non-fiction in Footprints on Zero Line represents history through the dreams and memories with the help of different characters. The pain of partition is re-flexing in the selected short stories as in the characters of Darshn, Moni, Majeed, Yaseen with the help of (re)living the complex traumas that enact its fragments. (Re)living trauma is linked to a tactile reflex of visualization of the memories and feelings of the past that are connected to their presence as I have read in the leitmotif of histories of the Partition. This form of trauma and the loss of identification are embodied in the selected short stories. It mobilizes the important context of the 'philosophy of immunity' and 'perceptive' as enacted by the Hindu and the Indian Muslim in the story "Fear". Violent protests at ongoing political conflicts are a prominent feature of the story "Fear". The confronting is additionally linked to the ethical demands that are made by Gulzar. The implications of ethics are once again clear in the work of Gulzar. However, due to mutual

acting, they put their relationship aside for the sake of deep political grounding in the world. Gulzar revisits the history through phantom, remembrance and retelling that has highlighted the consequences of the Partition. This study has explained the emotional, psychological, and consequences of the partition on people as the madness of Moni, Fear of Yaseen, emotional rebounding of Kulwant with Mushtaq, scene of becoming stone of Shani in "Crossing the Raavi".

To conclude, this research shows the (Re) living the trauma of the Partition of the subcontinent into India and Pakistan as assessed in Gulzar's chosen short stories. The Partition is a verifiable occasion that influenced the political, passionate, mental and sexual existence of individuals in South Asia. It keeps on affecting Indo-Pak relations in the selected short stories and outside them. The research utilizes Freud's psychoanalytic ideas of the "cognizant" and the "oblivious" to look at the appalling impacts of post-partition rearrangement on the lives of individuals in India and Pakistan. It also utilizes Bernstein's thought of re-contextualization while dissecting how the Partition has been updated many years after the fact in Gulzar's chosen short stories.

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The Challenges of Service Quality and Customer Satisfaction for E-retailers in the Post Covid Era: A Case of Fashion Retailer Sector of Pakistan

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Abstract. Service quality and customer satisfaction are important topics in the context of marketing and business, it has particularly become a challenge for the e-retailers in the post covid era. The present study aims to examine the role of E-service quality on customer satisfaction in the context of retail clothing. Also, to find out the moderating role of perceived value for money on the relationship between E-service quality and customer satisfaction. The data that was used to analyze this relationship was collected from 225 customers of online shopping. The research model was analyzed using a structural equation modeling technique. Results show that customer satisfaction is dependent on the factors of Service quality. Customers are highly satisfied if they get find the website easy to use, face no problem while placing the order, and get the product delivered on time. Moreover, the perceived value of money plays a moderating role in the relationship between E-service quality and customer satisfaction. Due to time limitations, we were able to collect 225 responses. Moreover, the results exhibit a negative influence of customer service on satisfaction. This study will help managers how they can increase customer satisfaction by offering the right amount of service. It will help managers to understand the sensitivity of each dimension of service quality influencing customer satisfaction. Moreover, while giving discounts and services they will be able to attract new customers as well. SERVQUAL has been used first time in the context of retail clothing in Pakistan. The results of this study enhance the knowledge of organizations that how online service quality is important to gain customers. It will help organizations to find out what exactly customers want from them which will help them to improve their services.

Keywords: E-service Quality, Customer Satisfaction, Online Shopping, SERVQUAL, E-SERVQUAL, Retail Clothing.

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1. Introduction

Customer satisfaction and E-service quality are two major insights in marketing philosophy (Spreng & Mackoy, 1996). Due to better Service quality, there can be a rise in customer satisfaction (Alauddin, Ahsan, Mowla, Islam & Hosain, 2019; Leinkumar, 2017). Many researchers have worked on the relationship between customer satisfaction and service quality. A lot of them used the SERVQUAL model to explain this relationship. Selvabaskar and Shanmuga Priya (2015) used the SERVQUAL model in their study to explain customer satisfaction in clothing retail in India. According to the result of their study, a lot of customers are satisfied with many of the SERVQUAL dimensions.

SERVQUAL model is being studied in other sectors like banking (Sangeetha and Mahalingam, 2011). But there has not been much work done on online retail clothing in Pakistan before. According to the previous studies, there are four determinants of E-service quality that influence customer satisfaction. They are named web design, assurance, order management, and customer service. The online retail clothing firm should pay more attention to these

determinants. They should focus on the E-service quality facts and make their marketing strategies according to it; it will help them to get success in the future. This suggestion is made because service quality can be helpful for a firm in achieving competitive advantages among its competitors. It is also suggested to make comparisons between different clothing brands from different cities or other service industries to add more perceptions into the marketing research.

This research explores the influence of various dimensions of E- SERVQUAL on customer satisfaction. Furthermore, this study investigates the moderating role of perceived value for money on the relationship between perceived E-service qualities on customer satisfaction. Parasuraman (1985) shows a conceptual service quality model which states that if service quality matches with customer standards and expectations, it will lead to the high perceived value which will ultimately lead to high customer satisfaction. (Tam 2004, Howat & Assaker 2013, Yu 2014).

2. Literature Review

Customer satisfaction has become important these days. It is clearer when you understand that there is no business without customers. Customer is the center of attention for any organization, Braciníková, and Matušínská (2017). A single dissatisfied customer can affect the company more than a satisfied customer. For any firm, the most critical thing is to understand the needs of the customer.

The service quality in a network of the business is one of the leading lights of customer satisfaction for various needs. It is an important part of the competition, as it is related to the company's ability to meet customer needs which is an important thing (Hoa Nguyen, Chung, Jeong, 2018), Company's capability of meeting customer needs itself is greatly affected by the level of quality and the level of the quality of services provided by the company to its customers, which includes all quality aspects in the form of product quality and service. In this way, on the off chance that there's a crevice between the level of quality conveyed by the company and the genuine needs of the client, there will be a issue of customer dissatisfaction which may be a quality issue that ought to be settled by the company since it can influence the misfortune of clients that are possessed by the company (Kim, 2013). Parasuraman has developed one of the references to service quality, Zeithaml, and Berry have developed the model that has been used for a long time and is still used today, it is SERVQUAL or service quality (Parasuraman, Zeithaml, & Berry, 1988). According to Rauch (2015), to look at a total assessment of a company, the administration should compare its execution with its customers' desires and with the execution of other companies within the same industry.

Consumers' discernment of e-service quality has presently ended up a portion of the in general assessment of all the administrations given by the organization (Alzoubi, 2019). Providing high-quality service in an online platform in absence of human interaction has become a challenge for service-oriented businesses. (Kim and Kim, 2020). Moreover, The COVID-19 pandemic has forced businesses to change the way they conduct their business and find new solutions (Carnevale and Hatak, 2020). Internet is now the fastest way for many organizations to expand their business and increase their efficiency in providing better and fast services to the customers (Pedro, 2001).

According to the study of Van der Wiele and Timmers (1990), it is not sufficient to just satisfy a customer, but also to make it happy by exceeding their expectations to achieve a competitive advantage. To do that, the firm needs to work on its continuous

improvements in providing service. The result of empirical studies shows that service quality is linked with customer satisfaction (Babakuset, 2004). Customers, who are highly satisfied with the quality of service, show a high level of response i.e. customer satisfaction.

Grewal (1998) in his study assumed acquisition and transaction values for the measurement of perceived value. Soutar and Sweeney (2001) defined value as a mixture of emotional, quality, price, and social factors. Customer perceived value is a weapon to attract or retain customers if customers will get what they paid for, they will be more attracted. And if not, they will switch (Zeithaml, 1988; Woodruff, 1997).

Customer perceived value can also be defined in the context of price, quality, benefits, and social psychology. Slater and Narver's (2000) study show that customer value will be maximized when the benefit will be more than the cost incurred. Firms should provide good quality products and services at fewer prices, it will help them gain customer loyalty and in case a firm fails to do so, it can lose profitability and customers will start searching for an alternative. Although perceived value is different for quality and it is different for price. Different researchers suggested ways to enhance perceived value. Gale and Klavans (1985) suggested two ways provide value, firstly by reducing price and keeping performance the same. Secondly by keeping price same and increasing performance. In this way, the company will be able to provide value to customers and will be able to attract more customers.

According to the findings of previous researchers, service quality, perceived value, and customer satisfaction are some of the factors that help service-providing firms in gaining competitive advantage and success (Bolton and Drew, 1991; Parasuraman, Zeithaml, Berry, 1988, 1991, 1996). According to the study of Anderson & Fornell, (2000) client fulfillment has three variables: to begin with is seen benefit quality, at that point seen esteem and the client desires, where benefit quality includes a coordinate effect on client fulfillment. When the desires meet the real execution, a client will be considered as fulfilled, though in the event that desires seem not be met, a client will be disappointed (Szymanski and Henard, 2001).

As given in the previous studies, The SERVQUAL model has been used to measure service quality on the five dimensions that are empathy, tangibles, assurance, responsiveness, and reliability. According to the study of Lee and Lin (2005), they identified the main factors that influence customer satisfaction. Those factors are as follows, Website Design, Personalization, Reliability, Responsiveness, and Trust. Furthermore, few studies proposed that the SERVQUAL scale items should be redeveloped before they can be expressively used in the situation of online shopping (Van 2001; Santos, 2003).

3. Website Design

As there is a physical store of any organization, which shows the appearance of staff, equipment, etc. it is a tangible element of SERVQUAL. In an online environment, there is a need to focus on this element by web design, as it is the first impression of the store and it plays a huge role in the purchasing process. There should be Easy use of the online transaction. It is related to the design of the website for example the layout, user-friendliness, content, etc (Yang and Fang, 2004; Yang 2004). In terms of comparison between online purchasing and offline purchasing, purchasers from online websites perceive that they have a benefit in the sense that the information they receive is authentic and directly from the website and they don't need to look at any salesperson (Zeithaml, 2002).

3.1. Customer service

Previously it was thought that being present online and having a business is the only factor to get successful. But now, customer service has proved itself the major element for achieving good profits and success for any organization (Zeithaml, 2002). Now every customer wants attention, to get their order on time, to get a response quickly, and access to the information they need.

3.2. Assurance

Affirmation can be defined as a kindness of workers, their information, and the capacity to exchange believe and confidence to clients, Parasuraman, Zeitham (1994). This characteristic can be shown in a way that the service provider would provide security and credibility along with the service (Parasuraman et al., 1998). As has been observed in online purchasing, customers have a major security concern. And when it is assured that they are on the right website and no one is going to bluff them it is then easier for customers to trust (Wolfinbarger and Gilly, 2002).

3.3. Order Management

It is characterized as improving the speed and exactness of arrange preparing and fulfillment for a prevalent obtaining involvement for clients and trade accomplices. This dimension is related to the process of changing, delay in the process of purchasing at any time and with no compulsion, and obtaining available information of the product at the time of purchase.

4. Conceptual Framework

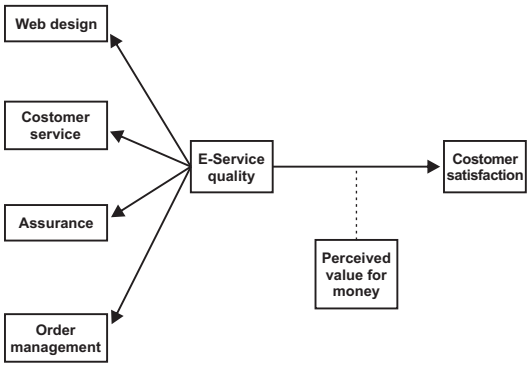

Fig. 1. Proposed Model of Conceptual Framework.

4.1. Proposed hypotheses

Based upon the above discussion the study proposes the following hypotheses. The figure 1 exhibits the proposed model based upon these hypotheses.

H1: There is a positive relationship between E-Service Quality and Customer Satisfaction

H1.A: There is a positive relationship between web design and Customer Satisfaction.

H1.B: There is a positive relationship between customer service and Customer Satisfaction.

H1.C: There is a positive relationship between Assurance and Customer Satisfaction.

H1.D: There is a positive relationship between Order Management and Customer Satisfaction.

H2: Perceived value of money moderates the relationship among E-service quality and satisfaction of the customer in a way that with high perceived value for money strengthens the relationship between service quality and customer satisfaction and vice versa.

5. Research Methodology

The study in hand is quantitative, cross-sectional and convenience sampling technique was chosen for data collection. An online questionnaire was developed and distributed among 250 male and female online shoppers.

The sample size was chosen based on the 10 rules of thumb provided by Hair Jr, Sarstedt, Hopkins and Kuppelwieser (2014) 25*10=250 and we received 230 surveys filled. The data was analyzed using SPSS and Amos version 23.

5.1. Instrument Development

The survey comprises instruments from the past studies and 5 points Likert scale. The scales were adopted from Customer service (), web design (), Assurance (), order management (), the perceived value of money (), customer satisfaction.

5.2. Descriptive of the study

The descriptive of this research presents that most of the respondents were male. The age group of the respondents was 21-25 and the education level of the majority of respondents was Bachelor. Table 1 represents the demographics of the study.

5.3. Model Fitness Indices

The confirmatory factor analysis was performed using Amos to assess the model fitness. Table (2) presents the model fitness. All values are within the acceptable range (Ahmad, Zulkurnain, & Khairushalimi, 2016).

Table 1. Descriptive of the Study

Variable		Frequency	Percentage
Gender			
	Male	139	63.2%
	Female	81	36.8%
Age			
	15-20	24	10.9%
	21-25	146	66.4%
	26-30	39	17.7%
	31-35	8	3.6%
	36-40	2	0.9%
Education level			
	Bachelor	121	55%
	Masters	82	36.8%
	M. Phil.	14	6.4%
	PhD	4	1.8%
Brand			
	Limelight	4	1.8%
	J.	62	28.2%
	Ideas	9	4.1%
	Breakout	21	9.5%
	Outfitters	51	23.2%
	Khaadi	43	19.5%
	Beechtree	17	7.7%
	Others	13	5.9%

Table 2. Model fitness Indices

Measure	Value	Acceptance Range
CMIN	356.489	
DF	205	
CMIN/DF	1.739	Between 1 and 3
CFI	0.855	>0.95
RMSEA	0.058	<0.06
PClose	0.094	>0.05

5.4. Reliability and Validity

The reliability of the present study was computed using SPSS and all values were above 0.7 and within the satisfactory range. Further, composite reliability was also computed using Amos. After satisfactory reliability results, convergent and discriminant validity was computed.

The concurrent legitimacy was surveyed utilizing Normal Fluctuation Extricated (AVE), and all Values were inside the satisfactory extend of 0.5. Then Discriminant validity was analyzed; the square root of the AVE of every scale should be larger than the correlation coefficient of another scale (Ab Hamid, Sami, & Sidek, 2017; Sekaran & Bougie, 2016). Table (3) represents the reliability and validity of the constructs.

Table 3. Reliability and Validity

	CR	AVE	MSV	OM	WD	A	S	CS
OM	0.702	0.572	0.09	**0.61**				
WD	0.751	0.58	0.151	0.239*	**0.616**			
A	0.738	0.568	0.038	0.151	0.150*	**0.607**		
S	0.726	0.516	0.151	0.300**	0.389***	0.195*	**0.645**	
CS	0.724	0.549	0.081	0.270*	0.284**	0.61**	0.223**	**0.591**

Table 4. Reliability and Validity

Hypothesis	Structural Path	β	p
H1	CS <--- S	.116	.294
H2	CS <--- WD	.419	.002
H3	CS <--- As	.167	.014
H4	CS <--- OM	.201	.053

Notes: CS =customer satisfaction, S =customer service, WD = Web design, As= Assurance, OM= Order management

Table 5. Moderation Influence of perceived value of money between E service quality and customer satisfaction

Relation	β	p	LLCI	ULCI
Customer Satisfaction as DV				
Customer Service x Perceived value of Money	-0.1305	0.054	-.2638	- .0027
Web Design x Perceived value of Money	-0.40	0.000	-0.032	-0.05
Assurance x Perceived value of Money	-0.13	0.05	0.26	0.005
Order Management x Perceived value of Money	-0.18	0.00	-0.32	-0.05

5.5. Structural Equation Modelling

The testing of the structural model is based on calculations of model fitness to see the correctness of the model as well as it investigates the theoretical relationship between all variables (hypotheses testing). The results of the hypothesis testing were presented in table (4). The results revealed that there is a positive and significant influence of customer satisfaction and web design (β=0.419, p<0.01), customer satisfaction and assurance (β=0.167, p<0.01), customer satisfaction, and order

5.6. Moderation Analysis

The moderation analysis was performed using Hayes Processes model 1 (Hayes, 2012). The output is presented in table (5). All values are within the satisfactory range provided by E-service quality and customer satisfaction.

6. Conclusions

The data was collected from 225 customers and the research model was analyzed using a structural

equation modeling technique. The following conclusions were drawn:

- Customers are highly satisfied if they get find the website easy to use, face no problem while placing the order, and get the product delivered on time. Moreover, the perceived value of money plays a moderating role in the relationship between E-service quality and customer satisfaction. The results exhibit a negative influence of customer service on satisfaction and it will help managers how they can increase customer satisfaction by offering the right amount of service. It will help managers to understand the sensitivity of each dimension of service quality influencing customer satisfaction. Moreover, while giving discounts and services they will be able to attract new customers as well. SERVQUAL has been used first time in the context of retail clothing in Pakistan. It will help organizations to find out what exactly customers want from them which will help them to improve their services.

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Analysis of Designs - A Comparative Study of BIM and AutoCAD

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Abstract. Building information modeling (BIM) is software for the efficient designing of the structures, which provides the advanced level designing of the structures along with the quantity takeoff required for the construction of the respective structure. On the other hand, AutoCAD is the traditional drafting software which is not enough efficient as compared to the building information modeling software. This research also focuses on the visual as well as featural differences of the building information modeling software (BIM) and AutoCAD, by the qualitative design analysis of the same structure from both AutoCAD and BIM, and also by quantitative analysis technique for this research which incorporates the questionnaire online survey, to collect the responses from various experts such as civil engineers of different years of experience and BIM experts of the different levels and years of experience. According to the design analysis result, by using BIM and AutoCAD Models and drawings, to visualize the difference between the features and level of advancement and efficient modeling. The BIM allows us to design structures that are more attractive as well as well-structured along with the quantity takeoff for the specific drawing. While AutoCAD is just the drawing software, it does not support the quantity takeoffs and finished look better than that of BIM, according to the quantitative results, it can be concluded that implementing BIM could reduce human error and also provides user-friendly ease to work, and also to perform necessary variations without reworking on the model from the beginning.

Keywords: AutoCAD, BIM, Modelling.

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1. Introduction to BIM

BIM (Building Information Modeling) has the potential to be a game-changer in the architectural, and civil engineering business. Building Information Modeling technology generates a precise virtual picture of a digitally constructed building. The computer-generated model, once completed, will include flawless drawing components and also the important details for the structure to construct, commercially or for residential purposes. Building information modeling software also provides the support to model the lifecycle of the building, which provides a framework for the entire project for execution, designing modeling, and drawing of the entire structure. The building information model (BIM) also provides the advanced level designing of the structures along with their quantity takeoff and the project schedules to work effectively during the execution stage. BIM technology can help with a range of business activities. Although BIM adoption is still in its early stages in the AEC/FM (Facilities Management) business, while the software named "AutoCAD "is being used widely to produce the

drawings unable to create an efficient and smart model of the building (AutoCAD, 2020), AutoCAD is works based on the basic level of drawings techniques, though the advances are being incorporated in the software but still not efficient enough as compared to the building information modeling software (Eastman, Teicholz, Sacks, & Liston, 2008).

1.1. BIM Strategy

BIM is the advanced level software for building modeling, which incorporates the modified, realistic, and rendered visualization along with the efficient and advanced structural modeling of the developed drawings (Dunston & Wang, 2005). The advancement in building information modeling is also being approached by the various modeling developer companies to improve the level of a building and structural simulations (Eastman C, Teicholz P, Sacks R, & K, 2011). Following are the strategies to make the 3d models of buildings, being adopted widely throughout the world:

By using the building information modeling software, such as the "Revit" supported by Autodesk, to create the user-friendly building modeling, in the sense of changing the design parameters, structural components, to identify the flaws and mistakes in the designs, and the ease to make the changes and variation if required, without changing the entire design (Building SMART, 2010).

