COGNITIVE DEVELOPMENT OF STUDENTS THROUGH COLLABORATIVE LEARNING AT UNDERGRADUATE LEVEL

BY

Mehwish Parveen

NATIONAL UNIVERSITY OF MODERN LANGUAGES

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Mehwish Parveen

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THESIS/DISSERTATION AND DEFENSE APPROVAL FORM

The undersigned certify that they have read the following thesis, examined the defense, are satisfied with the overall exam performance and recommend the thesis to Faculty of Social Sciences for acceptance:

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Submitted By: Mehwish Parveen **Registration #:**05-MPhil/Edu/S20

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Education
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Dr. Quratul Ain Hina
Name of Research Supervisor

_____
Signature of Research Supervisor

Prof. Dr. Khalid Sultan
Name of Dean (FSS)

_____
Signature of Dean (FSS)

_____
Date

AUTHOR'S DECLARATION

I Mehwish Parveen

Daughter of Ch. Fazal Elahi

Registration # 05-MPhil/Edu/S20

Discipline Education

Candidate of **Master of Philosophy** at National University of Modern Languages do here by declared that the thesis **"Cognitive Development of students through Collaborative Learning at undergraduate Level"** submitted by me in partial fulfillment of M.Phil Degree, is my original work, and has not been submitted or published earlier. I also solemnly declare that it should not, in future, be submitted by me for obtaining any other degree from this or any other university or institution.

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ABSTRACT

Title: Cognitive Development of Students through Collaborative Learning at Undergraduate Level

This research was conducted to explore the collaborative learning strategies among undergraduate level and to assess the level of cognitive development of students at undergraduate level. Furthermore, the purpose of the study was to measure the effect of collaborative learning strategies on cognitive development of students at undergraduate level**.** The conceptual framework of the study was based on two models. Collaborative learning conversation skills taxonomy model by Soller (2001) was consisted of three sub indicators While levels of Structure of observed learning outcomes taxonomy and associated cognitive abilities by (Zipp et al., 2016) were consisted of seven sub indicators. The approach of this study was quantitative, further, the descriptive design and correlational type was used. Population was based on 7221 student's enrolled (session 2020) spring in social sciences departments in 6 public sector universities of Islamabad. Proportionate stratified sampling technique was used and sample was collected 10% (722) of the entire population. The researcher used two sets of adapted close ended questionnaires. The Cronbech reliability of Collaborative learning assessment scale was (.829) and reliability of cognitive development assessment scale was (.891). Data was collected by personal visits to the 6 public sector universities of Islamabad. Total 722 questionnaires were distributed by the researcher and 587 questionnaires were returned. Thus, rate of return was 81%.. It was revealed that mean values 4(3.9) were agreed regarding collaborative learning strategies at undergraduate level. (61%) respondents were at above average level of cognitive development. there was a significant (25%) effect of collaborative learning strategies on cognitive development of students at undergraduate level. Teacher may provide opportunity for equal participation of students. Teachers may teach skills to their students such as; praising others, accept others opinions.

TABLE OF CONTENTS

Chapter **Page**

5. SUMMARY, FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

Abbreviation	Terms
AS	Attention Speed
AP	Auditory Processing
CD	Cognitive Development
CLE	Collaborative Learning Environment
CLAS	Collaborative Learning Assessment Scale
CDAS	Cognitive Development Assessment Scale
CLA	Collaborative Learning Activities
CS	Cognitive Skills
CLP	Collaborative Learning process
CLS	Collaborative Learning Strategies
ELP	Effective Learning Process
IM	Innovative Method
LE	Learning Experience
LTM	Long Term Memory
PSS	Problem Solving Skills
PS	Processing Speed
ST	Science Teacher
SCC	Socio-cognitive Collaboration
SDL	Self-directed Learning
SS	Social Skills
SPSS	Statistical Products for Services Solutions
SCM	Students Centered Method
TCS	Teacher-centered Strategies
TCM	Teachers Centered Method
VP	Visual Processing

LIST OF APPENDICES

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Mehwish Parveen

Dedicated to

My Beloved Parents

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Education is an important matter in one's life. It is the key to success in the future and to have many opportunities in our life. Education has many advantages for people.For instance, it lightens up a person's mind and thinking. In addition, education develops human personality, thoughts and social skills. It also prepares people for life experiences. There is various benefits of having education such as; having a good career, having a respectable status in society, and having self-confidence. Apart from traditional teaching and learning process, 21st century skills involve innovation, exploration, analysis and critical thinking. However, learning process is now beyond the route system of memorization of the content. In other words, we can say that this new era gives more emphasis on interpersonal (social) and intrapersonal (self- management) skills of the students as well. Active teaching contains many components such as reinforcement aspect, constant response, feedback through questioning and encouragement in addition to all other steps that create classroom as the place of acquiring desired learning results (Rao, 2019).

Educational institutions are developed for the purpose of transmission of knowledge from one generation to another. New teaching methods or strategies were introduced by the theorists according to the mental level of the learners aiming at active participation of the students in the classrooms. The role of education is considered as a backbone for the development of any society. Pakistan is ranked at fifth position among the countries of the world in standings of population. The undergraduate learning is considered a cornerstone for every country in view of sustainability and maintaining international standards in education. The success and stability of the present century requires a great deal of well-organized and updated version of educational

system which could stand with changing time. Collaboration in present day, education is a way by which individuals not only have their own point of view but are also able to recognize and accept others' abilities and participation in the learning process (Qiftiyah, 2020). In other words, collaboration is a process of dealing with other people and giving due respect to their skills. Teachers face challenges during implementing collaborative learning strategies in the classrooms such as lack of planning, abilities of teachers, shortage of experience, strength of students in the classrooms, inflexibility among students regarding acceptance of other members' opinions. These are the major constraints and therefore teachers are unable to implement those activities which lead to develop cognitive thinking among students (Qiftiyah, 2020).

Collaborative learning strategy is an emerging trend within the global context. Since the past few decades, many studies have been conducted on evolving collaborative learning strategies. The emphasis of these research studies was based on classrooms, laboratory, computer-based situations, and face to face as well. These research studies found significant improvements in the progress of students' learning. Collaborative learning is commonly used now days as a desired strategy in educational setup. The procedure of collaborative learning strategies provides an opportunity for learners to have a face-to face conversation with their peers within the group. In order to solve difficult problems, collaborative learning is a capable instructional practice (Panhwar et al., 2017).The concept of collaborative learning strategies is rooted back to "socio- cognitive perceptions", which includes providing such atmosphere to the students, that they learn from other peers collaboratively. Cognitive skills include certain aptitudes which help the students to perform well in any task within the group.

Cognitive development is a tool by which students can practice in order to give justification or explanation about the content. Theories of cognitive development clarify the active practices

through which human minds develop and change from initial stages all through the life span. Cognition related development introduces students to skills including memory, rational thinking, problem resolving abilities, and discussion. The purpose of Cognitive Development (CD) theories is to clarify tools of change and to define the skills of children (Rao, 2019).

Children learn through play, reflection, and through expression. Education should give such atmosphere to children in order to carry out investigation and experimentation within the learning process. Apart from collaborative learning strategies, cognitive development of students is also very crucial need of every student. Collaborative learning strategies are basically strategies that help the individuals to enable students to become more confident, socialized, to enable them to present their opinion and also provide valid justification (Rao, 2019).

Collaborative learning strategies are the most broadly suggested approaches that help teachers in order to enhance students' interaction, interpersonal and communication skills. Teaching and learning of any language need communicative scenario in which students can connect and communicate frequently to improve their communicative skills. In Pakistani educational system, students are unable to improve sociable and practical collaboration through which they not only can study, communicate, collaborate, and boost one another understanding, but they also can improve their communicative, social and interpersonal skills (Panhwar et al.,2017). Here the under- examination problem is to explore the effect of collaborative learning strategies and cognitive development of students at undergraduate level. The study aimed at exploring the cognitive development of students through collaborative learning at undergraduate level.

1.2 Rationale of the Study

For the past few decades, several measures have been taken by the educational institutions to enhance the capability of teaching among the students by introducing new teaching strategies in order to develop cognitive skills in students. A research study carried out by Khan, Amin, and Sad (2019) defined that main agenda of the educational institutions is to train the students and their individualistic development. In case of Pakistan, it is evident that after its creation it is constantly facing various hurdles such as political, social and economic besides other issues in educational system as well. It is a fact that educational system shows a main role for the growth and sustainability of any country, and no one can deny its importance.

A research study carried out by Larocca, Margottini and Capobianco (2014) describes that the collaborative learning within the college environment can definitely impact students to keeping up a regular motivation level and generate interest towards their think about. This also offers help to reduce the drop-out and encourage more important strength within the educational career of the students. Exploratory studies expose that these teaching techniques (TT) create positive results within the academic atmosphere as a cognitive back. A research study carried out by Wang (2009) investigated that collaboration becomes to be a basic experience within the current educational scenario. A collaborative learning atmosphere (CLA) encourages students to get knowledge in collaborative grouping and learn in a socialized way. Instructional plans of friendship and major educational tasks were linked towards develop collaboration among students. Learning tasks such as writing improvement reports were used in order to see the collaborative learning environments. A research study conducted by Scager et al. (2016) describes that it is important to know the background of collaboration and outcomes of collaboration in the learning process. This has been focused on the process of collaboration and its development. At undergraduate level it has been observed that teachers face challenges in

implementing collaborative learning strategies (CLS) towards developing cognitive skills (CS) within students such as; strengths of students and size of the classrooms, lack of collaboration among teachers and students and diverse mental levels of the students, lack of resources, shortage of time, students' previous academic background specification and personality conflicts, unavailability of trainings of teachers, absence of trainers for teachers.

A research study conducted by Dayan and Bano (2018) found that the basic types of new teaching plans is producing a collaborative teaching and learning atmosphere. This is very difficult to find such a classroom environment in Pakistani institutions.

Teacher's led classrooms are there and there is no participation of students in the teaching-learning process. Similarly, they discover out a gap between what they were instructed in trainings and the ground realities. Especially in public sector institutions teachers follows certain outlines of instructions. There prevails a common sense of disappointment with the value of education and knowledge in Pakistani classrooms. Silent or teacher-centered strategies (TCS) of teaching are common within the schools. A research study carried out by Rao (2019) explains that collaborative learning strategies are quite useful technique for the students in order to learn English language systematically within the modern English classrooms. Teachers implement many techniques within the language classrooms for the purpose of better learning of the students. The learners adopt techniques such as pair work, group work, collaborative learning. By adopting certain techniques students are able to learn English within the short time span.

A research study carried out by Nurhayati et al. (2017) presents a model of strategies that teachers can execute to create socio-cognitive collaboration (SCC) among students within the classroom during the learning process. Collaborative learning could be a form that is a field in

this new era of advancement towards physical and virtual education. Models of strategies are categorized and have been linked up to the socio-cognitive perspective. But it is expected to modify these in order to virtually implement these strategies by means of several communicational technologies**.** A research study conducted by Andrews (2012) explains that society is perceived as present both as a subjective and an objective truth. Cognitive development area is badly neglected in our Pakistani culture. Teachers are major source of providing knowledge to students even at undergraduate level. But there is no proper system that is arranged for them for working on this element. It is the prime responsibility of our concerned authorities and institutions to train the teachers for cognitive development of students. The current study emphasizes on the collaborative learning and cognitive development of the students. Nevertheless, a cognitive development skill is known as a difficult part within teaching and learning process. Still development of cognitive development is considered as a much-needed strategy in 21st century to sustain our educational standard. Over population is the other issue that Pakistan is facing these days as the educational institutions are not able to enroll all the students who apply for admission.

Cognitive skills (CS) include facts and observations regarding particular phenomenon. When research has focused on the process of collaboration these research studies put emphasis on individual and group dynamics and miss the development of cognitive skills of the students at undergraduate level (Abun, 2021). Students are the future of our country. Cognitive development is very important for the students. The current study focuses on cognitive development of students through collaborative learning at undergraduate level.

1.3 Statement of the Problem

Since past few decades, advancement influences almost every aspect of human lives such as living standards, mode of communication, transportation. But in the process of transferring

knowledge to students many learning strategies have been presented with the passage of time (Wang, 2009). Collaborative learning is a right word for a variety of educational strategies including joint mental action by learners or learners and teachers together. This includes two or more than two students working together in order to make a product. The current study is planned in order to consider the importance of modern teaching and learning strategies and doing collaborative learning strategies to help students boost their interest in classroom activities which have a positive impact on learning outcomes and create social abilities. The research was intended to explore the practices of collaborative learning strategies among undergraduate level. The study aimed to assess the level of cognitive development of students at undergraduate level. Collaborative learning activities in the classrooms develop cognitive skills of the students. To consider the significance of "collaborative learning strategies" for the students of undergraduate level, the researcher selected the area of teaching methods for the conduct of research. The study was designed to measure the effect of collaborative learning strategies on cognitive development of students at undergraduate level.

1.4 Research Objectives

1. To explore the practices of collaborative learning strategies among students at undergraduate level.
2. To assess the level of cognitive development of students at undergraduate level.
3. To measure the effect of collaborative learning strategies on cognitive development of students at undergraduate level.
    3a. To measure the effect of "conversation" on cognitive development of students at undergraduate level.

3b. To measure the effect of "active learning" on cognitive development of students at undergraduate level.

3c. To measure the effect of "creative conflict" on cognitive development of students at undergraduate level.

1.5 Null Hypotheses

H_o 1: There is no significant effect of collaborative learning strategies on cognitive development of students at undergraduate level.

H_o1 a: There is no significant effect of "conversation" on cognitive developmentof students at undergraduate level.

H_o1 b: There is no significant effect of "active learning" on cognitive developmentof students at undergraduate level.

H_o1 c: There is no significant effect of "creative conflict" on cognitive development of students at undergraduate level.

1.6 Research Questions

Q1. What are the practices of collaborative learning strategies among students at undergraduate level?

Q2. What is the cognitive development of students at undergraduate level?

1.7 Conceptual Framework

Conceptual framework of the current study was created on two models. “Collaborative learning conversation skills taxonomy” model by Soller (2001) and other was about “levels of Structure of observed learning outcomes taxonomy associated cognitive abilities” by (Zipp et al., 2016).

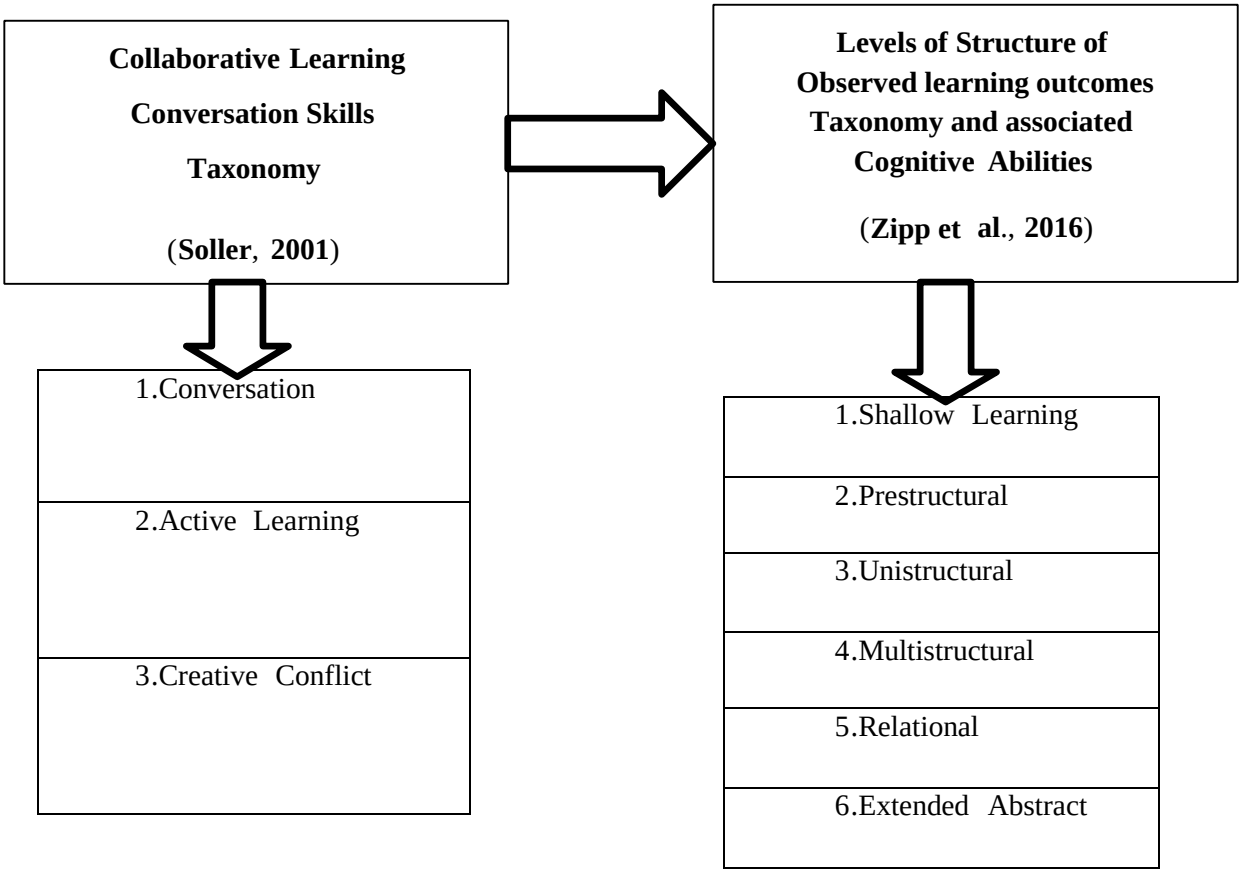

Figure No.1.1 Conceptual Framework of the Study

1.7.1 Collaborative Learning Conversation Skill Taxonomy Model by Soller (2001)

1.7.1.1 Conversation

According to Soller (2001) a collaborative conversation is a purposeful conversation in the groups which includes generation of new thinking and more in-depth understanding of a desired outcome in other words we can say that a solution to a problem. Learners' collaborative conversation includes students working together to utilize conversation as a meaning making methodology to attain common objectives. Learning is seen as a social preparation and information as a mutually created phenomenon. Collaborative conversation means a dialogic

engagement that takes place among the learner, and it ends in a meaningful result and solution. The sub skills of the skill are following:

1.7.1.1.1 Task: It is related to a work inside the classroom which includes students' ideas, working, creation or collaboration with other students (Soller, 2001).

1.7.1.1.2 Maintenance: Collaborative maintenance is the concept that all students must be committed to contributing for the advancement of the total, enhancing the connections, and coming to the desired objectives (Soller, 2001).

1.7.1.1.3 Acknowledgment: Acknowledgment may be an expression of conservation that something is right or correct. It includes proper, composed communication that an offer has been developed or acknowledged and accepted. The act of acknowledging something or someone's acknowledgment of a mistake (Soller, 2001).

1.7.1.2 Active Learning

Soller (2001), the quality of communication in group talks impacts the group members' learning experience and accomplishment. Skill in learning collaboratively involves knowing when and how to question, inform, and motivates other members of the group, knowing how to discuss and facilitate discussion, and knowing how to reduce with clashing conclusions. This incorporates the effectively involvement of learners to prepare and make data and ideas, instead of utilizing repetition of data (Soller, 2001). The sub skills of the skill are following:

1.7.1.2.1 Request: Inquiring for data without giving a clarification since the nature of the data is scheduled. Request for help and advice towards solving the problem, accepting other members of the group point of view. Furthermore, if one needs answer of the question, some options might be considered in a mind such as ask the foremost vital question first, followed by a clarification and after those other questions. Other request can be upon utilizing a respectful command, "Please answer the question", the tone must be alert and respectful (Soller, 2001).

1.7.1.2.2 Inform: Straight or extend the conversation by providing information and advice and the individual has his own opinion about it. (Soller, 2001).

1.7.1.2.3 Motivate: Motivation is the method that starts, guides, and keeps up goal-oriented behaviors. In everyday use, the term "inspiration" is usually used to describe why an individual does something. It is the motivating effort behind human activities. It includes positive response and support (Soller, 2001).

1.7.1.3 Creative Conflict

This includes discussion and conflict, but it is active and motivating, like something critical is happening, like something new may be developed. Creative conflict is familiar for its depth of interest and common concern and its ability to learning and finding the best plan or course to require. There is an acceptance and difference from the other peers of the group members (Soller, 2001). The sub skills of this skill are following

1.7.1.3.1 Argue: The argumentation interprets your data, showing how the information strengthens your title or clarifying why the data validates your title. Furthermore, it indicates the aim (positively or negatively) regarding remarks or ideas prepared by group participants. It provides reasons or cites proofs in favor of an idea, action or theory. Usually with the point of inducing others to share one's point of view (Soller, 2001).

*1.7.1.3.2 Mediate**:** The method in which students construct items, concepts and exercises about the demonstrated question. In this the students actively participate in their social environment. They construct their understanding about the phenomenon and also develop their understanding of the words (Soller, 2001).*

1.7.2 Levels of Structure of Observed Learning Outcomes (SOLO) Taxonomy and Associated Cognitive Abilities Model by Zipp et al., (2016)

Conceptual framework of the current study was based on the model presented by (Zipp et al., 2016). This model includes 5 degree /levels of structure of observed educational outcomes taxonomy and associated cognitive abilities. “Structure of observed learning outcomes” taxonomy gives a straightforward as well as vital way of interpreting how learning results develop in complexity from surface to deep understanding.

1.7.2.1 Shallow Learning

Shallow learning occurs when all you are doing is recalling what you're reading. Furthermore, without attempting to think almost its fundamental status: keep in mind in its place of understanding. Reality of phenomenon instead of disagreement (Zipp et al. 2016).

1.7.2.2 Prestructural

According to Zipp et al (2016) usually the stage in which students do not actually have any information or understanding of the subject being studied. So, a student in this stage will respond with, “I do not get it”. In other words, this level includes that students have no idea about the phenomenon. Usually at this particular stage they use this sort of sentences such as, “I am not guaranteed regarding the phenomenon and there is a doubt around it.”

1.7.2.3 Unistructural

Moving on from pre basic, understudies that are unistructural have constrained information of the topic. They may know a confined reality around the topic. So, a normal reaction may be, “I have a few understanding of this point.” At this level students will be able to have some understanding the phenomenon or a question (Zipp et al. 2016).

1.7.2.4 Multistructural

Zipp et al. (2016) explains this level includes moving forward from unistructural to multi-structural basically involves that the students know some truths very nearly this point but are unable to link them together. So, a typical reaction could be “I know some points about this point” or “I have collected a few data about this subject.” On this level, students are able to define and describe the phenomenon.

1.7.2.5 Relational

In this relational stage, we are opening to move towards developments of higher-level thinking. Students are able to border together and clarify a few

thoughts around a related theme. In other words, we can say that at this level student are able to compare or relate the phenomenon. Students normally use this sort of sentences in this stage of solo taxonomy such as “I have several ideas about this questions or phenomenon”, “I can link this idea or information to the other context” (Zipp et al. 2016).

1.7.2.6 Extended Abstract

Zipp et al., (2016) describes this stage indicates that students are not only able to connect related ideas jointly. But they can frame these to other more thoughts and concepts. So, a student’s feedback at this level might sound like, “By reflecting and assessing on my learning, I am able to see at the larger image and connect parts of diverse thoughts together.” In this stage students use certain sentences, “I have many ideas about the phenomenon or a question”, “I can link them to the big picture”, “I can look at these ideas in a new and different ways”. In short, we can say that at this level student can relate new ideas in a new and different way.

1.7.2.7 Deep Learning

More deep learning could be a set of students’ results that includes control of important learned material such as critical thinking, problem solving ability and understanding complex issues. Working collaboratively and communicating effectively during the learning process. It also shows that students are having an educational attitude and being engaged in the learning process through self- directed learning (Zipp et al. 2016).

1.8 Significance of the Study

The current study would be important due to its great significance in the circumstance of education organizations in order to evaluate the collaborative learning strategies on cognitive development of students at undergraduate level. This would be expected that it put light on the fact that how collaborative learning strategies are important in Pakistani context. In case of Pakistan, there is a great need of such stance at undergraduate level. In order to meet the international standards of better education, this would be more beneficial for the educational institutions to produce students who compete and survive internationally.

This would be significant for students in order to them know about collaborative learning strategies and cognitive development process, so they can attempt to memorize rapidly and collaboratively.

Current study would be important for the teachers and concerned authorities of universities because teachers are responsible for output and performance of the students. It would be helpful for teachers so that they will conduct related activities in the classrooms because classroom activities increase motivation towards students in order to express their point of view regarding the topic. The study would be helpful training institutions of teachers, which can train the teachers to implement collaborative learning strategies in order to boots social skills and cognitive development of students.

This would be helpful for the institutions and universities authorities who conduct training for the teachers on it in order to improve the collaborative learning practices and to develop such curriculum which would be helpful in development of cognition in students. Furthermore, it would also consider as a road map for the future research studies.

The current study would be helpful for curriculum wing in order to know the techniques to increase critical thinking abilities of students through collaborative learning strategies of the upcoming students. Considering this fact, the curriculum wing mark practical decisions in order to develop a useful and collaborative sort of courses which would develop to implement collaborative learning strategies and cognitive development of students.

1.9 Methodology

Methodology is consisted on “research approach”, “research design”, “population”, “sampling technique”, “sample size”,” Instrumentation”, “validation of instrument”, “reliability of instrument”, “data collection” and “data analysis”.

1.9.1 Research Approach

The current study was used quantitative approach which involved interpretation of the collected data using numbers. Furthermore, the researcher was used SPSS (Statistical product and service solution) for the analysis of collected data. The researcher had selected this approach because it estimates the problem through creating numerical data which can be converted into useable statistics. Moreover, it facilitates more structured research patterns so that is why researcher has prioritized it. Researcher was interested to collecting data in the structured form, so the researcher was used this approach for the study because the nature of the research objectives and hypotheses.