The three-dimensional building construction models can also be developed by using AutoCAD software supported by Autodesk. The AutoCAD 3d models or the drawings are usually considered a lower-level design for the drawings, which is called the level"0", in the BIM technology. as the AutoCAD lags in providing Real-time environments to the drawings, and also the visualization difference of the drawings being produced by the AutoCAD, as compared to the building information modeling software (Li, et al., 2014).

1.2. Building Information Modelling levels

Building an information model provides the access to visualize a three-dimension model of the drawings that serve as the project's sole source of data. According to Mark Bew and Mervyn Richards' model (Mark & Mervyn, 2013), four levels of the drawings can be distinguished, either prepared by the AutoCAD or by Building Information modeling software. Any sort of paper documentation, whether created by hand or using computer-aided design (CAD) software, falls under Level 0. Level 1 refers to digital files that contain 2D and 3D content that is not backed up by a comprehensive database. Building information modeling might be considered to begin at Level 2. It appears to be comparable to Level 1 from before. The library management and file-based communication tools employed in the project are the most significant differences. As a result, the essence of BIM is a project-wide shared database, linked to the object's 3D model, from which we may create comprehensive project documentation. Currently, the majority of engineers work at Level 1 or 2 positions. BIM proponents have set a goal of preparing all projects in BIM at Level 3 (intelligent BIM, or BIM), which allows for construction management throughout the design life cycle. They also expect ISO standards to be introduced, as well as the widespread adoption of BIM formats like IDM, IFC, and IFD (Hietanen, 2008).

1.2.1. Collision detection

Collision detection is the essence of interdisciplinary cooperation in the old design when collisions were found visually by tracing all crossings with overlapped drawings on tracing papers. A similar approach is used in CAD 2D systems, where layers

of different colors are visually contrasted on a computer screen. The next stage was to use a CAD 3D model to help detect collisions. There is, however, a significant distinction between CAD 3D and BIM 3D. Collision detection in BIM is based on technologies created for the gaming and computer graphics industries. Collision detection techniques in BIM should be precise rather than quick. As a result, BIM systems employ computer graphics techniques as well as sound engineering practices and standards. BIM distinguishes three types of collisions:

- Severe Collisions occur when two objects clash in the same space.
- Physical collisions: verifying the assembly sequence and delivery schedule; verifying the number of workers and time required to complete the construction phase.
- Technological collisions: verifying the assembly sequence and delivery schedule; verifying the number of workers and time required to complete the construction phase. The ability to detect collisions is a significant advantage of building information modeling in general. During both the design and construction phases, it offers significant cost reductions (Ireneusz Czmoch & Pekala, 2014).

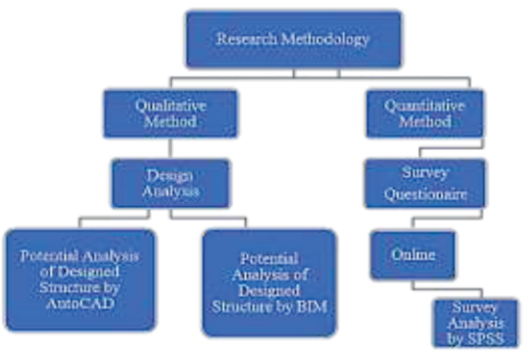

Fig. 1.Methodology Flowchart

2. Results and Comparative Analysis of BIM and AutoCAD drawings and models

2.1. Qualitative Method Results

2.1.1. Analysis of Design

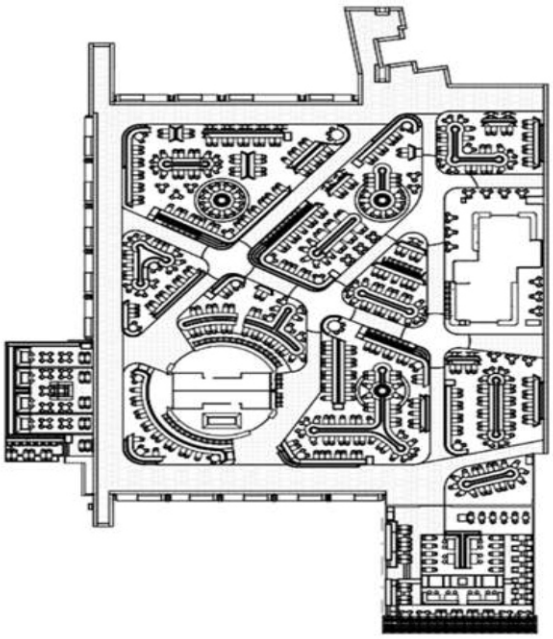

Fig. 2. Food Court Plan in Mall of Oman (AutoCAD)

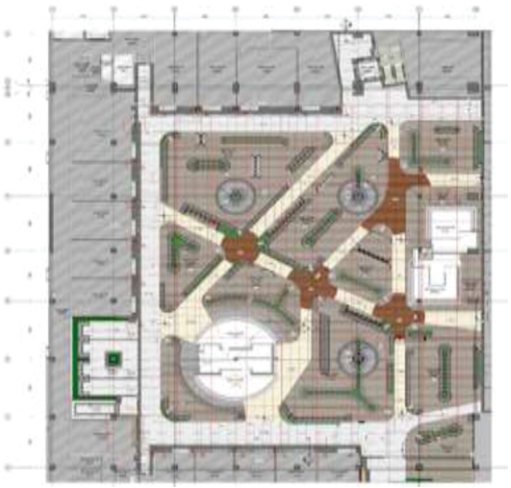

Fig. 3a. Food Court Finish Plan in Mall of Oman (BIM)

Fig. 2 and Fig. 3, show the visual difference in the same plan designed on AutoCAD and modified on BIM. The difference between the software, BIM, and AutoCAD can be visualized from the output drawings. The BIM allows us to design structures

that are more attractive as well as well-structured along with the quantity takeoff for the specific drawing. While AutoCAD is just the drawing software, it does not support the quantity takeoffs, and the finished look better than that of BIM.

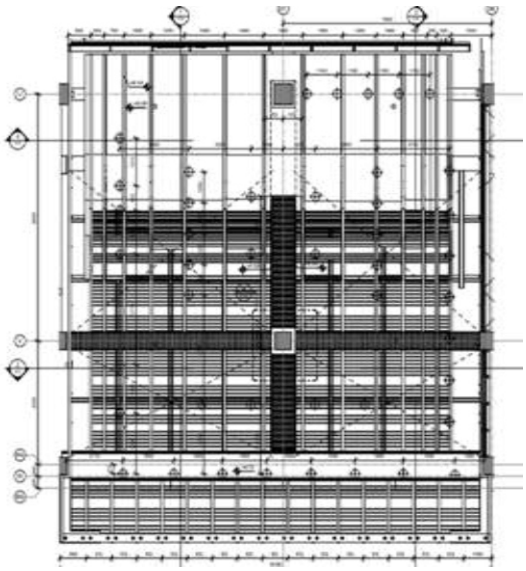

Fig. 2b. Food Court Finish Plan in Mall of Oman (BIM)

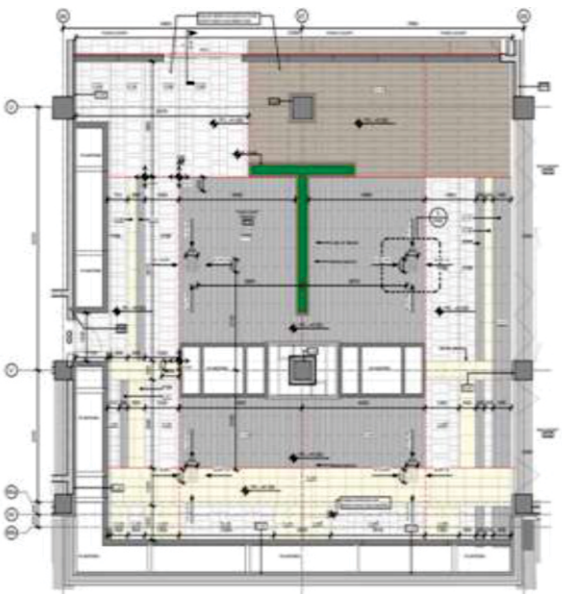

Fig. 3c. Food Court Terrace Ceiling Plan Mall of Oman (BIM)

Figs. 3-6 shows the basic architectural plan for the sitting area made by AutoCAD and the modified plan by using BIM with sitting arrangement to provide a real look by using the filled rendered objects for the previously created features, respectively.

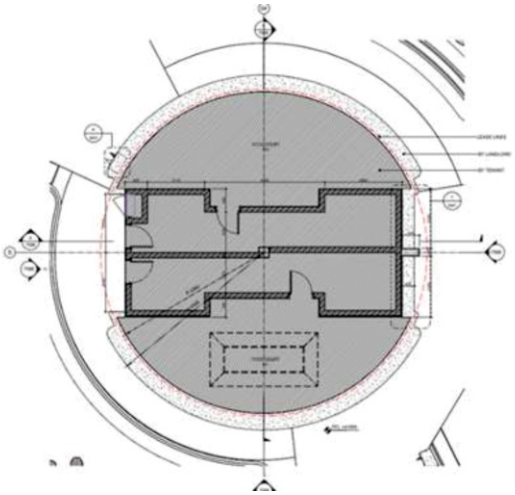

Fig.4. Food Court Column Architectural Plan Mall of Oman (BIM)

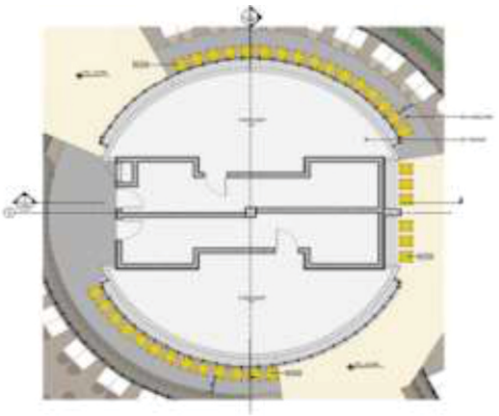

Fig.5. Food Court Modified Plan in Sitting Area in Mall of Oman (BIM)

Fig. 6. Food Court 3D plan, Mall of Oman (AutoCAD)

Figs. 7-9 shows the 3D model of the interior design of the food court located in the Mall of Oman developed by using AutoCAD and BIM respectively. While, Fig. 8, and Fig. 9 show the columns and special features in the food court by using AutoCAD and BIM, respectively.

Fig. 7. Food Court 3D plan, Mall of Oman (BIM)

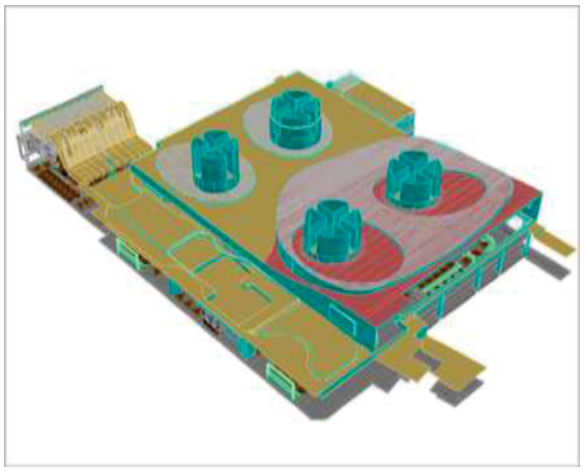

Fig. 8. Food Court 3D plan with Column and Special Features, Mall of Oman (AutoCAD)

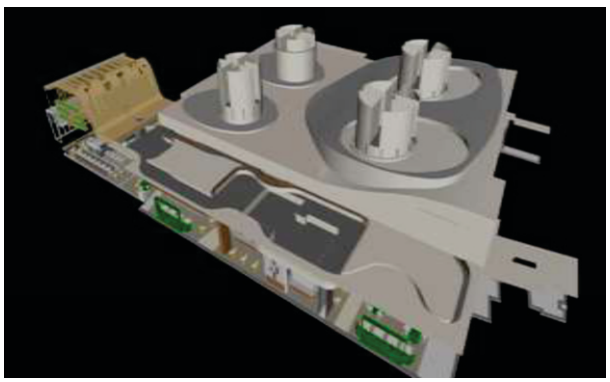

Fig. 9. Food Court 3D plan with Column and Special Features, Mall of Oman (BIM)

3.2. Quantitative Method Results

3.2.1. Correlation Analysis

According to the results, it is observed that "years of experience of BIM technology" has a strong relationship with the specialization. While the covariances observed for the "years of experience of BIM technology", "size of a company based on human resource", "specialization" is 0.24, 0.257, 0.69 respectively, For the (Implementing of BIM could reduce the human error due to incomplete, incorrect, and rework during design) with the demographic variables, it is observed that it has a strong relationship with the specialization and weak correlation with the size of the company based on human resource. And the covariance is observed to be about 1.667. (Adopting BIM can earlier detect the design errors and clashes among a variety of structural, mechanical, electrical and plumbing systems) with the demographic variables, it is observed that it has a positive correlation with years of experience of BIM technology variable while negative with other two variables. And the covariance is observed to be about 2.138. According to the results of the correlations for the (Drawing errors could be greatly adjusted through BIM implementation) with the demographic variables, it is observed that it has a negative correlation with all the demographic variables. And the covariance is observed to be about 1.720, while for the (BIM could enhance communication between design team) with the demographic variables, it is observed that it has a significant correlation with all the specialization variables. And the covariance is observed to be about 1.826. According to the results of the correlations for the (The financial aspect of BIM setup prevents its implementation i.e., software, training, and hardware) with the demographic variables, it is observed that it has a positive correlation with the size of a company based on human resource variable while negative with other two variables. And the covariance is observed to be about 2.202, while for the (High cost of recruiting BIM specialists) with the demographic variables, it is observed that it has a negative correlation with all the demographic variables. And the covariance is observed to be about 1.426.

According to the results of the correlations for the

(lack of awareness of the capabilities of BIM tools) with the demographic variables, it is observed that it has a negative correlation with all the demographic variables. And the covariance is observed to be about 1.168., while for the (Cultural resistance in companies is the greater challenge than any technological challenge) with the demographic variables, it is observed that it has a significant negative correlation with the size of a company based on human resource variable. And the covariance is observed to be about 0.993.

According to the results of the correlations for the (Lack of demand and disinterest of BIM) with the demographic variables, it is observed that it has a negative correlation with the specialization variable and a positive correlation with other demographic variables. And the covariance is observed to be about 1.402, while for the (An insufficient electronic standard, protocols, and coding system of BIM) with the demographic variables, it is observed that it has a negative correlation with all the demographic variables and the covariance is observed to be about 1.131.

According to the results of the correlations for the (Adopting alternative standards like New Rules of Measurement (NRM) can solve the lack of BIM standard) with the demographic variables, it is observed that it has a strong correlation with the size of a company based on human resource variable, And the covariance is observed to be about 1.128, while for the (Multi software of BIM lead to decrease the efficiency)with the demographic variables, it is observed that it has a significant positive correlation with years of experience of BIM technology variable, And the covariance is observed to be about 1.197, and on the other hand, for the (Few data/information could be lost while transforming between BIM software) with the demographic variables, it is observed that it has a positive correlation with the size of a company based on human resources variable and negative correlation with the years of experience of BIM technology, And the covariance is observed to be about 1.085.

According to for the (Engineers in the industry prefer AutoCAD for Structural Design instead of BIM) with the demographic variables, it is observed that it has a significant positive correlation with the size of a company based on human resources variable, And the covariance is observed to be about 1.275, while for the (BIM can be considered more suitable for the project planning according to design than AutoCAD) with the demographic variables, it is observed that it has a positive correlation with the size of a company based on human resources variable and negative correlation with the specialization, And the covariance is observed to be about 2.395, on the other hand, for the (AutoCAD 3D contains less realistic approach in structural designing than BIM) with the demographic variables, it is observed that it has a negative correlation with all demographic variables. And the covariance is observed to be about 1.430.

Fig. 10 responses based on Engineer's Specification for BIM Q1, as according to the results of the question regarding BIM implementation that could reduce the human error during designs, most civil engineers based on specialization about 16.67% of the total respondents agreed on it. According to the results of the question regarding the adoption of BIM that that can help detect errors and design mistakes within the drawings and provide a user friendly and easy variation in the specific part of the flawed design, on the other hand, as AutoCAD does not provide such easiness to the users, in AutoCAD the design mistakes are to be observed manually and also to be altered to change under the correct design standards all over again. Fig. 11 shows the responses that the drawing error could be greatly adjusted

through the use of BIM technology under the year of experience of the respondents. For both of the categories of the respondents, either less than five years or the experience of more than a year, all the respondents have scored 23 percent of the positive agreed responses.

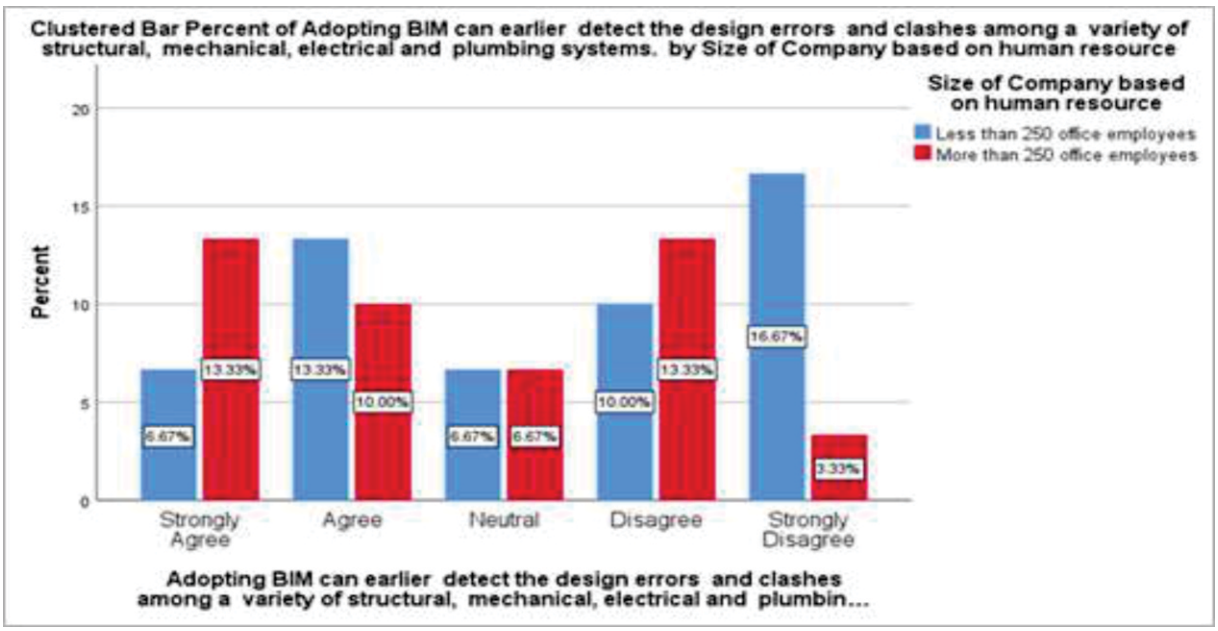

Fig. 10.Responses based on Company Size for BIM Q2

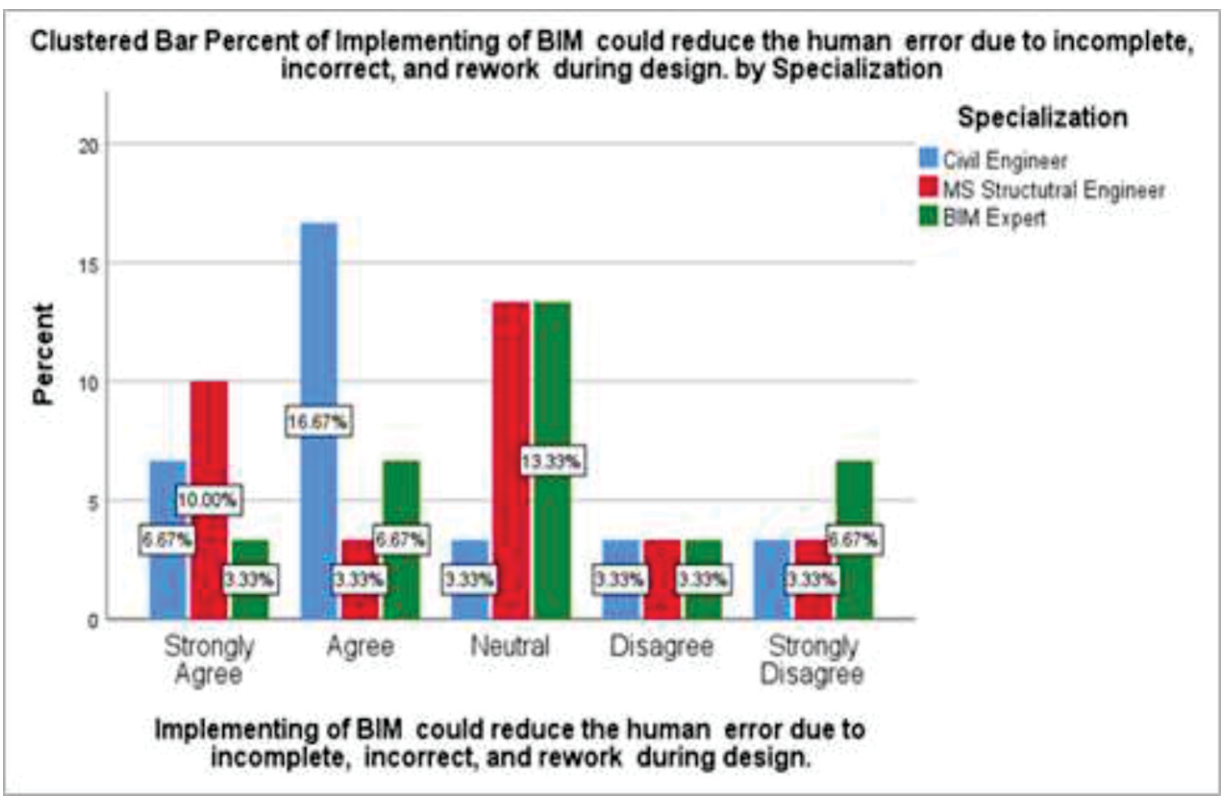

Fig. 11. Responses based on Experience of BIM technology for BIM Q3

4. Conclusions

a) From the observed results, it can be concluded that BIM provides more advanced-level drawing than that AutoCAD. BIM provides an improved and efficient environment for architectural designing and plans as well.

b) From the result, it can also be concluded that BIM involves 3D solid components designed in the well-mannered Revit modelling environment due to which very little time is required to produce drawings, while in AutoCAD every feature is to be designed manually which takes a lot of time.

c) According to the quantitative results, it can be concluded that implementing BIM could reduce human error due to incomplete, incorrect, and rework during design. As more than 50 of the respondents agreed to this statement.

d) From the quantitative results, it can also be concluded that BIM could enhance communication between design teams, as more than 50 of the respondents agreed with this statement.

e) From the quantitative results, it can also be concluded that drawings errors are to be greatly adjusted through BIM implementation, as more than 50% of the respondents agreed to this statement.

f) It can also be concluded that there is a lack of awareness of the capabilities of BIM tools in the industry, as more than 60% of the respondents agreed to the statement.

g) It can also be concluded that multi-software of BIM does not lead to a decrease the efficiency.

h) It can also be concluded that BIM can be considered more suitable for the project planning according to the design than AutoCAD as more than 53% of the respondents agree to the statement.

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Control of Unbalanced Power Fluctuation Using Out-of-Step Tripping (OST) Method

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Abstract. Power systems are being exposed to a wide range of disturbances during operations and those disturbances could be smaller and larger. In the provided study we are going to discuss that disturbances in electrical power systems are common and result in electromechanical oscillations which could be also defined as power swing. The interconnected generator with a synchronous system might be severe and may occur into the loss of synchronism due to power fluctuation. Step tripping could be defined as the method which differentiates between stable and unstable power fluctuations and controls the swings and keeps on initiating network shield during synchronism among power system targeted zones. The current & voltage have fluctuated when the out-of-step condition occurs and it damages power system equipment as well as of step condition involved in protective devices requires a more effective algorithm. This research concerns step state many protective devices. For correct recognition of out in power system network, and discusses in what way to enhance the attainment of protective devices during power swing. In the provided study we would be designing the algorithm by using MATLAB code the required needful simulation and PSCAD. The procedure followed here identifies the faults in the system, reliability concerns, sustainability and effectiveness and it will predict loss of synchronicity to make it smoother for operations.

Keywords: Power System, Voltage Swing, Protection System, MATLAB Simulation, PSCAD.

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1. Introduction

When a disturbance takes place in a power system, it is very essential to figure out the changes as quickly as possible and to take precise actions against the fault. Modern power networks utilize distance relays with the detection of power fluctuations to identify out-of-step conditions. Pre-set tripping relays in the electrical power system to get free of the oscillations and to continue important components operating without disturbances. As, an alternative to using distance relays to identify Out-of-Step conditions, new measurement techniques are available where it is possible to detect phase angles in the complete power system with the same time and angle as a reference shown in Fig. 1. Studies have been done with the new technique to calculate voltages and currents in power systems and also to measure the difference between mechanical rotor angle and electrical power (SEL, 2017). This research goes one step further in the way of making the new techniques in the power system network to discover electric power swing oscillations and avoiding Out of Step. During steady-state operating conditions, power systems operate on the nominal frequency (50Hz or 60Hz) ±0.02Hz and Voltage=Nominal

voltage ± 5% (PSRC, 2005). During steady-state conditions, a balance exists between consumed and generated active power that is essential for the stability of the electrical power system. There are various disturbances in the power system e.g., variation in the system, loss in generation or transmission side, and clearance of fault. Due to these variations in power system imbalance is created in the input and output of power. During steady-state conditions output is considered as electrical and input as mechanical, so electro-mechanical oscillations are created because of unbalanced input and output and can result in electrical power flow swings (Abdelaziz et al. 2010). These oscillations affect the current and voltage waveforms of the power system. Current and voltage waveform during steady-state and power swing conditions are shown in Fig. 2 & Fig. 3, respectively (Elmore, 2009). Due to the reaction of disturbance, two types of power swings stable and unstable are produced in a power system.

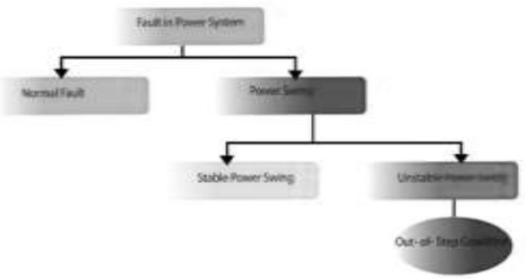

Fig. 1. Block diagram of the System

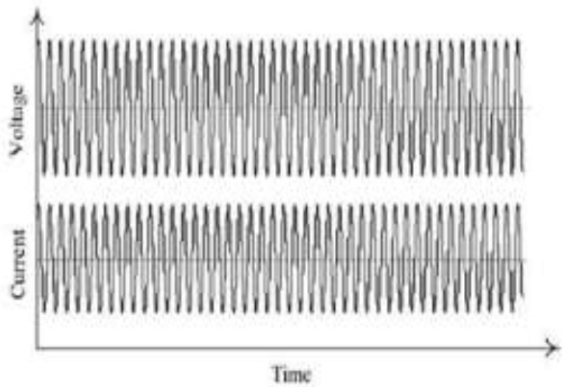

Fig. 2. Current and Voltage curves during Constant State Condition (Elmore, 2009)

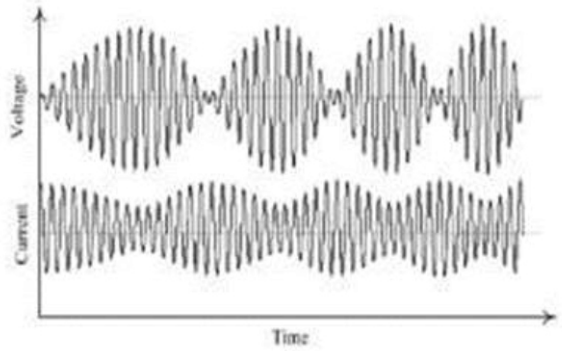

Fig. 3. Current & Voltage Curves in Electrical Power Swing (Elmore, 2009)

When produced oscillations in the power system return to a steady-state point, it is considered as a stable power swing. But if there are huge oscillations and if it does not return to a steady-state point then it is considered as unstable power swing that is also called out-of-step situation. These out-of-step phenomena can result in huge oscillations in current and voltage waveform which affect the stability of the power system (Kimbark, 1948).

2. Relationship for different fluctuations

The generated electric power Pa transmitted from the generator to a load of the electric machine is given by Eq. (1) (Tziouvaras, 2004).

$$P_g = \frac{E_g E_l}{X} Sin \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

$$P_a = P_m - P_g \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

As turbine generates the electric power by using mechanical power and according to electric power equation if one parameter will change due to disturbance in the power system it will affect the overall system. Electrical power is changed due to two parameters one is reactance (X) and the second is load voltage E_l of load side. Load voltage will be decreased due to short circuits and reactance will be increased due to the opening of the circuit breaker. When one of the generators in the power

system is tripped, the load will have to shift on other generator units and this change will affect the stability of the power system (US-CAN, 2012). In such conditions, instantaneous electrical power by the load is not equal to instantaneous mechanical power by the load (Tziouvaras, 2004). So, rotor angular velocity will go on decreasing due to a sudden increase in load on other generator units. As a result, large power flow swings will be produced due to oscillation in rotor angle. The accelerating torque T_a is determined by the difference between electro-mechanical torque T_m and shaft torque T_m in a machine as presented by Eq. (3).

$$T_a = T_m - T_e \ldots\ldots 3$$

$$P = T * w \ldots\ldots\ldots 4$$

Where,

P = Power in watt

T = torque in N.m

ω= Angular velocity in rad/s

$$\omega = \frac{d\theta}{dt} \ldots\ldots\ldots\ldots\ldots\ldots 5$$

$$T = J * \alpha \ldots\ldots\ldots\ldots\ldots\ldots 6$$

$$M = J * \omega \ldots\ldots\ldots\ldots\ldots 7$$

$$P_a = T_a * \omega = M * \alpha = M * \frac{d2\theta}{dt2} \ldots 8$$

$$\theta(t) = \omega_{syn} *t + \delta \ldots\ldots\ldots\ldots\ldots 9$$

While the angular velocity ω is:

$$\omega = \frac{d\theta}{dt} = w_{syn} + \frac{d\delta}{dt} \ldots\ldots\ldots\ldots 10$$

$$P_a = M * \frac{d2\delta}{dt2} \ldots\ldots\ldots\ldots\ldots 11$$

$$P_a = P_m - P_e = \frac{2H}{w_{syn}} * \frac{d\omega}{dt} \ldots\ldots\ldots 12$$

2.1. Proposed Method

The proposed approach is categorized into three conjectures, (I) Firstly to define the three conditions when fault occurs at different angles of the rotor of the generator, which shows that how to power system response and what can be the behavior of fluctuations curves during three conditions included before-fault, during fault and after a fault. (II) Secondly explaining why, a threshold value of rotor angle is set to determine the type of the fault, whether it is normal fault or power swing. Compare the rotor angles value if the gap is more than 0.1 so then fault moves to power swing region, otherwise this normal fault can easily be detected with normal relay operation. (III) Thirdly to differentiate between stable and unstable fault by comparing the mechanical power of rotor and electrical power of generator (Kundur; Paudyal, 2018). If the electrical power is greater than mechanical power then the curve will not come back originally to the mechanical power line. To make the algorithm accurate and perfect enough time is consumed to make the out-of-Step conditions hold in all the perspectives (Fig. 4).

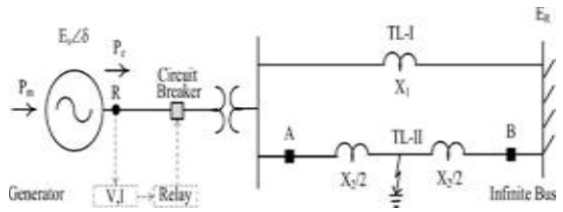

Fig. 4. Single-Machine Infinite Buses System (SMIB)

Fig. 4 shows the single-machine power system and parallel transmission line TL-1 and TL-2 with impedance X_1 and X_2 respectively. The electrical power from the generator to the motor is given by,

$$P_e = P_{max} Sin\delta \ldots\ldots\ldots\ldots\ldots 13$$

The maximum power relocated from generation to motor end is given by,

$$P_{max} = \frac{E_s E_r}{X} \ldots\ldots\ldots\ldots 14$$

δ = phase angle between E_S and E_R

X = total impedance

Power changes due to change of impedance during a fault in the system in three cases are before-fault, during fault and after-fault.

Fig. 5 shows that mechanical power P_m is equal to electrical power P_e at angle δ_o and at the pre-fault steady-state condition (Adibi, 2013; Cheng and Sachdev, 2015). Electrical output power rapidly drops and follows the fault curve when fault is applied to the power system as shown in the figure. 5. Output electrical power suddenly changes and monitors the post-fault curve when fault is cleared at δ_o. The area **A** and area **B** represent the transient energy for $P_m > P_e$ and $P_m \leq P_e$ respectively.

$$A = \int_{\delta_n}^{\delta_e} \frac{w_s}{H}(P_m - P_e)d\delta \ldots\ldots 15$$

$$B = \int_{\delta_n}^{\delta_{max}} \frac{w_s}{H}(P_m - P_e)d\delta \ldots\ldots\ldots\ldots 16$$

A will be equal to and less than **B** for the stable power system.

As shown in Fig. 6, the power angle δ swings up to δ_{max} where $\delta_{max} = \pi - \delta_\circ$. A will be greater than B for an unstable power system.

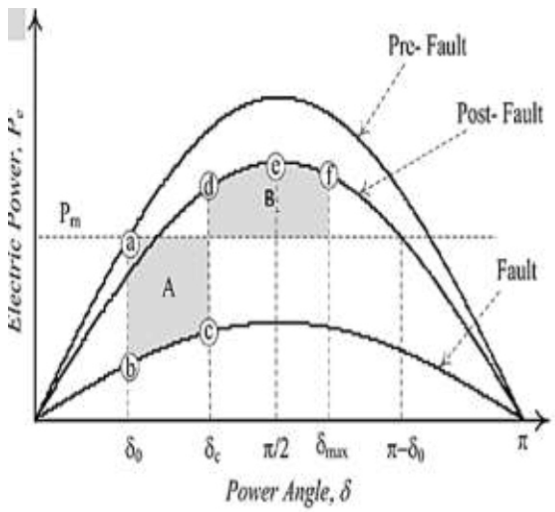

Fig. 5. Power- Delta bend displaying an even state (Kundur, 2007)

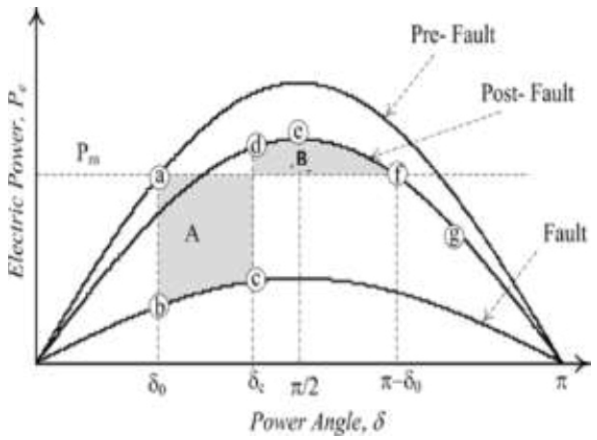

Fig. 6. Power- Delta bend displaying an uneven state (Kundur, 2007)

3. Flowchart

Fig. 7 shows the flow chart of the common algorithm and the following table.1 shows the result of this algorithm

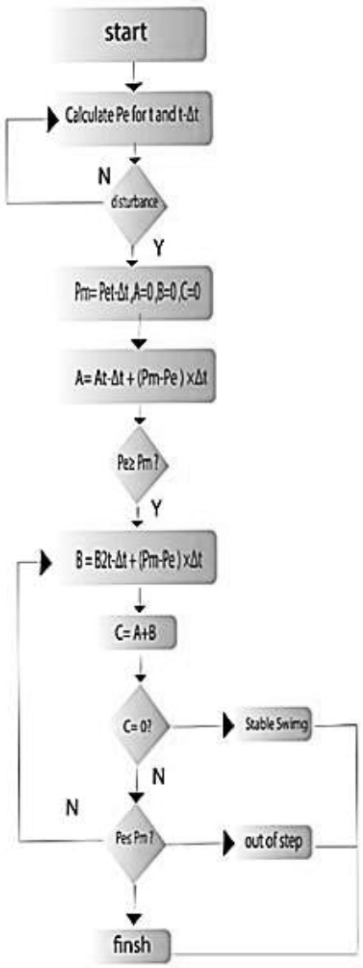

Fig. 7. Flowchart Algorithm (Paudyal et al. 2018)

Table 1. Summary of Steady and OOS swing of a single-machine infinite-bus System

Case	A	B	C	D
Power Angle δ_o	30°	30°	30°	30°
Fault Duration Time ,s	0.158	0.22	0.244	0.358
Part (A) pu-s	0.059	0.064	0.051	0.057
Part (B) pu-s	-0.046	-0.064	-0.037	-0.036
A+B	0	0	0.044	0.041
Decision Time ,s	0.0740	0.950	0.688	0.604
Decision	Steady	Steady	OS	OS

The following flow chart shows the proposed algorithm. Figure. 8 explain as, at the beginning of the algorithm, at t=0 consider that initial condition is stable and just to check the value of mechanical power and rotor angle as well. In the second step, iteration starts and goes through each next value of the angle. The IF condition in this segment looks at the difference of two values close to one another in the phase angle vector, if the values show dissimilarity a larger part of the algorithm that detects power swings will begin.

Here assumes a threshold value which is equal to 0.1, if the value is greater than the threshold algorithm will start and move to the next step (Rebizant et al. 2011). Similarly in the opposite case-algorithm goes a step back. After calculating the value of angles, the IF statement is used to measure the value of change in the angle and electric power output.

This IF condition is the most significant part of the algorithm if the angle has changed excessively and the electric power output has diminished to a level beneath the mechanical power input (Cheng and Sachdev, 2015). It is without a doubt that the framework will encounter a power swing, and this algorithm starts observing the value of electrical power Pe and mechanical power Pm and also compares all these values to differentiate between normal condition and power swing fault.

Therefore, if the statement is decided at the end, this IF statement compares the areas as shown in Figure. 9. For whatever length of time that part A is lesser than part B the IF condition will get NO and the algorithm proceeds. Yet on the off chance that the angle becomes excessively enormous and part A is more prominent than part B, the IF condition gets a YES and the algorithm stops

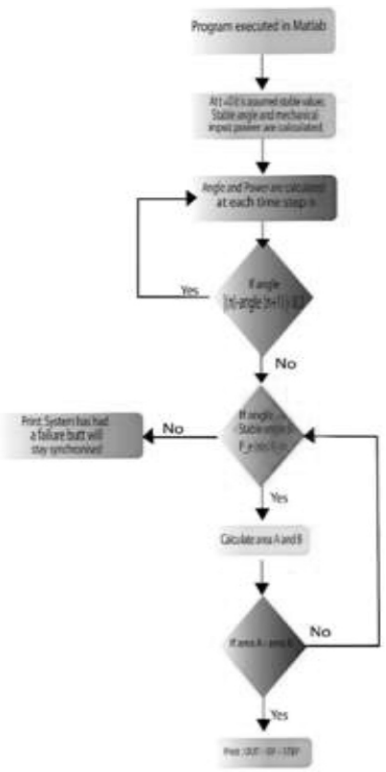

Fig. 8. Flowchart of Algorithm Proposed

4. Results and Discussions

The main goal of this research is that first of all we have differentiated between normal faults and power swings are afterward to separate among steady and unsteady power swings (out-of-step condition) (Adibi et al., 2013). Defining the all three conditions focus is only to describe the different steps of before-fault, during fault, and

after fault condition and it is achieved by using the formula,

$$P = \frac{E * v}{X} Sin\delta \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 17$$

F = 60Hz generator 60 MVA supplying 60 MW with inertia constant 'H' = 3.8 MJ/MVA at rated speed. E = 2.06 pu, V = 2 pu, X1 = X2 = 0.5 pu 3 phase fault.

Fig. 9 shows the power system response and behavior of swing curves during three conditions that are before-fault, during fault and after fault. Power changes because of change in impedance during a fault in the system and when fault takes place in the system, the power curve will show all three set conditions during fault.

Fig. 10 shows a fluctuation curve for a sustained fault up to a time of 5 secs. When the fault occurs in the system, the angle changes concerning time. This power curve shows the unstable condition because fault sustained in the system for only a few seconds.