1.9.2 Research Design

The design of the current research was correlational design. The researcher was visited in field personally and collected responses of the respondents. The questionnaire was used to gather information. The researcher was interested to see

the effect of collaborative learning strategies on cognitive development of students at undergraduate level.

1.9.3 Population

Population was based on 7221 students enrolled (session 2020) spring in social sciences departments in 6 public sector universities of Islamabad. There are 3835 male students whereas 3386 female students are enrolled in the selected public universities of Islamabad. There are 13 public sector universities of Islamabad. 6 out of 13 universities offering social sciences programs. The information about public sector universities Islamabad is retrieved from the website of HEC (HigherEducation Commission, 2021) and population of students of social sciences departments was taken from the administrative authorities of 6 public sector universities of Islamabad.

Table No. 1.1

Population of the study

S #	Name of Universities	Total number of Students Enrolled in Social Sciences Departments (Session 2020)	Male	Female
1.	National University of Modern Language, Islamabad (NUML)	1994	1155	839
2.	International Islamic University, Islamabad (IIUI)	2200	1194	1006
3.	Quaid–E-Azam University, Islamabad (QAU)	245	130	115
4.	Bahria University, Islamabad (BU)	877	373	504
5.	Allama Iqbal Open University, Islamabad (AIOU)	1750	878	872
6.	Air Univ ersity,Islamabad (AU)	155	105	50
	Total	7221	3835	3386

1.9.4 Sampling Technique

Sampling technique is known for the identification of the procedure in which individuals of sample was selected. The outcomes found from selected sample were generalized on the overall population. Therefore, selected the sample is said to be a choice of researcher regarding the respondents who are going to be a part of the research.

Sampling technique for the current study was proportionate stratified sampling. It was chosen because the population of the study was distributed in sub-groups. Proportionate stratified sampling includes the selection of respondents in the sub- groups. These sub-groups were comprised of six public sector universities of Islamabad. Moreover, to select a necessary quantity of students‟ respondents from the public universities, proportionate stratified sampling technique was selected.

In proportionate sampling technique, the selected respondents were selected with the equal percentage by the researcher from each sub-group.

Thus, keeping in view these sub-groups of six public sector universities were National University of Modern Language Islamabad, International Islamic University, (NUML), Quaid –E-Azam University, Isl (QAU), Bahria University, Isl (BU) Allama Iqbal Open University, Isl (AIOU), Air University, Isl (AU), proportionate stratified sampling was used.

1.9.5 Sample Size

For the current study, sample was composed 10% of the whole population from the Departments of social sciences 6 public sector universities in Islamabad. Total number of students (social sciences) in public sector universities 7221.Male students was in 3835 numbers and its 10% sample size was 385 whereas female students 3386 in numbers andits 10% sample size was 337 in this way sample study was 722 total students as the sample. The researcher was used formula of Cohen, Manion and Morrison (2007) to select sample size. So, the sample size for this study was 10% of the population that was 722.

Table No.1.2

Sample Size

S #	Name of Universities	Total number of Students Enrolled in Social Sciences Departments (Session 2020)	Male	Female	Sample 10%
1.	National University of Modern Language, Islamabad (NUML)	1994	1155	839	199
2.	International Islamic University, Islamabad (IIUI)	2200	1194	1006	220
3.	Quaid–E-Azam University, Islamabad (QAU)	245	130	115	24
4	Bahria University, Islamabad (BU)	877	373	504	88
5	Allama Iqbal Open University, Islamabad(AIOU)	1750	878	872	175
6	Air University, Islamabad (AU)	155	105	50	16
	Total	**7221**	**3835**	**3386**	**722**

1.9.1 Instrumentation

For data collection, researcher used two instruments for the study. These two instruments named as collaborative learning assessment scale and cognitive development assessment scale. The information of the two instruments is:

1.9.1.1 Collaborative Learning Assessment Scale (CLAS)

Collaborative learning assessment scale was adapted from the work of James (2016) measure students‟ perceptions on assessed group works. Collaborative learning assessment scale was based on three sections such as1. Conversation, 2. Active learning and 3. Creative conflict and on 33 items that were measures three dimensions “conversation”, “active learning”, and “creative conflict”.

Table No. 1.3

Collaborative Learning Assessment Scale

Variable	**Sub Variables**	**Items**
Collaborative Learning	Conversation	11
	Active learning	11
Creative Conflict		11
Total		33

1.9.1.2 Cognitive Development Assessment Scale (CDAS)

Cognitive development skill assessment scale was adapted from the work of Özsevge and Cepni (2021) measure cognitive development of the students. Cognitive development assessment scale was based on seven sections. These seven sections as shallow learning, Prestructural, Unistructural,, multistructural, relational, extended abstract and deep learning. The total items of cognitive development assessment scale were 64.

Table No. 1.4

Cognitive Development Assessment Scale

Variable	**Sub Variables**	**Items**
Cognitive Development		
	Shallow Learning	9
	Prestructural	9
	Unistructural	9
	Multistructural	10
	Relational	9
	Extended Abstract	9
	Deep Learning	9
Total		64

1.9.2 Validation of Instruments

The termed Validity means “a test is valid what it is supposed to be measured”. For the validation of instruments, researcher was present the instruments to six experts from the field of education to check “face and content” validity of the questionnaires. Therefore, according to the valued recommendations from experts, researcher brought some changes in the questionnaires.

1.9.3 Pilot Testing

Pilot trial was taken by the scholar concerning to measure the reliability of instruments. 40 questionnaires were distributed among 40 samples respondents. Rateof return was 100 percent because researcher personally visited the university and faceto face interaction with the respondents. The responses were analyzed with the help of SPSS (Statistical product and service solution) 20th Edition.

1.9.4 Reliability of Instruments

For concerned study the researcher was administered instruments to 40 social sciences students of undergraduate level of public sector universities in Islamabad. For pilot trial, and data which was collected through pilot trial were analyzed by applying test of reliability to items (Cronbach alpha and calculating the correlations related to items).

1.9.5 Data Collection

For concerned study the researcher was administered instruments to 40 social sciences students of undergraduate level of public sector universities in Islamabad. For pilot trial,

and data which was collected through pilot trial were analyzed by applying test of reliability to items (Cronbach alpha and calculating the correlations related to items).

1.9.6 Data Analysis

Researcher was investigated data through applying appropriate statistical techniques. For the purpose of analysis, SPSS (Statistical product and service solution) 20th Edition was used. The table described objectives, hypotheses and statistical tests which were used in the study.

Table No. 1.5
Data Analysis

Sr #	Objectives	Null Hypotheses	Statistical Techniques
1.	To explore the practices of collaborative learning strategies among undergraduate level.		Mean
2.	To assess the level of cognitivedevelopment of students at undergraduate level.		IndividualScore
3.	To measure the effect of collaborative learning strategies on cognitive development of students at undergraduate level.	There is no significant effect of collaborative learning strategieson cognitive development of students at undergraduate level.	Regressionanalysis

Table No. 1.5 described the objectives, hypotheses of the study and also which statistical technique was used to the respective objectives and hypotheses on SPSS (Statistical Product and Service Solution) to conclude the results of the current research.

1.10 Operational Definitions

1.10.1 Collaborative Learning Conversation Skill Taxonomy Model by Soller (2001)

Collaborative Learning Conversation Skill Taxonomy Model by Soller (2001) Collaborative learning strategies comprised all activities in which students work together and share their views or understanding with their group members regarding the demonstrated material by teacher.

1.10.1.1 Conversation

Students' two-way discussion includes students working together to use conversation as a meaning making technique to complete common objectives.

1.10.1.2 Active Learning

Active learning collaboratively involves knowing when and how to question, inform, and motivates other members of the group.

1.10.1.3 Creative Conflict

Creative conflict is familiar for its depth of interest and common concern and its ability to learning and finding the best plan or course to require. There are acceptances and opposite from the other peers of the group members.

1.10.2 Level of Structure of Observed Learning Outcomes Taxonomy and Cognitive Abilities

This above-mentioned taxonomy gives a direct and vital way of interpreting how learning results develop in complexity from surface to deep understanding.

1.10.2.1 Shallow Learning

It refers to the reality or foundation of a phenomenon.

1.10.2.2 Prestructural

This refers towards the first stage in which students do not really have any data or understanding of the subject being examine**.**

1.10.2.3 Unistructural

Moving on from pre-structural stage, students who give reaction which are based on a single point.

1.10.2.5 Multistructural

This refers to the students know a few truths very about this point but empower to connect them together. On this level, students are able to distinguish and describe the phenomenon**.**

1.10.2.6 Relational

This includes that students are able to frame together and explain some thoughts around a related subject.

1.10.2.7 Extended Abstract

The particular stage indicates that students are not only able to connect related ideas jointly. But they can frame these to other more thoughts and concepts.

1.10.2.8 Deep Learning

It appears that students are having an informative state of mind. Students know the information of the phenomena on deeply.

1.11 Delimitations

Due to limitation of period and resources current research was restricted to:

1. Public sector Universities of Islamabad that were having faculty of social sciences only.
2. Students of social sciences departments only.
3. BS students of undergraduate session (Spring 2020) only.
4. Current study was restricted to six public sectors universities of Islamabad National University of Modern languages Islamabad, Quaid-e-Azam University Islamabad, Air University, Bahria University, International IslamicUniversity, Allama Iqbal open University Islamabad.
5. Following list of 6 public sector universities having Social Sciences departmentsare:

i. Education
ii. International Relations
iii. History
iv. English
v. Pak. Studies
vi. Islamic Studies
vii. Anthropology
viii. Sociology

ix. Mass Communication

x. Humanities

xi. Islamic art and architecture

xii. Area Studies

xiii. Asian Civilization

xiv. Defense and Strategic Studies

xv. Economics

xvi. Law

xvii. Gender Studies

xviii. Linguistic Studies

xix. Political Science

xx. Commerce

xxi. Iqbal Studies

xxii. Urdu

xxiii. Library and Information Science

xxiv. Gender and Women Studies

xxv. Pakistan Language

xxvi. Business Administration

xxvii. Social Work and Pakistan Studies

xxviii. Peace and Conflict Studies

xxix. Common Wealth

xxx. Confucius Institute

xxxi. Governance and Public Policy

xxxii. Psychology

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

The title of current study was “Cognitive Development of students through collaborative learning at undergraduate level”. This chapter includes with the literature regarding collaborative learning and cognitive development. Furthermore, includes the theories, models and related research studies about collaborative learning and cognitive development. Firstly, collaborative learning will be discussed in the light of literature and after that cognitive development will be explained. Different research studies explained that collaborative learning is an umbrella term of group activities or more than one student in classroom work jointly in order to achieve the same goal. In the process of collaborative learning there is an opportunity for students in order to communicate with the group members and express their understanding about the phenomenon. Collaborative learning strategies are a well-known procedure for the active engagement of the students in the learning process.

Section 1 General Introduction of Research Area

It is very important that teaching includes two major and significant components during teaching and learning process such as sending and receiving information to the students. Being a teacher, it is really important to teach knowledge to students as he/she understands the content/phenomenon. There is a chance of hope regarding advancement in any field which is flexible towards productive change in the field.

Educational institutions implement innovative methods (IM) not only to improve the education but also empower their teachers and students in order to reach the goal of human development for the country as well. Education seems to be light towards showing the right directions to humans. The foremost purpose of education is not only to make a student educated rather it makes a student rationale thinker, creative writer and knowledgeable person (Astunnisyah, Budiyono & Hutama, 2017).

2.1 Collaborative Learning

Learning experiences (LE) of students at higher level are seems to be more significant. Qualities of learning experiences are based on the situations or scenarios provided by the educational institutions to the students. According to osipov and ziyatdinova (2015) in the field of education there are two methods of teaching and learning such as; teachers centered method (TCM) and students centered method. In teacher centered method we can see that role of teacher is vital in the procedure of teaching and learning and students remain passive. On the other side in students centered methods (SCM) the role of students is active rather than teachers. In students centered methods they are responsible for their construction of knowledge. Currently we can see idea of self-directed learning (SDL) in educational process is increasing. This educational procedure comprises communication and association and education building. The atmosphere of collaborative teaching and learning provides students an opportunity to exchange, to discuss, to define diverse thoughts about the subject matter.

According to Osipov and Ziyatdinova (2015) teachers are not only the source of knowledge for the students and interaction between teacher and students are considering more important during teaching and learning process. In other words, we can say that educational process includes two-way interaction and communication

during within the classroom. Hence, the self-directed work seems to be as a vital tool for the students during the learning process. Collaborative learning is considered as a significant concept in face-to-face and virtual education system. Collaborative learning includes various strategies in order to improve students' interpersonal skills of the students and enhance their understanding about the subject matter. Moreover, collaborative learning strategies are not based on surface-level understanding or rote-memorization of the subject matter. Collaborative learning strategies are revolving around the interaction with one another, motivation, communication, acceptance of others' opinions and over-come conflicts among them.

2.2 Effectiveness of Collaborative Learning

Soller (2001) explains that effective collaboration with other students has demonstrated itself an active learning strategy. In groups students learn effectively in order to encourage each other and motivate each other towards questioning, explanation of their point of views regarding the subject matter. Effective collaboration indulges students in rational thinking process and makes improvements and motivation towards the learning process. Making groups of students and giving them an assignment does not ensure the involvement of the students in the process of active collaborative learning. Because in grouping some students are extroverts by nature and perform well and participate during the task whereas some students are introvert and face certain difficulty during participating in the group. In other words, we can say that previously teachers give more emphasis on the cognitive development of the students instead of social skills (SS) of the students.

Murtaza (2011) explains that traditional methods of teaching are unable to polish social skills of the students and only some students are involved in the tasks in the classroom.

On the other side if we can see that in collaborative learning activities (CLA) students are supposed to construct their own knowledge without the interference of the teacher. With the passage of time, thoughts about talking in the classroom have changed totally. Now we do not consider that a well classroom is that in which students' passive listeners and quiet during the learning process. Effective learning process (ELP) is only possible when learners have the opportunity to talk with others in order to share their point of views, ask questions and sort out issues without the instructions given by their teachers.

The classrooms are not seeming to be a place where students learn content rather it is a social place in which students learns the social skills such as collaboration with other students, friendship, communication skills, confidence, tolerance, acceptances. Collaboration could be logic of interaction and individual way of life in which students are responsible for own actions, comprising knowledge as well as respect the abilities and words of other class fellows (Murtaza, 2011).

2.3 Benefits of Collaborative Learning

Petrescu, Gorghiu and Drăghicescu (2018) describes that collaboration is a latest trend of twenty-first-century in which humans are engaged in order to think and work jointly for crucial issues. Because individually humans are unable to sort it out issues and they need to know others point of view about the issues. Hence, through collaboration they need to know the others perception and at the end they are able to find out the solution of the problem. Collaborative learning gives various benefits such as social benefits, psychological benefits and as well as academic benefits to the students within the learning process. Further explanations of these above-mentioned benefits of collaborative learning are:

2.3.1 Social Benefits

Social benefits of collaborative learning means that gives system of social support for students during the learning process. Moreover, collaborative learning leads towards constructions of different understanding among students. It also establishes a positive environment for demonstration within the classrooms and also develops learning groups (Petrescu, Gorghiu and Drăghicescu, 2018).

2.3.2 Psychological Benefits

Petrescu, Gorghiu and Drăghicescu (2018) explains that collaborative learning activities are based on students centered activities so in the way these activities develop self-esteem within the students. A further collaborative leaning activity reduces anxiety in the students.

2.3.3 Academic Benefits

As far as academic benefits are concerned collaborative learning enhances critical thinking and creative writing skills in the students. In short we can say that students are able to think and write regarding their understanding of the material. Moreover, collaborative learning process indulges students in the learning atmosphere so that they may participate actively in the learning activities. Further collaborative learning increases results of the students and as well as polish problem solving skills (PSS) (Petrescu, Gorghiu and Drăghicescu, 2018).

Petrescu, Gorghiu and Drăghicescu (2018) elaborated a more important benefit of collaborative learning is that people work together and spread their activities outside of the classrooms. If they feel any problem related to the task so that they contact to the other members of the group and sort it out the solution. Collaborative learning gives a pathway in order to academic community not only within the classroom but also in the institution. Due to collaborative learning process students are able to overcome their differences because students are interacted with each other on a daily basis and learn how to solve the social issues which occurs.

A collaborative learning strategy shifts the learning responsibilities to the students. For implementation of collaborative learning strategies, teachers should know their students well such as their mental levels and favorite learning styles. This will help teachers in order to when and how to start a project. This may also help teachers regarding motivation of all type of students having diverse mental ability of understanding the content. There is a need to provide such atmosphere to the students in order to resolve the difficulties by themselves or with other students of the group. In this way, they are able to socially interact with fellows in different ways such as collaboration, listening to others point of view, argumentation about diverse opinions, and more importantly compromise (Petrescu, Gorghiu and Drăghicescu, 2018).

2.4 Cognitive Development

According to the chweu, mji and simelane-mnisi (2019) Pointed out those current educational institutions does not produce well train graduates who can meet the international standard. Therefore, educational institutions need to identify and frame

the set of those skills and values in order to enable students about the requirement of international standard. 21st century, the capabilities that individuals need for work, citizenship and self-actualization are different as compare of the 20th century. For this purpose, every society educational system needs to transform their curriculum objectives, teaching methods and evaluation systems accordingly. Therefore, the purpose of education is to prepare students in such a way that they could think, communicate and develops main aptitudes such as success, financial safety and expand their abilities.

2.5 Process of Cognitive Development

Cognitive development is considering as a broad field in regard to human development process. Word "cognitive" refers to the ability of knowing, comprehension, mental activity. Cognitive process includes the conscious involvement within the intellectual activity. Moreover, cognitive process is a process in which existing knowledge is utilizing in order to create new knowledge. It is a process which occurs within many levels of childhood. Cognitive skills seem to be the basic abilities within the humans' brain and these abilities are to think, read, learn, remember, reason, and focus. When humans work together, they take external information and move it into the bank of knowledge in the brain (Feldman, 2003).

According to Feldman (2003) initially, children develop and create quickly in their major five years through the four important parts of development such as; physical, communication, cognitive, social and emotional. Basically, Cognitive development includes how children think, investigate and figure things out. In other words, we can explain that cognition leads towards development of knowledge, skills and problem-

solving abilities in the students. It also helps children in order to understand their surroundings and think about it. Brain progress is portion of cognitive development.

According to Kuhn, Black, Keselman and Kaplan (2000), students must know that they have the right to get it things and make things work and accepts that issues can be analyzed. Moreover, the solutions often come from such analysis which they are able of that examination. Students know how to ask questions to teachers or other peers within the classroom. In other words, students come to get it that they are able to secure information they desire and perform their own understanding. Cognitive development is all almost learning and thinking, including the improvement of memory, thought, and problem-solving abilities. When a school-age child understands a math issue, questions something they have studied so that is cognitive development. Cognitive development talks about to the intellect and how it works and the experiences a child has early in life are significant for brain development as they offer help to shape the design of their brains.

2.6 Types of Cognitive Skills

Learning is both individual and public and takes put inside social and social settings. Children who gather negative experiences shift those impacts with them all through their lives. In other words, we can say that experiences are for the lifetime. In educational institutions children spend their days in organized school settings. Because institutions can give a space for children to put through with others, investigate their opinions, exposure of abilities, and apply their information. It can moreover provide them the time and space they have to be preparing all they are learning. Each of your cognitive abilities plays a critical part in making new information. Humans have certain cognitive skills such as; long term memory, working memory, reasoning and thought,

hearing processing (HP), graphic processing (GP), handling speed (HS), attention speed (AS). If one cognitive skill is weak so that any type of knowledge is coming in the mind might be impacted (Sirois & Shultz, 2006).

According to Sirois and Shultz (2006) long term memory enables humans to review information which is stored in the past. If any one's long-term memory (LTM) is weak so that person is forgetting names or important information which seems to be significant at the moment. Working memory leads towards hanging on to facts and if this memory is weak so that a person to read the guidelines again in the mid of a task or remembering what was just said in a discussion. Whereas, logic and reasoning allow a student to use reason, develop ideas and use problem-solving skills. If one's logical reasoning ability is weak so that person is taking uncertain and confusing decision such as what should I do next, feels stuck in the situation.

Auditory processing allows individuals in order to analyze and merger the facts. If this skill is weak in humans so that they are suffering from different situations such as struggling with learning to read, fluency of reading or reading understanding. Visual processing directs towards empowering individuals in order to think in visual image and if someone's visual processing ability is weak so that they might be suffering from certain difficulty such as; problems understanding what you have just read. Furthermore, processing speed skills includes empowers you to perform assignments rapidly and specifically. If someone's processing speed is weak so that oneis taking a sufficient to finish tasks for school or work or f being the last one in a groupto finish tasks. Attention is a skill which directs to stay concentrated on task for a continued period of time. If someone's particular skill is weak so that suffers from

certain scenario such as incomplete plans, skipping from task to task, easily confused and made mistakes during the task (Sirois & Shultz, 2006).

Section 2 Theories and Models Related to Research Area

Theories seem to be an explanation or in other words predication of the phenomenon. Whereas, a model includes a graphic representation or application of a theory. The foremost purpose of model is to explain a phenomenon in a systematic and organize way.

2.7 Collaborative Learning Theories

Collaborative learning theory includes peer-to-peer learning that develops more deep thought within the classroom. Collaborative learning theories recommends that group learning provide help to students in certain ways such as developing higher order thinking skills, verbal communication, leadership skills and self-management as well.

2.8 Vygotsky Socio-Culture Theory

According to Zubaidi (2015) in 20th century, Lev Vygotsky (1896-1934) developed a theory related to cognitive development of children. Later this theory was known as "Lev-Vygotsky's" "Socio-Cultural theory of cognitive development". Vygotsky proposed a new approach to psychology which includes both socio-cultural contexts. He examined the part of social and social components within the making of human awareness. His theory of human improvement emphasizes how an individual's social and social worlds impact development. In the light of Vygotsky theory, a child social world is guided by talk, and children use talk to get it and involvement their world.

Since the past few decades, Vygotsky theory provides a foundational base for many research studies related to cognitive development. In the light of Vygotsky theory, human development seems to be a social process in which children's get their cultural values, problem solving capabilities, views with the help of other knowledgeable persons of the society through joint discussion.

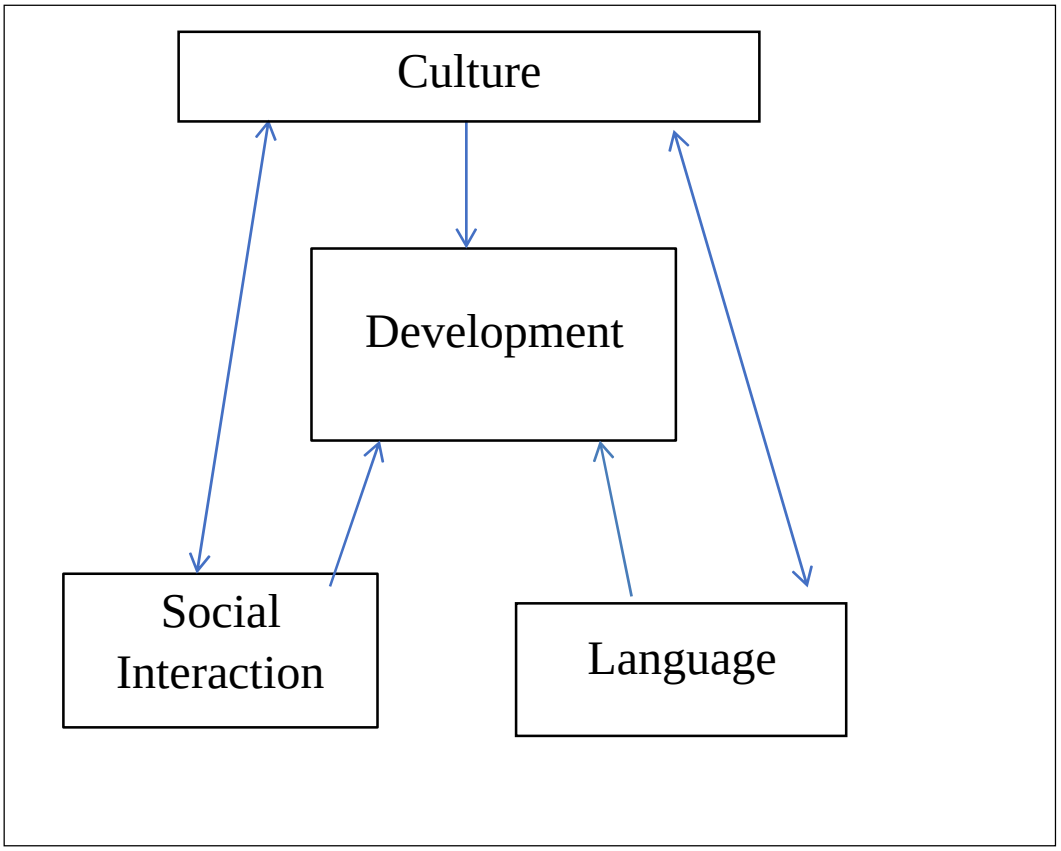

Figure: 2 Social Cultural theory and Human Development Zubaidi, (2015)

In the light of Vygotsky point of view about socio-cultural theory, learning seems to be a social procedure and it boots the intelligence of humans in a society. The central indication of Vygotsky's theoretical framework was social communication shows a key part inside the improvement of understanding. Socio-cultural theory of Vygotsky was not related to social and cultural aspects of human existence whereas it is a theory which

is related to human mind. Moreover, Vygotsky theory comprises certain concepts such as “Internalization”, “Zone of Proximal Development (ZPD)”, “Scaffolding”, “Mediation”, and “Dynamic Assessment” (Zubaidi, 2015).