Fig. 11 shows the fluctuation curve if the only fault is removed by confining line in 0.1 seconds. Similarly, during a fault, the angle changes concerning time. This power curve shows the stable condition because the fault is removed by confining line in 0.1 seconds

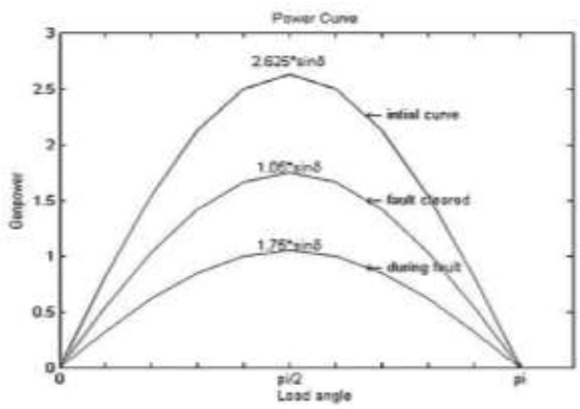

Fig. 9. Power Curve w.r.t load angle during fault

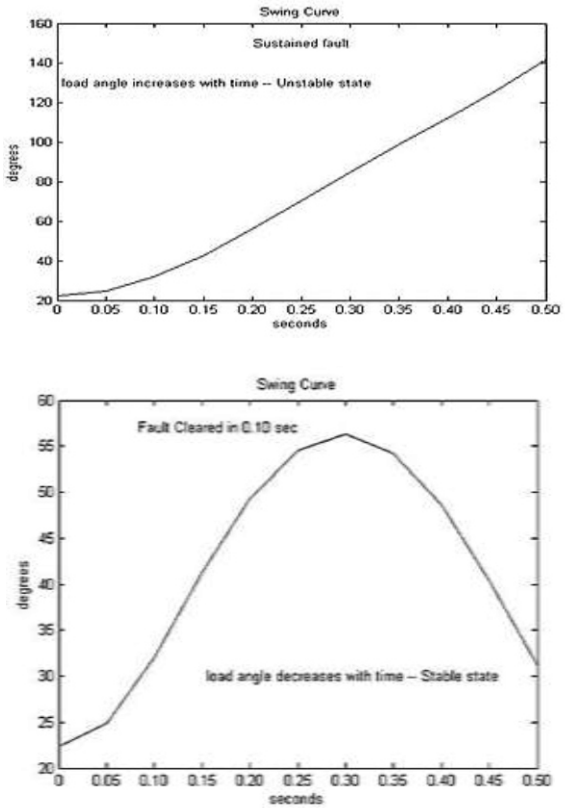

Fig. 11. Swing Curve for Stable State

4.1. Simple AC System

A simple single line AC system is drawn in PSCAD to perform an experiment to detect the fault in the transmission line. Fault "Flt1" is created in a system; in which breaker "Brk1" detects the ground fault for a limited time.

230 kV transmission line system with a passive load is shown in Fig. 12. This demonstrates the use of the single line of a transmission line directly connected with the sending and receiving ends (Bahbah and Girgis, 2017; Hashiesh et al., 2010; Adibi and Milanicz, 2009).

Three-phase transformer of value 100 MVA is used in the conversion from delta (Δ) to star (Y). Three-phase impedance type source is used and its value is 100 MVA with a base voltage of 13.8 kV. Set the input voltage constant time of source as 0.05 sec. The sending end currents are measured on the

transformer secondary windings inside the transformer component.

A timed phase C to earth fault is applied at 0.25 sec & lasts for 50 msec. The timed breaker logic is set to trip at 0.26 sec and reconnects at 0.31 sec. After setting the values of each component set the fault duration, fault time and run the system. The below figures show the result that is easy to understand the concept of detection of a fault in the transmission line of the power system (Paudyal, 2018).

Fig. 13 shows the disturbance in current when the fault occurs in the system for 50 msec. Similar behavior of breaker current and load voltage during fault conditions are shown in Figs. 14 and 15, respectively.

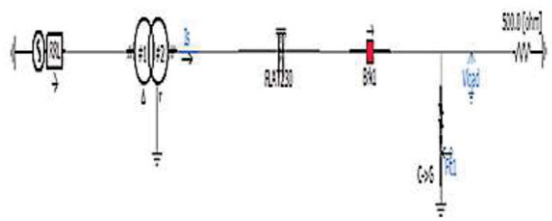

Fig. 12. Simple AC System

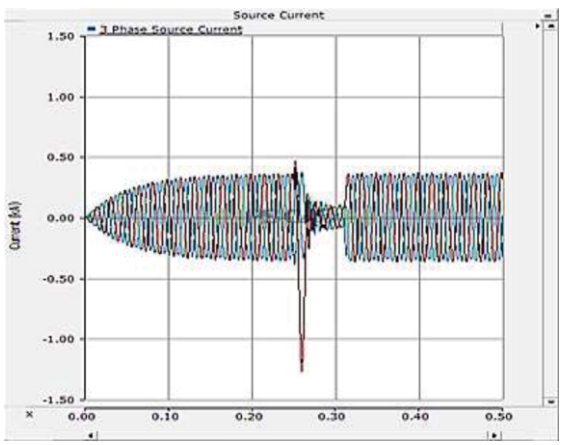

Fig. 13. Three Phase Source Current as for Time

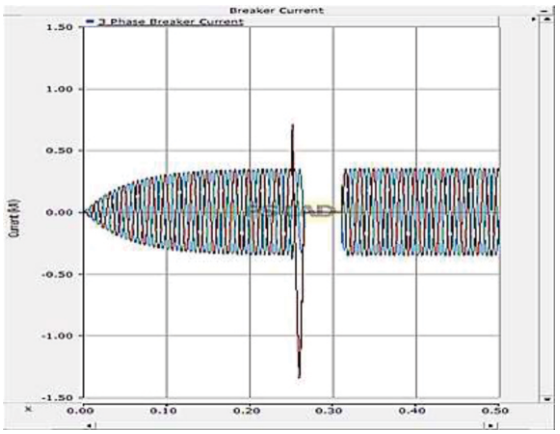

Fig. 14. 3-Phase Breaker Current as for time

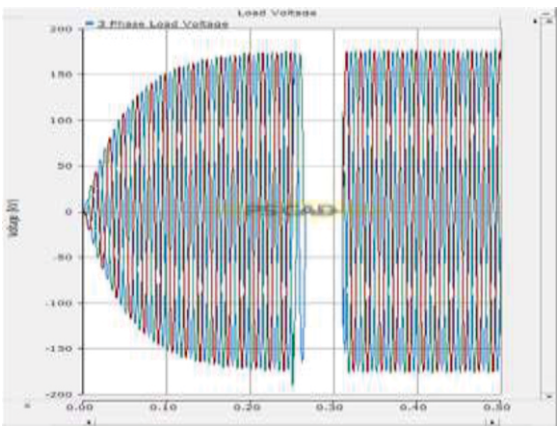

Fig. 15. 3-Phase Voltage as for time

5. Conclusions

In the research work, we developed a modified technique for the control of power fluctuations using the out-of-step method. In this study, we used the power area technique in which we are not only calculating power concerning time but can also calculate phase angle and also the phase angle difference concerning time to calculate the power. If part A is smaller than or equivalent to part B, the system will be stable/firm. Say if part A is larger than B, the system will be unstable (out-of-step). The result of all measurements of this research work shows that the algorithm works properly. The algorithm is designed to identify power fluctuations and it discriminates the unstable and stable power swing correctly. Hence it is promising to use this method in a procedure to find out OOS conditions. The results of the simulation in the simple circuit

was performed in PSCAD shows that if you set a time of fault duration and other time in which fault occur properly it will result in clearing fault and to get stable power swing. The result of the power fluctuations curve shows the criteria in which the defined three conditions can easily determine the before-fault, during fault and after fault condition on different values of power angle are attained. Furtherly this research work presents an alternate method to detect power fluctuations and vibrations in a power system. The results of the simulation show that methodology to detect unstable power swing using modified OOS method remains a valuable technique to forecast loss-of-synchronism in power system linkage.

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Numerical Analysis of Hartmann Number Influence on Nonlinear Horizontal Stretched Sheet

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Abstract. This study examines numerically the problem of Hartmann number influence on two medium conduction-convection (conjugate) flow of nanofluids on a nonlinear horizontal stretched sheet. This model nonlinear partial differential equation solved by using Keller box method for nanofluid integrates the influence take on the buoyancy parameter, solute buoyancy, Brownian motion, thermophoresis parameter, Prandtl number and Lewis number found to have a strong effect on the system. The numerical result showed the velocity profile decreases during Prandtl number increases and temperature of Nano fluid increases under the influence of Hartmann number. The reduced Nusselt number when Prandtl number rises and reduced Sherwood number for large values of Lewis number. The Hartmann number influence and different parameters are presented through table and graph.

Keywords: Heat Effects, Nano fluids, Nonlinear Stretched Sheet, Hartman number Hx. Numerical solutions, Implicit Finite Difference.

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1. Introduction

The study of conjugate effects on stretching surfaces is important for many industrial applications like an extrusion molding, glass fiber, paper production industry hot rolling, and movement of biological fluids (Anwar et al., 2012). The inertia slips flow transfer of heat over a flat Stretching sheet in the presence of soret and dofour effect will directly affect heat transfer (Afify, 2009). The thermal diffusion effect of convective heat transfer over a Horizontal Stretched sheet considering injection or suction with thermal diffusion so the suction and injection have a significant impact on heat transfer (Aman and Ishak, 2010). This research paper on a vertical Surface effect of thermal diffusion identifies the surface heat flux. The base fluids poor heat transfer properties were observed as a great hurdle to the high solidity and value of heat exchangers (Daungthongsuk and Wongwisis, 2007). To increase the thermal conductivity, solid nanoparticles may be suspended into the base fluid. The first step is to get the base or conventional fluids having thermal conductivity hundreds of times lower than solid particles (Choi, 1995). They have inspected the impact of nanoparticles on characteristic convection limit layer stream past a vertical plate, utilizing a model in which Brownian movement and thermophoresis are represented. The writers have accepted the most straightforward conceivable limit conditions, in particular those in which both the temperature and the nanoparticle division are steady along the divider (Kuznetsov and Nield, 2010).

Nomenclature

C	nanoparticle volume fraction	Cw	nanoparticle volume fraction stretching
DB	Brownian diffusion coefficient	K	thermal conductivity
DT	thermophoretic diffusion coefficient	Le	Lewis number
Nb	Brownian motion parameter	Nt	thermophoresis parameter
Nu	Nusselt number	Pr	Prandtl number
P	Pressure	g	the acceleration due to gravity
u and v	the velocity components in the x and y directions respectively		
μ	the viscosity	ρ_f	the density of the base fluid
ρ_p	the density of the nanoparticle	β_T	the coefficient of volumetric thermal expansion
β_c	the coefficient of volumetric concentration expansion		
$\alpha = k/(\rho C)_f$	the thermal diffusivity		

$\tilde{\delta}$	solutal buoyancy parameter
λ	buoyancy parameter
BC	Boundary Condition
G_r	Grashof Number
BL	Boundary Layer
$(\rho C)_p$	the heat capacitance of the nanoparticles,
$(\rho C)_f$	the heat capacitance of the base fluid
$\tau = (\rho C)_p/(\rho C)_f$	ratio between the effective heat capacity of the nanoparticle material and heat capacity of the fluid

Hartmann number (Hx) the ratio of electromagnetic force to the viscous force first introduced by Hartmann.

In this work, the nano-fluid properties presented the stream over a stretching sheet. Nano fluid flow in a porous channel (well known as Cheng-Mincowcz problem) has been analyzed. Similarity method and porous series method laminar buoyant flow of bathing (Nield and Kuznetsov, 2010).

. On a moving plate analysis, the conjugate effect for different parameters configuration. Numerical study in a pour's medium analysis on the free convective Boundary Layer (Gdalevich and Fertman, 1977). In a numerical study of the Conjugate Heat Transfer in a vertical hollow cylinder heat transfer is calculated by free convection. Recently, Rani and Kim (Char et al., 1990). This research investigates that conjugate heat transfer depends on the open cavity in a free convection Boundary Layer with the high viscosity porosity surface Conjugate Heat transfer effect calculated by Darcy mixed convection problem. The temperature is dependent on the fluid viscosity now a day the conduction phenomenon resistance at the surface of the wall effect presents on the wall geometries. The stream flow and heat transfer induced, for example, in the air space double-pane window system varies basically from the peripheral natural convection in which the boundary layer was considered. (Pop and Na, 2000). In this research paper, the stagnation slip flow at stretching of the sheet surfaces was investigated by the homotropy analysis method (Abbas and Hayat, 2011).

2. Governing Equation

The solution of governing equations is presented here based on the implicit finite difference scheme. This two-dimensional assumption if apply the external pressure on a surface of a sheet in the x-direction is having a diluted Nano particle of the sheet in the x-direction is having a diluted Nano particle. The basic parameters and equations for nano fluids can be written in Cartesian coordinates x and y. Nano-fluid boundary layer flow on stretching surfaces has been studied for purpose of heat and mass transfer investigation.

The two-dimensional measurement through along the x-axis above the flow of Nano fluid and y ≥ 0. when applying the two equal but opposite forces along the x-axis then the sheet will be stretched. The stretched sheet surface temperature T and the Nano particle fraction C yield constant values Tw and Cw. The outer/ambient values are T∞ and C∞ are approaches to y infinity.

The Study flow of a Nano fluid towards a flat horizontal surface, under the effect of an external B0. It is assumed that the flow is laminar whereas the fluid is incompressible and electrically conducting and applying the external magnetic effect. Further, the Cartesian coordinate system is the most appropriate for the present problem, with the x-axis being taken along the surface and the y-axis being assumed to be in the normal direction.

Under these considerations, the governing equations for the problem with boundary layer approximations are:

$$\frac{\partial u}{\partial x}+\frac{\partial v}{\partial y}=0 \quad (1)$$

$$u.\frac{\partial u}{\partial x}+v.\frac{\partial u}{\partial y}= v.\frac{\partial^2 u}{\partial y^2}, \quad - \quad \frac{1}{\rho_f}\sigma_f\beta_0^2 u \quad +\left[(1+C_\infty)\rho_f\beta_T(T-T\infty)-(\rho_p-\rho_{p_\infty})\beta_c(C-C_\infty)\right]g \quad (2)$$

$$u.\frac{\partial T}{\partial x}+v\frac{\partial T}{\partial y}=\alpha\frac{\partial^2 T}{\partial y^2}+\tau\left[D_B\left(\frac{\partial C}{\partial y}\frac{\partial T}{\partial y}\right)+\frac{D_T}{T_\infty}\left(\frac{\partial T}{\partial y}\right)^2\right] \quad (3)$$

The boundary conditions are

$$u=\lambda U_w, \quad v=v_w, \quad T=T_w, \quad C=C_w, \quad at \quad y=0, \quad (4)$$

$$u\to 0, \quad T\to T_\infty, C\to C_\infty, \quad as \quad y\to\infty \quad (5)$$

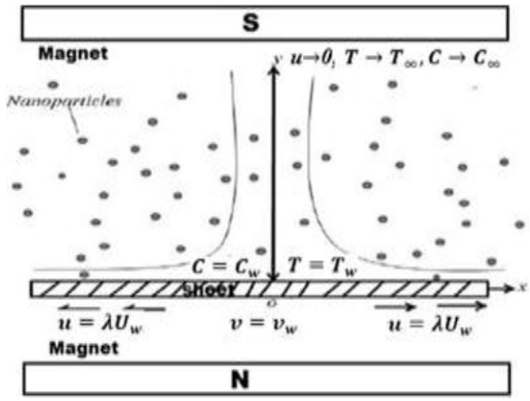

Fig. 1. Horizontal Stretched sheet with Magnetic Effect

Where the horizontal and normal velocity constituents, p are the pressure. The flat surface of the sheet is considered to be at the constant temperature T_w whereas the atmosphere temperature of the fluid far from the surface is T_∞.

Under these boundary conditions, we intended to solve the governing equations of the problem. To accomplish this, we introduce the following similarity transformations.

$$\eta=y\sqrt{\frac{a(n+1)}{2v}}x^{(n-1)/2}, u=ax^n f'(\eta) \quad (6)$$

$$v=-\sqrt{\frac{av(n+1)}{2}}x^{(n-1)/2}\left[f(\eta)+\frac{n-1}{n+1}\eta f'(\eta)\right] \quad (7)$$

$$\theta(\eta)=(T-T_\infty)/(T_w-T_\infty), \quad \emptyset(\eta)=(C-C_\infty)/(C_w-C_\infty)$$

With:

$$v_w=-\sqrt{\frac{av(n+1)}{2}}x^{(n-1)/2}S$$

Where S is the constant suction/injection parameter.

The flow field has given above identically satisfies the continuity equation, which means that Eq. (7) is

compatible with the continuity equation (1), and hence represents the possible fluid motion.

The fluid flow satisfies the continuity equation, which means that Eq. (7) is well-matched with the continuity equation, and the following represents the possible fluid motion. Substituting Eq. (7) into the mathematical model, we obtain:

$$f''' + ff'' - \frac{2n}{n+1}f'^2 + \frac{2}{n+1}(\lambda\theta - \delta\phi) = 0 \qquad (8)$$

$$\frac{1}{Pr}\theta'' + f\theta' + Nb\theta'\emptyset' + Nt\theta'^2 = 0 \qquad (9)$$

$$\emptyset'' + \frac{1}{2}Lef\emptyset' + \frac{Nt}{Nb}\theta'' = 0 \qquad (10)$$

Whereas the boundary conditions reduce to

$$f(0) = S, \quad f'(0) = \lambda, \quad \theta(0) = 1, \ \emptyset(0) = 1 \qquad (11)$$

$$f'(\eta) \to 0, \quad \theta(\eta) \to 0, \emptyset(\eta) \to 0 \ as \ \eta \to \infty$$

With $Pr = v/\alpha$ is the Pr no, and $Le = 2v/D_B$ is the Lewis no. Finally,

$$Nb = D_B\frac{\tau(C_W - C_\infty)}{v}. \quad Nt = D_T\frac{\tau(T_W - T_\infty)}{vT_\infty}$$

Are respectively, the Brownian motion parameter and thermophoresis parameter.

Here

$$\lambda = \frac{Gr}{Re_x^{\frac{3}{2}}}, \quad \delta = \frac{Gm}{Re_x^{\frac{3}{2}}}, \quad \Pr = \frac{v}{\alpha}, \quad Le = \frac{v}{D_B}, \quad v = \frac{\mu}{\rho_f}$$

$$Nb = \frac{\tau D_B(Cw - C\infty)}{v}, Nt = \frac{\tau D_T(Tw - T\infty)}{vT_\infty}, \quad Re_x = \frac{u_\infty(x)x}{v}$$

$$Gr = \frac{(1 - C_\infty)\left(\frac{\rho_{f\infty}}{\rho_f}\right)gn(T_w - T_\infty)}{v^2Re_x^{\frac{3}{2}}}$$

$$Gm = \frac{\left(\frac{\rho_f - \rho_{f\infty}}{\rho f}\right)gn_1(C_w - C_\infty)}{v^2Re_x^{\frac{3}{2}}}$$

Where f, θ and ϕ are stream function, temperature and concentration of nanoparticle.

The boundary condition transformed in to;

$$f = 0, f' = 1, \theta = 1, \phi = 1 \text{ at } \eta = 0$$

$$f' \longrightarrow 0, \theta \longrightarrow 0, \phi \longrightarrow 0 \text{ when } \eta = \infty$$

The nonlinear ordinary differential equations 8, 9.and 10 use the following boundary conditions by implicating a finite difference scheme. The reduced the Nusselt number –θ (0) and reduced the Sherwood number – ϕ (0) under the influence of Hartmann number as defined as:

$$Nu_r = \frac{Nu}{\sqrt{m+1_2 Rex}}, \quad Sh_r = \frac{Sh}{\sqrt{m+1_2 Rex}}$$

3. Solution Procedure and Main Results

In this research, the governing Equations 8, 9 and 10 imposed boundary conditions Eq. 11 are solved for the numerical study by using the Keller box method.

1. We reduce the equations 8, 9. and 10 of the nonlinear system to a First-order System (FOS).

2. We mark the variance equation spending central difference scheme (Keller box method).

3. We practice the block tridiagonal elimination technique (BTET) to explain the linear system.

This solution procedure is extensively used which is earlier, easier to program, more effective and stretchier.