Zubaidi (2015) describes that internalization includes that Language is key to the internalization of complex thoughts. Through dialects children are able to solve their problems personally. On the other side, Zone of proximal development (ZPD) was an important concept in Lev Vygotsky theory of learning and development. Zone of proximal development includes the space between what a student can do by their own and what a student may do through grown-up direction or in collaboration with more talented peers. In other words, we can say that zone of proximal development bridge up the distance between unknown to known for children.

In the light of Vygotsky theory, Scaffolding seems to be the role which is being played by the teachers and other peers in order to provide support to the learners for the developmental of their knowledge and to reach the next level. Mediation is considered as a significant part of the theory, and it is that the individually humans are not able to develop relationships with the world. They need to be use cultural tools for the development of relationships. These cultural tools may further categorize it in to two categories such as; psychological tools and social tools. Psychological tools mean that what humans are thinking whereas a social tool includes that humans can also share their thoughts through communication or speaking (Zubaidi, 2015).

Dynamic Assessment refers to what children can do with the help of others well reproduces intelligence than what a child can do alone. The teachers and other gradually offers additional signs regarding how to do the task. The chief objective of dynamic assessment is to evaluate exactly how much backing a child needs towards performing

the task within the classroom. Moreover, language is to play a main role in the process of mental development within humans. Language is a primary source of thinking and transferring information between students and teachers within the learning process. Those students who have understood one language are well able to learn others (Zubaidi, 2015).

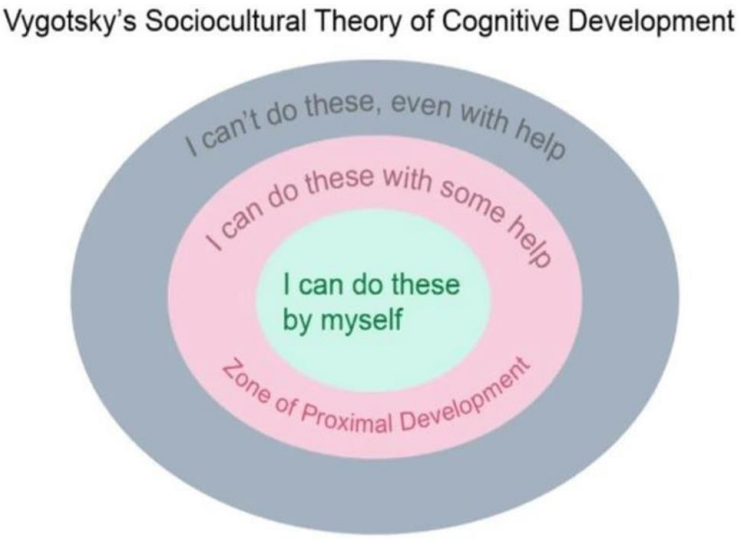

Figure: 3 Vygotsky Sociocultural Theory of Cognitive Development
By Zubaidi (2015)

2.9 Social Constructionism Theory

Social constructionism theory was presented within the "1966" book named as "The Social Development of Reality", by Peter L. Berger and Thomas Luckman and they both are sociologist. The work done by Berger and Luckman, there are three steps involved towards development of reality and these steps are "externalization" (Society is a human product), "objectivities" (Society is an objective reality) and "internalization" (Man is a social product). Societal constructionism acknowledges the

existences of an objective reality. It is focused on how facts are developed and understood. Thus, societal constructionism is related to an epistemological opinion not an ontological opinion (Andrews, 2012).

According to Galbin (2014) social development of reality is a theory of knowledge of sociology and communication that analyzes the development jointly developed understanding of the world. The individual capacity to build his/her own understanding of the world is associated with thinking and with the truth that the individual is able to develop. Social constructionism defined as a point of view which accepts that an incredible deal of human life exists as it does due to social and interpersonal effects. Although genetically acquired components and social variables are at work at the same time it gives emphasis on exploring the social impacts on individual life.

According to Clair (2010) describe that externalization refers to the construction of cultural products such as values and beliefs within the society through the social communication. Objectification is basic to share the knowledge and to create the reality round the individuals. Objectification is typically the result of people arguing the objects with the help of certain symbols. So, for objectification the part of language is important. Internalization includes that the individual's ability to build his/her own understanding of the world is associated with thinking and individual is able to develop their truth.

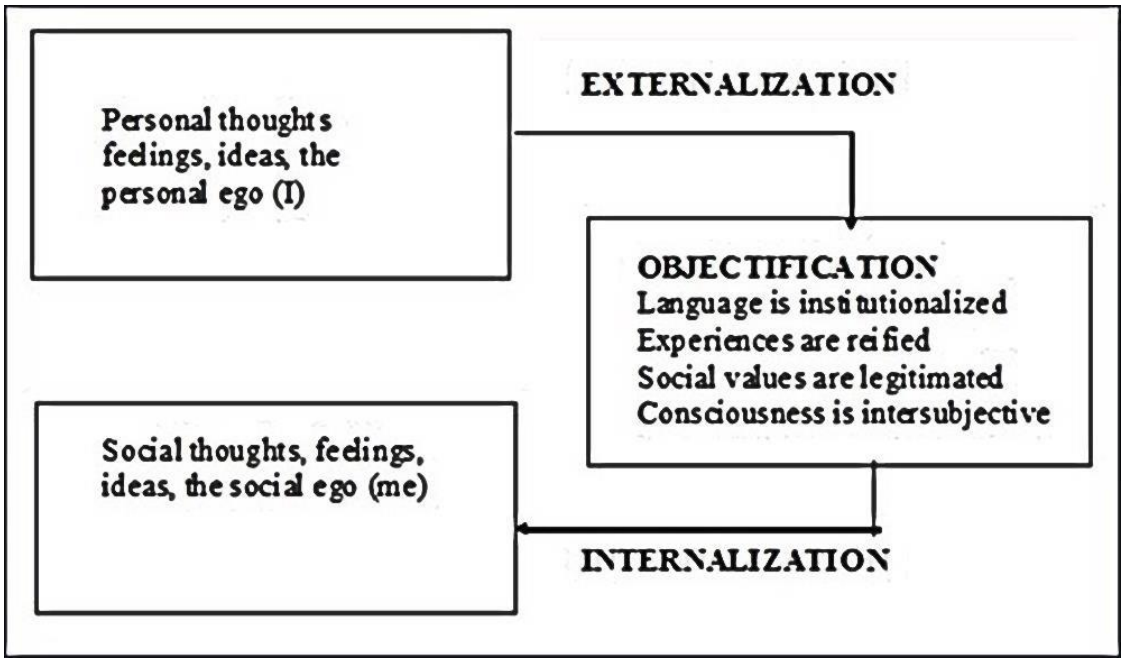

Figure: 4 the Social Construction of Culture by Clair (2010)

2.10 Cognitive Theories

Cognitive development includes the growth of intellectual and mental roles that affect the thinking, rational and problem solving of humans. Therefore, with the passage of time various theorists present their work regarding the concept of cognition as developmental theory by Jean Piaget's (1896-1980), Social cultural cognitive theory by Lev Vygotsky (1896-1934), Information process theory by (1945). These all theories are considering as main theories related to cognitive development.

2.11 Jean Piaget's Developmental Theory

Piaget works approximately five decades on children cognitive development. During the time span of his studies, he wants to know the answers of certain questions as why a kid inquires questions and kids‟ of similar age done the similar error. In 20th century jean Piaget recommend the famous theory which is related to stages of cognitive

development in kids. Piaget present four cognitive development phases for kids named as; “sensorimotor”, “preoperational”, “concrete operational “and “operational stage”. Piaget recommended that kids travel over “sensorimotor phase”, “preoperational phase”, “concrete operational phase” and “formal operational phase” of cognition (Babakr, Mohamedamin, & Kakamad 2019).

According to Babakr, Mohamedamin and Kakamad (2019) Children’s cognitive ability change subjectively during moving through one stage to another stage. Piaget clarifies that cognitive growth is an endless procedure within children of all around the globe. These children belong to diverse ecological setting and nation variety around the globe having the same system of cognitive development. First stage of cognitive development is sensorimotor begins from the birth of child to two years. In this stage children’s try to understand the objects by using the senses activity. Moreover, Piaget believes that in this sensorimotor stage of cognitive development, children’s thought procedure was their eyes, ears as well as hands.

In the light of Piaget’s theory in the stage of sensorimotor, there are important developments are arising. Firstly, in the age of 18, children are capable to direct limited language whereas ages of two years children are capable to show small and significant wording. Piaget’s second stage of cognitive development is called preoperational stage. This stage arises after 2 to 7 years. In this stage children’s representative skill grows as they use images and words as a sign to recognize their environments. Third stage is

concrete operations, and this stage starts from 7 to 11 years. Piaget proposed that during this period of time children are less self-centered and display the skill to recognize concert stuffs and able to resolve difficult issues by their own will. Formal operational stage is the fourth and final stage of cognitive growth which is begins after 11 years. In the light of Piaget believe during the formal operational stage children's thinking and understanding about their surroundings significantly. In other words, we can say that the children's thinks and logically (Babakr, Mohamedamin, & Kakamad 2019).

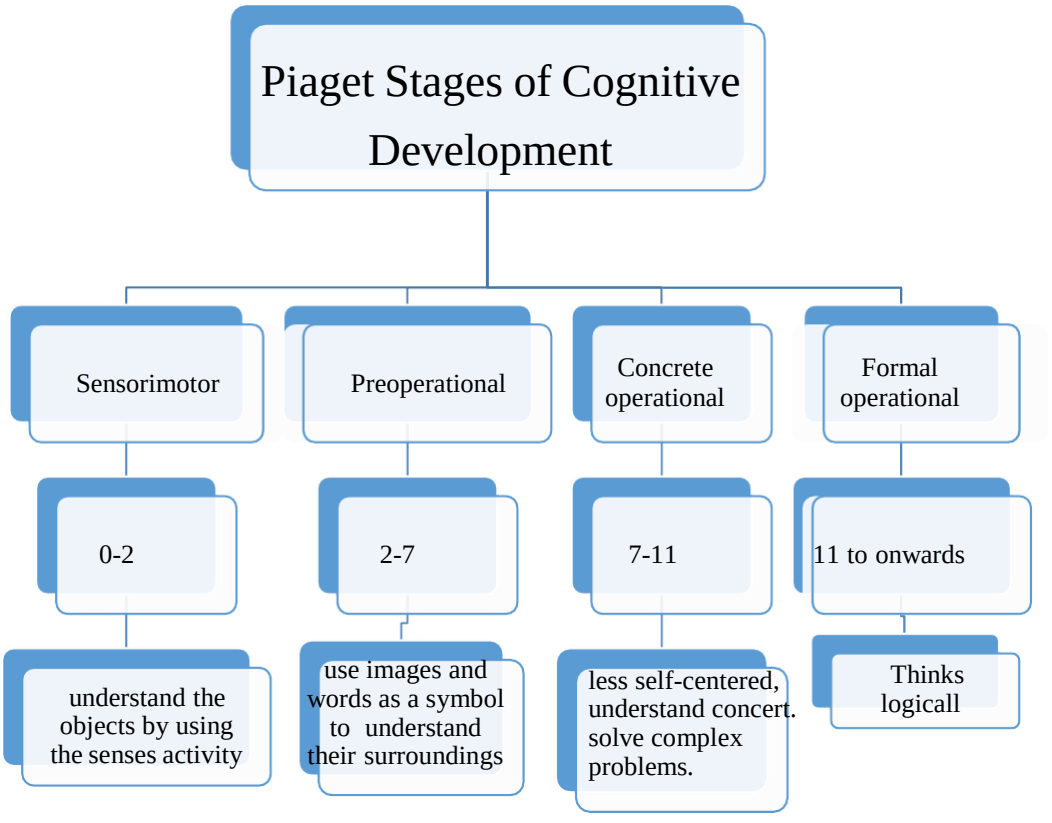

Figure No.5 Piaget Stages of Cognitive Development by Babakr, Mohamedamin, & Kakamad (2019)

2.12 Revised Bloom Taxonomy of Cognitive Development

Bloom's taxonomy was originally published in 1956 as a result of collaborative work with the “Cognitive Psychologist” at the University of Chicago. Moreover, the concepts of higher order thinking skills have an in-depth relationship with the cognitive domain of the bloom’s taxonomy. Cognitive domain of blooms taxonomy includes 6 steps of learning such as “Knowledge”, “Comprehension”, “Application”, “Analysis”, “Synthesis”, “Evaluation” (Mizbani & Chalak,2017).

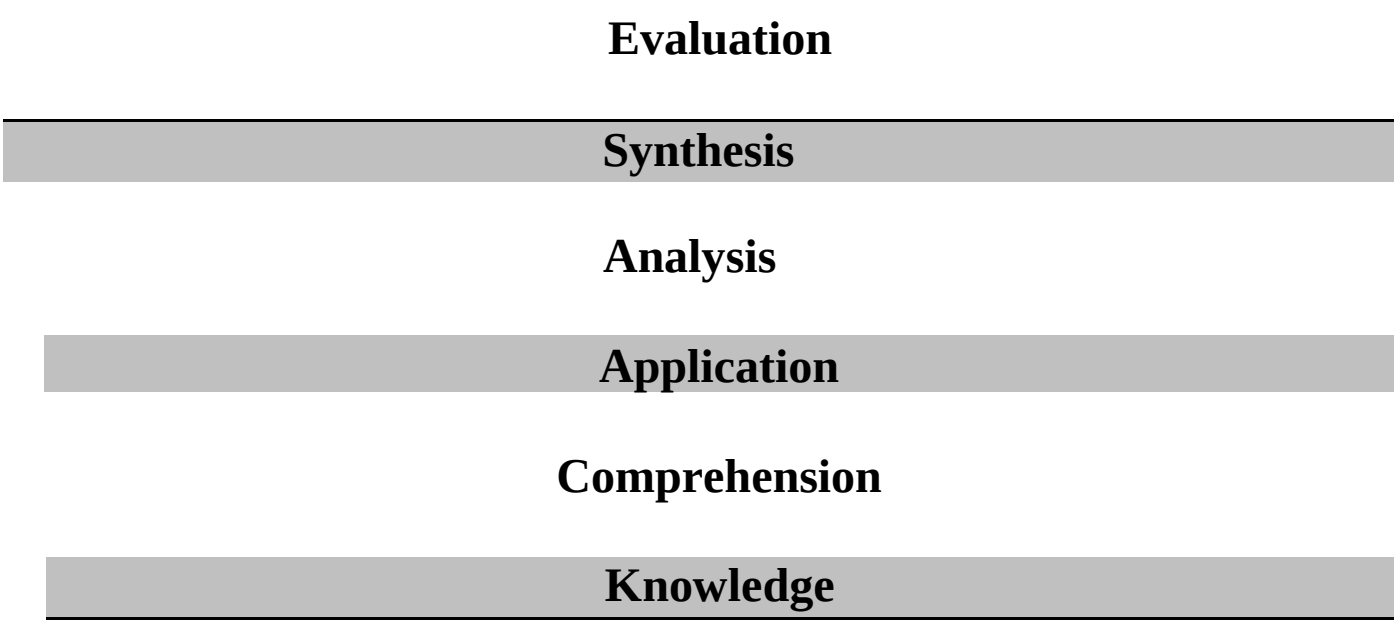

Figure. No .6 Cognitive Domain of Blooms Taxonomy by Mizbani and Chalak (2017).

According to Mizbani and Chalak (2017) describes that bloom was an educational psychologist he introduces a framework in order to categorize the statements of what we suppose the students to gain as the results of teaching. However, in 2001 with the collaborative work of cognitive psychologists, course thinkers and instructional scholars, and testing and assessment specialists published in 2001 a revision of "Bloom's Taxonomy" with the title "A Taxonomy for Teaching, Learning, and Assessment, A revision of Bloom's Taxonomy of Educational Objectives". This revised version of "Bloom's Taxonomy" included 6 steps such as; "Remember", "Understand", "Apply", "Analyze", "Evaluate", "Create". Additionally, following

figure of Bloom's revised taxonomy is:

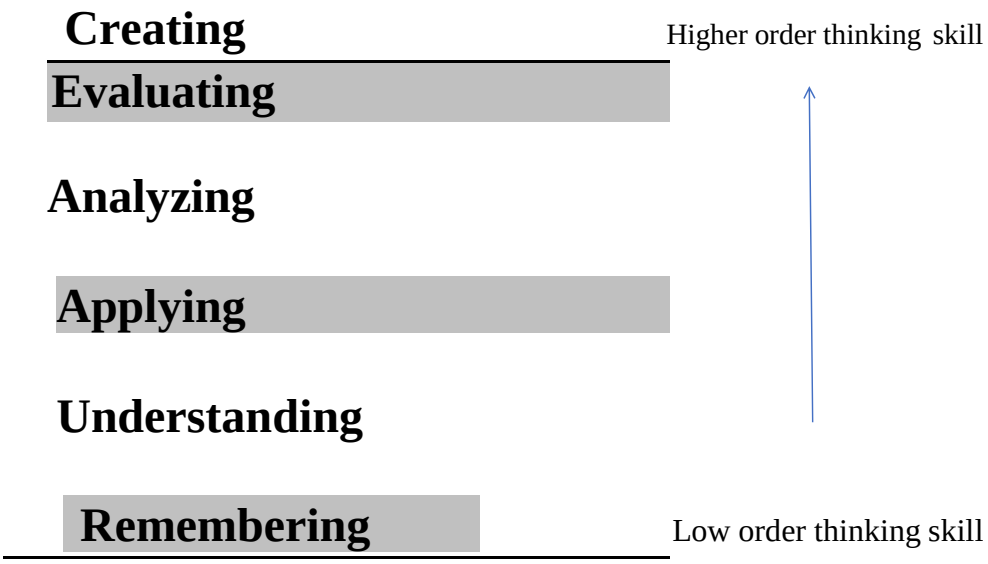

Figure No.9 Revised Cognitive Domain of Blooms Taxonomy by Mizbani and Chalak (2017)

According to Mizbani and Chalak (2017) describes that remembering level includes review or improve past learned data. In this level students are able to “define”, “describe”, “identify”, “knows”, “recall”, “recognize”, “outline” and lists the information. In understanding refers to interpretation, addition, and translation of issues. In other words, state an issue in one’s own words. In this level students are able to understands, changes, supports, differentiate, explains, covers, specifies, interprets, rephrases, predicts about the phenomenon. Applying level includes Applying level includes what was learned within the classroom into new

circumstances. In this level students are able to apply the facts, concepts, ideas and rules.

Analyzing level refers to breakdown the information it into parts, the study level is where students utilize their right decision to start analyzing the information they have learned. In this level students are able in certain ways such as “analyze”, “breaking down”, “relates”, “differences”, “deconstructs”, “differentiates”, “categorizes”, “decides”, “classifies”, “explains”, “concludes”, “selects”, “splits”. Evaluation level of bloom taxonomy directs make decisions around the thoughts or materials. In this level students are able to “evaluates”, “compares”, “concludes”, “criticizes”, “critiques”, “defends”, “describes”, “discriminates”, “evaluates”, “explains”,“interprets”, “justifies”, “relates”, “summarizes”, “supports” content. Creating level of bloom revised taxonomy explains the students are producing and they are being able to produce original work. In this level students are able to investigate, formulate, construct and design (Mizbani & Chalak 2017).

Section 3 Research Studies Related to Collaborative Learning Strategies and Cognitive Development

The 21st century introduced its own ways. Human life is totally change from the few decades, in general man need to technology to find knowledge, information, create ideas and develop their concepts and share them with others. For the purpose of transferring knowledge, with the passage of time many theorist and related authorities presents their works in order to well-trained their students who will not only shape up their futures but also give certain benefits for the societies (Panhwar et al., 2017). The benefits of collaborative learning strategies which contains group of students together and solve the problem collaboratively and make a solution. A main factor of understanding contains exercise students in the social skills needed to work collaboratively. Collaborative learning strategies develop social collaboration abilities within the students (Panhwar et al. 2017).

According to Yasmin and Alvi (2019) research aims toward discover the views of encouraging independence in Pakistani students above collaborative activities. The place of collaborative learning strategies towards rising autonomy within students is discovered over collecting teachers' point of view by semi structured interviews and observation of the practices within the classrooms. Collaborative learning boots certain elements within the students such as motivation, accountability, confidence, socialization among other peers who are a part of groups. Learner autonomy seems to be a tremendously progressing for the last few decades.

Collaborative learning motivates every student to ask questions, explanation, and justification of their point view, clear their thought about the phenomenon. In groups students learns more effectively because in this way students motivate each other and

feel comfortable to engage themselves in the conversation among members of the group. Communication faces off towards other members of the group creates self confidence in students. They feel more comfortable in order to express their understanding regarding the material. Communication put students in argumentation and inductive thinking process (Soller, 2001).

Collaboration and communication are viewed as a feature of major focus to train students for complex life and workplaces in the 21st century. Collaborative abilities are very self-motivated by the learners to give themselves the capacity to work successfully and respectfully within groups. Collaborative Learning strategies are significant and supposed to be able to work with the students to enhance their higher- level thinking. This mutual learning situation has been well-known by different names such as group learning, Cooperative learning, collaborative learning, group of learners (Amaila, 2018).

A research study conducted by Yasmin and Alvi (2019) directed that Collaborative learning increases autonomy in learners over raising concern, motivation, self-confidence, abilities. In other words, we can say that it might be helpful towards interdependence among students and provided that learners a chance to learn from other peers. Structure of collaborative goal enables students to attain learning goals along with the group members. Furthermore, Social interaction has a great influence on individual development. Conversation might be a rational trick to solve difficulties and oneself in establishing purposes that are basic to conceptual action.

Students' friendly environment strategies to develop a learning climate within the classroom in which students are encouraged and ready to learn. For the purpose of well development of students within the learning process the role of educational institutions

seems to be very important in order to welcoming to students and goes to all their interests and confidence needs (Murtaza, 2011). A research study conducted by Özsevgeç & Cepni (2021) the collaborative learning strategies includes certain elements such as; active contact with each other, responsible to others in order to participation in the learning process, Diverse grouping in which slow learners and active students part of the group, Encouraging interdependency, directly taught social skills.

A research study conducted by Adene (2021) investigated effect of peer collaborative education strategies on self-esteem of students along with behavior problems. There are a number of behavior issues which students' stage in the school room, but this see particularly centered on (ODI) Oppositional Disobedient Illness. Oppositional Disobedient Illness (ODI) disease characterized via way of means of everyday sample of competitive and disobedient behavior with the aim to harass others and being argumentative towards others. Thus, collaborative learning strategies have important influence on students‟ self-esteem and school engagement.

A research study conducted by Laal and Ghodsi (2012) advocates that collaboration could be a way of interaction and individual performance where people are careful about their activities, learning, their capacities and commitments of their peers as well collaborative learning is more learner centered. Collaborative learning (CL) could be an individual sense, not only knowledge tactic. It includes circumstances in which individuals come together in crews and proposes a path of managing by individuals with regard to highlight individual gather members' capacities and commitments. This is related to a sharing of ability and acknowledgment as well as responsibilities between groups for each group activity.

Collaborative learning can take place two-way communication in groups. Peer knowledge could be a kind of combined learning that includes learners worked in groups regarding examine thoughts or discover actions to problems. It normally happens during lesson session when students are presented to sequence content through understandings or teacher's lectures. Several teachers have found that through peer education, students educate each other by addressing misconceptions and clarifying misunderstandings (Laal & Ghodsi, 2012).

A research study conducted by Laal and Ghodsi (2012) describes the benefits of collaborative learning such as; development of higher-level thinking in the students, verbal communication, self-management, and leadership abilities, Improvement in peer interactions and boost students' conservation, self-esteem, and accountabilities. Students learn to work with all kinds of individuals. They find out many chances to reflect upon and answer to the different reactions of their fellows. Diverse students will have a range of answers. This range of responses can help the group make a conclusion that reflects a wide range of perceptions.

A research study conducted by Nurhayati et al. (2017) describes it can be said that the presence of self-confidence is very vital in students because it permit students to be able to accept within the ability influenced. Students are not simply giving up in the face of all problems or in other words they are able to execute all responsibilities delivered individually. It is therefore important to teach self- confidence in students. Confidence is one of the manners had by each person, which includes a positive viewpoint to him. Collaborative learning strategies play an important part to boots self confidence in students. Collaborative learning could be a learning that includes group of students to work together in understanding a problem or task.

A research study conducted by Galbin (2014) found that to decide students' success, Science teachers got to create their evaluation tools and this study is about activities to discover out the relationship between the teacher's evaluation tools and students cognitive development according to the teachers' teaching practices. It was clear that many science teachers use oral and written evaluation tools. Apart from teaching experience, nearly all the samples do not have any information on students cognitive development.

A study directed by Yasmin and Alvi (2019) discover that views of advancing independence in Pakistani learners through collaborative tasks. Findings of the study revealed that teacher accept collaborative learning leads towards freedom, accountability, faith, motivation, abilities and confident interdependency which are required for independence development. According to Laal et al. (2013) explains that when group of students offer help each other, collaborative learning happens. Collaboration could be a understanding of communication and personal way of life where persons are accountable for their accomplishments and concern the capabilities and influences of other fellows.

A research study carried out by Murtaza (2011) explains that early childhood education and development seems to be more vital stage for interpersonal skills and intrapersonal skills of the child. At this stage teachers‟ needs to be plays an important role towards providing friendly environment to the students within the school. The result of the study shows that early childhood education development seems to be important towards involving teachers towards developing their thinking and teaching practice. A research study conducted by Jang (2006) explains that impacts of team teaching upon two 8th-grade teachers within the field of mathematics.

Team teaching includes that two or more than teachers and their main concern is that to distribution of teaching experiences with the classroom. They take mutual for maximizing learning in order to give knowledge to students within the classroom. Results show that regular final examination during learning process in which students getting team teaching was higher as compared to those students who receives traditional teaching. Team teaching technique seems to be more important in order to up student's success.

A research study conducted by Andrews (2012) explains, that societal constructionists build facts and says that societal constructionism deals with the nature of information and how it is created. Therefore, it is unconcerned through ontological matters. Culture is seen as existing both as an individual and an objective truth. Collaboration can moreover upgrade the quality of group members"

preparations as they provide feedback to each other with respect to their information. The kind of task that is used for collaboration is also vital.