4. Result and Arguments

The physical amounts of our intrigued are the Liquid speed, stream astute speed, concentration Profile and temperature profile at the extending sheet dividers. The parameters of the issue are the Reynolds number Re, the attractive parameter Hx, the Prandtl number Pr, the Brownian movement Parameters Nb, thermophoresis Parameters Nt. and suction infusion Parameters. These parameters are all dimensionless bunches of fabric and stream properties, and/or geometric measurements of the space. The results of numerical for certain physical limitations are shown in tables and numerous figures.

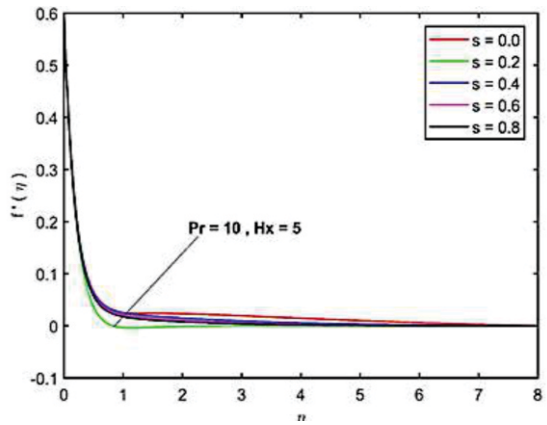

Fig. 1(a) Velocity Variation with different values of s and Pr number and Hartmann number Hx=0

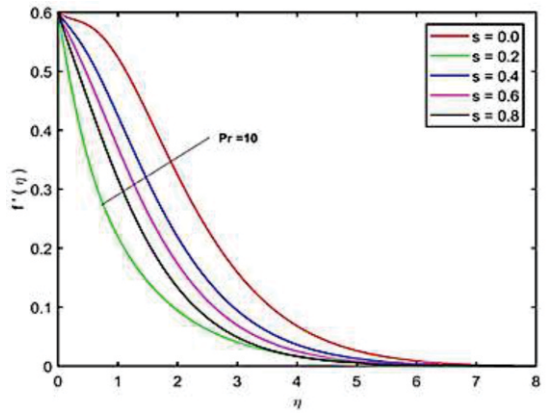

Fig. 1(b) Velocity Variation with different values of s and Pr number and Hartmann number Hx=5

The numerical result for some physical parameters of our attention according to this parameter λ=1.0, δ =1.0 Le=10 and Nb=Nt=0.1 without the effect of external magnetic effect f'(η) increases with increasing values of s and lower Pr number 0.71 fluid is being injected. However, the high thermal conductivity (K) and low Prandtl numbers (Pr) of liquid metals indicate that heat transfer by molecular thermal conduction is important not only in the near-wall layer. When the Pr number increases at point s=0.2 the velocity decreases because when the Prandtl number increases the liquid will be thicker. The outside magnetic field Hx effect on the normal velocity is presented in figure 1(b).it can be shown that with an increase of magnetic field parameter Hx=5.0 the fluid velocity decreases those forces which affect this normal velocity is called Lorentz forces. These forces affect the slowdown motion of the fluid.

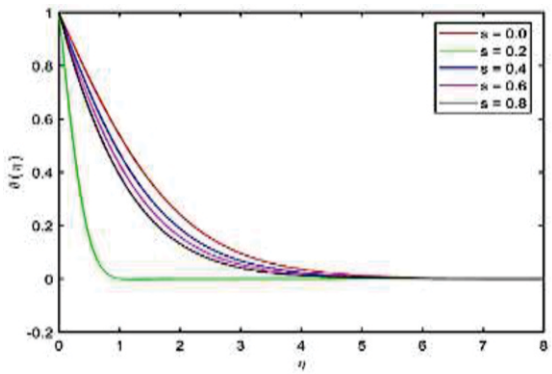

Fig. 2(a) Temperature Profile Variation with different values of s and Pr number and Hartmann number Hx=0

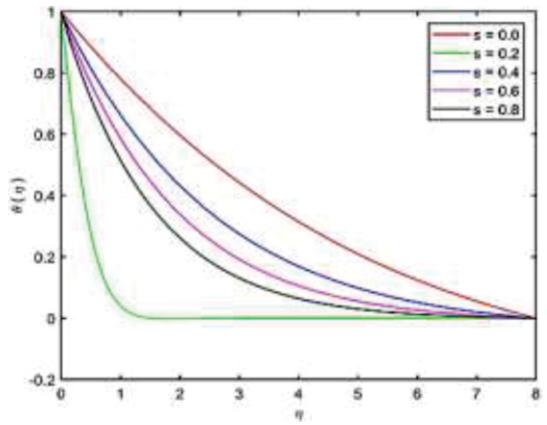

Fig. 2(b) Temperature Profile Variation with different values of s and Pr number and Hartmann number Hx=5

The numerical result for some physical parameter of our attention according to this parameter λ=1.0, δ =1.0 Le=10 and Nb = Nt = 0.1 without the effect of external magnetic effect θ(η) The thermal properties of liquid metal be influenced by only temperature.

The minor transverse thermionic alteration in liquid metal flow is mainly due to the high thermal conductivity(k), the effect of no isothermal conditions in heat transfer is not significant and, as a rule, is not careful during the Hx increases then the fluid temperature will be increased in figure 1 presents that when there increases the Pr number then Nano fluid will be thicker and during heating, it will be near the hot plate fewer values of Pr number are more effective.

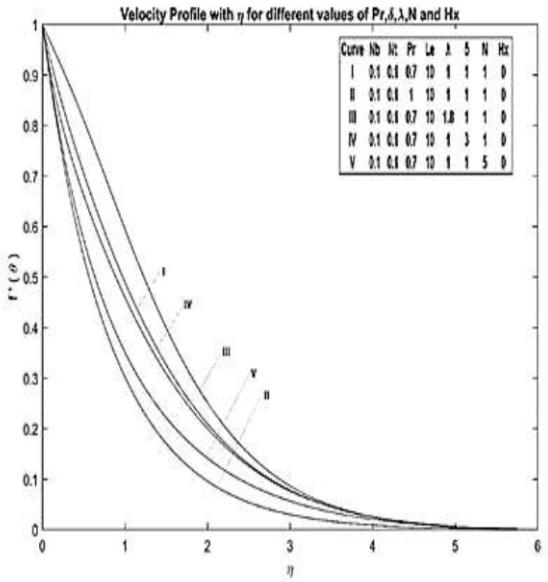

Fig. 3(a) Dissimilarity of f'(η) Profile along η for dissimilar Values of Prandtl, λ and δ, N and Hartmann number.

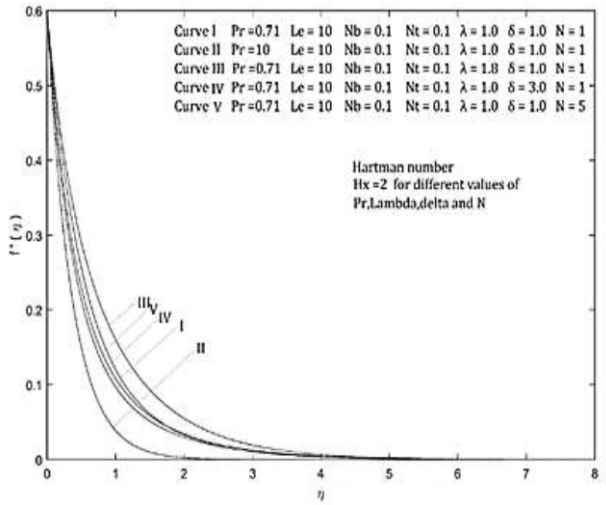

Fig. 3(b) Dissimilarity of f'(η) Profile along η for dissimilar Values of Prandtl, λ and δ, N and Hartmann number.

Variation of velocity on a stretching surface is present in two different figures with dissimilar values of Prandtl, λ, δ, N and Hx. In this fig. 3(a) present without Hartmann number effect at constant values of thermophoresis parameter Nt and Brownian motion Nb with dissimilar parameter Pr, buoyancy parameter, and solute buoyancy show that values of Brownian motion impact a large extent of fluid it results thickening the boundary layer during the small Prandtl number the boundary layer velocity increases when increases the values of Pr number decreases the velocity of the fluid. We observe Pr number increases fluid to move more viscous which leads to a decrease in the velocity. In figure 2 observe that curve I comparison with fig 1 show that the presence of Hartmann number the fluid velocity decreases curve travel below side near the hot stretching plate they present that magnetic effect on Nanoparticle movement decreases. Curve II presents that if the value of Pr number decreases then fluid will be more viscous velocity decreases this comparison shows present at the presence of Hartmann number effect fluid velocity will decrease smoothly. Curve III presents that comparison with fig 3(a) and 3(b) no wide effect on the flow because when the value of λ increases but at the presence of

Hartmann number velocity of the fluid will be the same. Comparison of Curve III with fig 3(a) and 3(b) presents when values of δ increase, but at the presence of Hx the fluid velocity will decrease. Curve V presents at the presence of Hartmann number there is a minor increase in velocity great difference occurs.

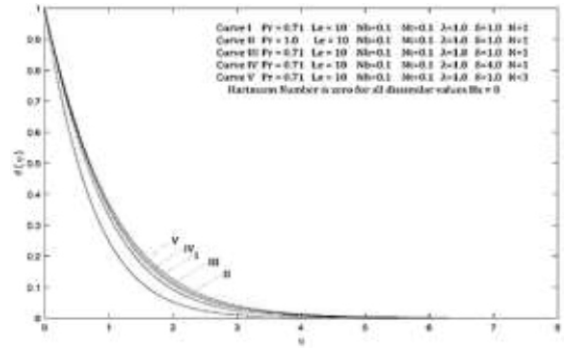

Fig. 4(a) Variation of Temperature Profile with η for dissimilar Values of Pr, λ and δ, and N

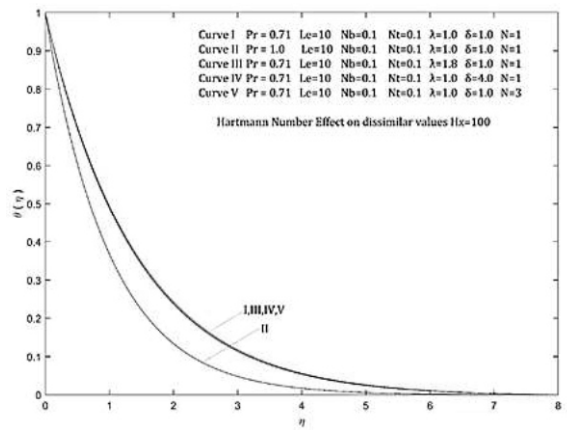

Fig. 4(b) Dissimilar Values of Pr, λ and δ, N and Hx for Variation of Temperature Profile

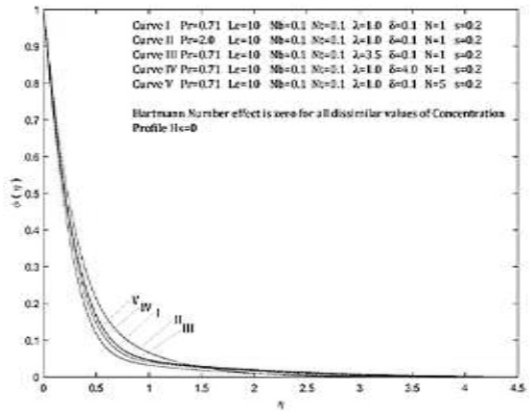

Fig. 5(a) Dissimilar Values of Variation of Concentration Profile

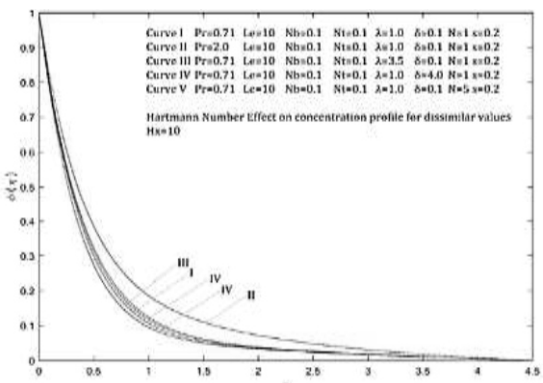

Fig. 5(b) Dissimilar Values of Variation of Concentration Profile with effect of Hartmann number Hx=10

The numerical result for some physical parameter of our attention according to dissimilar parameter without the effect of external magnetic Hx =0 effect θ(η) Figure 4(a)examine the different configuration of Pr,λ and δ on θ(η) profile. The analysis of the profile shows that when we increase values of Pr and λ the temperature profile decreases they increase when we increase the value of δ. The major reason is that when the Pr number increases the boundary layer of nano particle thick so suspended particle motion is affected. Figure 4(b) plotted to examine the no wide

Figure 5 is ready to think about the impacts of disparate arrangement parameters on concentration profiles. It has appeared concentration profile the expanding values of λ basis a diminish within the mass exchange in spite of the fact that, the concentration profiles ϕ (η) increment for huge values of Pr and δ. In figure 5(b) analysis the Hartmann number effect curve travel away from the sheet. Hartmann number scatter the nanoparticle in fluid which effect transfer of heat maximum

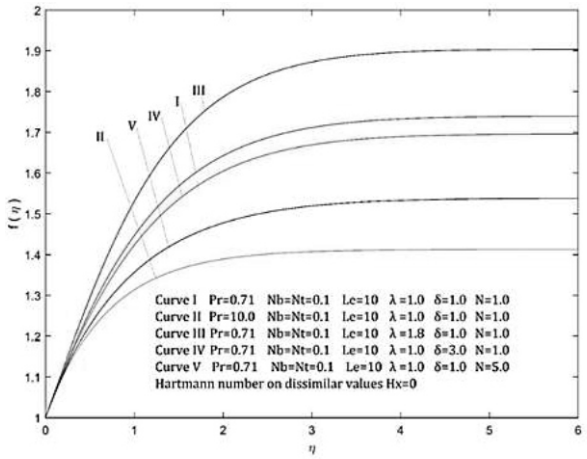

Fig. 6(a) Normal velocity with different Parameter's simulation without Hartman number

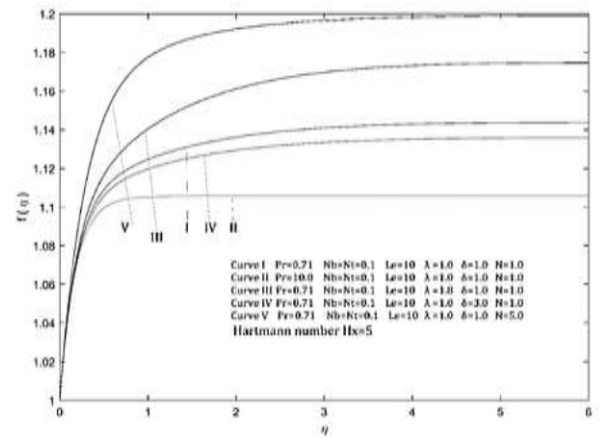

Fig. 6(b) Normal velocity with different Parameter's simulation with Hartman number

i. The normal velocity at a larger value of the Brownian motion parameters (Nt) influences a huge presence of the fluid that generates the thickening of the thermal boundary layer (TBL).

ii. When we increase the values of the thermophoresis parameter (Nb) it results in the diffusion is piercing into the fluid and causing the TBL to be thicker.

iii. We take various values of the Brownian motion, thermophoresis parameter (Nt), Pr, Le,λ and δ are shown in figure 1 when there is an increase in the values of Pr result in a decrease a velocity.

iv. Only velocity increases when there is an increase in the value of λ because when we increase the values of Pr number then the fluid is more viscous which declines the velocity of Nano fluids.

i. Velocity declines when increasing the values of δ and N.

ii. When Hartman number influences Fig. 6(b) the pours stretching sheet when we increase the values of δ and N then due to magnetic effect velocity of the Nano fluid will increase.

The numerical configuration shows that in Figure 7(a,b) present that taking the constant values of Pr number and Le number the velocity f'(η) increases when we increase the values of λ. The effect of Hartmann number in Figure 7(b) the velocity decreases because Lorentz forces attract toward the Nano particle the heat transfer increases.

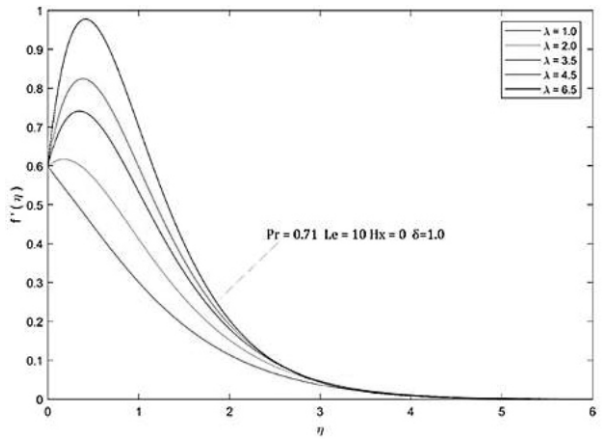

Fig. 7(a) Dissimilar values of λ for finding the stream wise velocity f'(η)

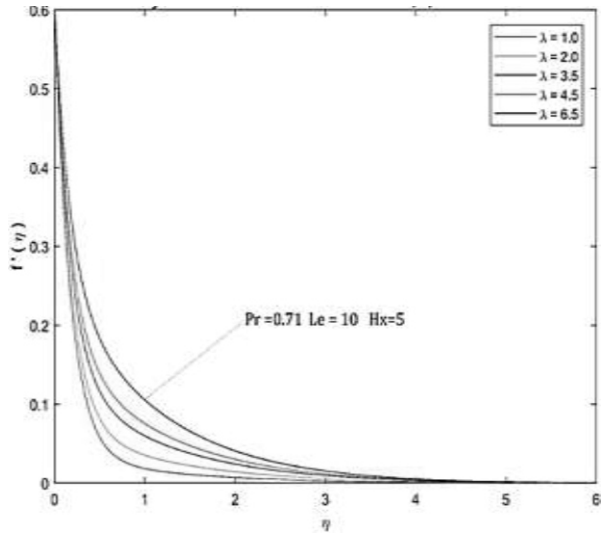

Fig. 7(b) Dissimilar values of λ for finding the stream wise velocity f'(η) with effect of Hartmann number

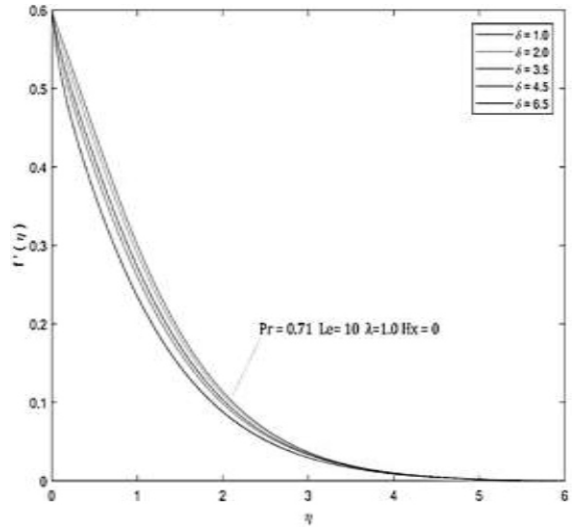

Fig. 8(a) Dissimilar values of δ for finding the stream wise velocity f'(η) with the effect of Hartmann number

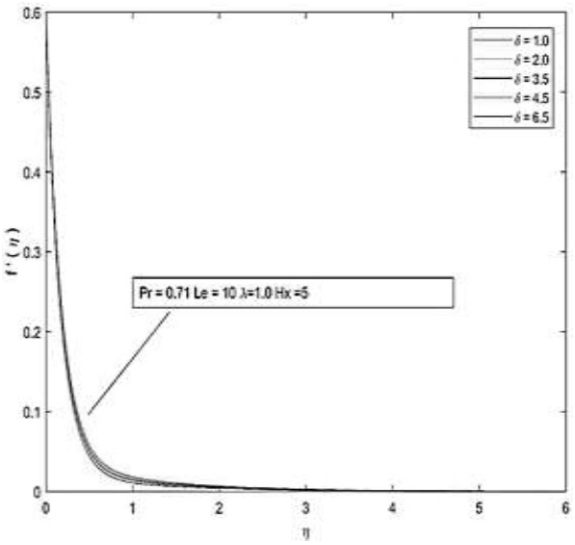

Fig. 9. Dissimilar values of δ for finding the stream wise velocity f'(η) with the effect of Hartmann number

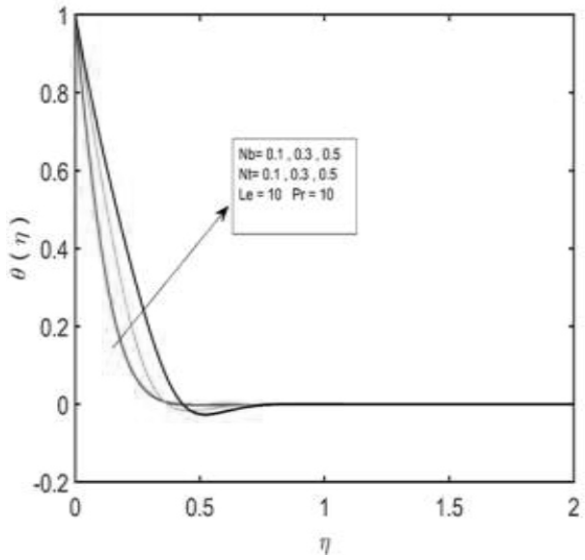

Fig. 8(b) Values of δ for finding the stream wise velocity f'(η) with the effect of Hartmann number

The numerical configuration shows that in Figure 8(a,b) present that taking constant values of Pr number and Le number the Velocity decreases when we increase the values of δ.