A research study conducted by Andrews and Rapp (2015) explained the components that determine whether and how collaboration influences learning and memory can light up the development of instructional practices that include collaborative activity. In education, collaborative activity has been admired as a student-centered, constructivist approach that enables learners to engage in the dynamic development of their own knowledge. In this way, it is important to decide how to best structure collaborative exercises within the classroom scenario. The communication between individuals of thegroup and characteristics of their discussion is measured the way through in which jointunderstanding and joint reasoning is come to. The societal procedure of building equally shared understanding is known as learning activities of the group.

Individuals in today's society are living in always changing situations where they commonly stand up to complex and surprising issues. Already learned practices do not always give satisfactory suggestions of adapting in these modern circumstances. Creativity is vital to deal with the evolution of new information and technologies. Hence, it is one of the abilities which should develop across our life span. The outdated 3 Rs as "Reading", "writing", "arithmetic "of the twentieth century have been changed by 4cs as; "Critical thinking", "problem solving", "communication", "collaboration", "creativity" , "innovation skills". Creativeness is measured a basic ability for an individual and social success because we live in the creative age of information, communication, and collaboration (Romero, Siklander and Barberà, 2012).

A research study conducted by Romero, Siklander and Barberà (2012) defines that "computer supported collaborative learning" is related of facts and communication tools to improve knowledge. The CSCL atmosphere is not only a means of secondary communication among people who are physically far away, but a tool used in both co-presence and distance situations for shaping collaboration in many ways and for taking, studying, and reflecting these relations in real time. A research study conducted by Romero, Siklander and Barberà (2012) define that education is essential for achieving person, social and national foundational objectives of a nation. The preparation for all general quality education is the most excellent way to create and maximize the ability and higher-level cognitive capacities of the students over the nation. The rising demand of collaborative learning is not only worked by policy approvals but also by accepting its values for educating students‟ academic performances.

A group is a meeting of individuals which is on the same space, physical environment. With the passage of time focus has been given to the societal origins of reasoning. Collaborative learning situations involve in building and keeping equally shared cognition and increases performance. Previously collaborative culture has mostly concentrated on defining basic settings such as group size, group composition and nature of tasks in order to leading well results. It is hard to define the direct effect of these physical settings on the result of group work. Thus, focus is now on middle practices that provides focus on active collaboration. Collaborative learning needs to emphasis on to the socio-cognitive practices through which a mutual idea is constructed. However, few researches of collaborative learning have studied how groups of people grow joint understanding (Vanden , Segers & Kirschner.2006).

A research study conducted by Vanden, Segers and Kirschner (2006) explains that conceptual representations can serve as systems that can direct learners to organize their information. These representations are vital for learners in developing information and engage in investigation in order to understand difficult phenomenon. Recognition refers to the method of thinking and memory. A research study conducted by Rafique, Baig, and Hussain (2019) elaborate that cognitive development mentions the developing in memory, the ability to think, see, and cognitive abilities. These abilities can help learners to adapt the environment of their surroundings. Cognitive development is known as the progress of mental abilities such as recognition, creativity, imagination, and thinking process.

A research study conducted by Qiftiyah (2020) students is challenged with the issue of how to overcome time requirements and can study at a reasonably brief time but can get as much data as feasible for them. Reading literacy can be an instrument for students

to identify, recognize and relate the information gained at school. The elementary school level is a significant era in the development and cognitive development of student. It was an appropriate period to prepared good practices for the students. Reading is the basic and main element to student's achievement in a range of courses. Reading ways can open a space of understanding that will take to get the things desirable in school for the students. Reading is also a skill that must be obsessed by all students.

A research study conducted by Abun (2021) describes that human state of mind suggests to the thoughts, opinions, feelings, and behavior of an individual toward certain subject. It is a tendency to assess things according to his/her personal insight, thoughts, or feelings. It gets to be person look to answer in a favorable or unfavorable method to certain course institution or circumstance. Cognitive development is the study around of childhood neurological and mental innovation. Cognitive development is measured and centered on the level of idea, opinion, facts, and verbal communication as a sign of brain growth. It is known that cognitive development progresses with age, as human consciousness and understanding of the world increases from early period to childhood, and then over into teenage years.

A research study of Al-Rahmi et al. (2017) describes that social media prospective control to inspire higher-level educational results through collaborative learning. Indeed, UNESCO in its documental record defended the potential of social media and suggested that classroom experimentation with it to highlight its qualities and shortcomings. Social media encourages collaboration and contributes to the relationship advancement among students and gives brief beginnings for educational program spread and upgrade that is outside to the genuine classroom. This single area

Communication clears the way for discussions that are required and increases the potential of higher students learning. Lecturers and administrators utilizing social media should be able to play a dynamic part in collaboration with learners. Typically, since it is their duty to advance students creativity, evaluate exercises, and clarify misconception emerging from the material area and information creation in order to maintain the learning environment integrity.

Social media can be ideally utilized as a basic review and collaborative learning instrument and not just as a promoting strategy for course updates. Professors and supervisors considering toward include social media in their teaching techniques must make sure that confident social media kind used is associated with the knowledge results towards develop educational presentation. Students focused to apply social media system in collaborative learning are the key analyze in innovation utilization of models (Al-Rahmi et al., 2017).

According to Al-Rahmi et al. (2017) examine that collaborative learning supports societal means innovative learning. Collaborative learning comprises the natural and associations of the students with the educational program. In this situation, social media empowers the development of the learning environment as learning takes place in classrooms. They can make use of social media to boost student's creativity and investigate examination of courses. Social media gives different options to the improvement of real things through blogs; YouTube empowers the study material in modern information era. Social media opens the entrances to making the next sense of student's community through collaboration among peers on certain points. Twitter look is basically a gadget for mental and social engagement and an implies to remain

educated in an energetic data world and it is this social energy that creates this new source of data very distinctive to those of the prior web.

Utilizing social networking at higher education ensures satisfactory understanding exchange and contributes to learners learning implementation development. Study results revealed that affiliation among students learning implementation and their fulfillment with learning through the utilization of social organizing as a stage for collaborative learning. A few staff authorities accept that certain social organizing devices might move forward students learning in which their interaction with staff and other peers, their writing abilities, as well as their fulfillment and learning implementation (Al-Rahmi et al., 2017).

Another as often as possible detailed benefit of societal means is its abilities of encouraging facts sharing. On the other side, blogging devices are utilized via several learners to spread data inside their zone. Nevertheless, the foremost detailed constraints to utilizing social media in rational thinking are the probable shortage of period. It is viewed that social media platforms share maximum number of the features for a great teaching developments (Al-Rahmi et al., 2017). A research study conducted by Al-Rahmi et al. (2017) explains that public means look like to provide advantage to learners, by facilitating learners in order to move in innovative and latest kinds of two-way education, which is reflecting learners' interface and their direct educational success. Similarly, face- book have demonstrated that learners pay focus on constructing links about public interface. It is influenced certain educationists to coordinated public media regarding usual interaction and conversation among students and teachers.

A research study carried out by Murtaza (2011) explains that early childhood education and development seems to be more vital stage for interpersonal skills and intrapersonal skills of the child. At this stage teachers needs to be playing an important role towards providing friendly environment to the students within the school. The result of the study shows that early childhood education development seems to be important towards involving teachers towards developing their thinking and teaching practice.

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traditional form of teaching. Team teaching technique seems to be more important in order to upgrade the level of student's success.

A research study carried out by An, Kim and Kim (2008) revealed that personal responsibility was seen as being the foremost basic factor. A need of person responsibility is dependable with referred to as "social loafing." This term was described as meaning that when people think they are working in groups they think doing less work than when they think they are working alone.

When students worked alone, they cannot depend on other students during the learning process. They are accountable for their activities or in other words they are supposed to complete their task without depending on others. When students depend on other students so that they feel a comfort zone and cannot give focus on their task. A research study conducted by Ali (2018) found that in group work students involves themselves in a duel way. One way leads to the collaboration among other members of the group and other way is regarding their creative and critical thinking skills of students. Specifically in linguistic classroom collaborative understanding strategies indulge low level skill students in approaching with ideas with the assistance of high- level proficiency students to them in order to revising their sentences and clear their concepts, ideas and thoughts. Another research by Lin (2015) talks about the structure of goals, such as kind of interdependence between learners and classified these into three dimensions such as: Collaborative, Competitive, and Individualistic.

Research conducted by Chandrasekaran et al. (2016) explains that learning institutes have a view that the distance learning might be a desired system to relate study with life. It also facilitates the students who are not able to attend educational institutions. In the process of distance education students and academic staff faces many challenges

such as; lack of motivation, sense of loneliness. Collaborative learning strategies will improve academic staff and learners' interaction during process of distance learning. The learning method for distance learners includes academic staff communicating meetings, peer-to-peer conversation, e-assessment and self- realization. A research conducted by Riga and Skopeliti (2019) defined that cooperative learning includes such educational methods in which pairs or smaller groups of students work together so that they can reach a common goal. The foremost aim of this collaboration is to increases students own knowledge by easily cooperating with the other fellows of the group who are a part of group and working for the common goal.

According to Laal et al. (2013) when a group of students offer help to each other it results in two-way knowledge. Teamwork could be an understanding of communication and individual way of life in which learners are accountable for their activities, skills with the participation of other members. Cognitive development of the students at undergraduate level seems to be the back bone of one's knowledge. Cognitive skills drag someone's thinking from unknown to known. In other words, we can say that cognitive skills build a bridge between unknowing to knowing unless one's reach the destination. It empowers the students in many ways such as; independent opinion about certain phenomenon, elaboration, explanation, justification, relation, comparison and in many other ways (Shams et al., 2020). In Pakistani educational scenario teachers use traditional teaching methods such as; lecture method for imparting knowledge to the students. But unfortunately those traditional methods are unable to meet the individual differences of the students. Because of lecture method students cannot approach the effective learning experiences in the classrooms. In lecture method

students are passively listening to the teacher and unable to express their point of view about the subject matter.

Concept mapping is a technique of collaborative learning method that permits students working in teams. It is a method of describing the links that are between terms or ideas hidden in course material. Collaborative concept mapping involves two or more than two students within the learning process in order to continue determinations in the construction of one or more concept maps for the purpose of better learning and creating facts. A concept outline could be a visual organization and representation of information about the content. Concepts and the relations prevail among them (Gao et al., 2007). A research conducted by Kezar (2005) defined that how organizations encouraged from values that support individual work to the ones that help collaborative work. Educational institutions realize the importance of collaboration because it enhances students learning. Institutions are not structured to back collaborative methods to learning of the students such as; bureaucratic and organizational divisions, Unions and other concerned unions act as barriers to collaborative work and partnerships.

Jigsaw is a collective learning strategy that gives students practice and show of new material in group discussion. Jigsaw is a well-known strategy for collaborative learning. In which students commonly use it in a face-to-face setting without computer maintenance. Jigsaw technique has certain steps such as teacher splits class into small teams, after making teams in the classroom teacher gives assignments and tasks to the teams, gives a diverse task towards each group within the classroom, teacher arranges and allow groups time to work within course and ask every student to prepare the course by themselves before class (Gallardo et al., 2003).

A research study conducted by Loes and Pascarella (2017) found that thinking procedure is a learning procedure, which creates students personal thinking about the material. In other words, we can say that it is ability within the students in order to justify their point of view regarding the material and how they understood the information. Laal and Laal (2012) explain that students are gathered two by two to talk about their opinions. This development permits learners to express their thoughts and to think about those of others. Students express their thoughts with a bigger crowd, like the entire class. Students are more open to giving ideas to a crowd in order to help other peers within the group. Student's thoughts get more developed and polished. A researchstudy carried out by Astunnisyah, Budiyono and Hutama (2017) explain that round table is a learning method that permits students to review earlier information, review data and practice relational abilities. This includes certain steps such as each student thinks of (one, two or 3) sentences regarding an assigned task (or this could be a response to an inquiry) and composes them on a piece of paper. Students must share their opinions regarding the questions or a content which is being demonstrated by the instructors/teacher. A student examines the remarks from others and suggests about the feeling of information revealed in the group about the subject (or question).

CHAPTER 3

METHODS AND PROCEDURES

The current research was undertaken “to measure the effect of collaborative learning strategies on cognitive development of students at undergraduate level”. Study findings helped the researcher to know about the “effect of collaborative learning strategies on cognitive development of students at undergraduate level”. Research method and procedure give a proper route to reach the final conclusion. The research includes “research approach”, “research design”, and “population”, “sampling technique”, “sample size”, “instrumentation”, “validation of instrument”, “reliability of instrument”, “data collection” and “data analysis”.

3.1 Research Approach

Current research was based on quantitative approach which contains interpretation of the collected data using numbers. This approach was considered most appropriate for analyzing the practices of collaborative learning strategies at undergraduate level, and cognitive development of students through collaborative learning. This approach helps in generating quantifiable data for a research study (Kabir, 2016).

All objectives required the gathering of numerical information and numerical investigation. That is why quantitative approach was chosen by the researcher. The Researcher had selected this approach because it estimates the problem through creating numerical data which can be converted into useable statistics. Moreover, it facilitates more structured research patterns so that is why researcher has selected it. The researcher was used this approach for the study because the nature of the research

objectives and hypotheses. The data was analyzed in numerical procedure and statistical techniques as mean, individual score and linear regression were applied.

3.2 Description of Variables

The present study was contained of independent and dependent variables. Collaborative learning strategies were independent variable for the current study and dependent variable was cognitive development.

3.2.1 Collaborative Learning Strategies (Independent Variable)

For the current study collaborative learning was an independent variable which included three sub-dimensions. These sub-variables were conversation, active learning and creative conflict.

3.2.1.1 Conversation

Collaborative discussion is in which dialogic engagement between students in order to find out solution of a problem.

3.2.1.2 Active learning

Active learning consisted on active involvement of learners in order to understand and create information and concepts instead of using rote memorization around the content.

3.2.1.3 Creative Conflict

Creative conflict includes communication and difference in opinions between students during group discussion.

3.2.2 Cognitive Development (Dependent Variable)

Cognitive development was considered as dependent variable for the current research, it based on seven sub-variables and these sub-variables are shallow learning, Prestructural, Unistructural, Multistructural, Relational, Extended abstract and deep learning.

3.2.2.1 Shallow Learning

Shallow learning happens when students are doing reviewing of content what they are reading.

3.2.2.2 Prestructural

Prestructural includes that students have no idea about the phenomenon.

3.2.2.3 Unistructural

This includes that students are able to have some understanding the phenomenon.

3.2.2.4 Multistructural

Multistructural indicates the connection among existing knowledge to previous one.

3.2.2.5 Relational

It comprises towards development of higher-level thinking of students. Students are able to border their thinking together and clarify a few thoughts around a related subject matter/content.

3.2.2.6 Extended Abstract

Extended abstract indicates that students are able to justify their understanding during the classroom discussion.

3.2.2.7 Deep Learning

It includes that students are able to think creative and having problem solving ability in order to understand complex issues. On the other hand, they are able to take out mistakes in previous learning.

3.3 Research Design

Design is referred towards comprehensive plan of detecting useful answers to research problems (Mccaig, 2010). As far as research design for the current research was concerned, correlational design was applied. Correlational research design is a non-experimental type of quantitative research. In correlational research design, variables are observed by the researcher without any manipulation and interference.

Correlational design was used to find out the "effect of collaborative learning strategies on cognitive development of students at undergraduate level". Correlational design was used in order to find out the relationship between independent variable and dependent variable (Tan, 2014). Therefore, researcher was interested to discover the one-way relationship between collaborative learning strategies and cognitive development of students, correlational design was used. In order to find out one way relationship and to analyze study objectives, linear regression was applied.

As far as research method of the current study was concerned, survey method was selected. Survey method is defined as the collection of information from a sample of individuals through their responses to questions. A survey method is a method in research that researcher can use to gather data in research by asking questions to a group of individuals. Furthermore, survey method facilitates the exchange of information between the research respondents and the researchers (Ponto, 2015).To find out the one

way relationship between collaborative learning strategies and cognitive development of students at undergraduate level, survey method was selected.

3.4 Population

The population of the current was based on 7221 students enrolled (session 2020) spring in social sciences departments in 6 public sector universities of Islamabad. There are 3835 male students whereas 3386 female students are enrolled in the selected public universities of Islamabad. Total 13 public sectors universities of Islamabad and 6 out of 13 public sector universities having social sciences faculties. The above-mentioned information regarding public sector universities of Islamabad is retrieved from the website of HEC (Higher Education Commission, 2021) and population of students of social sciences departments was taken from the administrative authorities of 6 public sector universities of Islamabad.

Table No. 3.1

Population of the study

S #	Name of Universities	Total Number of Students Enrolled in Social Sciences Departments (Session- 2020)	Male	Female
1	National University of Modern Language, Islamabad (NUML)	1994	1155	839
2	International Islamic University, Islamabad (IIUI)	2200	1194	1006
3	Quaid –E-Azam University, Islamabad (QAU)	245	130	115
4	Bahria University, Islamabad (BU)	877	373	504
5	Allama Iqbal Open University, Islamabad (AIOU)	1750	878	872
6	Air University, Islamabad (AU)	155	105	50
	Total	7221	3835	3386

Table No.3.2

List of Social Sciences Departments in 6 public sector Universities of Islamabad

Sr .No	**Departments of Social Sciences**
1	Education
2	International relations
3	History
4	English
5	Pak studies
6	Islamic studies
7	Anthropology
8	Sociology
9	Mass communication
10	Humanities
11	Islamic art and architecture
12	Area studies
13	Asian civilization
14	Defense and Strategic studies
15	Economics
16	Law
17	Gender studies
18	Linguistic studies
19	Political science
20	Commerce

21	Iqbal studies
22	Urdu
23	Library and information science
24	Gender and women studies
25	Pakistan language
26	Business administration,
27	Social work and Pakistan studies
28	peace and conflict studies
29	common wealth
30	Confucius institute
31	Governance and public policy
32	Psychology

3.5 Sampling Technique

Process of sampling technique includes picking a small portion of sample within the overall population. A sampling technique is known as for the identification of the specific process in which individuals of the sample was selected. The outcomes found from selected sample were generalized on the overall population. Therefore, Selection of sample is viewed to be a choice of a researcher regarding the respondents who are going to be a part of the research.

For the current study sampling technique was proportionate stratified sampling. Proportionate stratified sampling was selected because population of the study was distributed in sub-groups. Proportionate stratified sampling includes the selection of respondents in the sub-groups. These sub-groups were comprised of six public sector universities of Islamabad. Moreover, to select a necessary quantity of students respondents from the public universities, proportionate stratified sampling technique was selected. In proportionate sampling technique, the selected respondents were

selected with the equal percentage by the researcher from each sub-group. Thus, keeping in view these sub-groups of six public sector universities were National University of Modern Language,Isl (NUML), International Islamic University, Isl (IIUI), Quaid –E-Azam University, Isl (QAU), Bahria University,Isl (BU), Allama Iqbal Open University,Isl (AIOU), Air University,Isl (AU), proportionate stratified sampling was used.

3.6 Sample Size

For the current study, sample was composed 10% of the whole population from the departments of social sciences of 6 universities in Islamabad (Public sector). Total number of students (social sciences) in public sector universities 7221.Male students was in 3835 and its 10% sample size was 385 whereas female students 3386 and its 10% as a sample size was 337 in this way total 722 students were selected as a sample. The researcher was used formula of Cohen, Manion and Morrison (2007) to select sample size. So, the sample size for this study was 10% of the population that was 722.

Table No.3.3

Sample Size

Sr #	**Universities Name**	**Total Number of Students Enrolled in Social Sciences Departments (Session-2020)**	**Male**	**Female**	**Sample 10%**	**Rate of Return percentage (%)**
1	National Universityof Modern Language, Islamabad	1994	1155	839	199	39%
2	International Islamic University, Islamabad	2200	1194	1006	220	24%
3	Quaid –E-Azam University, Islamabad	245	130	115	24	4%
4	Bahria University, Islamabad	877	373	504	88	7%
5	Allama Iqbal Open University, Islamabad	1750	878	872	175	24%
6	Air University, Islamabad	155	105	50	16	2%
	Total	7221	3835	3386	722	100

3.7 Tool Construction

In the process of research, tools play significant part for collection of data. For current study, researcher used adapted questionnaires related to the requirement and nature of the study. As far as data collection for the current study was concerned, two sets of adapted questionnaires were used by the researcher. Reason behind adapted questionnaires was used by the researcher because researcher is not an expert of the field of psychology. So, for the data collection process need to be adapted standardized instrument related to the field in order to assess the cognitive development of students at undergraduate level. For the current study, Researcher was gone through for a certain process and this process was:

Step 1: The initial step was taken by the researcher to get permission from the author's tool which is used by the author in their study.

Step 2: After getting permission from the author for the usage of tool researcher made changes in the tool according to the nature of the study.

Step 3: After modification in the tool, researcher went for the tool validation related to the fields.

Step 4: After validation of the instruments form the related experts and incorporation of their suggestions regarding improvement of the statements of the instruments researcher went for the pilot trail and after pilot trial those statements which were having low reliability (less than 0.30*) were excluded from the instruments.

3.7.1 Description of Demographic Information

The demographic information of the research tool to record the demography of the respondents. This section includes nature of university and age of the

respondents.

3.7.2 Collaborative Learning Assessment Scale (CLAS)

Collaborative learning assessment scale was adapted from the work of James (2016) measure students perceptions on assessed group works. Collaborative learning assessmentscale was based on three sections. These three sections are conversation, active learning and creative conflict and on 33 items that were measures three dimensions conversation,active learning, and creative conflict. The first section was related to the conversation consisting of eleven items. The second section was related to active learning consisting of eleven items. The third section was related creative conflict consisting of eleven items.

Table No.3.4

Description of Collaborative Learning Assessment Scale (Before Pilot Trail)

Variable	**Sub-Variables**	**Items**
Collaborative Learning	Conversation	11
	Active Learning	11
	Creative Conflict	11
Total		33

Table No.3.4 Shows that Collaborative learning Assessment Scale (CLAS) had three sub-scales conversation, active learning and creative conflict. Collaborative learning assessment scale (CLAS) was involving on 33 items. Conversation associated collaborative learning unit consisted of eleven items, active learning linked to collaborative learning unit had eleven items and section interrelated to creative conflict also had eleven items.

3.7.3 Cognitive Development Assessment Scale (CDAS)

Cognitive development skill assessment scale (CDAS) was adapted from the work of Özsevge and Salih (2021) measure cognitive development of the students. Cognitive development assessment scale (CDAS) was grounded on sixty four items. This scale includes seven sub-sections. These three sub-sections were “shallow learning”, “prestructural”, “unistructural”, “multistructural”, “relational”, “extended abstract”, “deep learning”. First section was linked to the shallow learning comprising of eight items. Second section was associated to prestructural consisting of eleven items. Third section constructed on Unistructural and covered on eleven items. Forth section was associated to Multistructural involving of eight items or fifth section was connected to relational includes nine items. The sixth section was related to extended abstract covered nine items and seventh section was related to deep learning contained eight items.

Table No.3.5

Description of Cognitive Development Assessment Scale (Before Pilot Trail)

Variable	**Sub-Variables**	**Items**
Cognitive Development		
	Shallow Learning	9
	Prestructural	9
	Unistructural	9
	Multistructural	10
	Relational	9
	Extended Abstract	9
	Deep Learning	9
Total		**64**

Table No. 3.5 shows that Cognitive Development Assessment Scale (CDAS) had seven sub-sections “shallow learning”, “Prestructural”, “Unistructural”, “multistructural”,

"relational", "extended abstract" and "deep learning". Total numbers of items in Cognitive Development Assessment Scale (CDAS) were 64.

3.7.4 Description of Likert Scale

In Likert scale, scores can be rated on five points.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

3.7.5 Scoring of the Research Tool

For current study researcher adapted collaborative learning assessment scale (CLAS) to explore the collaborative learning strategies. Collaborative learning assessment scale includes three sub dimensions. These three dimensions were conversation, active learningand creative conflict. Collaborative learning assessment scale (CLAS) were rated on five point Likert scale. Respondents were requested to answer against the options ranging from5 to 1 representing their choices of reactions (5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree).The answers were scored through calculating the total achieved by the respondents. Around 25 items were interrelated to collaborative learning assessment scale (CLAS) .Therefore least possible score was 25 (1 x 25=25) whereas maximum possible scores was 126.This range was distributed in three levels. These threelevels were; Low Average, Below Average, Above Average. The scoring of the answers was calculated on the following levels;

Score 25-58 =Low

Score 59-92 =Below Average

Score 93-126 =Above Average

Table No.3.6

Scoring for the level of collaborative Learning Strategies among undergraduate Level

Variable	**Level of Collaborative Learning Strategies**	**Score**
Collaborative Learning	Low	25-58
	Below Average	59-92
	Above Average	93-126

For current study researcher adapted cognitive development assessment scale (CDAS) in order "to assess the level of cognitive development of students at undergraduate level". This scale includes seven sub dimensions. These seven sub-dimensions as shallow learning, Prestructural, Unistructural, Multistructural, relational, extended abstract and deep learning. Cognitive development assessment scale (CDAS) were rated on 5- point Likert scale. Respondents were requested to response alongside the options ranging from 5 to 1 representative their choices of answers (5=strongly agree, 4=agree, 3=neutral, 2=disagree, 1=strongly disagree).Reactions were scored by calculating the score attained by respondents. Almost 64 items were in cognitive development assessment scale (CDAS).The least possible score was 49 (1 x 49) and the maximum score was

246. This range was distributed into three levels. These levels were Low Average, Below Average and Above Average. The scoring of the answers was calculated on the basis of following levels;

Score 49-114 =Low Average

Score115-180=Below Average

Score 181-246 =Above Average

Table No.3.7

Scoring for the level of Cognitive Development among undergraduate Level

Variable	**Level of Cognitive Development**	**Score**
Cognitive Development	Low	49-114
	Below Average	115-180
	Above Average	181-246

3.7.6 Validation of Instruments

The termed validity means “a test is valid what it is supposed to be measured”. Research instruments were gone over under the procedure of validation. Collaborative learning assessment scale (CLAS) and cognitive development assessment scale (CDAS) was adapted and referred to almost five professionals of education departments of “international Islamic University of Islamabad”, “National University of Modern Languages, Islamabad” , “National Institute of Psychology of Quaid-e Azam university, Islamabad”. Because second scale of the current study was related to psychology so that is why researcher visited the “National institute of psychology of Quaid-e-Azam

University, Islamabad". The researcher provides copies of questionnaires along with the copies of cover letter and validation certificates of the questionnaires. The experts studiedthese research instruments along with the research objectives. As par expert's suggestions about the instruments, researcher omitted the suggestions about the questionnaires from the experts. The validated questionnaires are given in (Appendix J). The detail of tool experts explained in the following table: The table showed the experts of tools validation with their names and suggestions which they suggest to the researcher about the instruments.

Table. No .3.8

Experts list of Instruments Validation

Sr. No	**Experts Names**	**Suggestions**
1.	Dr. Sheikh Tariq Mahmood	Remove grammatical mistakes. Proofreading suggested
2.	Dr. Jameela Ashraf	Proof Reading Suggested. Checksentence structure
3.	Dr. Jamil.Malik	Proof Reading Suggested. Minimize questions. Grammatical mistakes.Exclude irreverent items
4.	Dr. Humaira Akram	Proof Reading Suggested.
5.	Dr. Azhar Mahmood	Proof Reading Suggested. Remove languageissues.
6.	Dr Imran Yousuf.	Cognitive development assessment scale need to be Validated by the expert related to psychology. Minimize items in both sets of questionnaires.

3.8 Finalization of Instruments

3.8.1 Pilot Testing

Forty questionnaires were distributed among forty sampled respondents. All questionnaires were returned by the students for pilot testing. The responses were analyzed with the help of Statistical Product for services solutions (SPSS) 20th edition. The data collected and was coded for the reliability analysis in order to finalization of research tool.

Table No. 3.9

Reliability Analysis of Collaborative Learning Assessment Scale (CLAS) Pilot Testing(n=40)

Variable	Sub-Variables	Reliability	Items
Collaborative Learning Assessment Scale (CLAS)		.761	33
	Conversation	.776	11
	Active Learning	.708	11
	Creative Conflict	.709	11

Table No.3.10 displays reliability of the collaborative learning assessment scale (CLAS) was .761. Although reliability of the sub-variables was determined by conversation, active learning and creative conflict were .776, .708, and .709 respective.

Table No. 3.10
Item Total Correlation-Pilot Testing of Collaborative Learning Assessment Scale (CLAS) (n=40)

Item	**r**	**Item**	**r**	**Item**	**r**
C1	.369*	AL1	.356*	CC1	**.675****
C2(R)	.293	AL2	.302*	CC2	.653**
C3	.521**	AL3	.394*	CC3	.336*
C4	.522**	AL4	.612**	CC4	.473**
C5	.365*	AL5	.436**	CC5	.465**
C6	.361*	AL6	.577**	CC6	.490*
C7	.302*	AL7	.514**	CC7 (R)	.036
C8(R)	.046	AL8(R)	.261	CC8	.636**
C9	.354*	AL9 (R)	.097	CC9 (R)	**.104**
C10	.411**	AL10	.394*	CC10(R)	.142
C1 (R)	.215	AL11	.628**	CC11	.391*

**Correlation is significant at the 0.01 level (2- tailed).

*Correlation is significant at the 0.05 level (2- tailed).

Table No.3.8 shows that the item-total correlation of the collaborative learning assessment scale (CLAS).The highest correlation was found for CC1 (.675**).The lowest correlation were found for items No.C2(R) (.293) C8(R) (.046), C11(R) (.215), AL8(R) (.261), AL9(R),(.097), CC7(R) (.036),CC10(R) (.142).Which indicated that the items needed to be excluded.

Table no. 3.11

Inter-Section Correlation of Collaborative Learning Assessment Scale (n=40)

	Conversation	Active Learning	Creative Conflict	Collaborative Learning Assessment Scale CLAS
Conversation	1			
Active Learning	.245	1		
Creative Conflict	.221	.512*	1	
Collaborative Learning Assessment Scale (CLAS)	.600**	.792*	.826**	1

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Table No.3.11 display that the highest correlation is found between sections relatedto collaborative learning and creative conflict (.826**).The lowest correlation was found between the sections conversation and active learning (.245), Conversation and creative conflict (.221).

Table No. 3.12

Reliability Analysis of Cognitive Development Pilot Testing (n=40)

Variable	**Sub-Variables**	**Reliability**	**Items**
Cognitive Development Assessment Scale (CDAS)		.897	64
	Shallow Learning	.596	8
	Prestructural	.558	11
	Unistructural	.601	11
	Multistructural	.634	8
	Relational	.716	9
	Extended Abstract	.663	9
	Deep Learning	.533	8

Table No.3.12 shows that the reliability of the cognitive development assessment scale (CDAS) was .897. Although the reliability of the sub-scales was determined by shallow learning, Prestructural, Unistructural, Multistructural, relational, extended abstract, deep learning were .596, .558, .601, .634, .716, .663, .533 respective.

Table No. 3.13
Item Total Correlation-Pilot Testing of Cognitive Development Assessment Scale (CDAS)

(n=40)

Item	**r**	**Item**	**r**	**Item**	**r**
SL1	.603**	U7	.403**	EA4	.412**
SL2 (R)	.205	U8	.377*	EA5	.419**
SL3	.493**	U9	.613**	EA6	.547**
SL4 (R)	.064	U10	.396*	EA7	.308*
SL5	.517	U11	.336*	EA8 (R)	.219
SL6 (R**)**	.055	M1	.469**	EA9	.388*
SL7	.368*	M2	.547**	DL1	**.655****
SL8	.426**	M3	.518**	DL2	.521**
P1 (R)	.271	M4	.373*	DL3	.327**
P2	.377*	M5 (R)	**.040**	DL4	.584**
P3	.584**	M6	.410**	DL5	.327**
P4	.521**	M7	.403**	DL6	.429**
P5 (R)	.215	M8	.338**	DL7 (R)	.238
P6	.308**	R1	.517**	DL8 (R)	.291
P7 (R)	.140	R2	.431*		
P8 (R)	.140	R3	.331*		
P9	.349*	R4	.611**		
P10	.429**	R5	.500**		
P11(R)	.276	R6	.349*		
U1	.320*	R7	.359*		
U2 (R)	.095	R8	.429**		
U3	.395*	R9	.547**		
U4	.376*	EA1	.606**		
U5 (R)	.170	EA2	.431**		
U6	.338*	EA3(R)	.298		

**Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

Table no.3.13 shows that the item-total correlation of the cognitive development assessment scale (CDAS).The highest correlation was found for item No.DL1 (.655**) and the lowest correlation were found for item No. SL2(R) (.205),SL4(R) (.064),SL6(R) (.055),P1 (R) (.271),P5(R) (.215),P7(R) (.140),P8(R) (.140),P11(R), (.276),U2(R) (.095), U5 (R) (.170), M5(R) (.040), EA3(R) (.298), EA8(R) (.219), DL7 (R) (.238),DL8(R) (.291).Which indicated that the items neededto be excluded.

Table. No. 3.14

Inter-Section Correlation of Cognitive Development Assessment Scale (n=40)

	Shallow Learning	Prestructural	Unistructural	Multistructural	Relational	Extended Abstract	Deep Learning	**Cognitive Development Assessment Scale**
Shallow Learning	1							
Prestructural	.531**	1						
Unistructural	.513**	.405**	1					
Multistructural	.584**	.538**	.606**	1				
Relational	.238	.667**	.491**	.580**	1			
Extended Abstract	.301*	.412**	.414**	.592**	.620**			
Deep Learning	.210	.501**	.533**	.591**	.684**	.724**	1	
Cognitive Development Scale (CDAS)	.625**	.763**	.753**	.827**	.810**	795**	.795**	1

**Correlation is significant at the 0.01 level (2 tailed

Table No.3.14 display that the highest correlation was found between the sections related to collaborative learning and multistructural (.827**).The lowest correlation was found between the sections shallow learning and relational (.238), Shallow learning and deep learning (.210).

3.9 Revised Instrument Tool

According to the table of Cohen (1988) all those items that had correlation less than .30 were excluded by the researcher due to weak correlation. That removed items were as from Collaborative learning assessment scale and items were skipped from the collaborative learning assessment scale.

Table No.3.15

List of items- Finalized tool "Collaborative Learning Assessment Scale"

Conversation	**Active Learning**	**Creative Conflict**	**Total**
C1	AL1	CC1	25
C2	AL2	CC2	
C3	AL3	CC3	
C4	AL4	CC4	
C5	AL5	CC5	
C6	AL6	CC6	
C7	AL7	CC7	
C8	AL8	CC8	
	AL9		

The table no. 3.15 shows that final items of Collaborative learning assessment scale that were used for data collection. All these finalized items had the correlation above than .30 and considered acceptable.

Table No.3.16

List of items- Finalized tool "Cognitive Development Assessment Scale"

Shallow Learning				**Deep Learning**			
Prestructural	**Unistructural**	**Multistructural**	**Relational**	**Extended Abstract**		**Total**
SL1	P1	U1	M1	R1	EA1	DL1	49
SL2	P2	U2	M2	R2	EA2	DL2	
SL3	P3	U3	M3	R3	EA3	DL3	
SL4	P4	U4	M4	R4	EA4	DL4	
SL5	P5	U5	M5	R5	EA5	DL5	
	P6	U6	M6	R6	EA6	DL6	
		U7	M7	R7	EA7		
		U8		R8			
		U9		R9			

Table no. 3.16 shows final list of items of Cognitive Development assessment scale that were used for data collection. In this table, all those item were deleted that had correlation less than .30. In this table, all items were considered accepted as their correlation was above than .30.

3.10 Data Collection

In research work data collection seems to be an important part of the process. So for the purpose of final data, researcher collected data from the selected public universities of Islamabad having social sciences faculties. List of those selected universities was presented in Appendix II. Firstly, the researcher took reference letter from the national university of modern languages, Islamabad (NUML) for data collection purpose. The reference letter was displayed to the authorities of public sector universities and get hold of permission for data collection. The researcher circulated 722 questionnaires to respondents that were consisted of 10% of the sample from the population and invited then to provide their answers. For online respondents of one public university 2 days were specified to each participant whereas rest of the respondents were approached physically and requested to give their responses on the same time. These respondents were undergraduate students of public sector universities of Islamabad. Total 587 questionnaires were return back from the respondents and rate of return was 81%.The researcher completed data collection process in two months. Data was collected over close-ended questionnaire as a data collection tool. Towards make the research authentic, reliable, researcher collected data through personal visits and online system from the selected universities in Islamabad. Due to the distance education system and online system of Allama Iqbal University, data were collected online via Google form, and Gmail. As far as ethical consideration is concerned researcher personally visits the coordinator offices of the concerned university social sciences departments in order to inform them regarding the data collection process.

3.11 Data Analysis

Table No.3.17

Description of objectives, Null Hypotheses and Statistical Analysis

Sr. No	Objectives	Null Hypotheses	Statistical Techniques
1	To explore the practices of collaborative learning strategies among undergraduate level.		Mean
2	To assess the level of cognitive development of students at undergraduate level.		Individual Score
3	To measure the effect of collaborative learning strategies on cognitive development of students at undergraduate level.	There is no significant effect of collaborative learning strategies	Regression Analysis

Table no. 3.17 Present research was concerned; data was analyzed by using of SPSS (Statistical Products for Services Solutions) 20th Edition. Appropriate Statistical test as mean, individual scores and linear regression were applied in order to discover situation about target variables and analysis of null hypotheses.

3.12 Ethical Consideration

As far as ethical consideration was concerned, directing diverse stages of research that were moral concern for researcher. Current study was constructed on the “effect of

collaborative learning strategies on cognitive development". Respondents‟ identity was not needed regarding instruments and researcher invited the undergraduates who desired to answer and filling the questionnaire happily. Respondents were ensured their answers would only be used for the purpose of research.

3.13 Delimitations

Due to limitation of time and resources, the current research was restricted to:

1. Public sector universities of Islamabad that were having faculty social sciences faculty only.
2. Students of social sciences departments only.
3. BS students of undergraduate session (Spring 2020) only.
4. The current research was restricted to 6 public sectors universities of Islamabad having faculty of social sciences.
5. The following 6 public sector universities having social sciences departments are;
    i. Education
    ii. International Relations
    iii. History
    iv. English
    v. Pak. Studies
    vi. Islamic Studies
    vii. Anthropology
    viii. Sociology

ix. Mass Communication

x. Humanities

xi. Islamic art and architecture

xii. Area Studies

xiii. Asian Civilization

xiv. Defense and Strategic Studies

xv. Economics

xvi. Law

xvii. Gender Studies

xviii. Linguistic Studies

xix. Political Science

xx. Commerce

xxi. Iqbal Studies

xxii. Urdu

xxiii. Library and Information Science

xxiv. Gender and Women Studies

xxv. Pakistan Language

xxvi. Business Administration

xxvii. Social Work and Pakistan Studies

xxviii. Peace and Conflict Studies

xxix. Common Wealth

xxx. Confucius Institute

xxxi. Governance and Public Policy

xxxii. Psychology

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION OF DATA

4.1 Summary of the Analysis (n=587)

This chapter is developed on the basis of four sections for the analysis research objectives. Mean, individual scores, linear regression were applied in the data analysis process.

4.1.1 Section I Tool Finalization

The first unit is about tables, which are related to the tools of the research. The adapted questionnaires were related to the variables of collaborative learning and cognitive development based on the models by James (2016) and Özsevge and Salih (2021). There are reliability and correlation (item-total and intersection) of the tools included in this section.

4.1.2 Section II Demographics Presentation of the Sample

This section includes the demographic information and its interpretation, this information was collected by the first part of the questionnaire, which was added by the researcher. That part was based on the name of universities, age and departments of the respondents.

4.1.3 Section III Collaborative Learning strategies among undergraduate Level

The third section is about the analysis of data against objective No. “To explore the practices of collaborative learning strategies among undergraduate level”

4.1.4 Section IV Cognitive Development of students at undergraduate Level

The forth section includes the analysis of data against objective No. *2* that was “To assess the level of cognitive development of students at undergraduate level”.

4.1.5 Section V Effect of collaborative Learning Strategies on Cognitive Development of students undergraduate Level

This section includes objective No.3 that was “To measure the effect of collaborative learning strategies on cognitive development of students at undergraduate level”.

Section 1: Tool Reliability

Table No. 4.1

The table display that the reliability of the Collaborative Learning Assessment Scale (CLAS).

Cronbach alpha reliability of the collaborative learning assessment scale (CLAS) (n=587)

Scale	Sub- scales	No. of Items	Cronbach' Alpha Reliability
Collaborative Learning Assessment Scale (CLAS)		25	.829
	Conversation	8	.758
	Active Learning	9	.816
	Creative Conflict	8	.795

Table no. 4.1 displayed the Cronbach alpha reliability of the "Collaborative Learning Assessment Scale (CLAS)" found .829. Collaborative learning scale had three sub-scales "Conversation", "Active learning" and "Creative conflict" and other section of scales also processed for reliability analysis. The reliability score for sub-variables were "Conversation", "Active learning" and "Creative conflict" was .758, .816 and .795 respectively.

Table No.4.2

The table presented the item total correlation of the collaborative learning scale that was used in current study by the researcher.

Item -total correlation of collaborative learning assessment scale (CLAS) (n=587)

Item	**R**	**Item**	**r**	**Item**	**r**
C1	.463**	AL2	.456**	CC2	.517**
C2	.373*	AL3	.480**	CC3	.482**
C3	.412**	AL4	.567**	CC4	.551**
C4	.506**	AL5	.512**	CC5	.423**
C5	.415**	AL6	.522**	CC6	.461**
C6	.548**	AL7	.559**	CC7	.494**
C7	.310*	AL8	.456**	CC8	.495**
C8	.546**	AL9	.544**		
AL1	.495**	CC1	.551**		

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Table no 4.2 displays that item-total correlation of collaborative learning assessment scale (CLAS). The maximum correlation was of item No. LU4 and AL 7 (.599**) and the minimum correlation was of the item No. C7 (. 310*). All the items of the collaborative learning scale were significantly correlated with each other.

4.3 Inter- Section Correlation

Table No. 4.3

Table 4.3 indicated that all the sub-scales were statistically significantly correlated with each other at the 0.01 level of significance.

Collaborative Learning Assessment Scale (CLAS) (n=587)

	Conversation	Active Learning	Creative Conflict	**Collaborative Learning Assessment Scale (CLAS)**
Conversation	1			
Active Learning	.572**	1		
Creative Conflict	.311**	.441**	1	
Collaborative Learning Assessment Scale (CLAS)	.732**	.825**	.805**	1

** Correlation is significant at the 0.01 level (2-tailed).

Above table no. 4.3 define that all the sub-scales of Collaborative Learning Assessment Scale (CLAS) were significantly correlated with each other at the 0.01 level of significance. The maximum correlation was among active learning and collaborative learning assessment scale (CLAS) (.825**) whereas the minimum correlation was found between creative conflict and conversation (.311**). The correlation among three Collaborative Learning Strategies (Conversation, Active Learning and Creative Conflict) was significant at the 0.01 level of significance.

Table No. 4.4

The table displays that the reliability of the Cognitive Development Assessment Scale (CDAS).

Cronbach Alpha Reliability of the Scale Cognitive Development Assessment Scale (CDAS) (n=587)

Scale	Sub- Scales	No. of Items	Cronbach Alpha
Cognitive Development Assessment Scale (CDAS)		49	.891
	Shallow Learning	5	.612
	Prestructural	6	.656
	Unistructural	9	.715
	Multistructural	7	.702
	Relational	9	.797
	Extended Abstract	7	.685
	Deep Learning	6	.620

Above table no. 4.4 demonstrated Cronbach alpha reliability of the "Cognitive Development Assessment Scale (CDAS)" was found .891. Cognitive Development scale had seven sub-scales "Shallow Learning ", "Prestructural", "Unistructural" , "Multistructural", " Relational", "Extended Abstract "and "Deep Learning" and other section of scale moreover managed for reliability analysis. The reliability score for sub-scales "Shallow Learning ", "Prestructural", "Unistructural" , "Multistructural"," Relational", "Extended Abstract "and "Deep Learning" were .612, .656, .715, .702, .797,.685, and .620 respectively.

Table No. 4.5

The table presented the item-total correlation of the Cognitive Development scale that was used in the study by the researcher.

Item-total Correlation of Cognitive Development Assessment Scale (CDAS) (n=587)

Item	**r**	**Item**	**r**	**Item**	**r**
SL1	.419**	M2	.512**	DL1	.450**
SL2	.408**	M3	.531**	DL2	**.339***
SL3	.510**	M4	.451**	DL3	.400**
SL4	.511**	M5	**.**453****	DL4	.395*
SL5	**.339***	M6	.416**	DL5	.500**
P1	.497**	M7	.445**	DL6	.360*
P2	.453**	R2	**.550****		
P3	.509**	R3	.515**		
P4	.498**	R4	.530**		
P5	.450**	R5	.520**		
P6	**.**419**	R6	.475**		
U1	.487**	R7	.438**		
U2	.379*	R8	.443**		
U3	.482**	R9	.588**		
U4	.496**	EA1	.500**		
U5	.521**	EA2	.582**		
U6	.429**	EA3	.518**		
U7	.351*	EA4	.510**		
U8	.522**	EA5	.499**		
U9	.500**	EA6	.419**		
M1	.555**	EA7	.410**		

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table no. 4.5 illustrated that item-total Correlation of Cognitive Development Assessment Scale (CDAS). The maximum correlation was of item No.R2 (.550**) whereas the minimum correlation was of the item No. SL5 and item No. DL2 (. 339*). Moreover, all the items on the Cognitive Development Scale were significantly correlated with each other.

Table No. 4.6

Table 4.6 shows that all the sub-sections of Cognitive Development Scale were significantly correlated with each other at the 0.01 level of significance

Intersection Correlation of Cognitive Development Assessment Scale (CDAS) (n=587)

	Shallow Learning	Prestructural	Unistructural	Multistructural	Relational	Extended Abstract	Deep Learning	**Cognitive Development Assessment Scale**
Shallow Learning	1							
Prestructural	.386**	1						
Unistructural	.301**	.340**	1					
Multistructural	.412**	.300*	.562**	1				
Relational	.208**	.311**	.752**	.582**	1			
Extended Abstract	.271**	.349**	.554**	.528**	.717**	1		
Deep Learning	.204**	.368*	.447**	.335**	.631**	.648**	1	
Cognitive Development Assessment Scale	.567**	.642**	.792**	.707**	.763**	.711**	.628**	1

**Correlation is significant at the 0.01 level (2 tailed)

Above table no. 4.6 indicates that all the sub sections of Cognitive Development Assessment Scale (CDAS) were significantly correlated with each other at the 0.01 level

of significance. The maximum correlation was among Unistructural and cognitive development assessment scale **(**.792**) whereas the minimum correlation was found between deep learning and shallow learning (.204**). The correlation among seven cognitive developments levels (Shallow learning, Prestructural, Unistructural, Multistructural, Relational, Extended Abstract and Deep Learning) was significant at the level of significance.

Section II

Demographic Presentation of the Sample

Table No. 4.7

Demographic Characteristic of Respondents related to Name of Universities (n=587)

Names of Universities	**Frequency**	**Percentage**
National University of Modern Languages, Islamabad	227	39%
International Islamic University, Islamabad	145	24%
Quaid-e-Azam University, Islamabad	24	4%
Bahria University, Islamabad	40	7%
Allama Iqbal Open University, Islamabad	139	24%
Air University, Islamabad	12	2%
Total	**587**	**100%**

Table no. 4.7 displays demographical information of sample who answered the questionnaire. Demographic section includes sub variables that were included were "university", "gender", and "age". The above table describes the detail of demographic section. A total of 587 students, 227 (39%) of national university of modern languages, Islamabad, 145 (24%) international islamic university, Islamabad, 24 (4%) quaid-e-Azam university , Islamabad, 40 (7%) bahria university, Islamabad, 139 (24%) allama Iqbal open university, Islamabad, 12 (2%) air university,Islamabad.

Table No. 4.8

Demographic Characteristic of Scale Related to Age (n=587)

Age	**Frequency**	**Percentage**
18-22	362	62%
23-27	225	38%
Total	587	100

Table No. 4.8 displays that respondents participated in the study were of different ages. In which 362 (62%) respondents were of between 18-22 years of age whereas 225 (38%) respondents were of 23-27 years of age. Hence majority of the respondents who participated in the study were between 18-22 years of age.

Section III

4.3 Practices of Collaborative Learning Strategies

Objectives No. 1: "To explore the practices of collaborative learning strategies among undergraduate level"

Table No. 4.9

Practices of Collaborative Learning strategies (n=587)

Sr. No	Variable	n	Mean (M)	Remarks
1	Conversation	587	4 (3.9)	Agree
2	Active Learning	587	4 (3.9)	Agree
3	Creative Conflict	587	4 (3.9)	Agree

Above table No.4.9 displays that the practices of collaborative learning strategies among undergraduate level. The mean value of three sources of collaborative learning is conversation, active learning, creative conflict are 4 (3.9), 4 (3.9), 4(3.9).This table showed that students were agree on practicing these three collaborative learning strategies (Conversation, Active Learning, Creative Conflict).

Section IV

4.4 Level of Cognitive Development of Students

Objective No.2: "To assess the level of cognitive development of students at undergraduate level"

Table No.4.10

Level of Cognitive Development (n=587)

Scoring	Status	No. of Students	Percentage %
49-114	Below Average	0	0%
115-184	Average	227	39%
185-246	Above Average	360	61%

Above table no.4.10 had revealed level of cognitive development of students at undergraduate level. Classification of respondents according to level of cognitive development of respondents and was distributed into three status to find out that exactly how many respondents standing on which status. Score of the respondents were split into three ranging named as "below average", "average", "above average". 0 titled named as "below average", 115-184 titled as "average", 185-246 titled as "above average". Study results found from the above table shows that (0%) of the students were at "below average" level, while (39%) of the students were at "average level" and maximum (61%) of the students at "above average" level.

Table No.4.10 (a)

Level of Shallow Learning (n=587)

Score	**Status**	**No. of Students**	**Percentage**
5-11	Below Average	39	7%
12-18	Average	220	37%
19-25	Above Average	328	56%

Above table no.4.10 (a) has revealed level of shallow learning of students at undergraduate level. Classification of respondents according to shallow learning level of respondents in order to find out that exactly how many respondents standing on which score. Study results found from the above table shows that (7%) of the students were at “below average” level, while (37%) of the students were at “average level” and maximum (56%) of the students at “above average” level.

Table No.4.10 (b)

Level of Prestructural (n=587)

Score	Status	No. of Students	Percentage
6-14	Below Average	12	2%
15-23	Average	245	42%
24-32	Above Average	330	56%

Above table no.4.10 (b) has revealed level of prestructural of students at undergraduate level. Classification of respondents related to prestructural level of respondents in order to find out that exactly how many respondents standing on which score. Study results found from the above table shows that (2%) of the students were at "below average" level, while (42%) of the students were at "average level" and maximum (56%) of the students at "above average" level.

Table No.4.10 (c)

Level of Unistructural (n=587)

Score	**Status**	**No. of Students**	**Percentage**
7-19	Below Average	8	1%
20-32	Average	159	27%
33-45	Above Average	420	72%

Above table no.4.10 (c) has revealed level of Unistructural of students at undergraduate level. Classification of respondents according to Unistructural level of respondents in order to find out that exactly how many respondents standing on which score. Study results found from the above table shows that (1%) of the students were at “below average” level, while (27%) of the students were at “average level” and maximum (72%) of the students at “above average” level.