The effect of Hartmann number in Figure 7(b) the velocity decreases because Lorentz forces attract toward the Nano particle the heat transfer decreases.

The effect of Brownian motion and thermophoresis parameters values increases the thermal boundary layer to be thicker which results in diffusion penetrating deeper into the fluid. In Figure 9(a) when values Nb and Nt increases the temperature profile increases but under the effect of Hartmann number the maximum values of Nb and Nt affected directly it will be decreases because nano fluid particle temperature increases the strongest Lorentz forces create more enhancement and resolve sticky effect due to nanoparticle in the fluid that signified increase convective heat transfer.

Fig.10 when increases the Hartmann number then the temperature profile will rise upward on specified parameters.

Fig. 11 presents that increases Hartmann number the velocity will be decreased. The velocity profile/streamlines close to the hot plate.

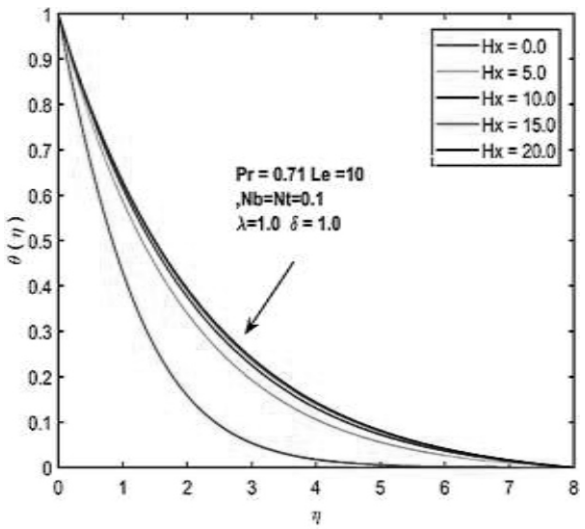

Fig. 10. Hartmann number effect on specified parameters for thermal profile

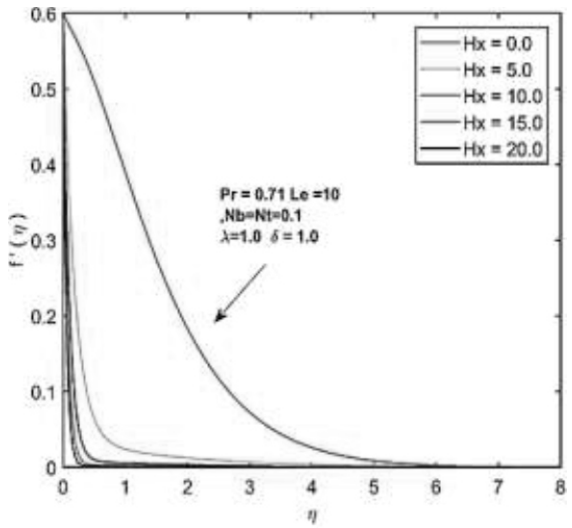

Fig. 11. Hartmann number effect on specified parameters for velocity profile

Table:-1 Comparison of reduced Nusselt Number and Sherwood Number with or without effect of Hartmann Number

Nb	Nt	Pr	Le	λ	δ	N	when Hx=0 -θ'(0)	when Hx=20 -θ'(0)	when Hx=0 -φ'(0)	when Hx=20 -φ'(0)
0.1	0.1	0.71	10	1	1	1	0.6605	0.3643	4.6541	3.927
0.5	0.1	0.71	10	1	1	1	0.7941	0.4827	4.9085	4.1546
0.1	0.5	0.71	10	1	1	1	0.5667	0.3183	3.5595	2.921
0.1	0.1	10	10	1	1	1	3.3549	2.9179	2.1486	1.364
0.1	0.1	0.71	25	1	1	1	0.6631	0.3643	10.717	9.993
0.1	0.1	0.71	10	3.5	1	1	0.7652	0.3683	4.81	3.9372
0.1	0.1	0.71	10	1	4	1	0.6329	0.3633	4.598	3.921
0.1	0.1	0.71	10	1	1	5	0.6008	0.3763	4.587	4.0417

The numerical result is described under the effect of the Hartmann number by using the buoyancy parameter and solute buoyancy parameter. The variation of reduced Nusselt number and reduced Sherwood number to take different values of the Nb, Nt, Pr, Le, λ, and δ.it is observed that –θ'(0) is increasing when we increase the values of Pr, Le and λ and decreasing when we increase values of Nt. The Hartmann number effect is shown in the table the overall values decrease with different range. The reduced Sherwood number decline for large values of Pr number because the fluid will be dense and Hx values affect the Pr number velocity decreases heat transfer increases.

5. Conclusion

In the present study, the nanofluids over a nonlinear horizontal stretched sheet investigated the conjugate heat and mass transfer. The velocity of Nano fluid variation with Prandtl number, solutal buoyancy parameter δ whereas increases for variation of buoyancy parameter λ Hartmann number decreases the velocity profile. Numerical solution depending upon all parameters describe through table and graph. Further following main results are concluded from this research.

1. When Hartman numbers a magnetic effect on the surface of the nonlinear stretching sheet then the thermal profile will be less due to hot plate magnetic intensity and the High value of Hx required for variation of thermal profile. When increases the Hartmann number the flow field increases due to the temperature rise of Hx. The temperature Profile of Nano fluids declines when Pr and λ are increased whereas increases for large

value of Pr, δ and these high values of the Pr number will represent the low thermal boundary layer affect the conduction phenomenon they thick the Nano fluid with high viscosity they generate the collide effect on the boundary layers. We detected that concentrated Nu number rises for the growing value of Pr whereas decreases for the increasing value of δ and N. but when Hartman number magnetic effect on it will be opposite.

2. The Concentration profile of the nonlinear stretching sheet decreases for large values of λ and increases for large values of Pr, δ and N if Hx effect on the surface of the stretching sheet then thermophoresis parameter and N effect on maximum. When increasing the Le number then the concentration profile decreases under the magnetic effect. The Hartmann number effect on concentration profile descends smoothly in the free stream when increasing the Hx.
3. We observe Nusselt number -θ(0) increases when Pr number increases but values of Hx direct effect on Pr values it will increase due to Lorentz forces and skin friction also increases for the greater value of Pr. The reduced Sherwood number –ϕ(0) in the table presents large values of Le number, Nb and λ decrease large values of Pr number and Nt. In the future, we used different types of Nano fluids such as Cu, Al2O3 and TiO2 for analysis on stretching of the sheet for finding conjugate heat transfer.

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Comparative Analysis of Multi-story Building containing Slabs made of Normal-, and Lightweight Concretes using Response Spectrum Analysis

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Abstract. Reinforced concrete is utilized in the construction of domestic, commercial, and industrial buildings in Pakistan. High-rise reinforced concrete buildings are planned by the architects due to the increase in population, restriction in the horizontal expansion of the structural system, the high value of land, etc. in Pakistan. For high-rise buildings, gravity and lateral loads are considered in the design of buildings. The construction of high-rise buildings is suitable when the construction materials at a reasonable price are easily available such as concrete, steel, bricks or stone, etc. Concrete is a building material and its consumption is increasing day by day. Lightweight concrete is the most suitable construction material due to its lighter weight and a good performance against lateral loads. A nineteenth-story office building (69ft x 147.25ft) with a constant story height of 13'-3" except a car parking floor of 9'-6" is selected for this research study. In this research, we compare the analysis and design of 19 story buildings containing normal-, and lightweight concrete floor systems using Response Spectrum Analysis by BCP-SP2007/UBC-97. The values of Fundamental Time Period, Base Shear, Story Drift Ratio (EQX), Story Shear, OTM, Size of Beam, Size of Column, Positive moment in Beam and Compression in Column for NWC floor systems are 3.128 seconds, 821 kips, 0.00278, 125 kips, 139151 kips-ft, 18"x27", 48"x39", 272 kips-ft and 3227 kips respectively. Similarly, for LWC floor systems are 3.219 seconds, 691 kips, 0.00250, 98 kips, 116695 kips-ft, 15"x21", 42"x33", 233 kips-ft, and 2949 kips.

Keywords: Time Period, Base Shear, Storey Shear, Storey Drift Ratio, Response Spectrum Analysis.

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1. Introduction

Food, water, air, clothing, shelter, transportation, source of energy, and buildings are basic needs of human life (Karim et al., 2011). Concrete can be molded into different shapes according to requirements with good resistance to water (Calkins, 2008). Annual consumption of concrete industry of cement, sand/rock and water are 1.5, 10-12 and 1 billion tonnes respectively (Shafigh et al. 2013). In the whole world, a large number of natural resources and raw materials are being used in the manufacturing of structural concrete (Altwair and Kabir, 2010). A minor decrease in the environmental impact per tonne of concrete will provide significant advantages to the environment (Silva et al., 2016). Deposits of aggregates have been reduced by the high production of concrete as well as a source of irremediable environmental destruction. So, attention to sustainable materials has increased (Alengaran et al., 2013). Researchers have focused on the utilization and transformation of surplus materials

into construction materials (Mo et al., 2015). Lightweight concrete is a field of research in concrete technology due to its superior heat insulator and sound absorber etc. (Shafigh et al., 2010). Lightweight aggregates are commonly used in the production of lightweight concrete (Polat et al., 2010). Pumice, diatomite, volcanic cinders, scoria, and tuff are major natural lightweight aggregates (Neville and Brooks, 1987). Expanding slag, sintered pulverized fuel ash and bed ash are industrial waste materials that are mostly used as lightweight aggregate (Satish and Berntson, 2002). Lightweight aggregates are cost-effective and provide better structural stability (Emdadi et al. 2014). The lightweight structural system is more flexible (Zhang and Poon, 2015). Lightweight aggregates are used as a construction material for the second millennium (Mo et al. 2016). In countries in which palm oil factories are in production, alternative lightweight aggregates such as oil palm shells and oil-palm-boiler-clinker are used as a construction material (Mo et al., 2014). 90% of the total world's palm oil production has been given by Malaysia, Indonesia, and Thailand in 2009 (Liu et al., 2014; Islam et al., 2016).

Normal weight concrete is used in different types of construction works such as the construction of buildings, construction of roads and construction of liquid retaining structures, etc. In simple words, structural concrete is used in all types of civil engineering works (Hosseini et al., 2009). Lightweight concrete (LWC) is used in precast concrete structures, roof decks, masonry blocks, and wall panels (Shafigh et al., 2012). Lightweight concrete (LWC) can also be used in multistory frame structures, bridges, and pre-stressed concrete structures (ACI 213, 2003).

In multistory buildings, the floor has been considered a critical component for loads. This component will determine the magnitude of the lateral load from an earthquake or wind that is transmitted to the resisting system subjected to lateral loads. These are additional loads to resisting gravity load which is a combination of live and dead loads acting on this component (Chopra and Chopra, 2007). Therefore, by considering the lightweight concrete in structures, these gravity loads can be reduced (Bremner and Eng, 2001). In addition, the use of lightweight concrete in the multistory building is safer than the conventional concrete against earthquake and wind loads (Chopra and Chopra), because it has significantly lower dry density in the range of 70 to 120 lb/ft3 (1120 to 2000 kg/m3) compared to the density of normal concrete in the range of 140 to 155 lb/ft3 (2300 to 2480 kg/m3) (ACI 213, 2003), and the LWC can be produced with the compressive strengths ranges from one Mega Pascal to over sixty Mega Pascal (Aslam et al., 2015) and can significantly reduce the cross-section of beams, columns, plates and the foundations Yasar et al., 2004). Furthermore, in the earth's crust, sudden energy releases create seismic waves resulting from an earthquake. The frequency, type, and size of an earthquake depend on the seismic activity of the subjected area. This will be an experience over a period of time and the structures are normally subjected to ground motion.

1.1. Normal Weight Concrete

Concrete is a combination of cement, sand, crush, and water. Some types of chemicals and steel bars are used to achieve the required capacity of concrete. It can be molded into the required shape with the help of shuttering. Concrete shuttering should be watertight and strong to bear the load of fresh concrete. Aggregate, cement, water, and additives are components of concrete.

a) Aggregate

Filler material/Aggregate is a mixture of well-graded

crushed stone. Round gravel, bloated clay, brick ballast, and iron filling can be used as a filler material according to need. 75% volume of concrete is covered by aggregate. Sand or crushed (Tantawi et al., 1988) or recycled concrete rubbles (Qasrawi et al., 2012) are also a type of aggregate.

b) Cement

It is binding material generally paste of cement in water and a relatively expensive material of cement concrete. 7-14% volume of concrete is covered by cement (Fahl, 2009). Portland cement is classified into five types by ASTM (American Society for Testing Materials).

c) Water

Concrete workability is proportional to the quantity of water. Cement rehydration reaction and hardening are started by the addition of water in concrete. To prevent the steel reinforcement from corrosion, free of saltwater should be used in the concrete.

d) Additives

The workability of concrete is increased by additives. Super-plasticizer, accelerators, and Retarders are types of additives.

e) Super-Plasticizer Additives

These additives are used to decrease the quantity of water and increase the workability of concrete.

f) Accelerator Additives

These additives are used to increase the strength and to shorten the concrete setting time (Fahl, 2009) due to the cold weather environment. Calcium chloride is frequently used in concrete as an accelerator. Reduction in strength of concrete and corrosion of steel reinforcement are major drawbacks of these additives.

g) Retarding Additives

These additives are used to increase the concrete setting time due to the hot weather environment. These additives are also used to transport the concrete from the mixing plant to the construction site. Sugar is frequently used in the concrete as a retarder. The workability of concrete can also be improved by retarders.

1.2. Lightweight Concrete

A very large part of the load in concrete construction is due to the self-weight of concrete and this large part of the load can be decreased by reducing the density of concrete. Concrete density can be decreased by using lightweight aggregate concrete (Mouli and Khelafi, 2008). Lightweight concrete has an expanding agent to improve the concrete quality (Zakaria, 1978).

1.2.1. Types of Lightweight Concrete

Lightweight concrete may be developed by introducing air into it or removal of finer particles of aggregate or replacement of normal aggregate. Different lightweight concretes are:

a) No-Fines Concrete

It is defined as lightweight concrete prepared by using cement with fine aggregate. Throughout its mass voids are shaped by the uniform distribution. No-fines concrete strength is proportional to the cement content in concrete.

b) Lightweight Aggregate Concrete

Lightweight aggregate concrete is prepared by the hollow, porous, and cellular aggregate in place of normal aggregate. Pumice and Scoria are involved in the category of natural lightweight aggregate. The main advantages of lightweight aggregate are low specific gravity and high porosity. Steel reinforcement can be utilized in structural lightweight concrete.

Impenetrable lightweight aggregate is preferred in the preparation of structural lightweight concrete (Samidi, 1997).

c) Aerated/foamed Concrete

Coarse aggregate is not included in aerated concrete. Air or gas is injected into the cement slurry and sand. Practically, pulverized fuel ash or any other siliceous material and lime are used as sand and cement respectively (Samidi, 1997). There are two techniques to prepare aerated concrete. The first technique is to inject the gas into mixing during its plastic condition. This technique is used for the construction of precast structural members. The second technique is to introduce the air by mixing-in stable foam or by whipping-in-air with an air-entraining agent. This technique is used for cast-in-situ concrete construction.

2. Analysis Methods for Earthquake Loading

The main objective of the seismic analysis is to determine the force, deformation, and capacity of each structural member in the building due to an earthquake effect. The following are the structural analysis methods for earthquake loading:

- Free Vibration Analysis
- Response History Analysis (RHA)
- Response Spectrum Analysis (RSA)
- Base Isolation Method
- Use of Special Energy Dissipating Devices
- Equivalent Static Force Procedure (ELF)

2.1. Structural Design Software's

2.1.1. ETABS Structural Design Software

ETABS 2016 is comprehensive structural design software that is used in the structural analysis and design of multi-story buildings. Multi-story buildings may be evaluated under static as well as a dynamic effect by using ETABS. Model and direct integration time history analysis may be combined with P-Delta and large displacement effects. Material nonlinearity due to monotonic or hysteric behavior may be captured by nonlinear links and concentrated PMM or fiber hinges. ETABS can design simple, modern, complex, and high-rise structures.

After more than 40 years of research, the latest ETABS structural design software provides linear and nonlinear analysis, structural design capacity with different types of engineering materials, graphic display, structural report, and drawings.

ETABS considers all the codal formalities and requirements during the generation of structural drawings. It provides framing plans and elevations by a simple command. ETABS can import AUTOCAD 2D drawing/Architectural plans for structural modeling. The state-of-the-art SAP Fire 64-bit solver supports nonlinear modeling techniques and gives results of the structural design of the large and complex structure in a short period of time.

ETABS provides the design of steel structure frames, concrete structure frames, composite structures, and structural walls. It also provides the capacity and demand for steel connections and steel base plates. It shows all structural design results directly on the structural components. Detailed structural design reports are available for output results. Detailed structural drawings such as framing plans, elevations, and cross-sections, etc. may be generated for concrete and steel structures.

2.1.2. CSI SAFE Structural Design Software

Structural Analysis and design of slabs, footings, and mats are performed by SAFE. SAFE considers all the structural design process requirements according to selected standards during the design and drawings preparation phase. Complicated Auto CAD drawings

can be imported to SAFE for accurate modeling. Post-tensioning techniques are available for slabs and beams. Non-linear uplift pressure formats and footings are calculated by soil springs. After the analysis and design phase, SAFE provides a design report with full structural results.

3. Literature Review

Asiz and Ahmed (2013) compared the flexible and rigid behavior of building made of normal weight and ultra-lightweight floor system supported by steel beams as shown in Figure 1. six and twenty-four story buildings were modeled and analyzed with reinforced concrete and ultra-lightweight concrete floor systems by considering rigidity using CSI SAP-2000.

The flexible and rigid behavior of both buildings with reinforced concrete and ultra-lightweight floor systems were compared in terms of lateral deflection, time period of the structure, base shear, and floor rigidity. Lateral deflection at roof level for a six-story building with R.C and CLT floor system was 83 mm and 62 mm whereas for a twenty-four-story building it was 180 mm and 130 mm, respectively.

A comparison of the structural period is given in Fig.

2. A comparison of maximum Base Shear is given in Fig. 3. The comparison of the weight of the structure is given in Fig. 4.