Table No.4.10 (d)

Level of Multistructural (n=587)

Score	**Status**	**No. of Students**	**Percentage**
7-16	Below Average	12	2%
17-26	Average	246	42%
27-36	Above Average	329	56%

Above table no.4.10 (d) had revealed level of multistructural of students at undergraduate level. Classification of respondents according to multistructural level of respondents in order to find out that exactly how many respondents standing on which score. . Study results found from the above table shows that (2%) of the students were at “below average” level, while (42%) of the students were at “average level” and maximum (56%) of the students at “above average” level.

Table No.4.10 (e)

Level of Relational (n=587)

Score	Status	No. of Students	Percentage
9-21	Below Average	9	2%
22-34	Average	203	35%
35-47	Above Average	375	64%

Above table no.4.10 (e) has revealed level of relational of students at undergraduate level. Classification of respondents related to relational level of respondents in order to find out that exactly how many respondents standing on which score. . Study results found from the above table shows that (2%) of the students were at “below average” level, while (35%) of the students were at “average level” and maximum (64%) of the students at “above average” level.

Table No.4.10 (f)

Level of Extended Abstract (n=587)

Score	**Status**	**No. of Students**	**Percentage**
7-16	Below Average	2	0%
17-26	Average	215	37%
27-36	Above Average	370	63%

Above table no.4.10 (f) has revealed level of extended abstract students at undergraduate level. Classification of respondents according to extended abstract level of respondents in order to find out that exactly how many respondents standing on which score. Study results found from the above table shows that (0%) of the students were at “below average” level, while (37%) of the students were at “average level” and maximum (63%) of the students at “above average” level.

Table No.4.10 (g)

Level of Deep Learning (n=587)

Score	**Status**	**No. of Students**	**Percentage**
6-14	Below Average	10	2%
15-23	Average	270	46%
24-32	Above Average	307	52%

Above table no.4.10 (g) has revealed level of deep learning of students at undergraduate level. Classification of respondents according to deep learning level of respondents in order to find out that exactly how many respondents standing on which score. Study results found from the above table shows that (2%) of the students were at “below average” level, while (46%) of the students were at “average level” and maximum (52%) of the students at “above average” level.

Section V

4.5 Effect of Collaborative Learning Strategies on Cognitive Development

Objective No. 3: "To measure the effect of collaborative learning strategies on cognitive development of students at undergraduate level"

Table.no 4.11

Effect of collaborative learning strategies on cognitive development (n=587)

Independent Variable	**Dependent Variable**	**R2**	**β (Coefficient)**	**t**	**Sig.**
Collaborative Learning Strategies	Cognitive Development	.252	.729	14.05	0.00

**P< 0.01

*P<0.05

Above table 4.11 displays the effect of collaborative learning strategies on cognitive development. The R2 value .252 which clarifies that collaborative learning had 25% percent variation in cognitive development whereas coefficient (β=.729) shows that this effect was positive and observed significant at 0.01 level of significance.

Therefore hypothesis no.1 "there is no significant effect of collaborative learning strategies on cognitive development" were failed to accept.

Objectives No. 3 (a): "To measure the effect of conversation on cognitive development of students at undergraduate level"

Ho1 (a): "There is no significant effect of "conversation" on cognitive development of students at undergraduate level"

Table 4.11 (a)

Effect of conversation on cognitive development (n=587)

Independent Variable	**Dependent Variable**	**R_2**	**β (Coefficient)**	**t**	**Sig.**
Conversation	Cognitive Development	.137	1.578	9.653	0.00

**P< 0.01

*P<0.05

Above table 4.11 (a) displays the effect of conversation on cognitive development of students. The R^2 value .137 which shows that conversation had 13% percent variation in cognitive development .Whereas coefficient is (β=1.578) which signifies that there was positive significant effect at 0.01 level of significance. Therefore hypothesis No. 1 (a) "there is no significant effect of conversation on cognitive development of students at undergraduate level" were failed to accept.

Objectives No. 3 (b): "To measure the effect of active learning on cognitive development of students at undergraduate level"

H_o1 (b): "There is no significant effect of active learning on cognitive development of students at undergraduate level"

Table No. 4.11(b)

Effect of active learning on cognitive development (n=587)

Independent Variable	**Dependent Variable**	**R_2**	**β (Coefficient)**	**t**	**Sig.**
Active Learning	Cognitive Development	.234	1.579	13.373	0.00

**P< 0.01

*P<0.05

Above table 4.11 (b) displays the effect of active learning and cognitive development. The R^2 value is .234 which shows that active learning had 23% percent variation in cognitive development. Whereas coefficient is (β=1.579) which signifies that there was positive significant effect at 0.01 level of significance. Therefore hypothesis No. 1 (b) "There is no significant effect of active learning on cognitive development of students at undergraduate level" were failed to accept.

Objectives No. 3 (c): "To measure the effect of creative conflict on cognitive development of students at undergraduate level"

Ho1 (c): There is no significant effect of creative conflict on cognitive development of students at undergraduate level.

Table No 4.11 (c)

Effect of Creative Conflict on cognitive development (n=587)

Independent Variable	**Dependent Variable**	**R_2**	**β (Coefficient)**	**t**	**Sig.**
Creative Conflict	Cognitive Development	.122	.969	9.030	0.00

**P< 0.01

*P<0.05

Table 4.11 (c) shows the effect of creative conflict and cognitive development. The R^2 value is .122 which shows that creative conflict has 12% percent variation in cognitive development. Whereas coefficient is (β=.969) which signifies that there was positive significant effect at 0.01 level of significance. Therefore hypothesis No. 1 (c) "there is no significant effect of creative conflict on cognitive development of students at undergraduate level**"** were failed to accept.

CHAPTER 5

SUMMARY, FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

Current study was elaborated to measure the effect of collaborative learning strategies on cognitive development of students at undergraduate level. The chief objectives of the study were “To explore the practices of collaborative learning strategies among undergraduate level”, “To assess the level of cognitive development of students at undergraduate level”, “To measure the effect of collaborative learning strategies on cognitive development of students at undergraduate level”.

Null Hypothesis was developed for the present study that was there was no significant effect of collaborative learning strategies on cognitive development of students at undergraduate level. Conceptual framework was based on two models. One model related to Collaborative learning (independent Variable) and second model was related to cognitive development (Dependent variable).

The collaborative learning conversation skills model was established by Soller (2001).There were three sub-sections. These three sub-sections as “conversation”, “active learning” and “creative conflict” and model related to levels of Structure of observed learning outcomes Taxonomy and associated Cognitive Abilities was developed by Zipp et al. (2016).There were seven sub-sections. The seven sub- sections as shallow learning, “prestructural”, “Unistructural”, “multistructural”, “relational,”

"extended abstract" and "deep learning". Current study was descriptiveand research approach was quantitative as a research design.

The current study population was based on 7221 students enrolled in session February 2022 social sciences departments at public sector universities, Undergraduate level.10% of the students population was taken as a sample through proportionate stratified sampling technique which contained of 722 students. Collaborative Learning assessment scale (CLAS) based on three sections presented by of James (2016) to measure students perceptions on assessed group works and cognitive development assessment scale was based on seven sections presented by Özsevge & Salih (2021) at undergraduate level. The data was analyzed by the researcher using "Cronbech Alpha reliability" , "correlation" , "regression" , "mean" , "Individual score" .To run these tests researcher used the 20th version of SPSS (Statistical product and service solution).The researcher interpreted the results and findings and gave recommendations on the basis of its results.

The research tool was certified by the six experts of the relevant field. These respected experts validated and suggested some important and relevant suggestions. The tool was improved in the light of given suggestions. The reliability of the scales was checked by the pilot testing. For pilot testing, researcher collected the data from the 40 respondents. Researchers personally visited the target institution and collected the data by face to face interactions. After that, data was analyzed by utilizing Statistical Product and service solution (SPSS) version 20th. The reliability of the collaborative learning scale was .761 and the reliability of cognitive development scale was .897. After pilot testing, tool was revised and prepared for final data collection. Final scale was based on 74 items in which 25 items were related to collaborative learning while 49 were related t

Cognitive development. The questionnaire was distributed by the researcher among 722 students in which 587 questionnaires was returned. Therefore, the rate of return was 81%. After that, data was analyzed by utilizing Statistical Product and service solution(SPSS) version 20th. The reliability of the collaborative learning was .829 and the reliability of cognitive development was .891. These statistical tests were individual score, mean, frequency, Cronbach Alpha reliability, Pearson's correlation and linear regression. Study findings revealed that collaborative learning strategies have an effectof students" cognitive development. This study explored that there was significant relationship found between collaborative learning strategies and cognitive developmentof students at undergraduate level.

5.2 Findings

The findings of the current study are discussed in this section:

Objective 1 "To explore the practices of collaborative learning strategies among undergraduate level"

1. Table No. 4.9 includes the practices of collaborative learning strategies among undergraduate level. Table result showed that means values of variable. Total students were 587 while mean of the first variable conversation was 4 (3.9), Mean of active learning was 4 (3.9) and mean value of creative conflict was 4 (3.9).Results showed that mean values were agreed regarding collaborative learning strategies at undergraduate level (Table No. 4.10).

Objective 2 "To assess the level of cognitive development of students at undergraduate level"

2. Table No. 4.10 showed that the score of research collaborative learning was also divided into three levels. There were 0 respondents in below average level regarding conversation. Therefore 227 (39%) respondents were falling at average level and 360 (61%) respondents were at above average level which means that maximum students falling at above average level of cognitive development (Table No.4.10).

   Table no.4.10 (a) shows that (7%) of the students were at “below average” level, while (37%) of the students were at “average level” and maximum (56%) of the students at “above average” level.

   Table no.4.10 (b) shows that (2%) of the students were at “below average” level, while (42%) of the students were at “average level” and maximum (56%) of the students at “above average” level.

   Table no.4.10 (c) shows that (1%) of the students were at “below average” level, while (27%) of the students were at “average level” and maximum (72%) of the students at “above average” level.

   Table no.4.10 (d) shows that (2%) of the students were at “below average” level, while (42%) of the students were at “average level” and maximum (56%) of the students at “above average” level.

   Above table no.4.10 (e) shows that (2%) of the students were at “below average” level, while (35%) of the students were at “average level” and maximum (64%) of the students at “above average” level.

Above table no.4.10 (f) shows that (0%) of the students were at “below average” level, while (37%) of the students were at “average level” and maximum (63%) of the students at “above average” level.

Above table no.4.10 (g) shows that (2%) of the students were at “below average” level, while (46%) of the students were at “average level” and maximum (52%) of the students at “above average” level.

Objective 3 “To measure the effect of collaborative learning strategies on cognitive development of students at undergraduate level”.

1. Linear regression was applied by the researcher to discover one way effect of independent variable on dependent variable. Table 4.11 represented that there was a significant (25%) effect of collaborative learning strategies on cognitive development of students at undergraduate level. It was analyzed by applying regression analysis. Moreover the (β =.729) showed that the effect was positive which indicated that there is a positive effect of collaborative learning strategies and cognitive development. It was also mentioned in table 4.11 that this effect was significant at (0.00) significance level.

Objective 3a“To measure the effect of conversation on cognitive development of students at undergraduate level”

It was mentioned in the interpretation of table no. 4.11 (a) that there was a significant (13%) effect of conversation on cognitive development of students at undergraduate. Also the β value (β=1.578) showed that the effect was positive which indicated that there is a positive effect between conversation and cognitive development.

Moreover, the association was significant at (0.00) significance level.

Objective 3b “To measure the effect of active learning on cognitive development of students at undergraduate level”.

It was mentioned in the interpretation of table no. 4.11 (b) that there was a significant (23%) effect of active learning on cognitive development of students at undergraduate level. Also the β value (β=1.579) showed that the effect was positive which indicated that there is a positive effect between active learning and cognitive development of students at undergraduate level. Moreover, the effect was significant at (0.00) significance level.

Objective 3c “To measure the effect of creative conflict on cognitive development of students at undergraduate level”.

It was mentioned in the interpretation of table 4.11 (c) that there was a significant (12%) effect of creative conflict on cognitive development of students at undergraduate level. Also the β value (β=.969) showed that the effect was positive which indicated that there is a positive effect between creative conflict and cognitive development of students at undergraduate level“. Moreover, the effect was significant at (0.00) significance level.

5.3 Discussions

Present research intended “to measure the effect of collaborative learning strategies on cognitive development of students”. The first objective was to explore the collaborative

Learning strategies. The outcome revealed that the mean values associated to conversation, active learning and creative conflict were revealed from the study that students were agreed regarding three variables of collaborative learning strategies (conversation, active learning and creative conflict).With a similar findings a research study conducted by Ashton & Pillay (2010) at secondary level, in which results showed that conversation in the classroom lead to the more opportunities for students in order to respond other fellows and also to their teachers. Further this study reported five main themes such as; learning styles, speaking competency, problem-solving feedback, active learning. Therefore, this study supports the finding of current study that the collaborative learning strategies increase cognitive development of students. Likewise, a research designed by the Amalia (2018) it revealed that active learning seems to be much needed by the students to be responsible for them with the capacity to work successfully and respectfully with different groups in the future. Results of the study found positive association that students were actively involved during teaching and learning process. Another study conducted by Laal et al. (2013) revealed that the mean scores of collaborative learning strategies and learning procedures were above average of undergraduate students. A study conducted by Laal & Laal (2012) revealed the positiverelationship between creative conflict and social skills of students at elementary level. Furthermore, creative conflict boots five fundamental elements in students such as; confident interdependence, communication, Individual responsibility and as well as social skills.

The present study found that the level of cognitive development of students was at above average level. It means that collaborative learning strategies can increase cognitive level of students. A research study conducted by Loes and Pascarella (2017) reported that collaborative learning considered a valuable instrument for learners in order to assess the level of cognitive development at undergraduate level. The result of study presented that the score of cognitive development was divided into three levels such as; below average, average and above average. It was found that majority of students were at above average level of cognitive development. Likewise, a research designed by Murtaza (2011) showed that students of undergraduate level had awareness about cognitive development. The study of Pillow (2009) found the positive relation of social experience impacts on student's cognitive development at secondary level. The students have ability to perform the task .A research study Özsevgeç and Cepni (2021) revealed that the maximum of science instructors used only written and verbal assessment tools in the classroom. Nearly all the teachers have awareness regarding prestructural level of solo taxonomy and cognitive development of students and its link to raising questions. A research study conducted by Wang and Wang (2016) revealed that children study over play, observation, in which students are regularly testing and modifying their assumptions based on data collected from unplanned investigation. Teaching and learning are goal-directed, careful and effortful creativities. Education should offer children with chances of maintained study and testing, planned demo and teaching. Therefore, study found the positive relation between unistructural and cognitive development of the students at secondary level. Likewise a research study conducted by Zipp et.al (2016) revealed that cognitive development is one of the foremost vital student's development practices. Cognitive potential can also grow and dependent on environmental factors and opportunity given to define the maximum growing limits at the level of intelligence. It

was concluded that reading is one of the foremost vital parts of each sort of learning process. Through reading, exercises would get a part of facts that can lead to understanding. The results of the study showed that a multistructural level create cognitive capacities of students. A research study conducted by zipp et.al,2016 found that at relational level of solo taxonomy, All aspects of all tasks to be performed are clear and are used for preparing the answers for all of the paragraphs in the document. At this stage, the knowledge level of student groups is sufficient for integrating all tasks into a coherent whole document. A research study conducted by zipp et.al,2016 Found that at extended abstract level of solo taxonomy, The student group has developed an abstract understanding of the steps and procedures required for compiling the document; the group understands other approaches that could be used to solve the same problem and is in a position to evaluate their strengths and weaknesses. This is done by assessing and evaluating other teams‟ solutions, which are represented by other team's documents. A study conducted by Baruah and Paulus (2019) in which the researcher found that the researchers related to collaborative learning strategies such as; group discussion, reading, group projects, effect of roundtables learning on students mathematics achievement, fall at different levels regarding cognitive development of students they develop. Therefore, the present study assessed level of cognitive development of student's through collaborative learning strategies and researcher found that they are above average level of cognitive development.

Third key objective was "to measure the effect of collaborative learning strategies on cognitive development of students at undergraduate level". A study directed by Cabrera et al. (2002) results presented that experience to collaborative learning prejudiced positively each of the effects in study. Another research conducted by Scager et al. (2016) results show that elements advising that real teamwork were learner individuality and self-regulatory behaviors, exposed and difficult group assignment that

necessary for learners in order to make something creative. Whereas research concluded that collaborative learning at higher education would be designed in order to using challenging and relevant tasks that form mutual ownership with students. A research study conducted by **Scager et al. (2016)** revealed a positive relationship that a collaborative learning framework focuses on filtering and establishing learning procedure and the subject information of the students with the help of collaborative assistants. Collaborative learning word is permitting learners to memorize and guarantee of collaborative learning is to permit students to memorize the content well.

A study conducted by Kuhn, Black, Keselman and Kaplan (2000) revealed that collaborative classroom cultures can influence on learners learning and performance. Results of the study found that there was a positive influence of collaborative learning strategies on student's societal abilities at elementary level. Collaborative learning situations includes students are not attractive in new facts or thoughts rather they are generating approximately different with that material and thinking.

A research study conducted by Rafique, Baig and Hussain (2019) found that cognition represents the procedure of thinking and memory and on the other side cognitive development is known as long lasting modifications in the actions. Cognitive development is a key part of student's behavior. Study results revealed that "there is no significant difference in the awareness of both genders concerning cognitive development in both sectors (Public and private)".

A research study conducted by Keyser (2000) reported that lecture-based education is frequently unproductive for numerous reasons, slow learners responsiveness, separated cases, and as well as much material teach at one time. Similarly, cooperative teaching methods cover the students in the class and boots understanding. Active learning methods are less demanding to apply and take less lesson time, whereas cooperative learning method require more development arranging and may take a whole course period. Study results found that selecting an educating method must be done carefully, with an understanding of the objectives of the course session.

A research study conducted by Richland, Frausel and Begolli (2016) concluded the wide concept of creativity and its significance in the process of teaching and learning. Creativity is required to deal with the advancement of latest information and developments; thus, it is one of the abilities we should to create over our life span.

A research study conducted by Roselli (2017) revealed that as societies are getting to be progressively needy on collaborative collaboration there has been a major move in center from person to group based advancement. Value is expanding in advancing group level innovative competence in students. Therefore, the study was looking forward to examine previous studies on creativity and focus of these studies on creative collaboration and application of these studies in the context of education. The study were based on hypothetical idea for collaborative creativity, diverse strategies for producing thoughts in groups and the method of selecting the important thoughts as well as the part of culture and differing qualities in collaborative imagination.

5.4 Conclusions

The present study was grounded on three chief objectives. “To explore the practices of collaborative learning strategies among undergraduate level”. It was originated that respondents were practice of collaborative learning strategies. They were agreed with collaborative learning and its sub-sections. The sections of collaborative learning were conversation, active learning and creative conflict. . It was concluded that teacher provides an opportunity to students in order to take interest to do work in groups. By active learning they engage in the classroom activities. They give responses to their fellows during classroom activities. It was concluded that students were more fascinate towards practical activities in classroom. The last section was related to creative conflict. In which students have ability to present creative solutions in the class. Students can breakdown information in order to solve problems. It Includes discussionand difference in opinions between students during the group discussions. Creative conflict also includes active participation and motivation in order to sort out the solution of the problem.

“To assess the level of cognitive majority development of students at undergraduate level”. The researcher concluded the result of this objective that mostly respondents were found at above average level. Researcher follows the individual scores into three categories. These categories as Below Average, Average and Above Average.

“To measure the effect of collaborative learning strategies on cognitive development of students at undergraduate level”. After testing hypotheses, it was concluded that there was a positive effect of collaborative learning strategies on cognitive development of students at undergraduate level. There was significant positive effect of all sections related to collaborative learning strategies like conversation, active learning and creative conflict, and shallow learning, Prestructural, Unistructural, Multistructural, relational, extended abstract and deep learning was found in cognitive development.

5.5 Recommendations

In the light of findings of the study, researcher gave following recommendations:

1. Teachers may further improve the collaborative learning practices by providing role play exercises, Think-Pair and share activities in teaching and learning process.
2. Teachers may further improve the abilities of their students such as; appreciating other fellows and accepting their point of views during the group discussion process.
3. Teachers may ask questions to students before going to start the teaching and learning process in order to know students understanding about the topic.

5.6 Recommendations for Future Researches

Researcher had presented the given below recommendations to the upcoming studies.

1. The current study suggested for upcoming studies may discover the dimensionsthat researcher was not capable to cover. The current study was delimited to public sector universities of Islamabad. A contrast study may be directed amongpublic and private universities located in Islamabad.
2. The study may also be directed in both Islamabad and Rawalpindi public and private sector universities for comparative study.

   i. The study may also be carried out on gender base for comparative study.

   ii. The current study was shown on undergraduate students only so this research can also be directed on post graduate level.

   iii. Future researches may conduct experimental studies regarding relationship of collaborative learning strategies on cognitive development of

students.

iv. Future researches may conduct studies on collaborative teaching and cognitive development of students.

5.7 Limitations of the Study

1. Due to lack of resources and time, research could not cover the private sector universities of Islamabad.
2. The collaborative learning strategies and cognitive development of students could not assess in different demographic settings of public and private universities of Islamabad.
3. The study was limited only to the undergraduate level of six public sector universities of Islamabad having social sciences faculties.

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Appendix-A

Approval of M. Phil Topic and Supervisor

NATIONAL UNIVERSITY OF MODERN LANGUAGES
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF EDUCATION

ML.1-4/2021/Edu

Dated: 10th December 2021

To: Mehwish Perveen
5 MPhil/Edu/S20

Subject: **APPROVAL OF MPHIL THESIS TITLE AND SUPERVISOR**

1. Reference to Letter No, ML.1-4/2021-Edu, dated 11-12-2021, the Competent Authority has approved the title and supervisor in 12th BASR meeting dtd 18th November 2021 on the recommendations of Faculty Board of Studies vide its meeting held on 9th September 2021.

   a. **Supervisor's Name & Designation**
      Dr Qurat Ul Ain Hina (Supervisor)
      Assistant Professor
      Department of Education, NUML, Islamabad.
   b. **Thesis Title**

Cognitive Development of Students through Collaborative Learning at Undergraduate Level

2. You may carry out research on the given topic under the guidance of your supervisor and submit the thesis for further evaluation within the stipulated time. It is to inform you that your thesis should be submit within described period **by 31st December 2022** positively for further necessary action please. ***(Time line attached)***

3. As per policy of NUML, all MPhil/PhD thesis are to be run on Turnitin by QEC, NUML before being sent for evaluation. The university shall not take any responsibility for high similarity resulting due to thesis run from own sources.

4. Thesis is to be prepared strictly on NUML's format that can be taken from (Dr Saira Nudrat, Coordinator MPhil/PhD)

Telephone No: 051-9265100-110 Ext: 2094
E-mail: snudrat@numl.edu.pk

Dr. Wajeeha Shahid
Head
Department of Education

Distribution:

Mehwish Perveen (MPhil Scholar)

Dr Qurat Ul Ain Hina (Thesis Supervisor)

Appendix-B

Conceptual Framework

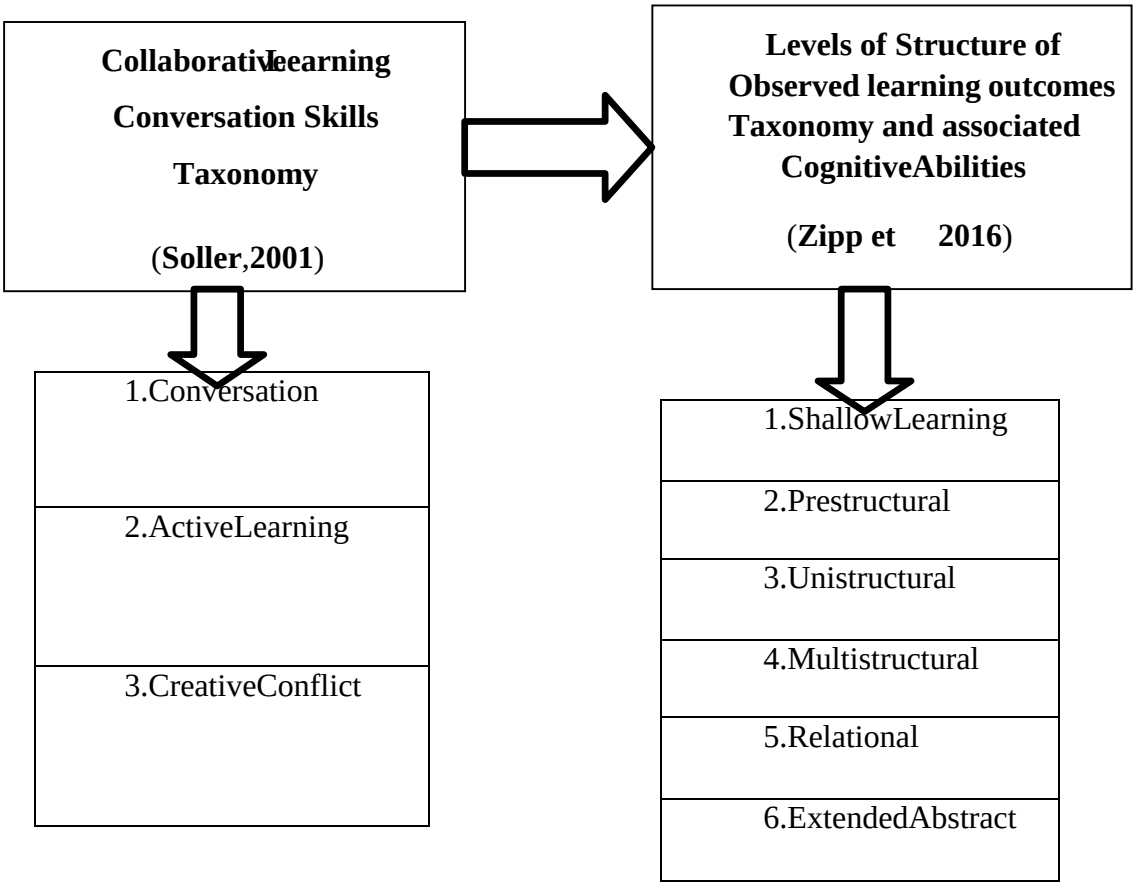

Figure No: 1.1 Conceptual Framework of the Stud

Appendix-C

List of Experts Validation

Sr No	Name of Experts	Date	Designation
1	Dr. Sheikh Tariq Mahmood	09-12-2021	Professor Assistant Department of Education (IIUI)
2	Dr Jameela Ashraf	28-12-2021	Assistant Department of Educational Sciences (Numl)
3	Dr. Jamil Malik	22-12-2021	Assistant Professor,(NIPS,QAU)
4	Dr.Azhar Mahmood	09-12-2021	Chairman, Department of Education (IIUI)
5	Dr. Humaira Akram	30-12-2021	IRA Education (IIUI)
6.	Dr. Imran Yousuf	8-12-2021	Chairman, Department of Education (AIRD)

Appendix-D

Validation of the Instruments

Covering Letter for Tool Validation Cognitive Development of Students through Collaborative Learning at Undergraduate Level

Subject: **Request for validity certificate**

Respected Sir/Madam

I have attached my questionnaires adapted for the purpose of research titled as "Cognitive Development of Students through Collaborative Learning at Undergraduate Level". The Collaborative Assessment Scale (CLAS) is based on the model collaborative learning conversation skills taxonomy presented by Soller (2001). It is categorized into conversation, active learning, and creative conflict. Cognitive Development Assessment Scale (CDAS) is based on the model levels of Structure of observed learning outcomes taxonomy and associated cognitive abilities presented by (Zipp et al., 2016).It is categorized into Shallow learning, Prestructural, Unistructural, Multistructural, relational, Extended Abstract, Deep Learning. Kindly check my questionnaires and provide your valuable suggestion for its improvement. Also certify its validity by filling the certificate attached at the end of the document.

Mehwish Parveen
M. Phil Researcher, Department of Education,
National University of Modern Language, Islamabad Pakistan

CERTIFICATE FOR TOOL VALIDATION

Collaborative Learning Assessment Scale (CLAS)

For The Research Entitled As

COGNITIVE DEVELOPMENT OF STUDENTS THROUGH COLLABORATIVE LEARNING AT UNDERGRADUAT LEVEL

By
Mehwish Parveen

M.Phil Scholar, Department of Education, Faculty of Social Sciences
National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certify that the questionnaire developed by the scholar towards her research has been assessed by me and find it that has been designed adequately to assess the collaborative learning scale based on the model presented by Soller (2001) consisted on three sections i.e. conversation, active learning, creative conflict.

It is considered that the research instrument, developed for research is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name_____

Designation_____

Institute_____

Signature_____

Date_____

Dr. M. Imran Yousuf
Associate Professor
Education
PIR MEHR ALI SHAH
Arid Agriculture University
RAWALPINDI

CERTIFICATE FOR TOOL VALIDATION

Cognitive Development Assessment Scale (CDAS)

For The Research Entitled As

COGNITIVE DEVELOPMENT OF STUDENTS THROUGH COLLABORATIVE LEARNING AT UNDERGRADUAT LEVEL

By

Mehwish Parveen

M.Phil Scholar, Department of Education, Faculty of Social Sciences

National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certify that the questionnaire developed by the scholar towards her research has been assessed by me and find it that has been designed adequately to assess the cognitive development based on the model presents by Zipp et., al (2016) consisted on seven sections i.e. shallow learning, Prestructural, Unistructural, Multistructural, relational, extended abstract, deep learning.

It is considered that the research instrument, developed for research is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name_____

Designation_____

Institute_____

Signature_____

Date_____

Dr. M. Imran Yousaf
Associate Professor
Education
PIR MEHR ALI SHAH
Arid Agriculture University
RAWALPINDI

CERTIFICATE FOR TOOL VALIDATION

Cognitive Development Assessment Scale (CDAS)

For The Research Entitled As

COGNITIVE DEVELOPMENT OF STUDENTS THROUGH COLLABORATIVE LEARNING AT UNDERGRADUAT LEVEL

By

Mehwish Parveen

M.Phil Scholar, Department of Education, Faculty of Social Sciences

National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

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It is considered that the research instrument, developed for research is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name_____

Designation_____

Institute_____

Signature_____

Date_____

Dr Sheikh Tariq Mehmood
Assistant Professo
Department of Educati
International Islamic Universit

CERTIFICATE FOR TOOL VALIDATION

Collaborative Learning Assessment Scale (CLAS)

For The Research Entitled As

COGNITIVE DEVELOPMENT OF STUDENTS THROUGH COLLABORATIVE LEARNING AT UNDERGRADUAT LEVEL

By
Mehwish Parveen

M.Phil Scholar, Department of Education, Faculty of Social Sciences
National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certifying that the questionnaire developed by the scholar towards her thesis research has been assessed by me and find it that has been designed adequately to assess the collaborative learning assessment scale based on three sections i.e. conversation, active learning, creative conflict.

It is considered that the research instrument, developed for research for the cognitive development of students through collaborative learning at undergraduate level is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name Dr. Jameela Ashra
Designation Assistant Profe
Institute NUML
Signature
Date 28/12/2021

CERTIFICATE FOR TOOL VALIDATION

Cognitive Development Assessment Scale (CDAS)

For The Research Entitled As

COGNITIVE DEVELOPMENT OF STUDENTS THROUGH COLLABORATIVE LEARNING AT UNDERGRADUAT LEVEL

By

Mehwish Parveen

M.Phil Scholar, Department of Education, Faculty of Social Sciences

National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certifying that the questionnaire developed by the scholar towards her thesis research has been assessed by me and find it that has been designed adequately to assess the cognitive development assessment scale based on seven sections i.e. shallow learning, Prestructural, Unistructural, Multistructural, relational, extended abstract, deep learning.

It is considered that the research instrument, developed for research for the cognitive development of students through collaborative learning at undergraduate level is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name Dr. Jameela Ashraf

Designation Associate Professor

Institute NUML

Signature

Date 28-12-2021

CERTIFICATE FOR TOOL VALIDATION

Collaborative Learning Assessment Scale (CLAS)

For The Research Entitled As

COGNITIVE DEVELOPMENT OF STUDENTS THROUGH COLLABORATIVE LEARNING AT UNDERGRADUAT LEVEL

By
Mehwish Parveen

M.Phil Scholar, Department of Education, Faculty of Social Sciences
National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certifying that the questionnaire developed by the scholar towards her thesis research has been assessed by me and find it that has been designed adequately to assess the collaborative learning assessment scale based on three sections i.e. conversation, active learning, creative conflict.

It is considered that the research instrument, developed for research for the cognitive development of students through collaborative learning at undergraduate level is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name Dr. Jamil A. Malik
Designation Associate Professor
Institute NIP
Signature
Date 22-12-2024

CERTIFICATE FOR TOOL VALIDATION

Cognitive Development Assessment Scale (CDAS)

For The Research Entitled As

COGNITIVE DEVELOPMENT OF STUDENTS THROUGH COLLABORATIVE LEARNING AT UNDERGRADUAT LEVEL

By

Mehwish Parveen

M.Phil Scholar, Department of Education, Faculty of Social Sciences

National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certifying that the questionnaire developed by the scholar towards her thesis research has been assessed by me and find it that has been designed adequately to assess the cognitive development assessment scale based on seven sections i.e. shallow learning, Prestructural, Unistructural, Multistructural, relational, extended abstract, deep learning.

It is considered that the research instrument, developed for research for the cognitive development of students through collaborative learning at undergraduate level is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name Dr. Jamil A. Malik

Designation Associate Professor

Institute NIP, QAU

Signature

Date 22-12-2021

CERTIFICATE FOR TOOL VALIDATION

Collaborative Learning Assessment Scale (CLAS)

For The Research Entitled As

COGNITIVE DEVELOPMENT OF STUDENTS THROUGH COLLABORATIVE LEARNING AT UNDERGRADUAT LEVEL

By
Mehwish Parveen

M.Phil Scholar, Department of Education, Faculty of Social Sciences
National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certify that the questionnaire developed by the scholar towards her research has been assessed by me and find it that has been designed adequately to assess the collaborative learning scale based on the model presented by Soller (2001) consisted on three sections i.e. conversation, active learning, creative conflict.

It is considered that the research instrument, developed for research is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name Dr. Azhar Mahmood
Designation Associate Prof.
Institute IIUI
Signature
Date

Dr. Azhar Mahmood
Chairman, Department of Education
International Islamic University
Islamabad

CERTIFICATE FOR TOOL VALIDATION

Cognitive Development Assessment Scale (CDAS)

For The Research Entitled As

COGNITIVE DEVELOPMENT OF STUDENTS THROUGH COLLABORATIVE LEARNING AT UNDERGRADUAT LEVEL

By

Mehwish Parveen

M.Phil Scholar, Department of Education, Faculty of Social Sciences

National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certify that the questionnaire developed by the scholar towards her research has been assessed by me and find it that has been designed adequately to assess the cognitive development based on the model presents by Zipp et., al (2016) consisted on seven sections i.e. shallow learning, Prestructural, Unistructural, Multistructural, relational, extended abstract, deep learning.

It is considered that the research instrument, developed for research is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name Dr Azhar Mahmood

Designation Associate Prof.

Institute IIUI

Signature

Date

Dr. Azhar Mahmood
Chairman, Department of Education
International Islamic University
Islamabad

CERTIFICATE FOR TOOL VALIDATION

Collaborative Learning Assessment Scale (CLAS)

For The Research Entitled As

COGNITIVE DEVELOPMENT OF STUDENTS THROUGH COLLABORATIVE LEARNING AT UNDERGRADUAT LEVEL

By
Mehwish Parveen

M.Phil Scholar, Department of Education, Faculty of Social Sciences
National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certify that the questionnaire developed by the scholar towards her research has been assessed by me and find it that has been designed adequately to assess the collaborative learning scale based on the model presented by Soller (2001) consisted on three sections i.e. conversation, active learning, creative conflict.

It is considered that the research instrument, developed for research is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name Dr. Humaira Akram
Designation TRA Education
Institute IIUI
Signature
Date 30.12.2021

CERTIFICATE FOR TOOL VALIDATION

Cognitive Development Assessment Scale (CDAS)

For The Research Entitled As

COGNITIVE DEVELOPMENT OF STUDENTS THROUGH COLLABORATIVE LEARNING AT UNDERGRADUAT LEVEL

By

Mehwish Parveen

M.Phil Scholar, Department of Education, Faculty of Social Sciences

National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certify that the questionnaire developed by the scholar towards her research has been assessed by me and find it that has been designed adequately to assess the cognitive development based on the model presents by Zipp et., al (2016) consisted on seven sections i.e. shallow learning, Prestructural, Unistructural, Multistructural, relational, extended abstract, deep learning.

It is considered that the research instrument, developed for research is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name Dr. Humaira Akram

Designation TRA Education

Institute IIUI

Signature

Date 30.12.2021

Appendix-E

HEC Recognized Universities and Degree Awarding Institutions

Name	Sector	Chartered By	Discipline	Province	City
Air University	Public	Government of Pakistan	General	Islamabad Capital Territory	Islamabad
Allama Iqbal Open University	Public	Government of Pakistan	General	Islamabad Capital Territory	Islamabad
Bahria University	Public	Government of Pakistan	General	Islamabad Capital Territory	Islamabad
COMSATS Institute of Information Technology	Public	Government of Pakistan	General	Islamabad Capital Territory	Islamabad
Federal Urdu University of Arts, Sciences & Technology	Public	Government of Pakistan	General	Islamabad Capital Territory	Islamabad
Institute of Space Technology	Public	Government of Pakistan	General	Islamabad Capital Territory	Islamabad
International Islamic University	Public	Government of Pakistan	General	Islamabad Capital Territory	Islamabad
National Defense University	Public	Government of Pakistan	General	Islamabad Capital Territory	Islamabad
National University of Modern Languages	Public	Government of Pakistan	General	Islamabad Capital Territory	Islamabad
National University of Sciences & Technology	Public	Government of Pakistan	General	Islamabad Capital Territory	Islamabad
National University of Technology (NUTECH), Islamabad	Public	Government of Pakistan	Engineering & Technology	Islamabad Capital Territory	Islamabad
Pakistan Institute of Development Economics (PIDE)	Public	Government of Pakistan	General	Islamabad Capital Territory	Islamabad
Pakistan Institute of Engineering & Applied Sciences	Public	Government of Pakistan	General	Islamabad Capital Territory	Islamabad
Quaid-i-Azam University	Public	Government of Pakistan	General	Islamabad Capital Territory	Islamabad
Shaheed Zulfiqar Ali Bhutto Medical University	Public	Government of Pakistan	Medical	Islamabad Capital Territory	Islamabad

Appendix-F

List of social sciences discipline

HIGHER EDUCATION COMMISSION
H-9, Islamabad (Pakistan)
Phone: (051) 90402116, Fax: (051) 90402102,
E-mail: fshah@hec.gov.pk

No. DD/SS&H/CDSSHP/List/2015 Dated: 3rd February 2015

NOTIFICATION

It is hereby to notify all concerned that the list of subjects for disciplines of Social Sciences, Arts & Humanities and Business Education has been revised and stated below:

Social Sciences

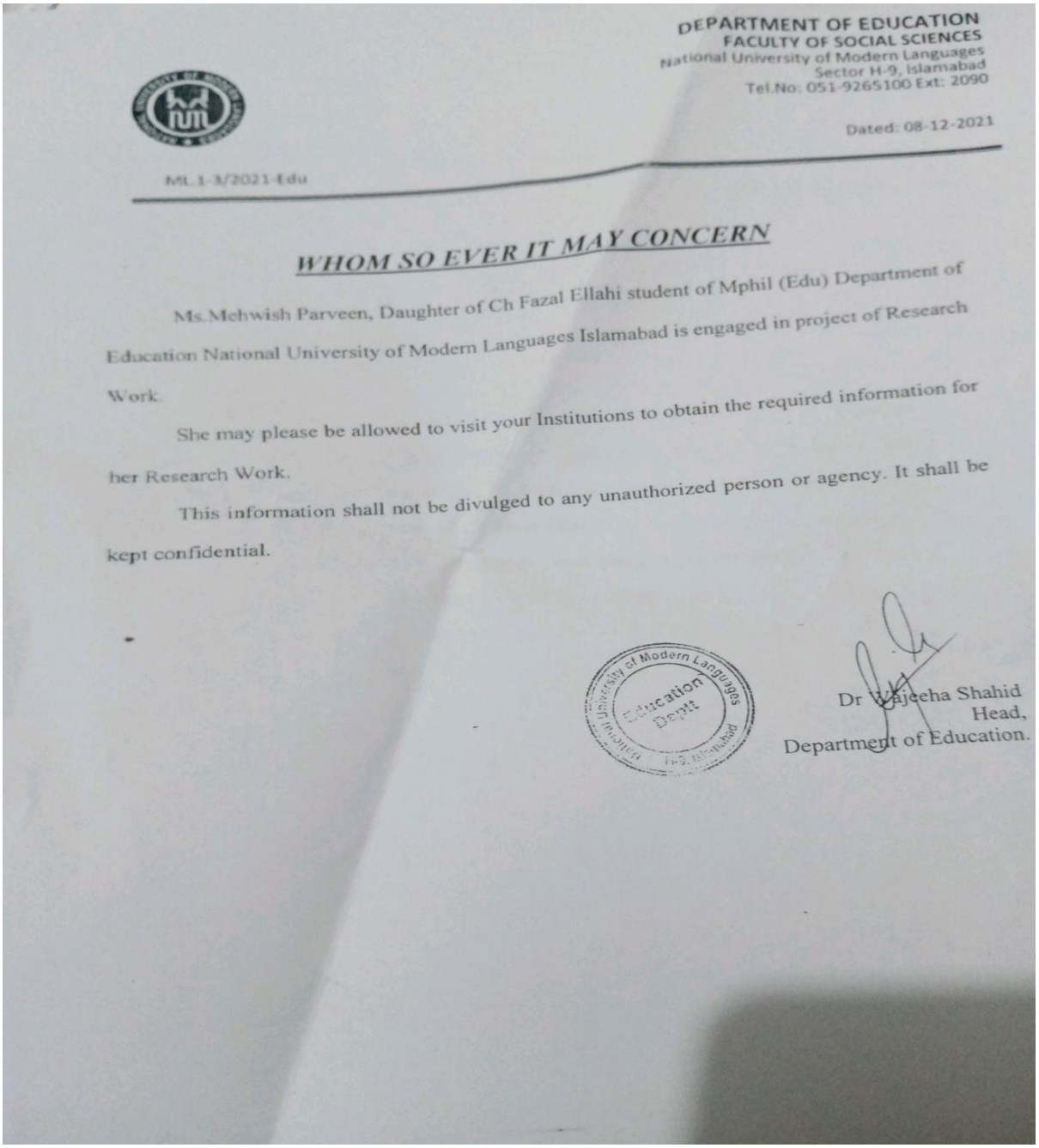
- Archeology
- Anthropology
- Archival Studies
- Economics
- Econometrics
- Disaster Economics
- Political Science
- Public Administration
- Defence & Strategic Studies
- International Relations
- Psychology including Clinical, Industrial, Developmental Psychology
- Philosophy
- Sociology
- Iqbal Studies / Iqbaliyat
- Rural Development Studies
- Social Work
- Criminology
- Library and Information Sciences
- History
- Demography and Population Studies
- Ethnography
- Conservation Studies
- Religious Studies / Comparative Religion
- Islamic Studies / Arabic Studies
- Education
- Special Education
- Law and Legislature
- Home Economics
- Pakistan Studies
- Peace & Conflict Studies
- Behavioral Sciences
- Women and Gender Studies
- American Studies
- Area Studies
- Development Studies
- Journalism
- Mass communication
- Media Studies
- Rural / Urban Studies
- Women Studies

Arts & Humanities

- Fine Arts
- Liberal Arts
- Photography
- Performing Arts
- Musicology
- Film / Film Production
- Physical Education and Sports
- Languages and Literature
- Translation Studies
- Museology (Museum Science)
- Curatorial Studies
- Design
- History of Art & Design
- Architecture
- Urban & Town Planning
- Pedagogy of Arts & Design
- Visual Arts

Appendix-G

Reference Letter of Data Collection



DEPARTMENT OF EDUCATION
FACULTY OF SOCIAL SCIENCES
National University of Modern Languages
Sector H-9, Islamabad
Tel.No: 051-9265100 Ext: 2090

Dated: 08-12-2021

ML.1-3/2021-Edu

WHOM SO EVER IT MAY CONCERN

Ms.Mehwish Parveen, Daughter of Ch Fazal Ellahi student of Mphil (Edu) Department of Education National University of Modern Languages Islamabad is engaged in project of Research Work.

She may please be allowed to visit your Institutions to obtain the required information for her Research Work.

This information shall not be divulged to any unauthorized person or agency. It shall be kept confidential.

National University of Modern Languages Education Dept. H-9, Islamabad

Dr Wajeeha Shahid
Head,
Department of Education.

Appendix-H

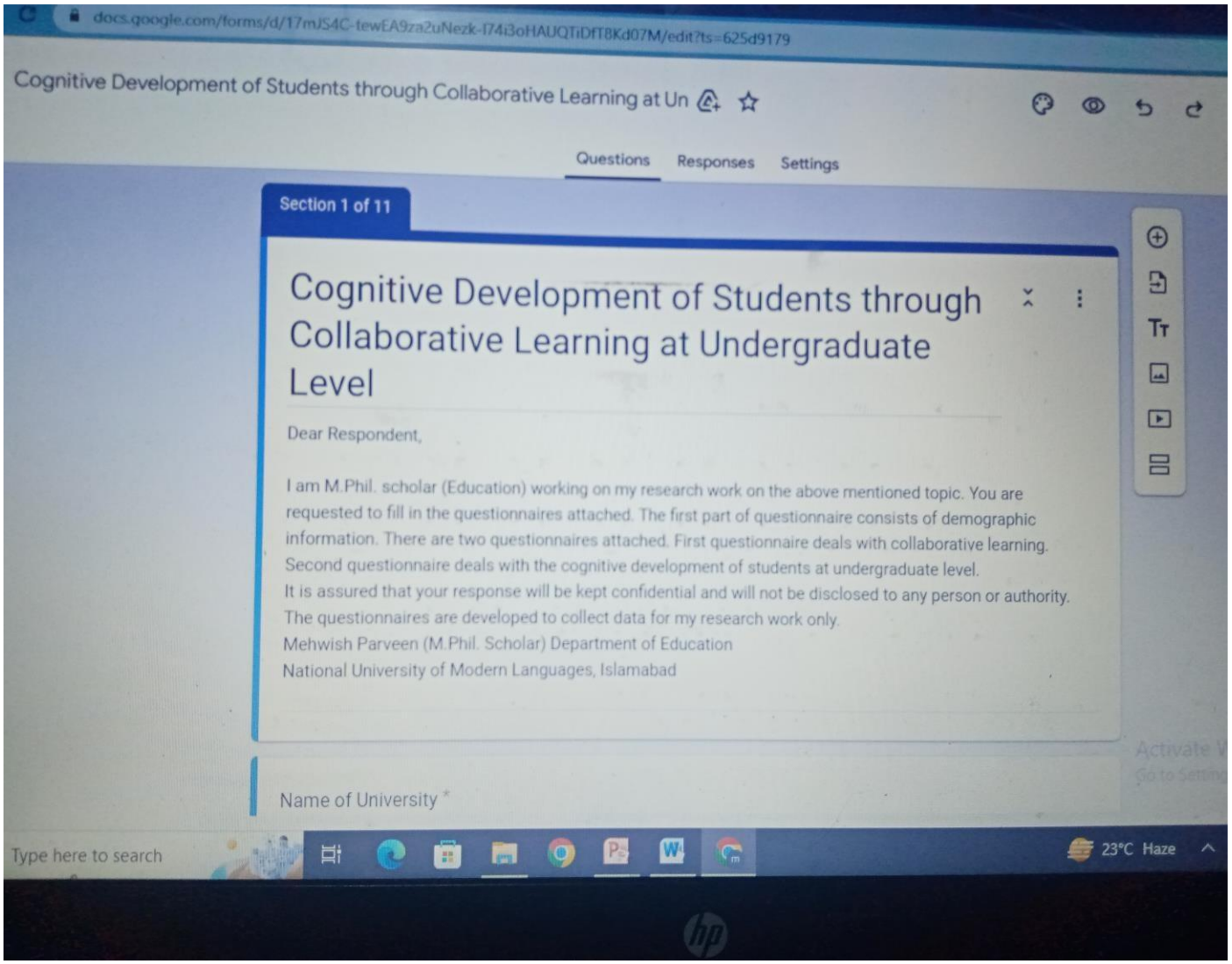
Population of the Study

Sr No	**University Name**	**Total Number of StudentsEnrolled in Social Sciences Departments (Session 2020)**	**Male**	**Female**
1	National University of ModernLanguage Islamabad	1994	1155	839
2	International Islamic University,Islamabad	2200	1194	1006
3	Quaid–E-Azam University,Islamabad	245	130	115
4	BahriaUniversityIslamabad	877	373	504
5	Allama Iqbal Open University,Islamabad	1750	878	872
6	Air University Islamabad	155	105	50
	Total	7221	3835	3386

Appendix-I

Google Form

https://docs.google.com/forms/d/17mJS4C-tewEA9za2uNezkl74i3oHAUQTiDfT8Kd07M/edit?ts=625d9179



Appendix-J

Research Instrument

DEMOGRAPHIC INFORMATION

1	**Name of University**	National University of Modern Languages, Islamabad 1	
		International Islamic University, Islamabad 2	
		Quaid-e-Azam University, Islamabad 3	
		Bahria University, Islamabad 4	
		Allama Iqbal Open University, Islamabad 5	
		Air University, Islamabad 6	
2.	**Age**	18-22 **1**	23-27 2

3.	**Semester**	1st 1	2nd 2	3rd 3		5th 5	6th 6	7th 7	8 8
4.	**Gender**	Male 1				Female 2			

Collaborative Learning Assessment Scale

Instructions for Respondents

Please tick and rate your response using following scales.