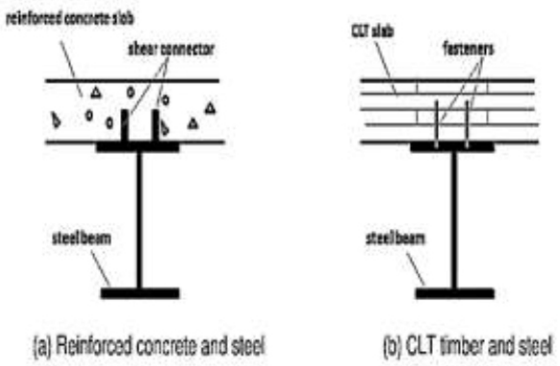

Fig. 1. The floor system of a multi-story building

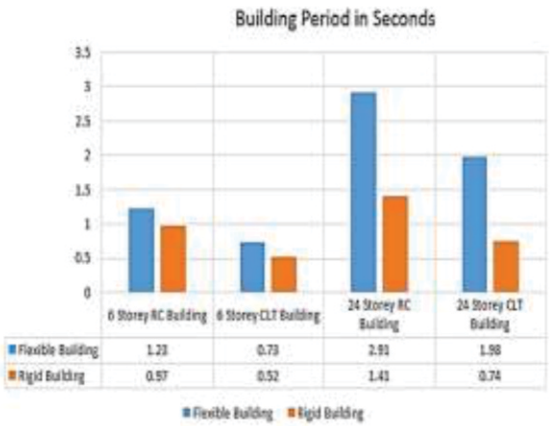

Fig. 2. Comparison of Building Periods

Fig. 3. Comparison of Base Shear

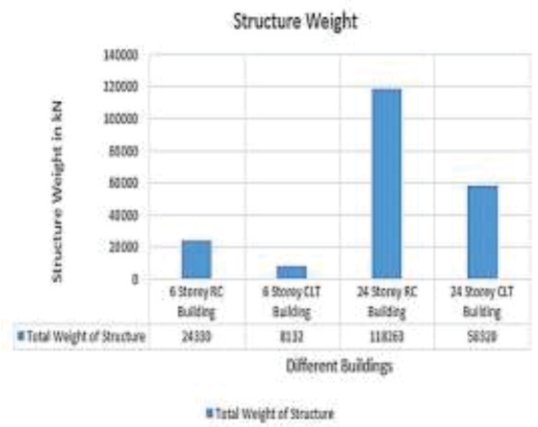

Fig. 4. Comparison of Structural Period

Kivrak et al. (2006) compared the quantity of steel reinforcement in columns, beams and slabs for three special types of structures. Normal weight and lightweight concrete were considered for three special types of structures such as eight-story car park, eighteen-story shopping mall, and twenty-two-story residential building. Turkish Earthquake Code

and TS 500 were used for structural analysis. The first seismic zone in Turkey was considered for three special types of structures. Densities of normal weight and lightweight concrete were 2.4 t/m3 and 1.8 t/m3, respectively. The amount of reinforcement in columns, beams, and slabs for three different structures was compared and results are given below in Fig. 5.

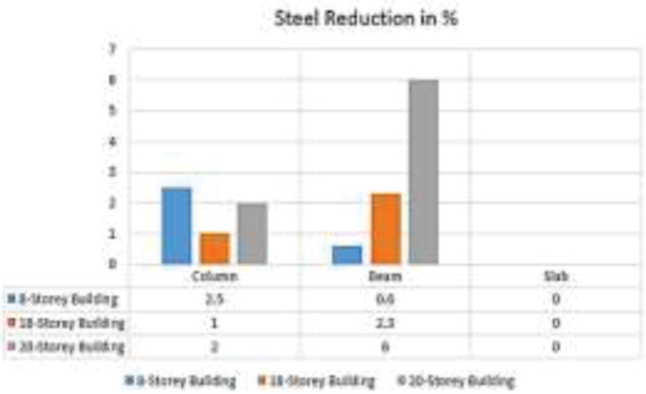

Fig. 5. Reduction in Reinforcement

Guleria (2014) analyzed and compared rectangular, L-shape, I-shape, and C-shape 15 story buildings. The size of the building was 32 m * 24 m with the distance between column along length and width was 4 m. The height of each story was 3 m. Dead, live and seismic loads were considered according to IS-875 (Part I & Part II) and IS-1893(2002) codes. The summary is given in Table 1

Table 1. Ultimate B.M (KN-M) and S.F (KN) in the Beam

Forces	Rectangular Building	L Type Building	I Type Building	C Type Building
B.M in Y-direction	92.990	97.880	101.540	99.740
B.M in Z-direction	0.110	1.560	0.640	1.120
S.F in Y-direction	161.090	159.180	158.180	159.270

4. Design Codes and Standards

For structural design under gravity loadings and seismic loadings, the following codes were considered:

4.1. Uniform Building Code 97/BCP-SP2007

UBC 97 (1997) consideration of lateral force is most important in building design. Building analysis will be performed by the seismic provisions of UBC-97. The different seismic parameters are utilized in the seismic analysis such as design base shear, zone factor, importance factor, structural time period, structural system coefficient, seismic dead load, seismic coefficients, soil profile type, source type, near-source factors, distribution of horizontal effects, OTM & story shear.

4.1. ASCE 07

ASCE 07 (2010) provides the intensity of wind pressure on the structural system. The latest techniques of wind pressure calculation are involved in ASCE for economical design.

4.2. ACI 318

ACI 318 (2008) provides the minimum building design requirements such as required splice length of steel bar according to load, development length of steel bar, allowable deflections in members, strength reduction factors, load factors, and load combinations.

5. Problem statement/research gap

A strong earthquake having 7.6 magnitudes on the Richter scale struck the Northern Parts of Pakistan and Kashmir on October 8, 2005. Eighty thousand people have died, thousands were damaged and millions became homeless as per the record of the Government department. The government of KPK, Pakistan prepared a mechanism for the resettlement of affected people.

As per the instructions of the Government of KPK, Field Practicing Manual or Guidelines were written by the University of Engineering and Technology, Peshawar for earthquake-resistant construction.

The main objective of the Field Practicing Manual or Guidelines was to describe the instructions for earthquake-resistant construction and construction materials in a simple way. After the detailed study of the Field Practicing Manual or Guidelines, it is observed that the self-weight of the structure has not been considered to overcome the lateral effect of loads on the structures.

6. Research significance

The weight of the structure can be minimized up to a considerable limit by using lightweight materials after proper testing according to approved standards.

Therefore, in this study, it is tried to compare the Analysis and Design of the multistory building after reduction in self-weight of the building by replacing Normal-weight concrete slab to lightweight concrete slab in Pakistan.

Comparison of Analysis and Design phase will provide the information regarding required reinforcement, stress intensity, and cross-sectional size of structural members such as beams, columns, and foundation systems for both structural systems with normal weight and lightweight concrete floors.

7. Objectives of the study

The key objective of this research is to scrutinize the structure of the multi-story building by using normal-weight, and lightweight concrete in the slabs by the response spectrum method.

The secondary objectives are as under: To explore the effect of concrete types on the structural behavior of various structural components/members.

To perform the static and dynamic analysis of the multi-story building with the normal-, and lightweight concrete floor system as per BCP-SP2007 and Response Spectrum Method.

To investigate the base shear, fundamental period, story drift ratio, story shear, overturning moment, structural weight, mat moments, raft settlement, and flexure of the multistory buildings with two different types of concrete in the floor system by CSI ETABs Software.

To compare the member sizes, analysis, and design of the footing of both floor systems of the multistory buildings.

8. Project Description

In this research, the 19-story building is considered with normal weight and lightweight concrete slabs to check the different parameters after the design phase.

The building measurements are 69 ft x 147.25 ft as shown in Figure 6, the center-to-center space between columns is also mentioned on the ground floor plan.

The architectural plan of the ground floor has meeting rooms, reception, client service, pantry room, toilet block, staircase, emergency staircase, lift wells, etc.

The perspective view of the building is shown in Figs. 6 & 7. Moment resisting frame of RCC structure with story elevation of 13'-3" except car parking floor of 9'-6" as shown in Fig. 8.

The Beam slab option is selected for the whole building. Two types of Floors such as lightweight-, and normal weight concrete floors are considered for the same building.

9. Research Methodology

The research methodology of this study is split into five phases. The step diagram of the research methodology is shown in Fig. 10 and the phases of the research are as under:

9.1. Phase-1

In this phase, the architectural drawings including perspective view for the selected building will be prepared, the detailed geotechnical investigations will be carried out, and then the properties of the concrete (NW-, and LW) such as compressive strength, weight per unit volume, and modulus of elasticity will be selected. At the end of this phase, design codes and design procedures will be studied.

9.2. Phase-2

A detailed study of design software is carried out in this phase. Practical practice of design software's from Pakistan Engineering Council registered consultant is also involved in this phase.

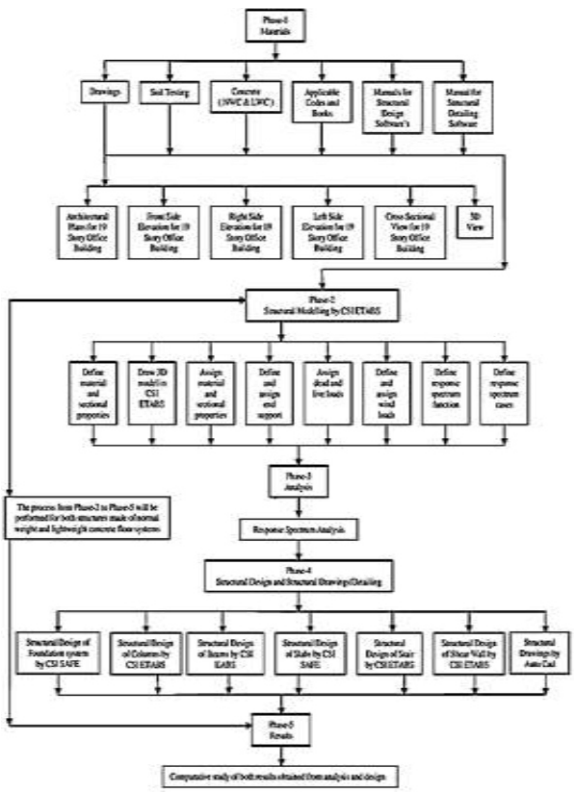

Fig. 10. Research Methodology

9.3. Phase-3

RSA of the selected building will be executed according to BCP-SP 2007/ UBC-97.

9.4. Phase-4

After the building analysis, the ACI code will be used for the frame design. Structural drawings can be prepared by ETABS. Foundation will be designed by CSI SAFE 2016.

9.5. Phase-5

The phase-5 involves the investigation of the design outputs of both normal weight and lightweight concrete floor buildings.

10. Materials Properties

The calculated Slab thickness for the maximum panel size is 7.25 inches. Concrete with cylinder strength =3000 psi at 28 days is selected for the design of floor systems and beams whereas concrete with cylinder strength=4000 psi at 28 days is selected for the design of columns as given in Table III. Deformed bars grade 60 with minimum yield strength is equal to 60,000 psi are provided in the structural design of 19 story building. The unit weight of brick, concrete, and tile is given in Table 2.

Table 2. Properties of Materials

Description	For NWC Slab	For LWC Slab
Minimum Yield Strength of Steel	*60,000 psi*	*60,000 psi*
Compressive strength for slab	*3,000 psi*	*3,000 psi*
Compressive strength for beam	*3,000 psi*	*3,000 psi*
Compressive strength for column	*4,000 psi*	*4,000 psi*
Brick Unit Weight	*120 lb/ft^3*	*120 lb/ft^3*
Concrete Density	*150 lb/ft^3*	*110 lb/ft^3*
Unit weight of Tile	120 lb/ft^3	120 lb/ft^3
Unit weight of Mud	120 lb/ft^3	120 lb/ft^3

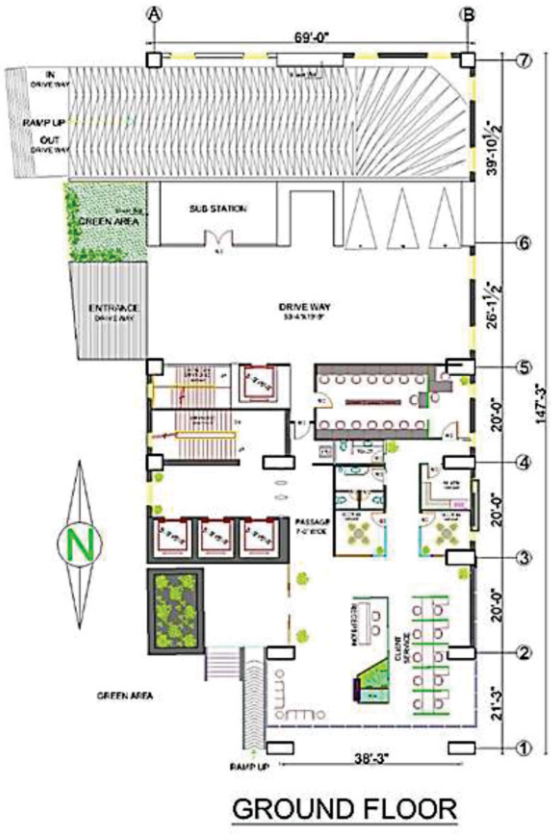

Fig. 6. Architectural Plan

Fig. 7. 3D View

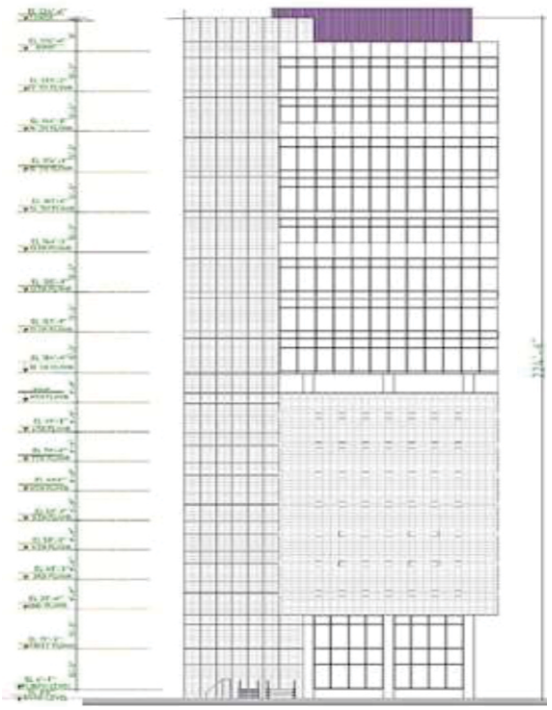

Fig. 8. Floor Elevation

Fig. 9 is the structural arrangement plan that shows the position of columns, beams, shear walls, and lifts well by a grid system. Spacing between grids lines is also mentioned in the Structural Arrangement Plan. The panel size of the slab is determined by a structural arrangement plan for analysis and design purposes.

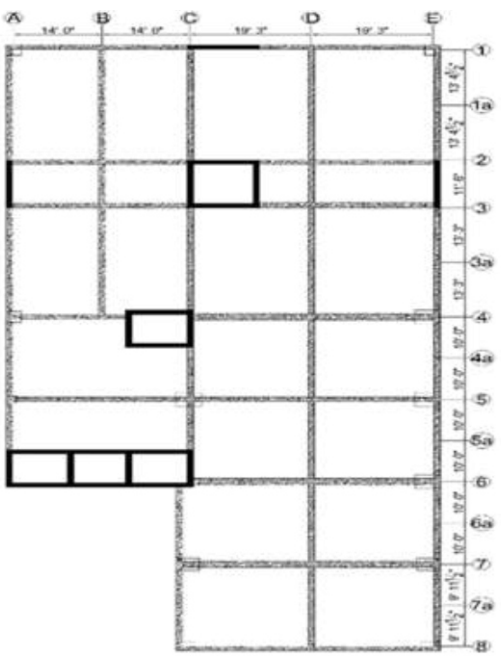

Fig. 9. Structural Arrangement Plan

11. Design Loads

Dead Loads

Self-weight of structure, partition, and floor finishes are included in the category of dead load. The location of the dead load is fixed as well as magnitude is constant throughout structural life. Dead load is calculated with the help of accurate structural dimensions and densities of engineering materials that are used in the construction of the building.

Live Loads

The loads produced due to the use or occupancy of the building are called live loads. Furniture, dresses, and books, etc., are included in the category of live loads. Its location and magnitude are changed over time. Live load values w.r.t occupancy is given in BCP SP-2007. The live load is considered 50 PSF for an office building.

Earthquake Loads

According to the Building Code of Pakistan Seismic Provision 2007 seismic zoning, site characteristics, occupancy, configuration, structural system, and height have been considered in the structural design of the 19-story building.

Wind Load

Wind load is very important in the structural design of high-rise buildings. Wind load is a horizontal load parallel to the floor system due to air movement relative to the earth. The magnitude of the wind effect is directly related to wind speed. Uplift load, shear load, and lateral load are generated during the application of wind load on buildings. The values of exposure type, wind speed, windward coefficient, leeward coefficient, importance factor, and building height are required as input data in ETABS for wind load calculations.

12. Load Combinations

Sufficient sizes of structural members are determined in the structural design stage to resist the effect of different load combinations. Most of the dangerous effects can occur when the more effective load is not acting on the building. As per the structural design requirements of ACI 318-14 and UBC-97/BCP-SP 2007, the load combinations are automatically generated in ETABS.

13. ETABS Modelling

Selected building (19-storey) in ETABS was analyzed with normal weight and lightweight concrete floors to check the behavior of the building. Structural analysis was done according to UBC-97/BCP-SP2007 with seismic zone 2A. The deformed shape of the ETABS model according to architectural drawings is shown in Fig. 11

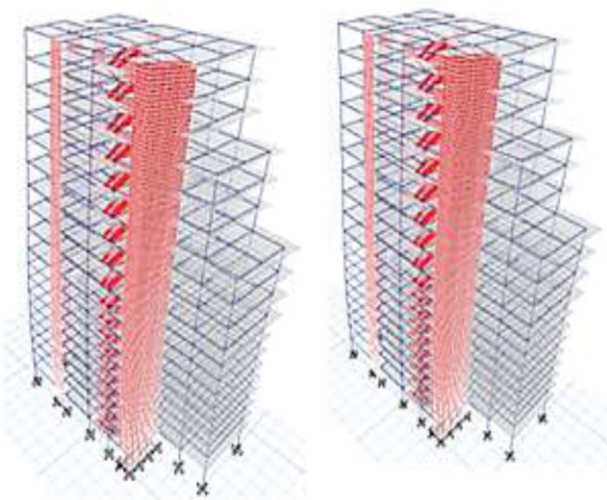

Fig. 11. Deformed Shape of ETAB Modeled Buildingy

14. Structural Analysis Phase

The structural analysis phase involves the analysis of slab, beams, columns, shear wall, and foundation of both structural systems made of normal weight concrete and lightweight concrete floors.

Analysis of Ground Floor Slab

Factored bending moments in both directions are calculated by column strips and middle strips as shown in Figs. 12 & 13. With the help of these figures, the value of maximum positive moments (moments at the bottom face of the slab) and maximum negative moments (moments at the top face of the slab) in both directions on the desired grid can be seen easily. Factored bending moments at the bottom face of the slab are shown by the red portion whereas factored bending moments at the top face of the slab are shown by the yellow portion.

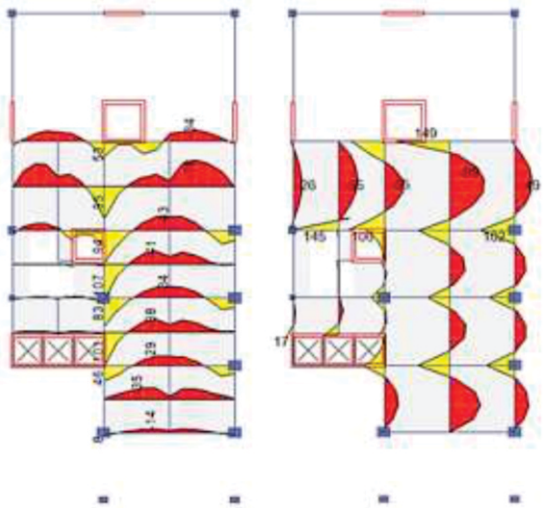

Fig. 12. Analysis of Ground Floor Slab with N.W.C

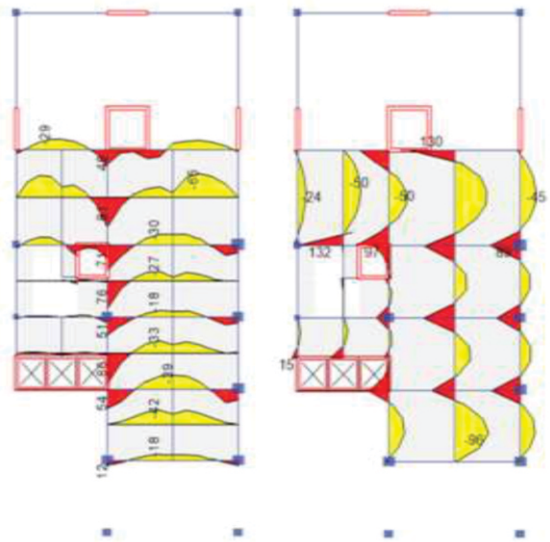

Fig. 13. Analysis of Ground Floor Slab with L.W.C

14.2. B.M.D & S.F.D of Beams at Grid 1/A-E

According to Figures 14 & 15, the yellow color shows positive moments and shears in beams whereas the red color shows negative moments and shears in beams. With the help of these figures, positive moments (moments at the bottom face of the beam), positive shears (shear at the right end of beams), negative moments (moments at top face of the beam), and negative shear (shear at the left end of beams) along the elevation of the structural system on grid 1/A-E according to structural arrangement plan of the beam can be seen easily at the desired level.

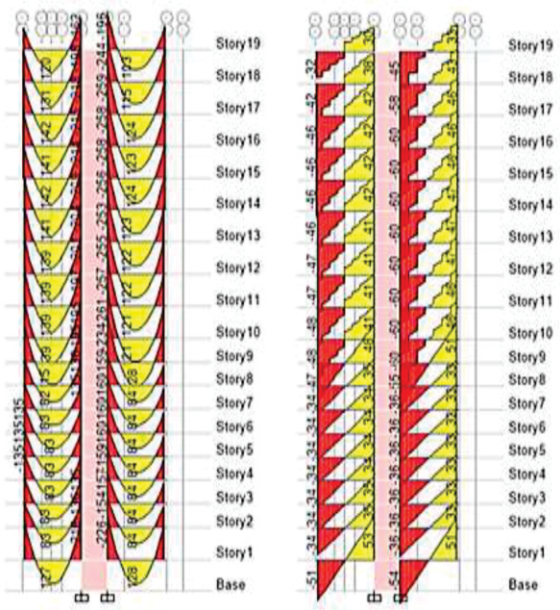

Fig. 14. Analysis of Beams with N.W.C Floors

14.3. Axial Forces in Columns at Grid 1/A-E

Fig. 16 shows the value of compressive forces in columns elevation at each story level on grid 1/A-E for a 19-story office building. The magnitude of compressive force in columns is continuously decreasing from the base of the column to the endpoint of the column. Continuously decreasing the magnitude of compressive force shows that the value of load demand is ultimate at the base of the column.

14.4. Axial Forces in the Shear wall at Grid 1

The magnitude of compressive forces in wall elevation at each story level on grid 1 for a 19-story office building. The magnitude of the compressive force in the wall is continuously decreasing from the base of the wall to the endpoint of the wall. Continuously decreasing the magnitude of compressive force shows that the value of load demand is ultimate at the base of the wall.

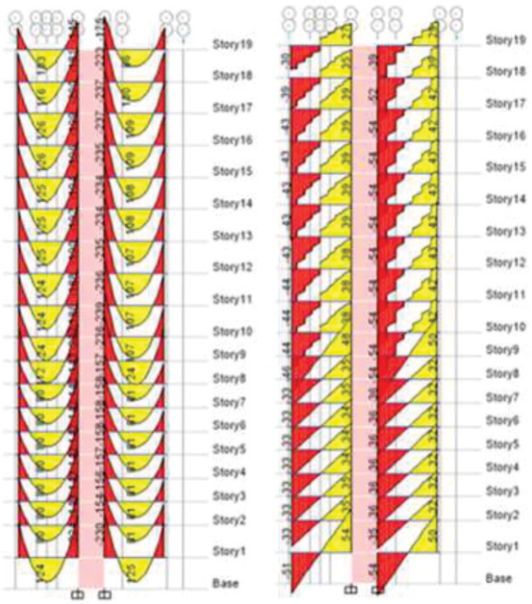

Fig. 15. Analysis of Beams with L.W.C Floors

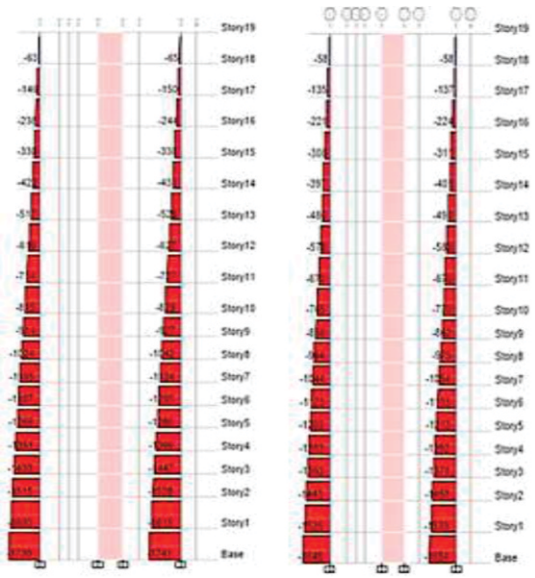

Fig. 16. Analysis of Columns with N.W.C & L.W.C Floors

14.5. Mat Foundation Analysis

After the selection of the size of the foundation based on bearing capacity and thickness based on punching shear, factored bending moments in both directions are calculated by column strips and middle strips as shown in Figs. 17 & 18. With the help of these figures, the value of maximum positive moments and negative moments in both directions on the desired grid can be seen easily.

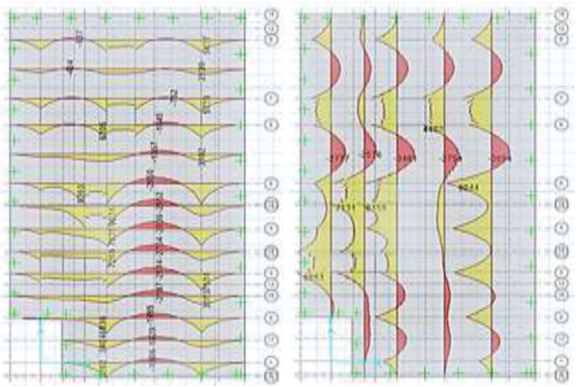

Fig. 17. Analysis of Ground Floor Slab with N.W.C

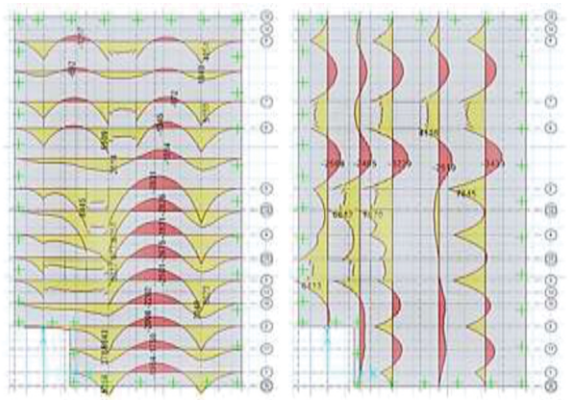

Fig. 18. Analysis of Ground Floor Slab with L.W.C

15. Structural Design Phase

The structural design phase involves the design of slab, beams, columns, shear wall, and foundation of both structural systems made of normal weight concrete and lightweight concrete floors.

15.1. Design of Ground Floor Slab

According to factored bending moments in both

directions, positive and negative reinforcements are shown in Figs. 19. Red color shows required positive reinforcement whereas yellow color shows required negative reinforcement. With the help, of these figures, the required number of bars in both directions on both faces of the slab can easily be seen on the desired grid number. The number of steel bars in yellow color is provided near the top face of the slab and the number of steel bars in red color is provided near the bottom face of the slab.

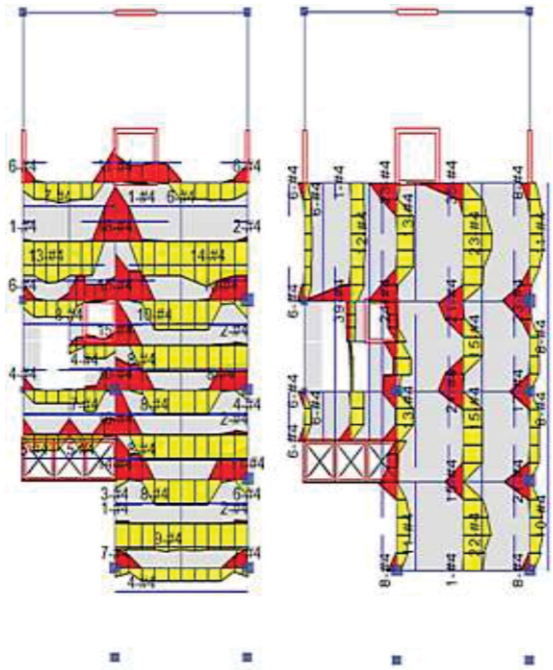

Fig. 19. Design of Slab with LWC

15.2. Beam sizes and Flexural reinforcement in Beams at Grid 1/A-E

Fig. 20 shows the beam size and area of bottom bars according to positive moments, and area of top bars according to negative moments along the elevation of the structural system on grid 1/A-E according to the structural arrangement plan.

15.3. Column sizes and Longitudinal Area of Steel in Columns at Grid 1/A-E

Fig. 21 shows section sizes and longitudinal reinforcement of columns on grid 1/A-E according to the structural arrangement plan. The cross-sectional size of the column is larger at the base level due to a larger magnitude of loads and decreasing towards the top roof due to a lesser magnitude of loads

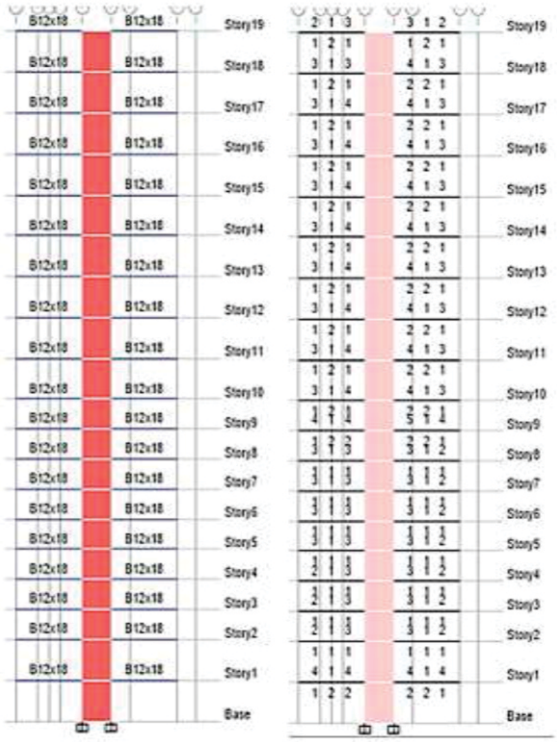

Fig. 20. Beam Sizes & Required Area of Longitudinal Steel with L.W.C Floors

Fig. 21. Column Sizes & Required Area of Longitudinal Steel with L.W.C Floors

15.4. Shear wall Longitudinal Area of Steel Bars at Grid 1/A-E

Fig. 22 shows the area of longitudinal bars in the wall on-grid 1/A-E according to the structural arrangement plan.

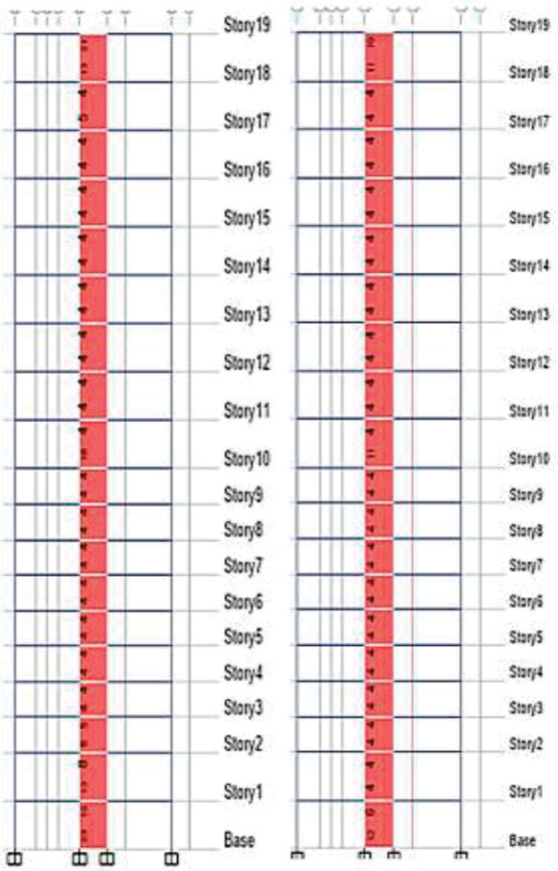

Fig. 22. Design of Shear Wall with N.W.C & L.W.C Floors

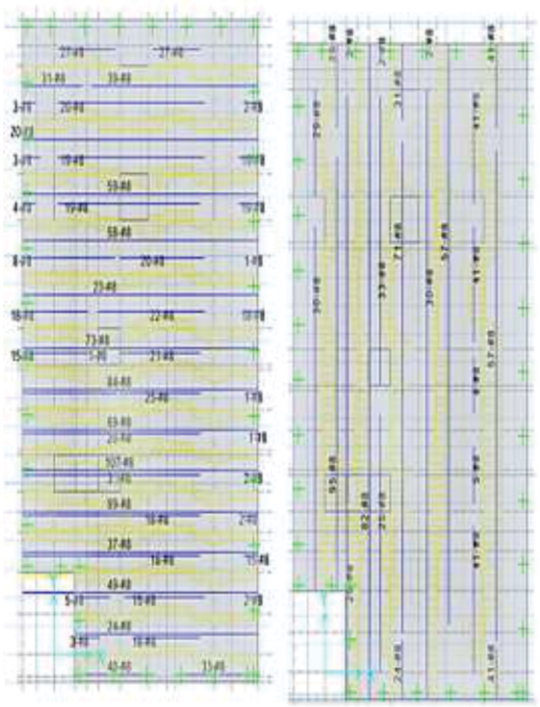

Fig. 23. Mat Design with N.W.C Floors

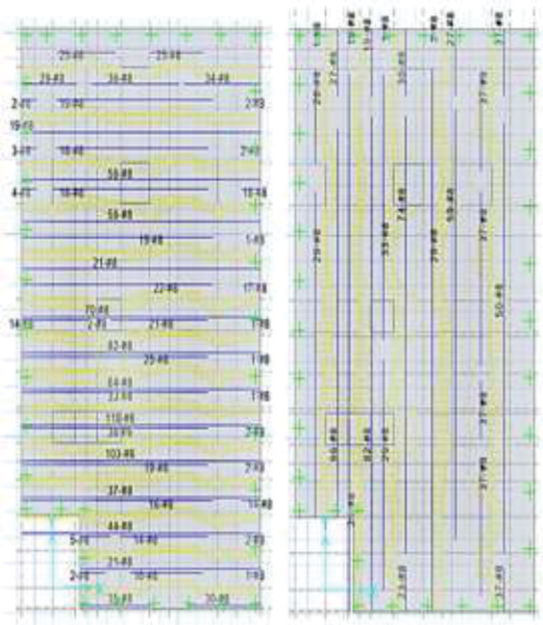

Fig. 24. Mat Design with LWC Floors

15.5. Number of Top and Bottom Bars in both sides of Mat

According to factored bending moments in both directions, the area of top bars and area of bottom bars are shown in Figs. 23 & 24.

After the passing of all structural members of both buildings with two different types of concrete in the floor system, the final results of all structural members are shown in Fig. 25.

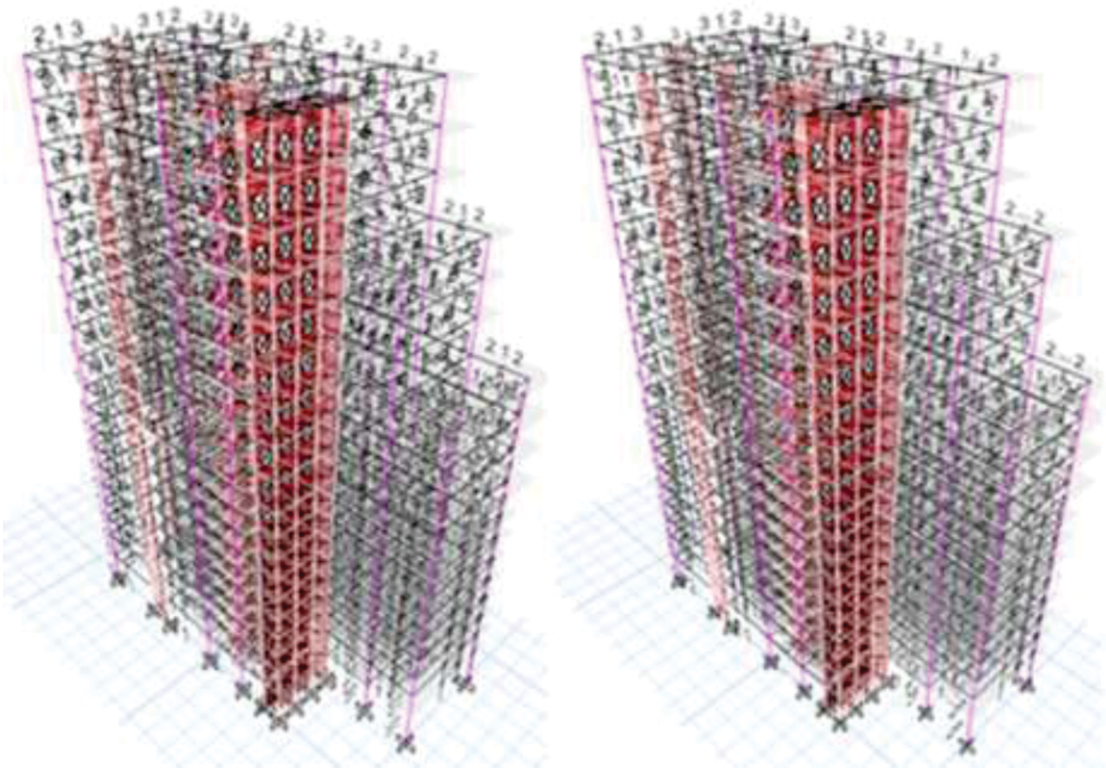

Fig. 25. Final Results of ETABS with N.W.C & L.W.C Floors

16. Conclusions and Recommendations

16.1. Conclusions

In this research, two types of 19 stories structural frame systems containing normal-, and lightweight concrete slabs are modeled, analyzed, and designed using ETABS. Building design parameters are compared in this section as under:

a) Base Shear

The magnitude of the Base Shear of building with NWC slabs and LWC slabs is 821 kips and 691 kips respectively.

b) Fundamental Time Period

The value of the Building Period with NWC slabs and LWC slabs is 3.128 sec and 3.219 sec respectively.

c) Story Drift Ratio

The value of EQX-Storey Drift Ratio with NWC slabs and LWC slabs are 0.00278 and 0.00250 respectively.

d) Story Shear

The value of Storey Shear with NWC slabs and LWC slabs is 125 kips and 98 kips respectively.

e) Overturning Moment

The value of Overturning Moment with NWC slabs and LWC slabs is 139,151 kips-ft and 116,695 kips-ft respectively.

f) Structural Weight

The value of building weight with NWC slabs and LWC slabs is 24,497 kips and 20,613 kips respectively.

g) Beam Forces and Sizes

The value of beam positive moment, negative moment, and shear with NWC slabs are 272 kips-ft, 362 kips-ft, and 71 kips respectively whereas beam positive moment, negative moment, and shear with LWC slabs are 233 kips-ft, 327 kips-ft, and 65 kips respectively. Beam size with NWC slab is 18 inches by 27 inches whereas with LWC slab is 15 inches by 21 inches.

h) Column Forces and Sizes

The value of the Column Axial Force with NWC

slabs and LWC slabs is 3227 kips and 2949 kips respectively. Column size with NWC slab is 48 inches by 39 inches whereas with LWC slab is 42 inches by 33 inches.

i) Shear Wall Forces

The value of Shear Wall Axial Force with NWC slabs and LWC slabs is 1579 kips and 1352 kips respectively.

j) Mat Moments

The value of mat positive moment and negative moment with NWC slabs are 3694 kips-ft and 9044 kips-ft respectively whereas mat positive moment and negative moment with LWC slabs are 9044 kips-ft and 7645 kips-ft, respectively.

k) Raft Settlement

The raft settlement of building with LWC slabs and NWC slabs is 1.05 inches and 1.13 inches, respectively.

16.2. Recommendations

- Lightweight concrete should be used in construction projects in Pakistan to save cost, time and also for better performance of the structural system during an earthquake.
- Lightweight concrete as a construction material is highly recommended for the upcoming project of the Government of Pakistan (Naya Pakistan Housing Scheme) for poor people in Pakistan.
- Research should be conducted for different types of structural systems such as Overhead Water Tanks, Underground Water Tanks, Hospital Buildings, School Buildings and Industrial Buildings with Lightweight concrete.
- Different Building Standards should be used for Structural Analysis and Design of multi-story

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