1. Strongly Disagree **(SD)**, 2. Disagree **(D)**, 3. Neutral **(N)**, 4. Agree **(A)**, 5. Strongly Agree **(SA).**

Sr. No	**Code**	**1.Conversation** Conversation is a purposeful conversation in the groups which includes generation of new thinking and in-depth understandingof a desired outcome.	**SD**	**D**	**N**	**A**	**SA**
1.	C1	My teacher helps me to express my opinions.	1	2	3	4	5
2.	C2	My teacher motivates me to learn.	1	2	3	4	5
3.	C3	My teacher encourages me to help class fellows in discussion.	1	2	3	4	5
4.	C4	My teacher provides me an opportunity to increase confidencelevel.	1	2	3	4	5
5.	C5	My teacher provides me an opportunity to speak in front of class.	1	2	3	4	5
6.	C6	My teacher is less motivating towards sharing ideas.	1	2	3	4	5
7.	C7	My teacher helps me to share information with class fellows.	1	2	3	4	5
8.	C8	My teacher's method sometimes makes me passive in class.	1	2	3	4	5

Sr. No	Code	2.Active Learning	SD	D	N	A	SA
		Active learning includes active engagement learners to process and create information ar					

9.	AL1	I like to participate in classroom discussion.	1	2	3	4	5
10.	AL2	I enjoy when i interact with my class fellows.	1	2	3	4	5
11.	AL3	I like to perform assigned role in group.	1	2	3	4	5
12.	AL4	I like to share my understanding with class fellows.	1	2	3	4	5
13.	AL5	I like when class fellows motivate me.	1	2	3	4	5
14.	AL6	I like to encourage my class fellows.	1	2	3	4	5
15.	AL7	I like to answers teacher questions.	1	2	3	4	5
16.	AL8	I get hesitate while asking questions in class.	1	2	3	4	5
17.	AL9	I like to be silent in class.	1	2	3	4	5
Sr. No	**Code**	**3. Creative Conflict** This includes discussion and difference in opinions between students during the group discussions. Creative conflict also includes active participation and motivation in order to sort out the solution of the problem.	**SD**	**D**	**N**	**A**	**SA**
18.	CC1	I have ability to present creative solutions in the class.	1	2	3	4	5
19.	CC2	I can breakdown information to solve problems.	1	2	3	4	5
20.	CC3	I like discussion with my class fellows.	1	2	3	4	5
21.	CC4	I share my information with class fellows.	1	2	3	4	5
22.	CC5	I try to give suggestion to class fellows.	1	2	3	4	5
23.	CC6	I feel happy to share my ideas.	1	2	3	4	5
24.	CC7	I feel good while giving answers to class fellows.	1	2	3	4	5
25.	CC8	I feel scared while expressing my opinions in class.	1	2	3	4	5

Respondents

Please tick and rate your response using following scales.

1. Strongly Disagree **(SD)**, 2. Disagree **(D)**, 3. Neutral **(N)**, 4. Agree **(A)**, 5. Strongly Agree

(SA).

Sr. No	**Code**	**1.Shallow Learning** Shallow learning refers to new information is Being memorized by the students duringlearning process.	**SD**	**D**	**N**	**A**	**SA**
26.	SL1	I try to recall my previous knowledge.	1	2	3	4	5
27.	SL2	I try to identify the concept of relevant discussion.	1	2	3	4	5
28.	SL3	I feel it difficult to find the information while reading.	1	2	3	4	5
29.	SL4	I feel difficulty to link previous knowledge to with new one.	1	2	3	4	5
30.	SL5	I try to think of my previous understanding of the information.	1	2	3	4	5
Sr. No	**Code**	**2. Prestructural** Usually the initial stage in which students do not actually have any information or understanding of the subject being studied.	**SD**	**D**	**N**	**A**	**SA**
31.	P1	I try to understand the purpose of text while reading.	1	2	3	4	5
32.	P2	I try to clarify the information with my class fellows.	1	2	3	4	5

33.	P3	I try to define the purpose of information with my class fellows.	1	2	3	4	5
34.	P4	I try to remember previous information about subject.	1	2	3	4	5
35.	P5	I try to break down the lesson to draw out key ideas.	1	2	3	4	5
36.	P6	I feel it challenging to think new information.	1	2	3	4	5

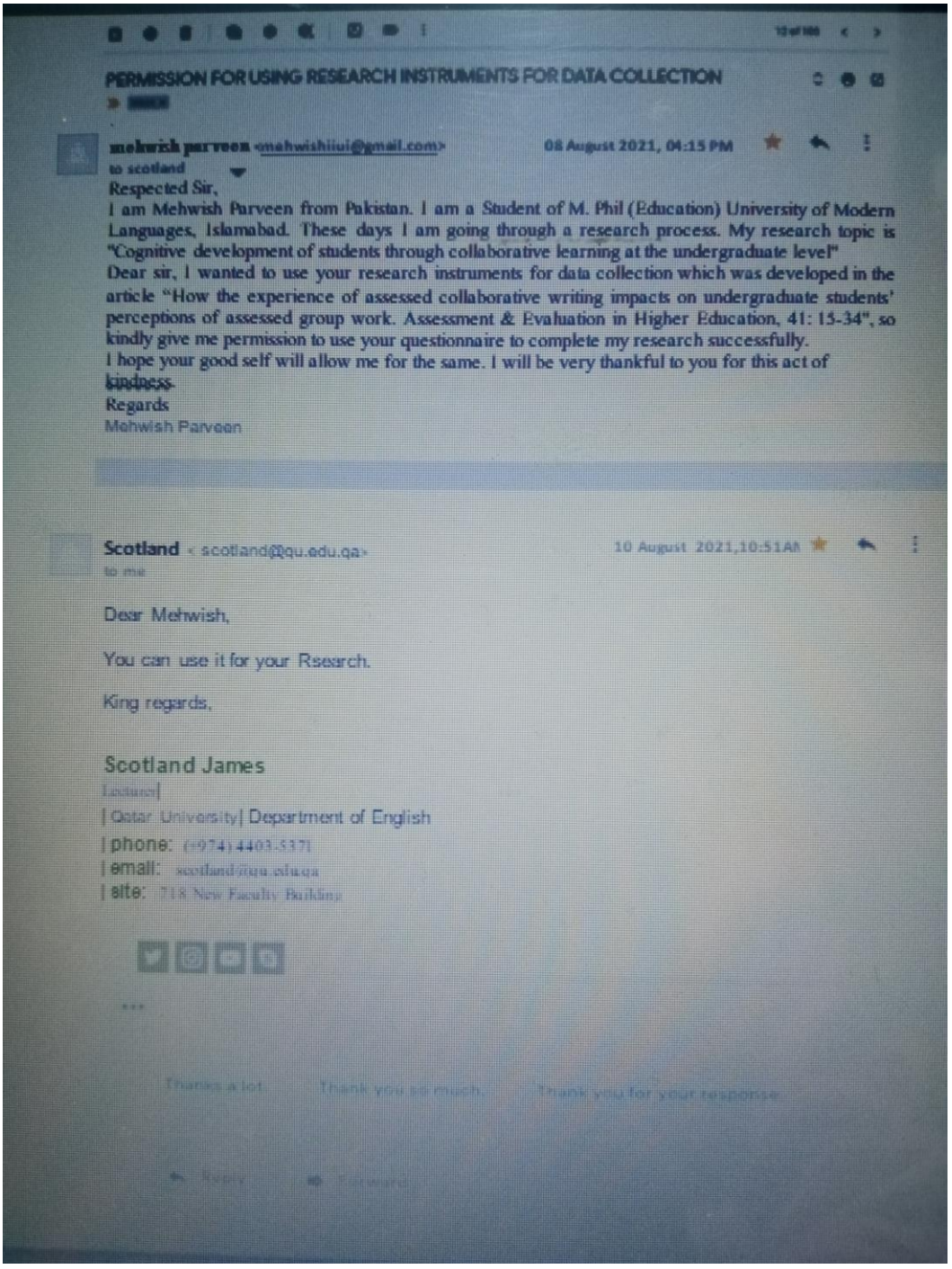
Sr. No	Code	3. Unistructural At this level students will be able to have some understanding the phenomenon or a question.	SD	D	N	A	SA
37.	U1	I try to share my observation with class fellows.	1	2	3	4	5
38.	U2	I try to write simple sentence about the information.	1	2	3	4	5
39.	U3	I try to explain my understanding towardsmy class fellows.	1	2	3	4	5
40.	U4	I try to give an example related to informationin the class.	1	2	3	4	5
41.	U5	I try to interpret the information during discussion with class fellows.	1	2	3	4	5
42.	U6	I try to express my opinions with class fellows.	1	2	3	4	5
43.	U7	I try to write sentences about my understanding of theinformation.	1	2	3	4	5
44.	U8	I feel confused to express ideas in class room.	1	2	3	4	5
45.	U9	I find it difficult to interpret fellow's opinionsabout information.	1	2	3	4	5
Sr. No	**Code**	**4. Multistructural** This level includes that the students knows sometruths very nearly this point but enable to link them together.	**SD**	**D**	**N**	**A**	**SA**
46.	M1	I try to explain relevant ideas in class discussion.	1	2	3	4	5
47.	M2	I try to explain connection among existingand previous information.	1	2	3	4	5
48.	M3	I try to compare the previous knowledgewith existing information.	1	2	3	4	5
49.	M4	I try to differentiate the information inclass discussion.	1	2	3	4	5

50.	M5	I try to discuss the benefits of informationduring discussion.	1	2	3	4	5
51.	M6	I try to combine different ideas related toinformation.	1	2	3	4	5
52.	M7	I feel confused to relate previous information to newideas.	1	2	3	4	5
Sr. No	**Code**	**5. Relational** In this relational stage students move towards developments of higher level thinking. Students are able to border their thinking together and clarify a few thoughts around a related subject matter/content.	**SD**	**D**	**N**	**A**	**SA**
53.	R1	I try to classify the information during classdiscussion.	1	2	3	4	5
54.	R2	I try to relate the information with different ideas.	1	2	3	4	5
55.	R3	I try to ask different ideas to my teacher.	1	2	3	4	5
56.	R4	I try to link the information in different ways.	1	2	3	4	5
57.	R5	I try to explain the effect of information with classfellows.	1	2	3	4	5
58.	R6	I try to link my understanding to different ideas.	1	2	3	4	5
59.	R7	I try to organize the information in class.	1	2	3	4	5
60.	R8	I try to link the information in a same way.	1	2	3	4	5
61.	R9	I try to ask same ideas to my teacher.	1	2	3	4	5
Sr. No	**Code**	**6. Extended Abstract** This stage indicates that students are not only able toconnect related ideas jointly. But they can frame these to other more thoughts and concepts.	**SD**	**D**	**N**	**A**	**SA**
62.	EA1	I try to evaluate the information in classroom.	1	2	3	4	5
63.	EA2	I try to create my own understanding in the classroom.	1	2	3	4	5
64.	EA3	I try to justify my opinion in the class room.	1	2	3	4	5

65.	EA4	I am able to reflect on my class fellows opinions.	1	2	3	4	5
66.	EA5	I am upset on class fellow's opinions.	1	2	3	4	5
67.	EA6	I try to defend my opinion in class room.	1	2	3	4	5
68.	EA7	I try to support fellow's point of viewduring discussion.	1	2	3	4	5
Sr. No	**Code**	**7. Deep Learning** It refers to control of important learned materialsuch as; Critical thinking, problem Solving ability, and understanding complex issues.	**SD**	**D**	**N**	**A**	**SA**
69.	DL1	I try to take out mistakes in my previously learnedinformation.	1	2	3	4	5
70.	DL2	I try to explore different solution tomake conclusion.	1	2	3	4	5
71.	DL3	I try to organize my opinions before discussionin the class.	1	2	3	4	5
72.	DL4	I try to summarize my statements in clear way.	1	2	3	4	5
73.	DL5	I try to discuss about the topic through easy tocomplex ways.	1	2	3	4	5
74.	DL6	I try to critically examine the information learned in class.	1	2	3	4	5

Appendix-K

Permission Letters for Questionnaire Usage



PERMISSION FOR USING RESEARCH INSTRUMENTS FOR DATA COLLECTION

mehwish parveen <mahwishiiui@gmail.com> 08 August 2021, 04:15 PM
to scotland

Respected Sir,
I am Mehwish Parveen from Pakistan. I am a Student of M. Phil (Education) University of Modern Languages, Islamabad. These days I am going through a research process. My research topic is "Cognitive development of students through collaborative learning at the undergraduate level"
Dear sir, I wanted to use your research instruments for data collection which was developed in the article "How the experience of assessed collaborative writing impacts on undergraduate students' perceptions of assessed group work. Assessment & Evaluation in Higher Education, 41: 15-34", so kindly give me permission to use your questionnaire to complete my research successfully.
I hope your good self will allow me for the same. I will be very thankful to you for this act of kindness.
Regards
Mehwish Parveen

Scotland < scotland@qu.edu.qa> 10 August 2021,10:51AM
to me

Dear Mehwish,

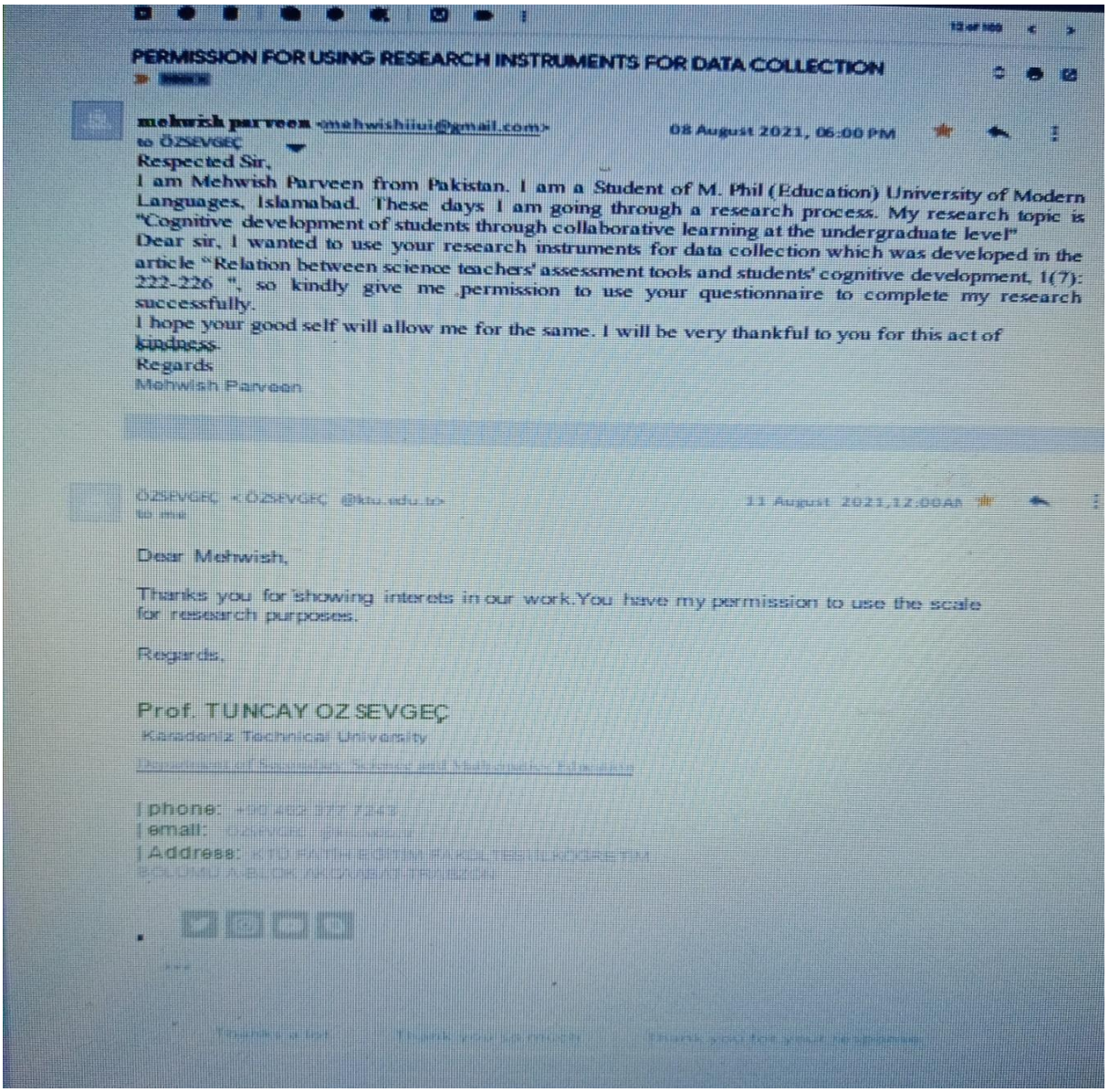
You can use it for your Rsearch.

King regards,

Scotland James
[redacted]
| Qatar University| Department of English
| phone: (974) 4403-5371
| email: scotland@qu.edu.qa
| site: 718 New Faculty Building

Appendix-L

Permission Letters for Questionnaire Usage



PERMISSION FOR USING RESEARCH INSTRUMENTS FOR DATA COLLECTION

mehwish parveen <mehwishiiui@gmail.com> 08 August 2021, 06:00 PM
to ÖZSEVGEÇ

Respected Sir,

I am Mehwish Parveen from Pakistan. I am a Student of M. Phil (Education) University of Modern Languages, Islamabad. These days I am going through a research process. My research topic is "Cognitive development of students through collaborative learning at the undergraduate level"

Dear sir, I wanted to use your research instruments for data collection which was developed in the article "Relation between science teachers' assessment tools and students' cognitive development, 1(7): 222-226 ", so kindly give me ,permission to use your questionnaire to complete my research successfully.

I hope your good self will allow me for the same. I will be very thankful to you for this act of kindness.

Regards

Mehwish Parveen

ÖZSEVGEÇ <ÖZSEVGEÇ @ktu.edu.tr> 11 August 2021,12:00AM
to me

Dear Mehwish,

Thanks you for showing interets in our work.You have my permission to use the scale for research purposes.

Regards,

Prof. TUNCAY OZ SEVGEÇ

Karadeniz Technical University

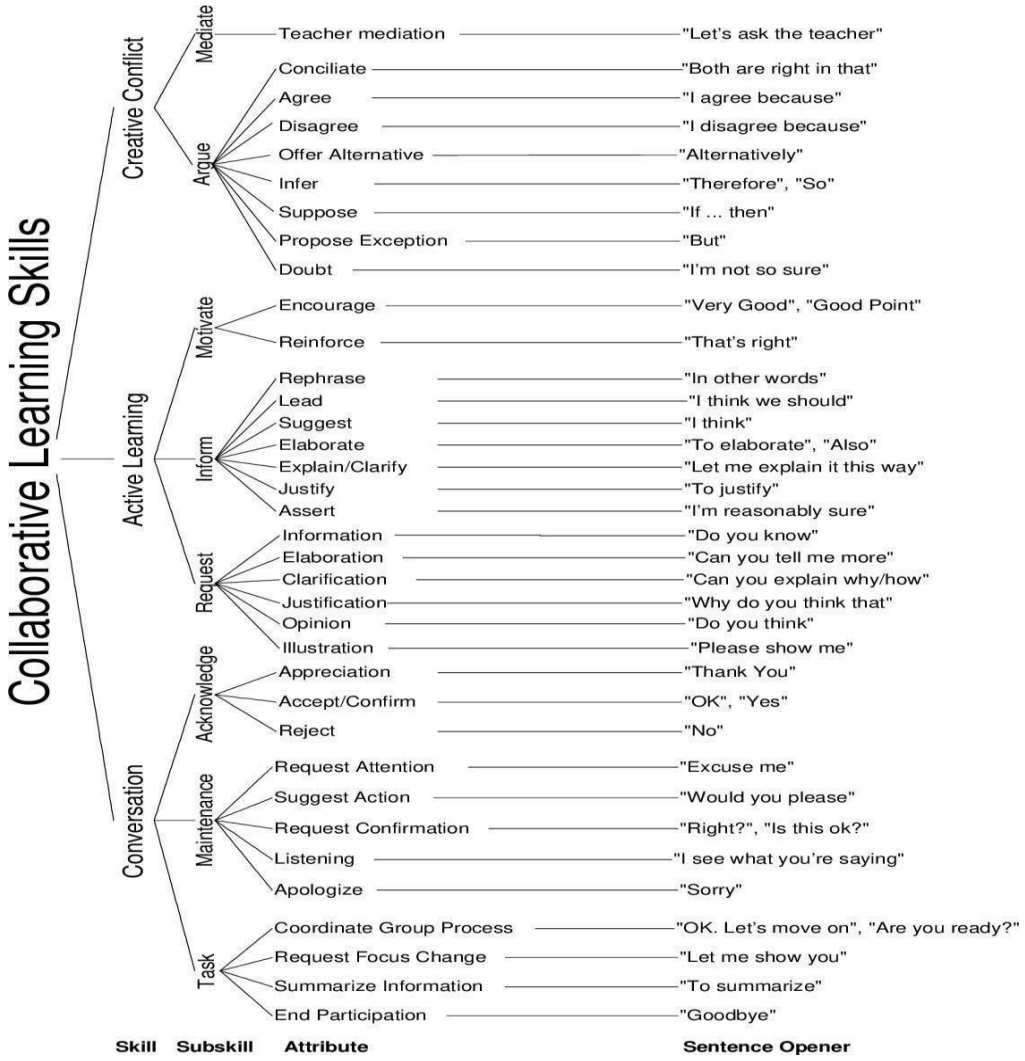
[illegible]

phone: [illegible]
email: [illegible]
Address: [illegible]

Appendix-M

Collaborative Learning Conversation Skill Taxonomy Model

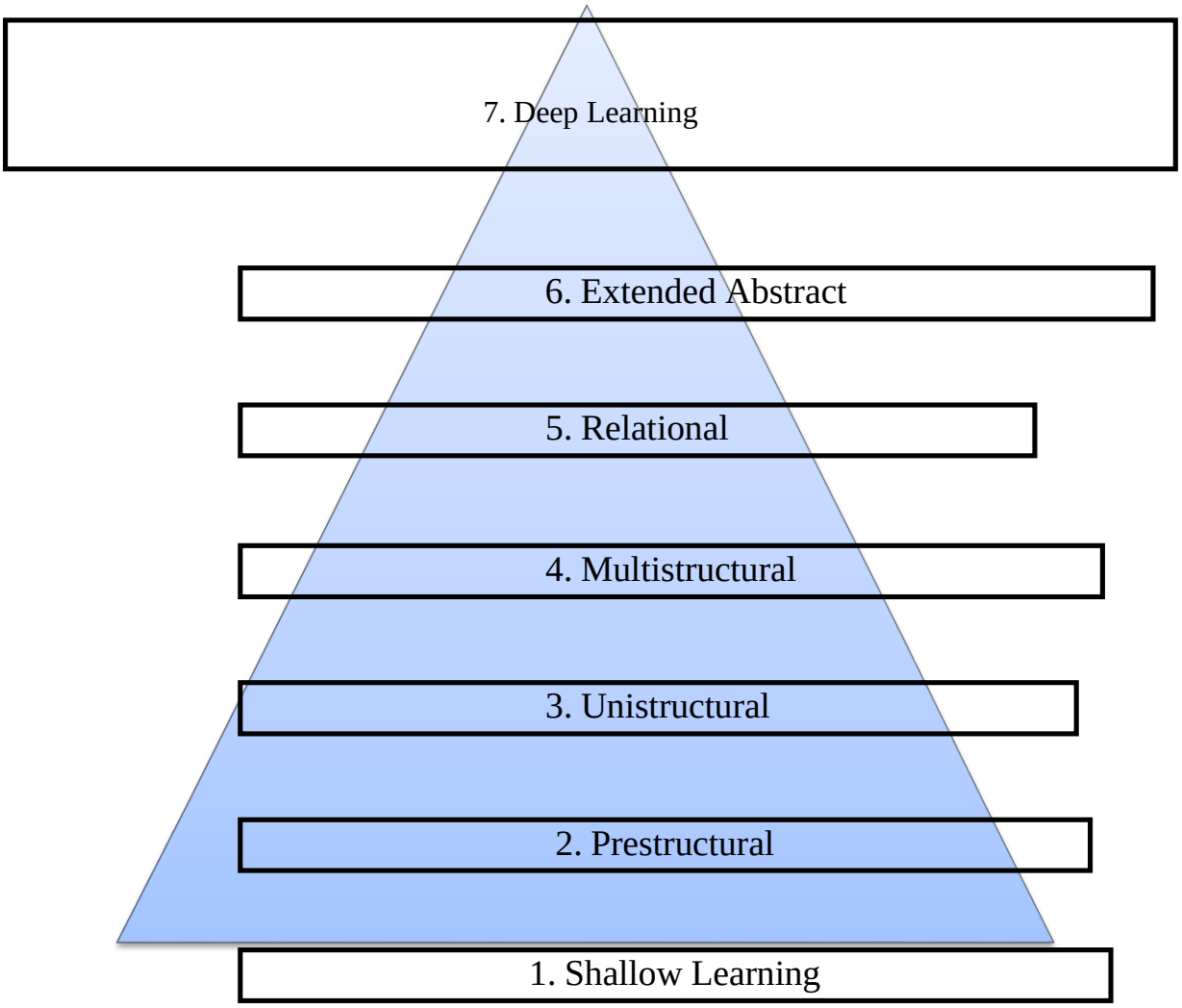
by soller (2001)



Appendix-N

Levels of Structure of Observed Learning outcomes (SOLO) Taxonomy and Associated

Cognitive Abilities by Zipp et al. (2016)



Appendix-O

PROOF READING CERTIFICATE

CERTIFICATE OF PROOF READING
For The Research Entitled As

Cognitive Development of Students through Collaborative Learning at Undergraduate Level

By
Miss. Mehwish Parveen
National University of Modern Languages, (NUML), H-9, Islamabad

It is certified that the research work with the title "Cognitive Development of Students through Collaborative Learning at Undergraduate Level" submitted by Mehwish Parveen, has been checked and proofread for the Language and Grammatical mistakes.

Name: Muhammad Tayyab Yaqub

Designation: Secondary School Teacher
Institute: Govt. Boys HighSchool,
Khayaban eSir Syed,
Sector 3,Rawalpindi.

Signatures:

Date: 24th Nov. 2022

Appendix-P

Thesis Turnitin Report

National University of Modern Languages
Quality Enhancement Cell
Sector H-9, P.O. Shaigan, Islamabad, Pakistan
Tel: +92-51-9265100 Ext 2246/2247
Web: www.numl.edu.pk

Dated: June 23, 2022

Faculty of Social Sciences

Subject: Turnitin Report of MPhil Thesis of Ms Mehwish Parveen (Education) 1st - Attempt

This is to state that **MPhil** thesis of **Ms Mehwish Parveen** has been run through **Turnitin on June 23, 2022**. Paper ID is 1861779167 and similarity index is 09%. This is within the limit prescribed by the Higher Education Commission.

The subject similarity index report is attached for further processing, please.

(Dr. Khushbakht Hina)
Director
Quality Enhancement Cell

National University of Modern Languages Quality Enhancement Cell 23/6/22

Dean FSS

24/6/2022

HOD Edu: