



WOLLEGA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

TEACHERS' INSTRUCTIONAL PRACTICES AND STUDENTS'
ACADEMIC ACHIEVEMENT IN SECONDARY SCHOOLS OF
WEST WOLLEGA ZONE

MA.THESIS

BY:

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**TITLE: TEACHERS' INSTRUCTIONAL PRACTICES AND
STUDENTS' ACADEMIC ACHIEVEMENT IN SECONDARY
SCHOOLS OF WEST WOLLEGA ZONE**

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APPROVAL SHEET FOR SUBMITTING FINAL THESIS

As examining board members of the final M.A. thesis open defense of the thesis , we certify that we have read and evaluated the thesis prepared by: Bekama Fufa Dibisa under the title “Teacher’s Instructional Practice and Student’s Academic Achievement in Secondary Schools of West Wollega “and recommend that the thesis be accepted as fulfilling the thesis requirement for the Degree of Master of Arts in Educational Leadership.

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DEDICATION

This research is dedicated to my wife, Nuritu Aga and my family who selflessly dedicated their whole life to the betterment of my education

Name: Bekama Fufa

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This thesis has been submitted for examination with my approval as university Advisor

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STATEMENT OF THE AUTHOR

I Mr. Bekama Fufa hereby declare and affirm that the thesis entitled “teachers’ instructional practices and students’ chemistry academic achievement in case of west Wollega secondary schools” is my own work conducted under the supervision of advisors. I have followed all the ethical principles of scholarship in the preparation, data collection, data analysis and completion of this thesis. All scholarly matter that is included in the thesis has-been given recognition through citation. I have adequately cited and referenced all the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and I have not misrepresented, fabricated, or falsified any idea / data / fact / source in my submission. This thesis is submitted in partial fulfillment of the requirement for a degree from the Post Graduate Studies at Wollega University. I further declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

BIOGRAPHICAL SKETCH

The author was born on Tuesday November 25, 1970 in Oromia Region, West Wollega Zone, Kiltu Kara in Woreda Lalisa Komis Farmers Association Kebele. He attended elementary school (1-6) at Ula Ganti Elementary school, (7-8) at Gori Elementary School, and (9-12) at Nedjo Secondary School and TTI and diploma from Nekemte College of teacher Education. Then he joined Jima University College through distance education and graduated with BA Degree in Educational planning and Management on January 19, 2005 (E.C). After that, he was employed as teacher in Oromia regional state at Kiltukara secondary school. Then he joined School of Graduate studies at Wollega University, Education Department in September 17, 2010 (E.C) to pursue M.A. program in Educational Leadership.

LIST OF ACRONYMS AND ABBREVIATIONS

AEP	:	Annually Expected Performance.
WWEO	:	West Wollega Education Office.
OEB	:	Oromia Education Bureau
WWZEO	:	West Wollega Zone Education Office
r	:	Pearson's coloration coefficient
P	:	P- value (significance value)
TSI	:	Teaching style Inventory
MOE	:	Minister Of Education
SPSS	:	Statistics Package For Social Science

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ABSTRACT

The purpose of this study was to assess teacher's instructional practice and students' academic achievement in secondary schools of West Wollega Zone. Literatures were reviewed on the concepts of teacher's instructional practice, the types of instructional practices teachers use in teaching chemistry, teachers' pedagogical skills, monitoring or assessing the progress of learners and the relationship between teachers' instructional practices and students' academic achievement. In order to meet the objectives of the study quantitative and qualitative (mixed) research method was employed. Moreover, descriptive and correlation design were employed. Eight Secondary Schools were selected through simple random sampling technique to be the sample of the study. From these secondary schools 22 teachers and 364 students were selected through simple random sampling technique and eight secondary school principals and 10 vice principals were selected through available sampling technique to be the sample of the study. Data were collected through questionnaires, interviews and document analyses. Data obtained through questionnaires were analyzed using statistical tools like frequency, mean, standard deviation and Pearson's correlation coefficient and data gathered through interview and document analysis were considered to complement the questionnaires in narrative form. Then, major findings of the study were identified. Accordingly, Chemistry teachers implements interactive lecturing and questioning learning practices to the average level and rarely organize the students' seat in to a circular or semi-circular shape prior to lecturing. In addition, they rarely implement team based learning practices and there are no permanent groups in chemistry classrooms. On the other hand, Chemistry teachers do not promote active student learning activities. They have drawn backs in teaching their students how to assess their learning, how to use technology in chemistry and motivate their students to take part in classroom activities. Students' academic achievement in Chemistry was low. There is strong, significant and positive relationship between teachers' instructional practice and students' chemistry academic achievement. The current status of teachers' instructional practices in secondary schools of West Wollega Zone was moderately implemented. The study revealed that Chemistry teachers in West Wollega Zone Secondary Schools have moderate level of pedagogical skills. The status of students' academic achievement in chemistry in West Wollega Zone Secondary Schools was not to the extent needed, but there is strong, significant and positive relationship between teachers' instructional practice and students' chemistry academic achievement. On the basis of these conclusions the researcher recommended that Chemistry teachers are advised to implement team based learning strategy. In addition, teachers don't have to depend on lecture approach and have to improve their instructional practices to improve the students' academic achievement. Furthermore, Zone Education Office and Woreda Education Office have to arrange trainings to enhance or update teachers' pedagogical skills.

Key words: *Instructional practices, students' academic achievement*

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The principal objective of teaching at all levels of education is to transform learner to useful and productive members of the society (Tebabal & Kahssay, 2011). For the process of teaching to be successful, teachers should apply instructional strategies that can best transfer information to the learners for the purpose of getting the best outcome. Traditionally, many teachers applied teacher centered strategies to transfer knowledge to the learners as compared to the learner centered strategies.

Even though teacher-student interactions were necessary in the learning process, Bruner (1985) and Grasha (1996) determined that teacher actions could also be a hindrance in the learning process if the teacher was not conscious of student perceptions of teacher actions. Although Bruner (1966) recognized a learners' ability to thrive despite exposure to a variety of instructional practices, Grasha (1996) acknowledged that certain teaching practices could be more beneficial than others to students who are engaged in the learning process.

Furthermore, Grasha (1996), intrigued by the relationship between instructional practices and student achievement, sought to further define the individual characteristics inherent to specific teaching practices. Through his research he identified five distinct teaching practices: expert, formal authority, personal model, facilitator, and delegator. His research revealed that teachers could influence student achievement by either assisting or hindering their ability to acquire new knowledge. He further theorized that as teachers become increasingly more aware of their teaching practices; they would be able to adjust their instructional activities to specifically target the needs of their students (1996). Wayne and Young's (2003) found that teachers were partially responsible for their positive impact on student achievement.

The classroom activities influence on students' achievement is two or three times more than the school level. Classroom teaching is nearly a universal activity designed to help students to learn. It is the process that brings the curriculum into contact with students and

through which educational goals are to be contacted with students and through which educational goals are to be achieved. The quality of classroom teaching is a key to improving students teaching (Brown et al., 2003). Although, setting standards for content and performance is an important first step, but merely doing so and holding teachers accountable will not improve students' learning (Anderson Brophy, 1998). Accordingly, particular attention should be paid to the actual process of teaching. However, a number of studies in classroom activities provide the critical link between students' academic achievement data and teacher practices at classroom level; this link is unfortunately lacking in most national education surveys (Deribssa, 2004).

Similarly, teaching and assessment are rarely studied at level, but education policy is often discussed nationally. It is important to know what aspects of teaching and assessment contribute significantly to achievement so that national discussions of classroom practices focus on the typical experiences of students (Silesh, 2001). Findings of research suggested that several classroom instructional activities were associated with achievement and noted that the ways in which instructional activities are presented in classroom context affects student achievement (Sewell, 1984 et.al). Moreover, Sommer (1999), found that quality of instruction influence achievement at the class level. Instructional activities in class include variables that describe aspects of classroom instruction such as quality of teaching practices and opportunity to learn (Belay, 2006).

An important part of any instructional setting is the teaching style. Research results suggested that teaching style exerted effects on student achievement that were independent of students' characteristics (Smith 1987). The promise "one teaching style fits all" which is attributed to a teacher-centered teaching style is not working for a growing number of diverse student population. Problems occur when teaching styles conflict with students learning styles, often resulting in limited learning or no learning (Desalegn, 2006). Gamoran-Sherin (2004), offers learner-centeredness as a model for responding to classroom challenges because of its viability for meeting divers needs. Both teaching styles (teacher and learner centered) recognize the student as a key factor in improving student achievement.

Although numerous researchers (Dugas, 2005 et. al), have utilized Grasha's teaching Style Inventory (TSI), few studies have examined the relationship between teaching styles and student achievement. McGowan (2007), conducted a post-secondary study that

examined the relationship between teaching styles and student achievement. He found a positive correlation between an occupational instructors' teaching styles and their students' achievement, but recommended research be done in other discipline areas as well. According to research, prominent variables that influence students' achievement include teachers' knowledge (subject matter knowledge and pedagogical content knowledge), professional development, teaching experience and teaching practices (Lubinski, 1993, et.al).

As theoretical background of the study indicates that teacher instructional practice has decisive role to improve the academic achievement of students by using participatory methods which engages students in teaching learning process to enhance student academic achievement. Therefore, this study attempts to investigate the teachers' instructional practice and grade 9th students' chemistry academic achievement in secondary school of West Wollega Zone.

1.2 Statement of the problem

The foundation of this study is the premise that student learning is contingent upon the instructional practices of the teacher and the teacher's use of the techniques that are best suited for the student. According to Dunn (1995) the mismatch between the teaching practices of teachers and learning styles of students lead to frustration and lack of continued educational development. Doolan and Honingsfeld (2000), explain that when students are taught with methods dissonant from their learning style preferences, they do not succeed in mastering subject matter as quickly as they could have. Park (2001), asserted that teachers need to match their teaching styles to students 'preferred learning styles for difficult tasks, and to reinforce the learning of contents by employing diverse teaching strategies.

Large-scale comparative international and national surveys continue to show poor performance of students in chemistry. Given such consistently poor productivity, much research has sought to identify students in school and out-of-school experiences that influence achievement and related outcomes especially those that are alterable or partly alterable by educators and could be manipulated by policy makers (Silesh, 2001). Research in western countries has shifted attention away from school-level factors to learning environment of the classroom (Saburoh, Shyoichi, 1984). In fact, all factors that

contribute to educational outcomes exist in one way or another in classrooms that differ in terms of learning environments. They have unique effects on pupils learning independently of factors operating at school and individual levels (Richard, 1994).

The classroom activities influence on students' achievement is two or three times more than the school level. Classroom teaching is nearly a universal activity designed to help students to learn. It is the process that brings the curriculum into contact with students and through which educational goals are to be contacted with students and through which educational goals are to be achieved. The quality of classroom teaching is a key to improving students teaching (Brown et al., 2003). Although, setting standards for content and performance is an important first step, but merely doing so and holding teachers accountable will not improve students' learning (Anderson Brophy, 1998). Accordingly, particular attention should be paid to the actual process of teaching. However, a number of studies in classroom activities provide the critical link between students' achievement data and teacher practices at classroom level; this link is unfortunately lacking in most national education surveys (Deribssa, 2004).

The teacher-centered style places control for learning in the hands of the teacher who decided what students would learn and how the teacher uses his expertise in content knowledge to help learner make connections. Teacher provides a variety of instructional methods and techniques for helping learners construct their learning and develop a system for applying knowledge and theory (Brown et al., 2003). Knuth (2003) found that student learn more in classes where they spend most of their time being taught or supervised by teachers, rather than working on their own. One of the main factors related to achievement scores is opportunity to learn which refers to the amount of time students are given to learn the curriculum.

The extent of the students' opportunity to learn content bears directly and decisively on student achievement (Huntley & Rasmussen, 2000). Classroom activity is seen as a contribution towards students' learning, extending the curriculum, which is conceived as one opportunity to learn in those regular school hours. Class room activities could be considered as a proxy measure for the degree to which teachers academically challenged "pressed" their students. While doing class room activities in chemistry course depends on the amount, type and efficiency of class room activities rendered in each contact hours

during instruction. Teachers' instructional practices effects on students go beyond and can interact with teaching methods to influence student learning.

These effects may include the teachers' knowledge of and experience with teaching chemistry, coverage of curriculum as it is assessed on the end of course test, rapport between the teacher and student, and classroom management practices. Any of these teacher effects can interact with teaching methods to enhance or detract from student achievement, and in addition, the results of this study. Marzano, Pickering, and Pollack (2001) warn that focusing only on instructional strategies leaves out other components of teaching that affect student achievement, suggesting that "effective pedagogy involves three related areas: (1) the instructional strategies used by the teacher, (2) the management techniques used by the teacher, and (3) the curriculum designed by the teacher".

Grasha (1996), intrigued by the relationship between teachers' instructional practices and student achievement, sought to further define the individual characteristics inherent to specific styles. Through his research he identified five distinct teaching styles: expert, formal authority, personal model, facilitator, and delegator (Grasha, 2004). Grasha's research revealed that teachers could influence student achievement by either assisting or hindering their ability to acquire new knowledge. He further theorized that as teachers become increasingly more aware of their teaching styles, they would be able to adjust their instructional activities to specifically target the needs of their students (1996). Wayne and Young's (2003) found that teachers were partially responsible for their positive impact on student achievement.

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development. Doolan and Honingsfeld (2000) explain that when students are taught with methods dissonant from their learning style preferences, they do not succeed in mastering subject matter as quickly as they could have. Park (2001) asserted that teachers need to match their teaching styles to students 'preferred learning styles for difficult tasks, and to reinforce the learning of contents by employing diverse teaching strategies.

In case of this study many secondary school students in West Wollega Zone were falling in academic achievement compared to students in other zones in Oromia region. The study conducted by the ministry of education (MoE) 2003, of Ethiopia, the national curriculum Guide Line indicates (MoE,2003;11) that some subjects teachers are not necessarily good at teaching in schools by using active learning methods for employing the advantages coming through promoting learners 'learning styles and strategies.

According to report from West Wollega Zone Education Office (2010), secondary schools students were falling behind in chemistry compared to students in other zones in Oromia region. The report shows that upper secondary schools students'(grade 9th) chemistry achievement shows that 48.3% of students scored 50-74 points (AEP=45%), 40.7% of students scored 75-89 points (AEP=35%), 11% of students scored 90 and above points (AEP=20%) and 12.6% of students scored less than 50 points (AEP=0%) in chemistry. This fact and score of students' chemistry academic achievement was the critical problem initiated me to conduct a research on this issue.

The purpose of this study is to investigate the effect of teachers' instructional practice on grade 9 students' academic achievement in Chemistry subject in secondary school of West Wollega Zone. The independent variable, teachers' instructional practice, will be determined by assessing the instructional practices which teachers perform in selected schools. The dependent variable, grade 9 students' academic achievement in Chemistry subject will be measured by analyzing performance on the students' documents. In an attempt to explain this student performance, the researcher explored the general relationship between teachers' instructional practice and various teacher attributes.

1.3 Research questions

Specifically, this study focused on the following research questions:

1. What is the current status of teachers' instructional practices in secondary schools of West Wollega Zone?
2. Do teachers in West Wollega Zone secondary schools have adequate pedagogical skills in teaching Chemistry?
3. To what extent do teachers assess the progress of learners in teaching the subject?
4. What is the status of students' achievement in secondary schools of West Wollega Zone?
5. What relation exists between teachers' instructional practices and students' academic achievement?

1.4 Objectives of the study.

1.4.1 General objective:

General objective of this study was to examine the effect of Chemistry teachers' instructional practices on students' academic achievement in Chemistry in secondary schools of West Wollega Zone.

1.4.2 Specific objectives:

1. To assess the current status of teachers' instructional practices in secondary schools of West Wollega Zone.
2. To investigate whether teachers in West Wollega Zone secondary schools have adequate pedagogical skill in teaching Chemistry.
3. To examine the extent to which teachers assess the progress of their learners in teaching.
4. To examine the status of students' achievement in secondary schools of West Wollega Zone.
5. To examine the relation between teachers' instructional practices and students' academic achievement.

1.5 Significance of the Study

A deeper understanding of effective instructional practices has the ability to produce an environment conducive to subject specific learning and generate widespread gains in students' Chemistry achievement. Researchers believe instructional practices of Chemistry teaching material plays just as vital of a role students' cognitive ability (Papanastasiou, 2002). According to Holcomb (2001), teacher trainees typically develop a instructional practices that is most comfortable to their personality, regardless of the subject matter or students that they intend to teach. The results of this study could impact the way secondary education departments teach and train future secondary school teachers. It is hoped that this study, which sheds light on the teaching practices of teachers have the following significance:

- Provide feedback to concerned bodies (notably government, curriculum designers, teachers, researchers, and students themselves) to help them improve the teaching-learning processes in secondary schools. This could be achieved through redesigning curriculum and through teachers improve their instructional practices depending on the findings of this study.
- Reduce learners bias or prejudice towards Chemistry by assisting them to use their own preferred learning styles and strategies;
- Contribute to further studies that make the learning of chemistry more enjoyable, participatory and sustainable.

This study is believed to contribute a lot in addressing the impact of teachers' instructional practices and strategies, provide feedback to the concerned government bodies to help them improve the teaching learning processes in secondary schools. It is also to reduce the bias or prejudice on Chemistry teaching practices to use active learning styles and strategies, and contribute to further investigations to make the learning of chemistry more enjoyable, participatory and lifelong career.

1.6. Definition of key terms

Effect: cause (something) to happen; bring about.

Annual expected performance (AEP): Annual expected performance was defined as the percent of students who expected to score proficient or advanced each year in order to increase allowable student proficiency as the year progresses towards 2011 and is formulated into the Annual Expected Performance Level. AEP for grade 9 and 10 is 45% of the students have to score 50-74 points, 35% of the students have to score 75-89 and 20% of the students have to score 90 and above points for all subjects.

Students' Academic Achievement (performance): students' academic achievement is defined as the students' scale score, as measured by (WWZEO) subtest (OEB, 2010).

Scale Score: The scale score is based on the calculation of the difficulty of the test questions and the number of correct responses. Scale scores are useful for comparing student performance (ACTAAP, 2009)

Instruction: In-class teaching practices, such as lectures, discussions, and assignments that facilitate students' achievement of learning outcomes.

Instructional practices: An adopted set of teaching practices.

Learning Style: The preferences, tendencies, and strategies exhibited by students while learning (Thomson & Mascazine, 1997)

Achievement: an achievement is something which someone has succeeded in doing, especially after a lot.

Academic achievement: the extent to which a student, teacher, an institution has achieved their short or long term educational goals.

Active-Learning: A method of instruction that provides students with opportunities to talk, listen, read, and write about concepts in order to organize and clarify their thinking and create new mental structures (Meyers & Jones, 1993).

Cooperative Activity: Students working in pairs or small groups to complete a highly structured learning activity and achieve specific learning goals (Barkley Cross, & Major, 2004; Ellis, 2005).

Team based learning: Team-based learning is an instructional strategy that has demonstrated the potential to positively impact self-regulation in the blended online learning environment. The goal of team-based learning is to promote active student learning through small group activities throughout an entire semester (Michaelson & Sweet, 2008).

1.7. Delimitation of the Study

This study was delimited to 8 secondary schools from west Wollega where the students' achievement was low continuously. From west Wollega secondary schools this study was delimited to eight secondary schools due to lack of enough resources.

1.8. Limitation of the Study

Every study has its own drawbacks. Likewise this study has some limitation, which may affect its qualities. A researcher planned his work to make the finding objective and effective of the factual data. This needed collection of data from concerned bodies and making references, as much as possible. Lacked of ample literature references related to the title of study was limitation of the study. In addition, shortage of time, budget and resources limited the study to be restricted to eight secondary schools.

CHAPTER TWO

LITERATURE REVIEW

This chapter contains concept of instruction, instructional practices of Chemistry teacher and student academic performance, teachers' instructional practices and theoretical framework. The review revealed pertinent historical and background information on Chemistry learning concepts, instructional practices for Chemistry and teaching styles used by chemistry teachers.

2.1 Concept of instruction

Bruner believed that learning is indeed sensitive by nature, but the learner is rather adaptive to a teacher's range of instructional approaches (Bruner, 1985). In the Theory of Instruction, Bruner (1966) confirmed Vygotsky's finding that a learner's growth and development were assisted by various external means. Bruner (1985) stated, "Any learner has a host of learning strategies at command," (p.8), but it is the teacher who equips students with the "procedures and sensibilities" (p. 8) to lead them to their potential for obtaining knowledge. Conversely, if a teacher has the ability to lead students to their potential, a teacher may also fail to provide students with opportunities that build complex thought patterns. Bruner (1985) recognized that certain educational environments could potentially be responsible for irreversible learning deficits in students. Bruner (1966) warned that these potential learning deficits could be established prior to entering a formal educational system. Whether the instructor is a parent or a formal instructor, the relationship between instructor and student is significant and has long-lasting effects.

Since this is a relation between one who possess something and one who does not, there is always a special problem of authority involved in the instructional situation. The regulation of this authority relationship affects the nature of the learning that occurs, the degree to which a learner develops an independent skill, and the degree to which he is confident of his ability to perform on his own, and so on. The relation between one who instructs and one who is instructed is never indifferent in its effect upon learning.

Bruner's (1966) Theory of Instruction is prescriptive, rather than descriptive, in the sense that instructional methods are prepared by educators based on how the material can best be learned by the student. Bruner's Theory of Instruction consists of four major principles that are practical for not only analyzing instruction, but for determining the best method to lead a child toward learning. First, Bruner declared that instruction should specify which educational experiences most effectively lead a learner toward learning.

With various instructional methods producing a range of educational experiences for learners, teachers should be mindful of the means in which material is delivered to students in order to reap the most benefit from the experience. Second, instruction must identify how a body of knowledge should be organized so that learners can readily grasp the concept. When teaching a complex body of knowledge, teachers should examine the structure of the knowledge in order to provide students with smaller components of information at a given time. By breaking the body of knowledge down into more manageable bits of information, students build mental frameworks that enable them to obtain the whole body of knowledge. Third, instruction must detail the manner and order in which the material should be disseminated for learning. For example, if a teacher was to prepare lessons pertaining to the Laws of Motion, the teacher would need to decide how to best introduce the material so students gain the most understanding. The teacher may choose to provide students with experimental motion experiences before mentioning the laws.

The teacher may probe students to inquiry by questioning the relationship between forces and motion. In contrast, the teacher might simply state the laws of motion, display the mathematical formulas for each, and follow up with discussion. Bruner (1966) suggested that the sequences teachers choose to deliver material have an impact on how well students attain the overall body of knowledge. Bruner provided educators the flexibility to determine the pace and choice between extrinsic and intrinsic reward, once the material was released to students. Fourth, Bruner believed that instruction must utilize both types of reward, but that student learning progressed further with intrinsic rewards. Bruner's theory of instruction reminds educators that the purpose of teaching is not only to supply students with a prescribed body of knowledge, but also to supply them with the know-how to process knowledge.

2.2 Instructional Practices of teachers and Students academic performance

When academic achievement falls below expectations, the manner in which teachers' present material to students becomes the focal point of parents, educators, and educational agencies. Teachers are expected to identify the academic performance weaknesses of their students and devise the instructional means that will fill the learning gaps. The results of these studies indicated that different teaching practices affect students' academic achievement learning outcomes.

Teaching methodology is broadly defined as the personal traits, characteristics, beliefs, and skills that are presented during classroom instruction. Chemistry teachers' instructional practices and grade 9th students academic achievement in Chemistry subject are the variables of interest in this study. Different teachers in different schools use different instructional practices which resulted in significant differences in academic achievements of grade 9th students in Chemistry Subject. A great deal of research has been conducted surrounding the idea of traditional teaching methods versus constructivism. Some of the teaching styles of teachers are listed below.

2.3 Teaching Style

2.3.1 Active Learning style (approach)

Meyers and Jones (1993) defined active learning to be in contrast with the traditional instructional model in which instructors actively present information while students passively receive it. Specifically, active learning occurs when students are given opportunities to talk, listen, read, and write about concepts in order to organize and clarify their thinking and create new mental structures (Meyers & Jones, 1993; Millis & Cottell, 1998).

To facilitate active learning, multiple researchers have recommended utilizing interactive lecturing and questioning, collaborative and cooperative activities, and writing assignments to encourage the active processing of information among students (AMATYC, 2006; Borich, 2007, Meyers & Jones, 1993). Thus, what follows is a

description of these practices and how they may be applied to developmental mathematics instruction.

2.3.2. Interactive Lecturing and Questioning

Interactive lecturing and questioning may be characterized by various student-teacher and student-student interactions in which the teacher encourages students to ask questions, effectively manages wait-time between questions, and also encourages students to answer their own questions (AMATYC, 2006; Davis, 1993). To facilitate these interactions, prior to lecturing an instructor may organize seats into a circular or semi-circular shape to encourage students to ask questions. Additionally, when students ask questions, the instructor may wait a few seconds before responding to allow students to reflect on the question and attempt to answer it themselves. Consequently, students are actively participating in the lecture.

2.3.3. Team-Based Learning

Professional nursing practice, in the 21st century, requires nurses to critically think, engage in evidence-based practice, function as a self-directed learner, and work within teams (AACN, 2008). Team-based learning is a highly learner-centered approach in which student teams engage in meaningful, problem-focused tasks. In contrast to problem-based learning and other group-based instructional approaches, one instructor can manage 20 or more student teams (Parmelee et al., 2012). Team-based learning has been extensively utilized in medical education.

As conceptualized by Michaelsen, team-based learning is characterized by four essential elements (Michaelsen & Sweet, 2008). The four elements include student peer team formation, student accountability, frequent and immediate feedback, and group learning assignments that develop and promote application learning. According to Michaelsen, this combination of attributes sets team-based learning apart from other group instructional approaches (Michaelsen & Sweet, 2008; Michaelsen et al., 1997).

2.3.4 Lecture Approach

Teacher-centered instructional methods are processes in the provision of lessons, which are also called direct instruction. In this teaching method, the transfer of knowledge is

mainly carried out by a teacher. Hence, the teacher maintains full control of the goals and processes of the instruction. That is, the selection of learning materials, and the speed of instructional events are controlled by the teacher (O'Sullivan, 2004). This teaching approach is used with the assumption of presenting a lesson in "...a form of explicit instruction that attempts to present information to students in a form they can easily access, understand and master" (Westwood, 2008).

2.3.5 Brainstorming

Brainstorming is a method used with a group to generate a large number of ideas quickly. It actively engages students in the learning process and encourages full participation as one person's ideas spark off ideas for another. Brainstorming is a valuable activity because it is unlikely that if students worked alone that they would come up with the same volume of ideas. The teacher needs to preselect the topic or issue and facilitate the session, limiting it in time to between 5-10 minutes. Brainstorming has many uses e.g. it can be used to revise a topic, introduce a new topic or solve a problem.

2.3.6 Project Method

Project centered instructions favored in acquiring the knowledge of science for many years (Egenrieder, 2007) and up to date it has advantages in Science education. The curricular being used supports project based learning as a method that motivates learners and allows them to retain greatly the learnt knowledge (Barak & Raz, 2000). Project method in teaching Science allows learners to construct their own knowledge and provide chances for changing classrooms into environment which are active (Krajcik, Blumenfeld, Marx, & Soloway, 1994).

2.4 Theoretical Framework

2.4.1 Theories of Learning

Anderson and Elloumi (2004:4) mention that theories are reasoned explanations rather than absolute facts that deal with a particular phenomenon. Learning theories attempt to explain how students think and what factors determine their behavior and learning. Learning theories are the basic raw materials, which are applied in the teaching-learning process. It is, therefore, essential for the lecturer to understand learning theories and learning and teaching approaches to design effective teaching activities.

Learning theory has a long history. In this century, the study of learning is mainly a concern of psychology and gains ground in the context of learning and teaching of mathematics at a university level. There is a shift from a lecturer-centered approach to an active learning/student-centered approach to learning and teaching. These changes encourage lecturers to reflect not only on the key principles of learning and teaching but also on their role in the process.

In an active learning classroom environment, the role of a lecturer is often that of a facilitator, supporting students as they learn and develop skills in, for example, assessing evidence, negotiation, making informed decisions, solving problems, working independently and working with others. Students' participation and involvement in their learning is essential (McConnell, 2005:36). A number of learning theories were explained in the next section and their implications for teaching Chemistry were pointed out.

2.4.1.1 Cognitive theory of learning

The cognitive theory of learning is a prominent school of thought that appeared as a complement to the behaviorist theory of learning. Ainsworth and ThLoizou (200300:671) report that cognitive theorists view learning as involving the acquisition or reorganization of the cognitive structures through which human's process and store information. Moreover, they report that cognitive theorists use observable and measurable outcomes in behavior as a means of conjecturing what goes on in a person's mind. Thus, unlike behaviorism, the cognitive theory of learning recognizes that the human mind is not simply a passive recipient of knowledge. Rather, the student/learner interprets knowledge and gives meaning to it. It endeavors to make learning meaningful to each student in a particular context (Papert, 2000:720-729). Opposed to behaviorist theories of learning, advocates of cognitive theory were more inclined to appreciate and discriminate factors that prompt the student to process information.

Thus, cognitivists are concerned with how information is received, organized, stored, and retrieved by the mind (Hening, 2004: 143-168). According to Lewandowsky, Little and Kalish (2007:98), unlike behaviorism, cognitive learning theory emphasizes mental events rather than overt, observable behaviors. Therefore, in cognitive theory the focus is on the formation of concepts (or cognitive structure) and the acquisition, processing, organization, and storing of information.

Cognitive psychologists, such as Jean Piaget and Vygotsky, have long espoused the constructivist theory of learning. Piaget said (in Wilson, Cooney & Stinson, 2005) students learn better when they can articulate knowledge through inquiry and experimentation, instead of passively acquiring facts. Piaget's theory on the development of thinking is grounded in the notion that students construct their own knowledge. To understand our environment and the world, people organize new experiences and adapt new ideas into schemas (cognitive structures). Assimilation occurs when these new experiences and ideas are incorporated into our existing knowledge. On the other hand, accommodation occurs when a person adjusts her/his knowledge to a new idea. That is, when it encounters an unfamiliar experience or idea, the schema tries to fit it into on the existing knowledge. If no similar structure exists, a new schema is created to accommodate the unfamiliar experiences. The construction of new knowledge occurs when new ideas disturb the current organization of knowledge (Savin-Baden & Wilkie, 2004:29-31; Slavin, Hurley & Chamberlain, 2003: 187-188).

To sum up, the goal of the teaching and learning process in both behaviorism and cognitive theory is the communication and transfer of knowledge to students in the most efficient and effective manner possible (Anderson, 2005:292). Motivation is a crucial aspect of the learning process (Hill, 2002:56). It is closely related to arousal, attention, anxiety, and feedback. Hofer and Yu (2003:30-33) point out that behavioral theories tend to focus on extrinsic motivation (rewards) while cognitive theories deal with intrinsic motivation (*i.e.*, goals). The characteristics of cognitive learning theory that assume importance in the context of teaching and learning mathematics are: (a) individual behavior is goal directed so teaching should take into account the students' goals; (b) learning is a meaningful process so teaching must evolve a process where the student/learner can understand what he/she learns; and (c) each student learns through his/her own cognitive map (Anderson, 2005:285). Hence, lecturers should take this into account and organize teaching and learning on the basis of the cognitive maps of the students.

2.4.1.2 Social learning theory

Social learning theory falls a category of learning theories which are grounded in the belief that human behavior is determined by a three-way relationship between cognitive factors, environmental influences and behavior (Bandura, 2002:270). Furthermore, social

learning theory points out that the individual learns from the behavior of others through observation, imitation and modeling. This theory was introduced by Albert Bandura in 1971 and it bridges behavioral and cognitive learning theories by taking into account how imitable behaviors are affected by cognitive constructs, such as attention, retention, and motivation (Bansberg, 2003:142-144). Bandura's social learning theory was widely accepted because of its complete but economical interpretation of social learning (Bolt & Brassard, 2004:65; Kukla, 2000:10-15).

Social learning theory is a valuable and effective tool for lecturers who want to assist their students in gaining new skills. Its implications for the teaching and learning are as follows: Social learning theory can help lecturers determine why certain learning activities work, and why other activities aren't very effective. Social learning theory also plays an important role in learning and teaching in the following ways: Firstly, the lecturer, by becoming a role model for his/her students, can improve their behavior. In fact, students are more likely to imitate their superiors rather than their peers because of their status, experience and reward power. Second, modeling has a considerable role to play in implementing a self-managed approach through self-observation and self-monitoring (Bandura, 2002:279-281). Third, for improving the effectiveness of teaching, a vicarious or modeling principle has been proposed to be used in four stages, namely, (1) presentation of models displaying the desired behaviors; (2) imitation or rehearsal by the observer of the modeling behaviors; (3) social reinforcement or favorable recognition for adoption of the modeled behaviors by the observer; and (4) transfer of teaching to encourage the use of learned behaviors back on the job (Hofstetter, 2005:28; Slavin, 2005:66-70).

Observers perform the desired behavior only if they have some motivation or reason to do so. Various factors determine motivation. The presence of reinforcement or punishment, either to the model or directly to the observer, is an important factor. An important component of motivation in Bandura's theory is self-efficacy, defined as "individuals' confidence in their ability to control their thoughts, feelings and actions, and therefore influence an outcome" (Bandura, 2002:147). Perceptions of self-efficacy are associated with the students' actual performances including academic performance and achievement through observation, practical activities and project work (Bandura, 2002:145-146; Kukla, 2000:18-21). 31

2.4.1.3 Constructivist theory of learning

Constructivism is a learning theory that attempts to explain how students learn by constructing understanding for them. This section will explore the constructivist learning theory by defining constructivism, providing varying views of constructivism, and illustrating how constructivism relates to independent learning (of mathematics in particular) and university education. Constructivism gives lecturers another perspective to rethink how students learn and to focus on processes and provide ways of documenting change and transformation. It also reminds lecturers to look for different ways to engage individual students, develop rich environments for exploration, prepare coherent problem sets and challenges that focus the model-building effort, elicit and communicate student perceptions and interpretations (Angeli, 2002: 9-15; Eggen & Kauchak, 2001:56-58).

Constructivism is viewed as a meaning-making theory that offers an explanation of the nature of knowledge and how human beings learn. Knowledge, as viewed here, is acquired through an involvement with content rather than imitation or repetition. According to this explanation of learning, “individuals create or construct their own new understandings or knowledge through the interaction of what they already know and believe and the ideas, events, and activities with which they come in contact” (Boudourides, 2003:6). Moreover, a constructivist view of learning holds that the student, in trying to make sense of new events or objects, begins from relevant existing ideas or models, and tests the extent to which the new phenomena can be explained using these existing ideas or models. If predictions based on a related existing idea or model fits the new observations, then the range of applications of the idea or model is extended; if the evidence does not fit the prediction, however, this may mean that the idea or model has to be modified or rejected in the light of the new evidence. To acquire meaningful learning, the students therefore require a deliberate effort to relate new knowledge to relevant concepts they already possess. Based on the learning perspectives as described above, one of the instructional approaches, concept mapping, could offer a means for course design, which promotes the development of a structured course within a good pedagogical framework (Christensen, 2003:386). By means of concept maps, students would foster meaningful learning.

The core of the constructivist view is construction of knowledge using old knowledge and materials at hand. A lecturer that uses a constructivist approach relates representations and explanations of new information which will meaningfully connect with prior knowledge.

The theorists in this perspective argue that cognition is enhanced when construction of knowledge is encouraged within the classroom discourse (Huang, 2002:30). That is, construction does not occur in vacuum. The student interacts with the environment, objects or persons (Hendry, Frommer & Walker, 1999:63-64).

Learning activities in constructivist settings are characterized by active engagement, inquiry, problem solving and engagement with others. Accordingly, a lecturer's role in such settings is not merely that of a dispenser of knowledge. The lecturer here is a guide, facilitator and co-explorer who encourage students to question, challenge and formulate their own ideas, opinions and conclusions. However, a lecturer who follows the constructivist views on learning will not look for 'correct answers' and will de-emphasize single interpretations. Constructivist also sees students as constantly checking new information against old rules and then revising rules when they no longer work. This view has profound implications for mathematics teaching, as it suggests a far more active role for students in their own learning than is typical in many classrooms. Because of the emphasis on students as active learners, constructivist strategies are often called an active learning/student-centered approach (Healey& Roberts, 2004:44-52; Taylor, 2000:109; Swan, 2005:52).

Constructivists believe that all humans have the ability to construct knowledge in their own minds through a process of discovery and problem solving. The extent to which this process can take place naturally without structure and teaching is the defining factors amongst those who advocate this learning theory. Piaget (in Slavin, 2005:119) observed human development as a progressive stage of cognitive development. Fundamentally, constructivism is a cognitive learning theory because of its focus on the mental processes that construct meaning. According to constructivism, learning is not passive reception of information but a student's active continuous process of constructing and reconstructing his or her conceptions of phenomena or mathematical problems.

Teaching is not transmitting knowledge but helping students to actively construct knowledge by assigning those tasks that enhance this process. This does not mean that mathematics lectures should be entirely removed from the learning process in constructivist learning environments. Rather it means that lectures should be accompanied by assignments in which students must reflect on and use the information given them in the lectures. An important aspect of lecturer guidance relates to the constructivist notion of generative learning. Since constructivists believe that the student must transform or appropriate whatever is learned, one can say that all learning is discovered.

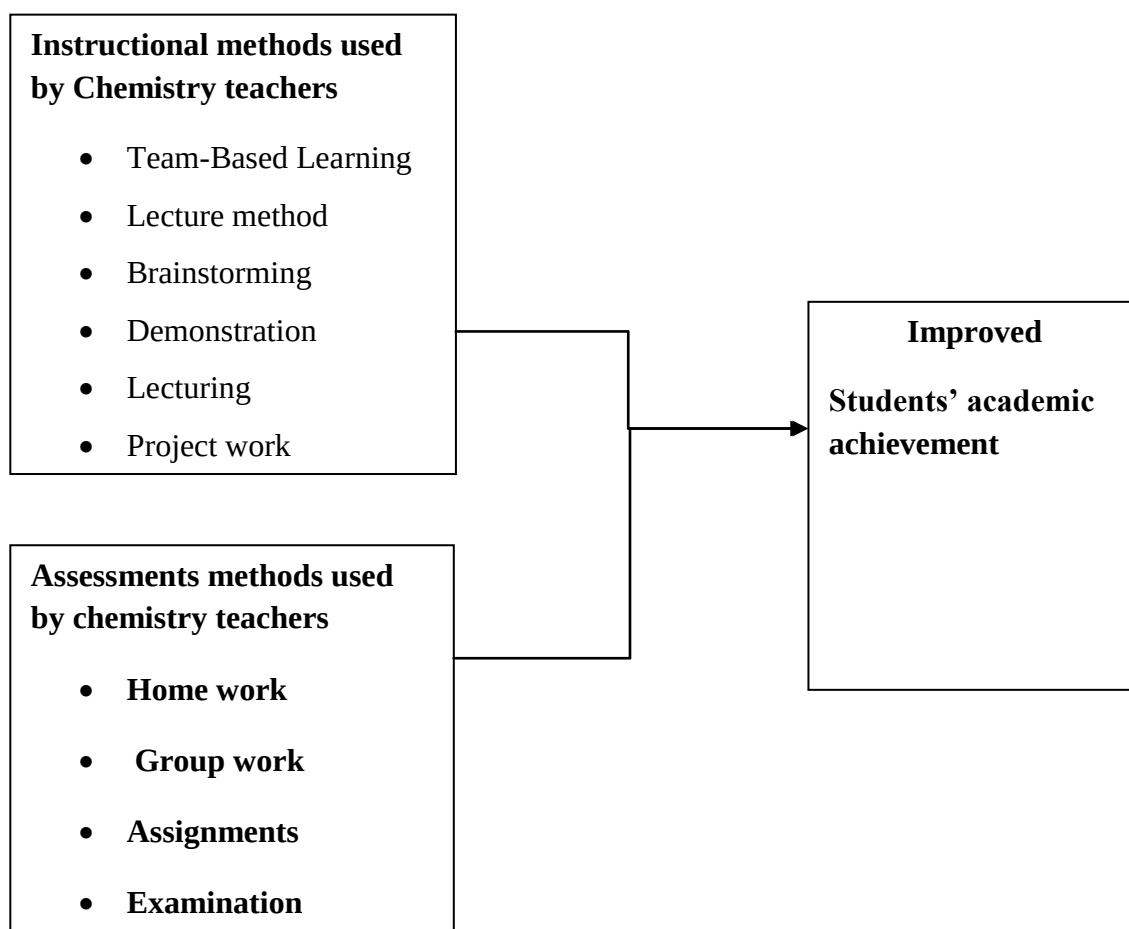
To appropriate new understanding from one's social environment and to become an efficient maker of meaning requires the adoption of specific intellectual skills, ones that should be modeled from more competent adults (e.g. mathematics lecturers) and peers. Thus generative learning strategies (learning-to-learn) in the mathematics classroom may be explicitly taught to students or may be discovered by students as they are trying to find strategies for solving problems. For example, students have been guided to generate their own questions and summaries and analogies during the reading of relevant texts (Winter *et al.*, 2001:328).

In conclusion, the following may be stated with respect to the differences between the behaviorist and constructivist learning theories in so far as learning is concerned. Behaviorism, as Kim (2005:8-10) considers, follows a 'banking' model in which the lecturer fills students with deposits of information considered by the lecturer as true knowledge and the students are required to retain this till such time as needed. Hence, a lecturer who uses a behaviorist approach follows a memory-oriented transmission strategy. The difficulty with such a method is that the knowledge acquired is not well integrated with prior-knowledge and is often accessed and articulated only for formal academic occasions such as examinations. Constructivist approaches, in contrast, are regarded as producing greater internalization and deeper understanding than lecturer-centered methods. Constructivists have many similarities to cognitive learning theorists. They both describe theories of learning that emphasize the construction of knowledge; however, they differ in a number of areas (related to realism and the role of social interactions). According to constructivists social interactions are vehicles for learning and development. Growth comes through these interactions, while behaviorists emphasize

teacher-centered methods and stimulus-response interaction (Biggs, 1999:21; Hinde&Kovac, 2001:95-98; Jacobs & Hall, 2002: 56-58; Prince & Felder, 2006:146).

2.5 Conceptual Framework

The framework was developed from the study variables. Instructional strategies, like inquiry, peer tutoring and project method if well used by teachers will lead to good academic performance.



2.6 Students Assessments

According to the cognitive information processing view, the human learner is conceived to be a processor of information, in much the same way a computer is. When learning occurs, information is the input from the environment which is processed and stored in the memory, and the output is in the form of a learned capability. This group of educators looks at universities as composed of groups of individuals with varying needs and skills and views humans as “rule-forming beings.” Lecturers need to assess the student’s

abilities to discover whether he or she is ready to learn. In line with Ausubel, “the most important single factor influencing learning is what the learner already knows. Ascertain this and teach accordingly” (Yoder & Hochevar, 2005:94). With this approach, instructional focus begins to move away from the lecturer and toward the students. Cognitivists favor procedural rather than declarative learning and promote the idea that learning is achieved through an active process of creating hypotheses through activities.

Bandura's social learning theory states that both deviant and normative human behavior is learned through a combination of observed behavior, communication with others, encounters with disciplinary action and cognitive modeling (Bandura, 2002:145; Snowman & Biehler, 2000).

Essentially, people gather information about the potential outcomes of any given behavior from a variety of sources, including both other people and media, and use that information to make assumptions about the outcome before engaging in that behavior themselves. Without this capacity for learning by example, Bandura argues that human development would have been severely retarded, tedious and hazardous. Without social learning, humans would have no method for learning beyond simple trial and error (Bandura, 2002:146). Social learning theory views the individual as an active participant in his or her behavior, interpreting events and selecting courses of action based on past experience.

2.7 Summary of the chapter

In this chapter concept of instruction, different teaching styles dealt with teachers, theories of learning and students assessments were reviewed from different scholars' points of view. There is strong relationship between one who possess something and one who receives or in takes. The relation between one who instructs and one who is instructed is never indifferent in its effect upon learning. Teachers should be mindful of the means in which material is delivered to students in order to reap the most benefit from the experience. Second, instruction must identify how a body of knowledge should be organized so that learners can readily grasp the concept. This indicates that teachers' instructional practices could impact the students' academic achievement.

The different teaching styles dealt by teachers has its own effect on the teaching learning process, and thus on the students' academic achievement. Active learning occurs when students are given opportunities to talk, listen, read, and write about what they are engaged in. In addition, in interactive learning style students actively participate in the lecture. Team-based learning is a highly learner-centered approach in which student teams engage in meaningful, problem-focused tasks. In lecture approach the teacher transfers the knowledge mainly carried out by a teacher. Hence, the teacher maintains full control of the goals and processes of the instruction. Brainstorming engages students in the learning process and encourages full participation of students. Project method allows learners to construct their own knowledge and provide chances for changing classrooms into environment which are active.

The main theories of learning and their usefulness for active learning education in particular were also described in this chapter. Cognitive theory, for example as formulated by Ausubel, Bloom, Gagné and Reigeluth (in Kozma, 2003:223-224) concentrated exactly on cognitive activities. A cognitivist lecturer not only presents and explains information, but also leads the students in their learning and monitors their progress. The students themselves play a passive role in receiving the information. However, in comparison to the behaviorist theories, cognitivist learning theory emphasizes the processing of the information that takes place within each individual student (Kozma, 2003:220).

Constructivism views the learning process as the active construction of knowledge. The students/learners are active participants in this process: they construct their knowledge on the basis of their experiences and interactions with others and the environment. The lecturer's role is to facilitate and support the students' effort whenever needed, primarily when the students need further information (Mahoney, 2003:9). A constructivist lecturer offers the students a variety of learning activities from which they can select the activities that meet their personal needs.

CHAPTER THREE

THE RESEARCH DESIGN AND METHODOLOGY

Introduction

This chapter describes philosophical orientation, research design, research method, sources of data, study area description, population, sample size and sampling techniques, instruments of data collection, validity and reliability of the instrument, data collection procedures, methods of data analysis, and ethical issues.

3.1 Philosophical orientation of the study

There are three types of research approaches. These are quantitative, qualitative and mixed approaches. Creswell (2012:26) described a quantitative research as a research that describes a research problem through a description of trends or a need for an explanation of the relationship among variables. Quantitative research provides a major role for the literature through suggesting the research questions to be asked and justify the research problem and create a need for the direction of the study. It creates purpose statements, research questions, and hypotheses that are specific, narrow, measurable, and observable and collect numeric data from a large number of people using instruments with pre-set questions and responses. It analyses trends, compare groups, or relate variables using statistical analysis, and interpret results by comparing them with prior predictions and past research; and write the research report using standard, fixed structures and evaluation criteria, and take an objective, unbiased approach.

On the other hand, qualitative research explores a problem and develops a detailed understanding of a central phenomenon; have the literature review play a minor role but justify the problem; state the purpose and research questions in a general and broad way so as to the participants' experiences. In qualitative research collecting data is based on words from a small number of individuals so that the participants' views are obtained; analyse the data for description and themes using text analysis and interpret the larger meaning of the endings. In qualitative research the report is written using flexible, emerging structures and evaluative criteria, and including the researchers' subjective reflexivity and bias.

A mixed approach is a procedure for collecting, analysing, and “mixing” both quantitative and qualitative methods in a single study or a series of studies to understand a research problem. A mixed methods study is used when we have both quantitative and qualitative data and both types of data, together, provide a better understanding of our research problem than either type. It is one in which the researcher tends to base knowledge claims on pragmatic grounds. It employs strategies of inquiry that involve collecting data either simultaneously or sequentially to best understand research problem. The data collection also involves gathering both numeric information as well as text information so that the final database represents both quantitative and qualitative information (Creswell, 2006 & Creswell, 2012).

According to Creswell (2012) there are six types of mixed research. These are: the convergent parallel design, the explanatory sequential design, the exploratory sequential design, the embedded design, the transformative design and the multiphase design. An explanatory sequential mixed methods design consists of first collecting quantitative data and then collecting qualitative data to help explain or elaborate on the quantitative results. The rationale for this approach is that the quantitative data and results provide a general picture of the research problem and a qualitative data collection is needed to refine, extend, or explain the general picture. For this reason, the researcher used explanatory sequential mixed design first to collect quantitative data from students then to collect qualitative data from principals and supervisors to explain the result obtained through quantitatively collected data..

An explanatory sequential mixed method was used in this study. This is because both quantitative and qualitative data was utilized in this study. In addition it was used because the intention of the study was to assess the existing situation and to describe opinions of the participants of the study to look in to the relationship between teachers’ instructional practices and students academic achievements. Using both quantitative and qualitative approaches can capitalize on the strengths of each approach and offset the weaknesses. And, it provides a better understanding of research problems than using either approach alone.

It also provides more comprehensive answers to research questions going beyond the limitations of a single approach (Creed, 2004). It is practical in the sense that the researcher is free to use both methods possible to address a research problem (Creswell,

2006). Furthermore, it is important to confirm and cross validate the research findings. In this study, quantitative method was taken as the major research method and qualitative method served for triangulation purpose and support the data obtained from the quantitative part.

3.2. Research Design

Research design is the overall plan for collecting data in order to answer the research question and also the specific data analysis techniques or methods that the researcher intends to use. The design for this study was descriptive survey research design since it attempts to obtain information that currently exists. The purpose of descriptive surveys study is to collect detailed and factual information that describes an existing phenomenon (Ezeani, 1998). In addition to descriptive survey, correlation design is included to investigate the relationship between teachers' instructional practices and students' academic achievements.

3.3 Data Sources

The data for this study was obtained from both primary and secondary sources. Primary data sources were teachers, students and secondary school principals. They were taken as primary data sources to respond to questionnaires and interviews. In addition secondary data were obtained from documents concerning issues under study like students score records and other documents.

3.4 Population of the Study

A study population is the entire group of people to which a researcher intends the results of a study to generalize. The population of this study was grade 9 chemistry teachers and grade 9th students of West Wollega Zone secondary schools. There are 23 woredas, and 86 government secondary schools in West Wollega Zone. From these woredas and government secondary schools study populations the sample respondents were selected through different sampling techniques.

3.5 Sampling Techniques

In order to get representative samples of this study all the appropriate sampling techniques were used. Among 23 woredas in West Wollega Zone 4 (20%) woredas were selected using simple random sampling technique. Gay and Arirasian (2003:111), state that the sample of 10% to 20% of the target population is often used in descriptive research for large population. Thus, the researcher decided to select 10%-20% samples from the total population. The selected woredas were Mendi Town, kiltukara, LataSibu, and Nedjo town administration.

There are 14 secondary schools in these four woredas, and 8 secondary schools were selected using simple random sampling technique. In these secondary schools there were 22 grade 9th Chemistry teachers and 22 (100%) of them were selected using availability sampling technique for the sample of the study. In addition from 3628 grade 9th students in these 8 government secondary schools 364 (10%) were selected using simple random sampling technique. Furthermore, 18 secondary school principals were selected purposively.

3.6 Sample Size

The samples of the study were 22 grade 9th Chemistry teachers, 364 grade 9th students, 8 secondary school principals and 10 vice principals which were 405 in general.

Table 3.1: The Sample Size of the Study

No	Schools	Population		Samples	Sampling technique
1	Kiltukara	Grade 9 th Ch. Teachers	3	3	Availability sampling
		Students	782	79	Simple random sampling
		Principals & v. principals	3	3	Availability sampling
2	Mendi Town	Grade 9 th Ch. Teachers	3	3	Availability sampling
		Students	658	66	Simple random sampling
		Principals & v. principals	3	3	Availability sampling
3	Werajiru	Grade 9 th Ch. Teachers	3	3	Availability sampling
		Students	305	31	Simple random sampling
		Principals & v. principals	2	2	Availability sampling
4	Agamsa Belea	Grade 9 th Ch. Teachers	2	2	Availability sampling
		Students	250	25	Simple random sampling
		Principals & v. principals	2	2	Availability sampling
5	Gori	Grade 9 th Ch. Teachers	3	3	Availability sampling
		Students	332	33	Simple random sampling
		Principals & v. principals	2	2	Availability sampling
6	Nedjo S.Sch.	Grade 9 th Ch. Teachers	4	4	Availability sampling
		Students	817	82	Simple random sampling
		Principals & v. principals	3	3	Availability sampling
7	Biftu Giddaa	Grade 9 th Ch. Teachers	2	2	Availability sampling
		Students	214	21	Simple random sampling
		Principals & v. principals	2	2	Availability sampling
8	Buke Akkache	Grade 9 th Ch. Teachers	2	2	Availability sampling
		Students	270	27	Simple random sampling
		Principals & v. principals	1	1	Availability sampling
		Total	3668	405	

3.7 Procedure of Data Collection

To answer the basic research question raised, the researcher went through series of data gathering procedures. The expected relevant data was gathered by using questionnaires, interviews and document analysis. In doing so, having letter of authorization from wollega University for getting permission; the researcher directly went to four sample woreda education offices and principals of respective schools for consent. After making agreement with the concerned participants; the researcher introduced his objective and purposes. Then the questionnaires were administered to sample students and teachers. The participants allowed giving their own answers to each item independently as needed by the researcher. They were closely assisted and supervised by the researcher himself.

Finally, the questionnaires collected back at the right appointment. The interview was also conducted with principals within the selected schools, after their consent was proved to lesson communication barriers during in depth discussion.

3.8 Data Gathering Instruments

Data gathering instruments were questionnaire, interview and document analysis.

3.8.1 Questionnaire

The researcher used questionnaires to collect data from student and teacher respondents. Questionnaires were believed better to get large amount of data from large number of respondents in a relatively shorter time with minimum cost. Hence, questionnaires were prepared in English language and administrated to 22 teacher participants. These questionnaires were translated into Afan Oromo by the researcher for the student participants with the assumption that they can't understand the language and administered to 364 grade 9th students.

In this study, two sets of questionnaire items were used. The first sets of items deals with the general background of the respondents. The second set of questionnaires was prepared on issue related to the teachers' instruction practices and students' chemistry academic achievement. In terms of content, the second section contained 29 items for student respondents on issues related to the teachers' instruction practices and students' chemistry academic achievement consists of four parts with focus on identification of types of instructional practices teachers use, teachers pedagogical skills, methods of Chemistry teachers used to assess the progress of learners in teaching the subject and the relationship between teaching styles and students' chemistry academic performance. Therefore, for structured question items, Likert scales employed, because Likert scale mostly used in survey research and easy to construct, simplest way to describe opinion, suggestion and frequency of respondents and also provide more freedom to respondents. The scale consists of five scales; 5 = strongly agree, 4 = agree, 3 = can't decide, 2 = disagree, and 1 = strongly disagree.

The instrument was scored by calculating the frequency, percentage, means and standard deviations for the items and it was given insights into the teachers' instructional practices.

3.8.2 Interview

The researcher employed semi-structured interview to gather in-depth information from principals of the sample schools. Cohen et al. (2003:269) suggested that, "Interview allows for greater depth than is the case with other methods of data collection." Thus, an interview guide was prepared in English. The interview was conducted with 8 principals and 10 vice principals by one-on-one interview. The interviewer was a structured format to record the responses of the interviewee.

3.8.3 Document Review

Documentary analysis is a type of qualitative research in which documents are reviewed by analyst to assess an appraisal theme. This study used grade 9th students' three consecutive years (2009-2011) rosters and mark list of students. Both rosters and mark list are used to make cross check the students' achievement and 50% of grade 9th students' rosters were analyzed.

3.9 Methods of Data Analysis

Data collected through questionnaire were analyzed quantitatively using frequencies, mean and standard deviation to indicate teachers' instructional practices and students' academic achievement. Both the data gained from the questionnaire and from semi structured interviews were compared with the data obtained from document reviews and the data was analyzed in an intermingled manner.

Quantitative data were analyzed and compared with data collected qualitatively using interview and the results were reported through narrative statement. To describe the demographic background of respondents' characteristics, frequency and percentage were used. To assess the types of teachers' instructional practices used by Chemistry teachers, frequency, mean and standard deviation were used.

To determine the results the following mean range were used as a cut of point. Mean value ≥ 4.50 indicates very high, 3.50-4.49 indicates high, 2.50-3.49 indicates moderate, 1.50-2.49 indicates low and ≤ 1.49 indicates very low implementation of the items.

In addition, to indicate the type of relationship between teachers' instructional practices and students' academic achievement, Pearson correlation coefficient was employed.

Finally, data gained through questionnaire and semi-structured interview were cross validated with the data obtained from document review and analyzed and reported through narrative description.

3.10 Reliability Checks

3.10.1 Pilot Test

The pilot test provides an advance opportunity for the investigator to check the questionnaires and to minimize errors due to improper design of instruments, such as problems of wording or sequence (Adams et al., 2007). Before the final questionnaires were administered, pilot testing was conducted in Nejo Alaltu secondary school which was not included in the sample study. It was conducted to test the validity and reliability of the content. Respondents were oriented about the objectives of the pilot study, how to fill out the items, evaluate and give feedback regarding the relevant items. It helped to ensure that the respondents understand what the questionnaire wants to address and was done with the objectives of checking whether or not the items contained in the instruments could enable the researcher to gather relevant information, to identify and eliminate problems in collecting data. The pilot test was provided an advance opportunity for the investigator to check the questionnaires and to minimize errors due to improper design of instruments. It also helped to ensure that the respondents understand what the questionnaire wants to address and was done with the objectives of checking whether or not the items contained in the instruments could enable the researcher to gather relevant information, to identify and eliminate problems in collecting data.

3.10.2 Reliability checks

Reliability is a measure of the degree to which a research instrument yields consistent results (Orodho, 2009). A reliability test was performed to check the consistency and accuracy of the measurement scales. To check the reliability of the questionnaires, Cronbach's alpha reliability test was calculated after the pilot test was conducted. All items were carefully input in to SPSS version 20 and the average result found from both teachers and students respondents were (0.94, 0.71 and 0.86). Tech-Hong and Waheed (2011), suggests that the reliability coefficients greater than 0.70 are generally found to be internally consistent. Thus the instrument was found to be reliable.

Table 3.2: Reliability test results with Cronbach's alpha

No	Variables	No of items	Cronbach Alpha
1	Teachers instructional practices		
1.1	Interactive lecturing and questioning	3	0.96
1.2	Team based learning	3	0.95
1.3	Brainstorming	3	0.87
1.4	Lecture approach	3	0.99
	Total	12	0.94
2	Chemistry teachers' pedagogical skills	10	0.7
3	Monitoring or assessing the learning process	7	0.86

Cronbach's alpha coefficient normally ranges between 0 and 1. George and Mallery (2003) provide the following rules of thumb: "> 0.9 Excellent, > 0.8 Good, _ > 0.7 Acceptable, > 0.6 – Questionable, > 0.5 – Poor and < 0.5 Unacceptable". It is noted that an alpha of (0.94, 0.71 and 0.86) is reasonable good to use the question for the research.

3.11 Ethical Considerations

This study recognizes that each human being has value in himself or herself, and that value must be maintained in all interactions between people as much as possible. Christensen (2006) warns that access alone is not all that the researcher needs for successfully interacting with subjects and collecting data. A good working atmosphere with respect and trust should be established before the researcher settles for data collection. This study therefore observed ethical standards of practice that researchers are expected to follow. The researcher sought permission from the university. The consent of respondents to participate in the study will thought by informing them of the purpose of the study. Assurance of maintaining confidentiality and anonymity was given. This will be done by having the identity part on the questionnaires optional.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

This chapter deals with the presentation, analysis and interpretation of the data gathered from the respondents through questionnaires and interviews. Quantitative and qualitative data were analyzed in this chapter. The qualitative part gathered through semi structured interview was used as complementary to the quantitative part.

A total of 386 copies of questionnaires were distributed to 22 teachers' respondents and 364 grade 9th students' respondents and 386 copies of the questionnaires were returned. This accounts for 100% of the total respondents to the questionnaire. In addition, 18 secondary school principals were interviewed to gather qualitative data. The analysis of the data begins with the characteristics of the respondents and the analysis of the main data followed.

4.1 Demographic Characteristics of Respondents

Under this topic characteristics of teachers respondents in terms of sex, age, education level and work experience were presented and analyzed. In addition back ground characteristics of students respondents in terms of sex was presented and analyzed.

Table 4.1: Demographic characteristics of teacher respondents in terms of sex, age, educational background and work experience

No	Characteristic	Item	Frequency	Percent
1	Sex	Male	15	68
		Female	7	32
		Total	22	100
2	Age	20-25 years	4	18
		26-30 years	6	27
		31-35 years	4	18
		36- 40 years	5	23
		41 and above years	3	14
		Total	22	100
3	Education level	Degree	19	86
		Masters	3	14
		Total	22	100
4	Work experience	1-5 years	2	9
		6-10 years	3	14
		11-15 years	3	14
		16-20 years	5	23
		21 and above years	9	40
		Total	22	100

Source: Field survey (2020)

Table 4.1 above presents characteristics of teacher respondents in terms of sex, age, educational back ground and work experience of the respondents. Accordingly, 15(68%) of the teachers were males and 7 (32%) of the teachers, were females. This indicates that the participation of females in secondary schools of West Wollega Zone was less. As compared to males, female teachers have less participation in secondary schools of West Wollega zone.

Regarding the age distribution of the teachers, 4 (18%) of the teachers were between the age group of 20-25 years. On the other hand, 6 (27%) of the teachers were between the age group of 26-30 years. In addition, 4 (18%) of the teachers were between the age group of 31-35 years. Furthermore, 5 (23%) of the teachers were between the age group of 36-40 years and 3 (14%) of the teachers were between the age group of 41 and above years. This implies that most of the teachers in west Wollega Zone were in middle age group which is useful in doing effective works.

In terms of educational level of respondents, none of the respondents were in diploma level, 19 (86%) of the teachers were first degree holders and 3 (14%) of the teachers were second degree holders. From the data it is clear that the majority of respondents were first degree holders. This shows that teachers in secondary schools of west Wollega Zone were below the set standards according to the new education roadmap.

Regarding work experience of the respondents 2 (9%) of the teachers have 1-5 years of work experience and 3 (14%) of the teachers have 6-10 years of work experience. On the other hand, 3 (14 %) of the teachers have 11-15 years of work experience and 5 (23%) of the teachers have 16-20 years of work experience. On the other hand, 9 (40%) of the teachers have 21 and above years of work experience. This indicates that majority of the respondents have 21 and above years of work experience, and implies that secondary schools in west Wollega Zone have experienced teachers.

Table 4.2: Demographic characteristics of students' respondents in terms of gender and age

No	Characteristic	Item	Frequency	Percent
1	Sex	Male	193	53
		Female	171	47
		Total	364	100
2	Age	15 years	2	0.5
		16 years	25	7
		17 years	319	88
		18 years	14	4
		19 and above years	4	1
		Total	364	100

Source: Field survey (2020)

Table 4.2 above presents demographic characteristics of grade 9th student respondents in terms of gender. Accordingly, 193 (53%) were males and 171 (47%) of them were females. This indicates that the participation of female students in secondary schools of West Wollega Zone were less than male students.

Regarding age group of grade 9th students respondents, the data indicated that very few students, 2 (0.5%) students' were 15 years of age. 25 (7%) of them were 16 years age, 319 (88%) were 17 years age, 14 (4%) were 4 years age and 4 (1%) of them were 19 and above years age. This indicates that majority of grade 9th students were 17 years age, and

implies that students are being registered or entered schooling in appropriate age of schooling.

4.2 The Current Status of Teachers Instructional Practices

In this part presents the current status of teachers' instructional practices instructional practices. Accordingly, pedagogical skills of Chemistry teachers and the extent to which Chemistry teachers assess the progress of their learners were presented and analyzed. To determine the degree of implementation of each instructional strategies used by Chemistry teachers the following mean ranges were used as a cut point. Mean value ≥ 4.50 indicates very high, 3.50-4.49 indicates high, 2.50-3.49 indicates moderate, 1.50-2.49 indicates low and ≤ 1.49 indicates very low implementation of the item.

4.2.1 The Current Status of Teachers Instructional Practices in terms of Interactive Lecturing and Questioning

The current status of interactive lecturing and questioning strategy used by chemistry teachers in West Wollega Zone Secondary School was presented and analyzed in the following table.

Table 4.3: The status of interactive lecturing and questioning used by Chemistry teachers

No	Questionnaire items for ILQ	Resp.	N	Mean	Std. D.	t	P-value
1	Prior to lecturing an instructor may organize seats into a circular or semi-circular shape.	teachers	22	1.91	.921	1.499	.148
		students	364	1.61	.677		
2	Chemistry teacher encourage students to ask questions.	teachers	22	3.95	.486	2.214	.033
		students	364	3.68	1.236		
3	Effectively manage time between questions, and also encourages students to answer their own questions.	teachers	22	3.73	.985	-.796	.434
		students	364	3.90	1.153		
	Average		386	3.07	.47		

Mean value of ≥ 4.50 = very high, 3.50-4.49 = high, 2.50-3.49 = moderate, 1.50-2.49 = low and ≤ 1.49 = very low

Table 4.3 above presents the current status of interactive lecturing and questioning strategies used by Chemistry teachers. Accordingly, data indicates that teachers and students responses were similar. Both respondents response indicate low level implementation of the item (M= 1.91 & 1.61, SD= 0.921 & 0.677, P-value > 0.05). This

shows that teachers rarely organize the students' seat in to a circular or semi-circular shape prior to lecturing. On the other hand, the data indicates that Chemistry teachers highly encourage students to ask questions, because, both respondents response indicate high level implementation of the item (M= 3.95 & 3.68, SD= 0.468 & 1.236, P-value > 0.05).

On item 3 of the questionnaire because, both respondents response similarly indicate high level implementation of the item (M= 3.73 & 3.90, SD= 0.985 & 1.153, P-value > 0.05). It indicates that teachers moderately manage time between questions, and also encourages students to answer their own questions.

In general the total means score of the respondents on the interactive lecturing and questioning learning strategy was 3.07 and standard deviation 0.47, which indicates moderate implementation of the item. Thus, it implies that Chemistry teachers in West Wollega Zone Secondary Schools moderately implements interactive lecturing and questioning learning strategy when teaching.

Interview conducted with secondary school principals indicated that teachers do not consistently organize seats into a circular or semi-circular shape prior to lecturing. Principals 1,2,4,6, 7, 9, 11, 13, 14 and 16 state that;

Teachers couldn't organize seats into a circular or semi-circular shape consistently because of many obstacles. Among problems that hinder to organize students in to groups large class size is a major one. Secondly, lacks of adequate seats of students were another problem to organize students in to group. Therefore, they couldn't organize students in to circular or semicircular shape consistently to teach in groups.

In addition, the interview result pointed out that Chemistry teachers' encourage students to ask questions before, in the middle and at the end of the lesson. Principals 15, 17, 18, 3, 5, 8, 10 and 12 state that;

Chemistry teachers' encourage students to ask questions before the lesson begins. They encourage students to ask questions by introducing the topic. In addition they make the students to interact with the teachers in the middle of the lesson. At the end they make students to respond to some review questions at the end of the lesson.

Thus, it complements the results of the questionnaire and implies that Chemistry teachers implements interactive lecturing and questioning learning in West Wollega Zone Secondary Schools.

4.2.2 The Current Status of Teachers Instructional Practices in terms of Team Based Learning

The currents status of team based learning strategy used by chemistry teachers in West Wollega Zone Secondary School was presented and analyzed in the following table.

Table 4.4: The status of team based learning used by Chemistry teachers

No	Questionnaire items for TBL	Resp.	N	Mean	Std. D.	t	P-value
1	Team based learning is practiced by chemistry teacher in classroom	teachers	22	1.86	.941	1.094	.286
		students	364	1.64	.746		
2	There are permanent group in your chemistry classroom	teachers	22	1.14	.351	-5.381	.000
		students	364	1.60	.785		
3	Chemistry teacher promote active student learning through small group activities throughout an entire semester	teachers	22	1.73	.456	1.339	.191
		Students	364	1.59	.814		
	Average		386	1.60	0.49		

Mean value of ≥ 4.50 = very high, 3.50-4.49 = high, 2.50-3.49 = moderate, 1.50-2.49 = low and ≤ 1.49 = very low

Table 4.4, presents the status of team based learning strategies used by Chemistry teachers. Accordingly, data indicates that teachers and students responses were similar. Both respondents response indicate low level implementation of the item on questionnaire item 1, (M= 1.86 & 1.64, SD= 0.941 & 0.746, P-value > 0.05). It implies that team based learning is rarely practiced by chemistry teachers in classrooms. On item 2 of the question, both respondents response indicate low level implementation of the item (M= 1.14 & 1.60, SD= 0.351 & 0.785, P-value =0.000). However, the two groups responses were different, since $P < 0.05$. It implies that there are no permanent groups in chemistry classrooms.

On the other hand, both respondents response indicate low level implementation of the item on item 3 of the questionnaire (M= 1.73 & 1.59, SD= 0.456 & 0.814, P-value >

0.05). This implies that Chemistry teacher do not promote active student learning through small group activities throughout an entire semester.

Grand mean score of the respondents on team based learning strategy was 1.60, and standard deviation 0.49 which indicates low implementation of the item. Thus, it implies that Chemistry teachers in West Wollega Zone Secondary Schools rarely implements team based learning strategy.

The results of interview conducted with secondary school principals showed that teachers rarely practice team learning strategy in Chemistry class rooms. Principals 3,4,5,6, 8,9,11, 12 and 13 state that;

Teachers do not practice team learning consistently in Chemistry class rooms. This is because students are crowded in classes and the seats are not suitable for grouping students in to groups. Forming teams are time consuming and make me reluctant in forming teams. As a result there are no permanent groups of students in Chemistry classrooms.

This indicates that team learning strategies are not practiced as needed in Secondary Schools in the study area and complemented the results obtained using questionnaire. Thus, it can be concluded that teachers do not promote active student learning through small group activities in secondary schools of West Wollega Zone.

4.2.3 The Current Status of Teachers Instructional Practices in terms of Brainstorming

The current status of brainstorming learning strategy used by chemistry teachers in West Wollega Zone Secondary School was presented and analyzed in the following table.

Table 4.5: The status of brainstorming learning used by Chemistry teachers

No	Questionnaire items for BS	Resp.	N	Mean	Std. D.	t	P-value
1	Teacher encourage ideas exchange, requires group work and relies on generating as many new and sometimes astonishing(surprising) ideas as possible as well as on providing solutions to problems	teachers	22	4.00	.690	11.352	.000
		students	364	2.16	1.289		
2	The teacher creates the sense of freedom and competition.	teachers	22	4.14	.710	10.369	.000
		students	364	2.40	1.360		
3	After all possible ideas are collected, evaluation takes place	teachers	22	4.18	.588	5.634	.000
		Students	364	3.36	1.420		
	Average		386	2.72	1.17		

Mean value of ≥ 4.50 = very high, $3.50-4.49$ = high, $2.50-3.49$ = moderate, $1.50-2.49$ = low and ≤ 1.49 = very low

Table 4.5 presents the current status of teachers' instructional practices in terms of brainstorming learning strategies used by Chemistry teachers. Accordingly, data indicates that on all items of the questionnaire teachers and students responses were different. Teachers' responses indicate high level implementation of the items and students' responses indicate low implementation of the items. On item 1 of the questionnaire (M= 4.00 & 2.16, SD= 0.690 & 1.289, P-value > 0.000). This implies that teachers moderately encourage idea exchange, however, students perceive as it is performed to the low level.

Teachers and students responses were (M= 4.14 & 2.40, SD= 0.710 & 1.36, P-value = 0.000) on item 2 of the questionnaire. Teachers' responses indicate high level implementation of the item and students' response indicates low level implementation of the item. It indicates that teachers moderately create the sense of freedom and competition among the students. On item 3 of the questionnaire, (M= 4.18 & 3.36, SD= 0.588 & 1.42, P-value = 0.000), which indicates response difference between teachers and students. It implies that teachers highly evaluate the students' achievement after all possible ideas are collected.

Grand mean score of the respondents on brainstorming learning strategy was 2.72, and standard deviation 1.17 which indicates moderate implementation of the item. Thus, it

implies that Chemistry teachers in West Wollega Zone Secondary Schools moderately implement brainstorming learning practices.

Interview results pointed out Chemistry teachers encourage students to exchange ideas and try to make students work in groups. Principals 4, 11, 9, 13, 16 and 18 state; “Teachers create sense of freedom between students. They make competition among students. Teachers conduct students’ evaluations as planned in each classe.” Thus it complements the results of the questionnaire and can be concluded that Chemistry teachers practice brain storming learning strategy in the study area.

4.2.4 The Current Status of Teachers Instructional Practices in terms of Lecture approach

The extent to which lecture approach learning strategy were used by chemistry teachers in West Wollega Zone Secondary School was presented and analyzed in the following table.

Table 4.6: The status of lecture approach used by Chemistry teachers

No	Questionnaire items for LA	Resp.	N	Mean	Std. D.	t	P-value
1	In your chemistry class you put all of your focus on the students and the students talks	teachers	22	3.09	1.231	-.139	.890
		students	364	3.13	1.526		
2	The students exclusively follow the lesson	teachers	22	2.45	1.101	-2.008	.055
		students	364	2.95	1.383		
3	During activities, students work alone, and collaboration is discouraged.	teachers	22	1.59	.590	-8.757	.000
		Students	364	2.87	1.406		
	Average		386	2.94	1.26		

Mean value of ≥ 4.50 = very high, 3.50-4.49 = high, 2.50-3.49 = moderate, 1.50-2.49 = low and ≤ 1.49 = very low

Table 4.6 presents the status of teachers’ instructional practices in terms of lecture approach used by Chemistry teachers. Accordingly, on item 1 of the questionnaire, (M= 3.09 & 3.13, SD= 1.23 & 1.52, P-value = 0.890), which shows that teachers and students responses similarly indicate moderate level of implementation of the item. This implies that the teachers put their focus on the students and the students’ talks to some extent in the classroom. In addition, the respondents’ responses on item 2 of the questionnaire indicates (M= 2.45 & 2.95, SD= 1.10 & 1.38, P-value = 0.055), which shows that

teachers and students responses nearly similar and indicate moderate level of implementation of the item. Thus, it implies that the students exclusively follow the lesson to some extent. Furthermore, the respondents' responses on item 3 of the questionnaire indicates ($M = 1.59$ & 2.87 , $SD = 0.59$ & 1.40 , $P\text{-value} = 0.000$), which shows that teachers and students responses were different; teachers indicate low level of implementation and students indicate moderate level of implementation of the item. This implies that students work alone and collaboration is discouraged during activities.

In general the grand mean score of the respondents on lecture approach learning strategy was 2.94 , and standard deviation 1.26 which indicates moderate implementation of the item. Thus, it implies that Chemistry teachers in West Wollega Zone Secondary Schools moderately implements lecture approach learning strategy.

Interview was carried out with 18 school principals on the type of teaching strategy implemented in schools and impacts of the teachers teaching styles on the students learning. Principals 3, 5, 6, 7, 8, 10, 14 and 15 state;

Interactive lecturing and questioning teaching practices are implemented to some extent in classes. Teachers use lecture methods most of the time, instead of teaching practically. This is because of lack of educational resources used to teach in practice. Teachers do not implement team based learning practices as needed in classes. In addition, teachers do not implement brainstorming teaching practices in classes. This is because the time is not sufficient to cover the topic of the lesson in a given period if many teaching practices are implemented in a single period.

Thus, interview results complement results of data gathered through the questionnaire and implied that lecture approach was practiced by Chemistry teachers in secondary schools of West Wollega zone.

4.2.5 Summary of the current status of teachers instructional practices used by Chemistry Teachers

The current status of four instructional practices used by Chemistry teachers were analyzed and summarized in the following table.

Table 4.7: Summery of the current status of teachers instructional practices used by Chemistry teachers

No	Teachers instructional practices	Resp.	N	Mean	Std. D.	t	P-value
1	Interactive Lecturing and Questioning	teachers	22	3.197	.432	1.38	.180
		students	364	3.065	.478		
2	Team Based Learning	teachers	22	1.575	.311	-.438	.664
		students	364	1.607	.508		
3	Brain Storming	teachers	22	4.106	.362	14.92	.000
		Students	364	2.641	1.157		
4	Lecture Approach	teachers	22	2.378	.699	-3.682	.001
		Students	364	2.981	1.285		
		Average	386	2.58	.62	3.351	.002

Mean value of ≥ 4.50 = very high, 3.50-4.49 = high, 2.50-3.49 = moderate, 1.50-2.49 = low and ≤ 1.49 = very low

Table 4.7 reveals the current status of four instructional practices used by Chemistry teachers in West Wollega Zone secondary schools. Accordingly, interactive lecturing and questioning practice was moderately implemented in Secondary schools of West Wollega Zone. In this regard respondents responses indicate (M= 3.19 & 3.06, SD= 0.43 & 0.47, P-value = 0.180), which shows that teachers and students responses similarly indicate moderate level of implementation of the item.

On the other hand, the current status of teachers' instructional practices in terms of team based learning practice was implemented to the low level in Secondary schools of West Wollega Zone. In this regard respondents responses indicate (M= 1.57 & 1.60, SD= 0.31 & 0.50, P-value = 0.664), which shows that teachers and students responses similarly indicate low level of implementation of the item. So it can be concluded that team based learning practice was rarely implemented in secondary schools of West Wollega Zone.

In addition, brain storming practice was moderately implemented in Secondary schools of West Wollega Zone. Since responses indicate (M= 4.10 & 2.64, SD= 0.362 & 1.157, P-value = 0.000), which shows that teachers and students responses different, teachers'

response indicates high level of implementation of the item and students' responses indicate moderate level of implementation of the item. Thus it can be concluded that brain storming learning practice was moderately implemented in secondary schools of West Wollega Zone.

Moreover, lecture approach was moderately implemented in Secondary schools of West Wollega Zone. In this regard respondents responses indicate ($M = 2.37$ & 2.98 , $SD = 0.699$ & 1.285 , $P\text{-value} = 0.001$), which shows that teachers and students responses differs, teachers' response indicates low level of implementation of the item and students' responses indicate moderate level of implementation of the item. Therefore, lecture approach was moderately implemented in secondary schools of West Wollega Zone.

In general teachers' instructional practices were moderately implemented in secondary schools of West Wollega zone, since total responses mean score and standard deviation on all items of teachers' instructional practice was 2.58 and 0.62 respectively, which indicate moderate average implementation of the items. It also revealed that interactive lecturing and questioning teaching practice was emphasized in West Wollega secondary schools since responses mean score on items of interactive lecturing and questioning was greater than all items of instructional practices.

4.3 Teachers' Pedagogical Skills in Secondary Schools

Pedagogical skills of Chemistry teachers were presented and analyzed in the following table.

Table 4.8: Pedagogical Skills of Chemistry Teachers

No	Teachers pedagogical skills	Respond.	N	Mean	Std. D.	t	p-value
1	Chemistry teachers appropriate classroom activities that initiate students' performance	teachers	22	4.14	.710	9.608	.000
		students	364	2.53	1.339		
2	Chemistry teacher facilitating and monitoring all class activities	teachers	22	4.32	.780	12.68	.000
		students	364	2.07	1.180		
3	Chemistry teacher organizing the students in group as they can do together	teachers	22	1.64	.581	-3.945	.000
		students	364	2.18	1.135		
4	Chemistry teacher teach how to use technology in chemistry instruction	teachers	22	2.05	1.133	.882	.387
		students	364	1.83	1.045		
5	Chemistry teachers motivate their students to take part in classroom activities.	teachers	22	4.27	.550	10.381	.000
		students	364	2.79	1.567		
6	Chemistry teachers identify desirable and undesirable practices in classroom activities in order to improve their students' chemistry achievement.	teachers	22	2.73	1.241	-5.639	.000
		students	364	4.25	.976		
7	Students are equitably relaxed by their instructor on few representative practical examples and classroom activities within specified time	teachers	22	3.18	1.402	2.948	.007
		students	364	2.28	1.316		
8	Chemistry teachers teach their students how to assess their learning in chemistry class	teachers	22	3.32	1.524	3.556	.002
		students	364	2.14	1.306		
9	Chemistry teacher teach important chemistry in context that are closely connected to real life situations	teachers	22	3.68	1.287	1.542	.136
		students	364	3.24	1.498		
	Average		386	2.62	1.28		

Mean value of ≥ 4.50 = very high, 3.50-4.49 = high, 2.50-3.49 = moderate, 1.50-2.49 = low and ≤ 1.49 = very low

Table 4.8 presents items of pedagogical skills of chemistry teachers. Accordingly, teachers and students responses were different on questionnaire item 1, 2, 3, 5, 6, 7 & 8. This was because p-value < 0.05 (p = 0.00, 0.007 and 0.002) in each questionnaire item. On the other hand, data indicates that teachers and students responses were similar on

questionnaire item 4 & 9. It was because $p\text{-value} > 0.05$ ($p = 0.387$ and $p = 0.136$) in each questionnaire item.

On item 1 of the questionnaire, data indicates that chemistry teachers moderately appropriate classroom activities that initiate students' performance ($M = 4.14$ & 2.53 , $SD = 0.71$ & 1.33 , $P\text{-value} = 0.000$). In addition, chemistry teachers facilitate and monitor all class activities to the moderate level ($M = 4.32$ & 2.07 , $SD = .780$ & 1.18 , $P\text{-value} = 0.000$). On the other hand, on item 3 of the questionnaire data indicates that chemistry teachers organize the students in group as they can do together to the low level ($M = 1.64$ & 2.18 , $SD = .581$ & 1.135 , $P\text{-value} = 0.000$).

On item 4 of the questionnaire, data indicates that chemistry teachers teach how to use technology in chemistry instruction to low level ($M = 2.05$ & 1.83 , $SD = 1.133$ & 1.045 , $P\text{-value} = .387$). In addition, on item 5 of the questionnaire data indicates that chemistry teachers moderately motivate their students to take part in classroom activities ($M = 4.27$ & 2.79 , $SD = .550$ & 1.567 , $P\text{-value} = .000$). On the other hand, data indicates that chemistry teachers highly identify desirable and undesirable practices in classroom activities in order to improve their students' chemistry achievement ($M = 2.73$ & 4.25 , $SD = 1.241$ & $.976$, $P\text{-value} = .000$).

On item 7 of the questionnaire, data indicates that the students are not equitably relaxed by their instructor on few representative practical examples and classroom activities within specified time ($M = 3.18$ & 2.28 , $SD = 1.402$ & 1.316 , $P\text{-value} = .007$). In addition, on item 8 of the questionnaire data indicates that teachers teach their students how to assess their learning in chemistry class to low level ($M = 3.32$ & 2.14 , $SD = 1.524$ & 1.306 , $P\text{-value} = .002$). Furthermore, on item 9 of the questionnaire data indicates that chemistry teachers moderately teach important chemistry in context that are closely connected to real life situations ($M = 3.68$ & 3.24 , $SD = 1.287$ & 1.498 , $P\text{-value} = .136$).

Grand mean score of the respondents on items of pedagogical skills of chemistry teachers was 2.62 and standard deviation 1.28, which indicates moderate implementation of the item. Accordingly, it implies that Chemistry teachers in West Wollega Zone Secondary Schools have moderate pedagogical skills.

Interview results pointed out that teachers have adequate pedagogical skills in teaching Chemistry. Principals 1, 2, 5, 6, 11, 14, 15 and 17 state;

Teachers use classroom activities to initiate students' participation and monitor students' activities. However there are problems that challenge the teachers to organize students in group. Among these class size and time allotted to one period is a major problem. On the other hand, lack of educational technologies is obstacles to practice students use technologies. But, teachers have skills to improve their students' chemistry achievement. Teachers teach important chemistry in context that is closely connected to real life situations.

Interview results and results obtained using questionnaire complement each other to some extent and imply that Chemistry teachers in the study area have adequate pedagogical skills to teach.

4.4 The Extent to which Chemistry Teachers Assess the Progress of Learners

The extent to which chemistry teachers monitor or assess the progress of their learners in teaching Chemistry were presented and analyzed in the following table.

Table 4.9: The Extent to which Chemistry Teachers Monitor or Assess the Progress of their Learners

No	Questionnaire items for Assessing	Respond.	N	Mean	Std. D.	t	p-value
1	Chemistry teachers' use tests or quizzes to assess students learning	teachers	22	4.05	.999	4.551	.000
		students	364	3.01	1.484		
2	Chemistry teachers make their Students work individually with the textbook or worksheet	teachers	22	3.95	1.046	5.855	.000
		students	364	2.59	1.322		
3	Chemistry teacher provides hint to students in response to work/answer	teachers	22	4.32	1.086	5.357	.000
		students	364	3.01	1.530		
4	Teacher checks students' exercise	teachers	22	4.18	1.053	5.117	.000
		students	364	2.96	1.539		
5	Chemistry teacher asks students to think of every step of the lesson	teachers	22	2.05	1.090	-1.038	.309
		students	364	2.30	1.290		
6	Chemistry teacher state learning goals clearly	teachers	22	2.18	.958	-.455	.653
		students	364	2.28	1.368		
7	Chemistry teacher asks students to work in small groups according their ability.	teachers	22	2.18	1.181	-.567	.576
		students	364	2.33	1.309		
	Average		386	2.67	1.4		

Mean value of ≥ 4.50 = very high, 3.50-4.49 = high, 2.50-3.49 = moderate, 1.50-2.49 = low and ≤ 1.49 = very low

Table 4.9 above presents the extent to which chemistry teachers monitor or assess the progress of their learners in teaching Chemistry. Accordingly, teachers and students responses were different on questionnaire item 1, 2, 3 & 4. This was because p-value < 0.05 ($p = 0.00$) in each questionnaire item. On the other hand, data indicates that teachers and students responses were similar on questionnaire item 5, 6 & 7. It was because p-value > 0.05 ($p = .309$, .653 and .576) on item 5, 6, and 7 respectively.

On item 1 of the questionnaire data indicates chemistry teachers' moderately use tests or quizzes to assess students learning ($M = 4.05$ & 3.01 , $SD = .999$ & 1.484 , $P\text{-value} = .000$). In addition, on item 2 of the questionnaire, data indicates that chemistry teachers rarely make their Students work individually with the textbook or worksheet ($M = 3.95$ & 2.59 , $SD = 1.046$ & 1.322 , $P\text{-value} = .000$). On the other hand, on item 3 of the questionnaire

data indicates that chemistry teachers moderately provide hint to students in response to answer ($M = 4.32$ & 3.01 , $SD = 1.086$ & 1.530 , $P\text{-value} = .000$).

Furthermore, on item 4 of the questionnaire data indicates that chemistry teachers moderately check students' exercise ($M = 4.18$ & 2.96 , $SD = 1.053$ & 1.539 , $P\text{-value} = .000$). On item 5 of the questionnaire, the data indicates that chemistry teacher rarely asks students to think of every step of the lesson ($M = 2.05$ & 2.30 , $SD = 1.090$ & 1.290 , $P\text{-value} = .309$). In addition, on item 6 of the questionnaire it indicates that chemistry teachers rarely state learning goals clearly ($M = 2.18$ & 2.28 , $SD = .958$ & 1.368 , $P\text{-value} = .653$). On the other hand, on item 7 of the questionnaire data indicated that chemistry teachers rarely ask students to work in small groups according their ability ($M = 2.18$ & 2.33 , $SD = 1.181$ & 1.309 , $P\text{-value} = .576$).

Total mean score of the respondents on the extent to which chemistry teachers monitor or assess the progress of their learners in teaching chemistry was 2.67 and standard deviation 1.4. This indicates moderate implementation of the item. Accordingly, it implies that Chemistry teachers in West Wollega Zone Secondary Schools moderately monitor or assess the progress of their learners in teaching chemistry.

Interview conducted with secondary school principals showed that Chemistry teachers use tests or quizzes to assess students learning. Principals 1, 2, 5, 7, 9, 12, 13 and 18 state;

Chemistry teachers' use tests or quizzes to assess students learning. Teachers do not make students work in groups; instead they make their students work individually with the textbook or worksheet to assure individual students performance. Chemistry teachers give hint to students in response to exercise given. In addition, teachers check students' exercise to some extent. However there is a problem in checking all students' exercise book regularly because of large class sizes.

Interview result is similar with results obtained using questionnaire and implies that chemistry teachers moderately monitor or assess the progress of their learners in teaching chemistry in secondary schools of West Wollega Zone.

4.5 The Status of Students' Academic Achievement as Perceived by Teachers

The status of students' academic achievement in chemistry was presented and analyzed in the following table.

Table 4.10: The Current Status of Students' Academic Achievement in Chemistry

No	Questionnaire items for students' academic Achievement	N	Mean	Std. Dev
1	The current status of grade 9 th students' achievement in chemistry is	22	2.27	1.077
2	Achievement of students in Chemistry in school examinations is	22	2.32	.716
3	The students activity in exercising educational task provided (i.e. assignment, class work, homework, etc.) in chemistry is	22	3.05	1.046
	Total	22	2.54	0.94

Mean value of ≥ 4.50 = very high, $3.50-4.49$ = high, $2.50-3.49$ = moderate, $1.50-2.49$ = low and ≤ 1.49 = very low

Table 4.10 above presents the status of students' academic achievement in chemistry. Accordingly, on item 1 of the question, mean score of teachers' response indicate 2.27 and the standard deviation is 1.077 and indicates that students' achievement in chemistry on grade 9th achievement in chemistry is low. On the other hand, on item 2 of the question, mean score of teachers' response is 2.32 and the standard deviation is .716. This indicates that achievement of grade 9th students in chemistry is moderate. In addition, on item 3 of the question, mean score of teachers' response is 3.05 and the standard deviation is 1.046. This implies that students' activity in exercising educational task provided in chemistry was moderate.

The total mean score of the respondents on the status of students' academic achievement in chemistry indicates 2.54 and standard deviation 0.94, which indicates moderate achievements of the students in Chemistry. Accordingly, it implies that the status of students' academic achievement in chemistry in West Wollega Zone Secondary Schools were moderate.

4.6 Document Review on the Students' Academic Achievement

Grade 9th students' academic achievement in Chemistry in West Wollega Zone Secondary Schools from 2017 – 2019 was presented and analyzed in the following table.

Table 4.11: Grade 9th Students' academic achievement in Chemistry in sampled Secondary Schools

N o	Year	No of schools	Students population		Achievement in class examinations							
					<50 %	%	50- 74%	%	75- 89%	%	90- 100%	%
1	2017	8	Male	1162	102	8.7	588	50.6	378	32.5	94	8
			Female	1011	120	11.8	464	45.8	369	36.4	58	5.7
			Total	2173	222	10.2	1052	48.4	747	34.3	152	6.9
2	2018	8	Male	1241	105	8.4	553	44.5	457	36.8	126	10.1
			Female	1124	126	11.2	537	47.7	342	30.4	119	10.5
			Total	2365	231	9.7	1090	46	799	33.7	245	10.3
3	2019	8	Male	1672	208	12.4	676	40.4	584	34.9	204	12.2
			Female	1956	229	11.7	786	40.1	675	34.5	266	13.5
			Total	3628	437	12	1462	40.2	1259	34.7	470	12.9

Source: Document review of eight secondary schools

Table 4.11 above presents three years (2017-2019) grade 9th students' academic achievement in Chemistry. Accordingly, documents of eight sampled secondary schools were reviewed in terms of three years students' academic achievement. Data gathered from these eight secondary schools through document reviews indicates that the students scoring <50% in 2017 was 10.2 %, in 2018 was 9.7% and in 2019 was 12%. This implies that the trend of low achievers was fluctuating between academic years. In addition it indicates that male students were better achieved in the first two years and female students were better in 2019 academic year.

The students score 50-74% in 2017 was 48.4%, in 2018 were 46% and in 2019 were 40.2% and implies that the trend was descending in each academic year. On the other hand, the students score 75-89% in 2017 was 34.3%, in 2018 were 33.7% and in 2019 were 34.7% and implies that the trend of students' academic achievement was almost similar in each academic year. In addition the students score 90-100% in 2017 was 6.9%, in 2018 was 10.3% and in 2019 was 12.9%. This implies that the trend of students'

academic achievement between 90%-100% become increasing in consecutive academic years from 2017 to 2019.

4.7 The relationship between teachers instructional practices and students' academic achievement in Chemistry

The relationship between teachers' instructional practices and students' academic achievement in Chemistry subject was presented and analyzed using Pearson correlation coefficient in the following section.

Table 4.12: The Relationship between Teachers Instructional Practices and Students' Academic achievement

Correlations		
Instructional practices		Students' achievement
Instructional practices	Pearson Correlation	.469**
	Sig. (2-tailed)	.000
	N	386
Teachers pedagogical skills	Pearson Correlation	.307**
	Sig. (2-tailed)	.000
	N	386
Assessing the progress of learners	Pearson Correlation	.170**
	Sig. (2-tailed)	.001
	N	386
Total	Pearson Correlation	.539**
	Sig. (2-tailed)	.000
	N	386

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

Table 4.12 above presents the relationship between Chemistry teachers' instructional practice and students' academic achievement in Chemistry. Accordingly, to identify the type of relationship between teachers' instructional practices and students' academic achievements in Chemistry a test of Pearson correlation was conducted. Pearson correlation coefficients between instructional practices of chemistry teachers, teachers' pedagogical skills and assessing the learners' progress significantly related with students' academic achievements in Chemistry subject.

Pearson's correlation is a measure of the degree of linear association between two variables. It indicates strengths, directions and significance of the relations of the variables. According to Gay Min (2009) 1.0 (-1.0) = Perfect Correlation, 0.60 to 0.99 (-

0.60 to -0.99) = Strong, 0.30 to 0.59 (-0.30 to -0.59) = Moderate, 0.01 to 0.29 (-0.01 to -0.29) = Weak and 0 = No Correlation. The correlation, denoted by r , can take on any value from -1 to 1 (Sileshi, 2008).

Pearson correlation coefficients between instructional practices of chemistry teachers and students' academic achievement in chemistry subject was significantly related, $r=.469^{**}$, $p<0.01$, which indicate there is a moderate, significant, and positive relationship between instructional practices of chemistry teachers and students academic achievement in chemistry subject.

In addition, Pearson correlation coefficients between teachers pedagogical skills significantly related with students' academic achievement in chemistry subject, $r=.307^{**}$, $p<0.01$; which indicate there is moderate, significant, and positive relationship between teachers pedagogical skills and students' academic achievement in chemistry subject.

Furthermore, Pearson correlation coefficients between assessing the progress of learners significantly related with students' academic achievement in chemistry subject, $r=.170^{**}$, $p<0.01$. However, it indicates weak correlation and significant and positive relationship between teachers pedagogical skills and students' academic achievement in chemistry subject.

Correlation coefficients r was positive and showed that, the relationship between Chemistry teachers' instructional practices, Chemistry teachers' pedagogical skills, monitoring and assessing the learners' progress and students' academic achievement in Chemistry subject revealed that instructional practices resulted in the students' academic achievement.

In sum the relationship between teachers' instructional practices and student's academic achievement was generalized and indicated that a test of Pearson correlation between teachers' instructional practice and students' academic achievement in Chemistry subject indicted $r=.539^{**}$, $p=.000$, $n=386$. This indicated that there is significant, positive and moderate relationship between teachers' instructional practice and students' academic achievement in Chemistry subject. Since teachers' instructional practice is positively correlated to students' academic achievement in Chemistry subject, it can be concluded that effective implementation of teachers' instructional practices resulted in the students' academic achievement.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter deals with the summary of major findings, the conclusion drawn from the findings and recommendations that the researcher suggests and assumes operational in improving Chemistry teachers' instructional practices and students' academic achievements.

5.1 Summary

The aim of the study was to assess the instructional practices of chemistry teachers in west Wollega secondary schools. Accordingly, instructional practices of chemistry teachers, pedagogical skills of chemistry teachers, the extent at which chemistry teachers monitor or assess the progress of their learners in teaching Chemistry were assessed. In addition, the relationship between teachers' instructional practices and students' academic achievement were examined. Finally, the study came up with suggestions and recommendations. In order to achieve the objective of the study, the following basic questions were stated and answered in the study process.

1. What is the current status of teachers' instructional practices in secondary schools of West Wollega Zone?
2. What is the status of students' achievement in secondary schools of West Wollega Zone?
3. What relation exists between teachers' instructional practices and students' academic achievement?
4. Do teachers in West Wollega Zone secondary schools have adequate pedagogical skills in teaching Chemistry?
5. To what extent do teachers assess the progress of learners in teaching the subject?

In this study a mixed research approach was used in which a descriptive survey study and correlation design was employed. The related literature and document regarding learning strategies and pedagogical skills of the teachers were reviewed to get answers for the above basic questions. The study was carried out in eight government secondary schools of the zone selected as the sample of the study which were selected through simple random sampling technique. 22 teachers and 364 students were selected using simple

random sampling technique as respondents to questionnaire and 8 principals and 10 vice principals were selected using purposive sampling technique as respondents of interview from sampled secondary schools. To gather necessary information on the issue, 29 questionnaires were distributed to students and teachers. The primary data was obtained through questionnaire and interview. The quantitative data was collected by the questionnaire from students and teachers of selected secondary schools and the qualitative data was collected from secondary school principals and vice-principals through interview.

The data collected from students and teachers using closed ended questionnaire was analyzed and interpreted using frequency, mean, and standard deviation. The analysis of the quantitative data is performed by the help of SPSS version 20. The data gathered through semi-structured interview was analyzed qualitatively in words to support the result obtained from quantitative analysis.

Finally, the data were carefully collected, coded, and presented for analysis and different data analysis tools such as mean, standard deviation and spearman's correlation. From these data analysis the following major findings reached.

5.2 Major Findings

The study revealed that majority of the teachers in secondary schools of West Wollega Zone was males. Males teachers were 68% and female students were 32%. It indicated that female teachers' participants in secondary schools of the zone were less than that of male students. Regarding age, majority of the teachers were between the ages of 26-35 years. However, 18% of them were between the age group of 20-25 years. Majority (45%) of the respondents were between 26-35 years age. Regarding educational background, majorities (86%) of teachers in West Wollega secondary schools were first degree holders and 14% of them were second degree holders. It reveals that majority of the teachers were below standard for secondary school. Even though Educational Road Map (MoE, 2011) has stated that the academic qualification required for the secondary school teachers is MA degree, majority of the teachers respondents were first degree holders. Thus it implies that secondary school teachers' in secondary schools of West Wollega zone need to improve their educational status to qualify educational standard of the secondary schools.

In terms of working experience, majority (43%) of the teachers have 16 years and above working experience. This implies that teachers are experienced enough that may be useful in improving the students' academic achievement.

Regarding instructional practices used by Chemistry teachers, the study found out that Chemistry teachers implement interactive lecturing and questioning learning strategy to the average level. Respondents' responses mean score was 3.07 and standard deviation 0.47. In addition, team based learning practice was rarely implemented in Secondary schools. Responses mean score was 1.6 and standard deviation was 0.49. Brain storming practice was moderately implemented in Secondary schools. Responses mean score and standard deviation on items of brain storming was 2.72 and 1.17 respectively. In addition, lecture approach was moderately implemented because responses mean score and standard deviation on items of lecture approach was 2.94 and 1.26 respectively. The study also revealed that interactive lecturing and questioning teaching practice was emphasized in West Wollega secondary schools since responses mean score on items of interactive lecturing and questioning was 3.07 and standard deviation was 0.47 and greater than all items of instructional practices. On the other hand, team based learning was rarely implemented with mean score of 1.6 and 0.49 standard deviation.

The study also indicated that teachers rarely organize the students' seat in to a circular or semi-circular shape prior to lecturing and there are no permanent groups in chemistry classrooms. In this regard respondents' responses mean score was 1.63 and the standard deviation was 0.69. It reveals that teachers do not promote active student learning through small group activities throughout an entire semester.

Regarding Chemistry teachers' pedagogical skills, the study revealed that chemistry teachers have average level of pedagogical skills. To his academic ability and preparation an effective secondary school teacher requires a good deal of pedagogical training and experience. Goble and James (1977) assert that good teachers have pedagogical skills, techniques and methods for helping children learn and how to manage classroom routines, how to plan curriculum programs and how to motivate students. However, the study revealed that Chemistry teachers in West Wollega secondary schools have moderate pedagogical skill that potentially affects students' academic achievement in Chemistry. Respondents' responses mean score was 2.62 and standard deviation was 1.28 on items of pedagogical skills of Chemistry teachers. In addition the study revealed that Chemistry teachers sometimes set classroom activities that initiate students' performance.

Responses mean score on this regard was 2.62 and the standard deviation was 1.36. On the other hand, it indicated that chemistry teachers rarely facilitate and monitor all class activities. Responses mean score on this regard was 2.20 and the standard deviation was 1.27.

Furthermore, the study revealed that chemistry teachers rarely organize the students in group as they can do together. Responses mean score on was 2.15 and the standard deviation was 1.11 on this regard. Furthermore, chemistry teachers rarely teach their students how to assess their learning in chemistry class since responses mean score on this regard was 2.20 and the standard deviation was 1.64.

Regarding assessing the progress of learners, the study revealed that chemistry teachers assess the progress of learners to the average level with the responses mean score of 2.67 and standard deviation 1.4. In addition, the study also revealed that Chemistry teachers rarely ask students to think of every step of the lesson since responses mean score was 2.28 and the standard deviation was 1.27. Furthermore, the study indicates that Chemistry teacher do not state learning goals clearly to the students, with responses mean score of 2.27 and standard deviation 1.34.

The study identified that grade 9th students were scored below an expected result in Chemistry. In contrast small numbers of students (11%) were scored greater than or equal to 90%. These are expected to be talented students. However, the trend of academic achievements of the students in chemistry become decreasing in last three (2017-2019) academic years.

Gifford and Latham (2013), indicate that lower achieving students typically display passive learning traits. Accordingly, this indicates that chemistry teachers taught by traditional teaching approach (teacher-centered) which is appropriate to teach only clever students which are up to three in one class. Thus, grade 9th students' academic achievement in Chemistry was low as because of teacher centered teaching practices of Chemistry teachers in West Wollega Zone secondary schools.

Learning is indeed sensitive by nature, but the learner is rather adaptive to a teacher's range of instructional approaches (Bruner, 1985). He confirmed that a learner's growth and development were assisted by various external means. He stated that any learner has a host of learning strategies at command, but it is the teacher who equips students with the procedures and sensibilities to lead them to their potential for obtaining knowledge.

These studies indicate that students' academic achievements depend on teachers instructional practices.

The study identified the type of relationship between teachers' instructional practice and students' academic achievements in Chemistry. Pearson correlation test of teachers' instructional practices and students' academic achievement in Chemistry indicted $r=0.539^{**}$, $P=0.000$. It indicates that there is strong, significant and positive relationship between teachers' instructional practice and students' chemistry academic achievement. It confirmed that as teachers instructional practices implemented well the students' academic achievement increases.

5.3. Conclusion

Based on major findings the following conclusions were drawn:

- The current status of teachers' instructional practices in secondary schools of West Wollega Zone was moderately implemented. Among teaching strategies interactive lecturing and questioning, lecture approach and brain storming practices were moderately implemented. On the other hand, team based learning practice was implemented to low level. Team based learning was not implemented as needed in West Wollega secondary schools.
- The study revealed that Chemistry teachers in West Wollega Zone Secondary Schools have moderate level of pedagogical skills. However, Chemistry teachers have low implementation in terms of facilitating and monitoring all class activities. In addition Chemistry teachers have low implementation in terms of organizing the students in groups. Furthermore, there are shortages in teaching how to use technology in chemistry instruction. Chemistry teachers have low activities in teaching their students how to assess their learning.
- The status of students' academic achievement in chemistry in West Wollega Zone Secondary Schools was not to the extent needed, but there is strong, significant and positive relationship between teachers' instructional practice and students' chemistry academic achievement. It confirms that as teachers instructional practices implemented well the students' academic achievement increases.

5.4. Recommendations

On the basis of the findings and conclusions arrived at, the following recommendations were forwarded so that teachers' instructional practices and students' academic achievement improved. Accordingly, the following points were recommended by the researcher.

1. Teachers' instructional practices have a vital role in students' academic achievement. Therefore, teachers have to improve their instructional practices to improve the students' academic achievement. Chemistry teachers are advised to implement team based learning strategy for the students' academic achievement in Chemistry. They don't have to depend on lecture approach all the time, instead they have to implement different teaching strategies like brainstorming learning strategy and interactive lecturing and questioning learning strategy as needed.
2. Chemistry teachers in West Wollega Zone secondary schools have moderate level of pedagogical skills in teaching Chemistry. So, Zone Education Office and Woreda Education Office have to arrange trainings to enhance or update teachers' pedagogical skills to teach in such a way it improves the students' academic achievement.
3. Assessing and monitoring the students' progress is a part of teachers' instructional practice which is important to identify areas of students' weakness and tackle the identified problems on time. Accordingly, Chemistry teachers have to emphasize on assessing and monitoring the students' progress. They are advised to assign students to work in small groups to complete tasks according to their abilities and monitor and assess their progress using the works given.
4. Students are not achieving results as needed in Chemistry in secondary schools of West Wollega Zone. It is revealed that students' academic achievement depends on teaches instructional practices. Effective implementations of teachers' instructional practices enhance students' academic achievement. So, Chemistry teachers have to implement different instructional practices by enough preparation for teaching.

The school leaders and Woreda Education Offices are advised to hold in staff training and scale up best practices of teaching among Chemistry teachers in order to help them implement best instructional practices.

5. Although this research may have its own contribution in understanding the teachers' instructional practices and students' academic achievement in Chemistry in West Wollega Zone secondary schools, the outcomes of the study may not be complete. Therefore, the researcher recommends further research by concerned bodies.

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APPENDICES

Appendix A: Questionnaire for the Teachers and Students

WOLLEGA UNIVERSITY
FACULTY OF EDUCATION AND BEHAVIORAL SCIENCE
DEPARTMENT OF EDUCATION

APPENDICES/APPENDIX I: LETTER OF INTRODUCTION

Dear Madam/sir:

RESEARCH: REQUEST FOR DATA COLLECTION PERMISSION

I am a post graduate student pursuing a Master of Education Degree at Wollega University I am researching on:

Teachers Instructional Practice and Student Academic Achievement In West Wollega Zone.

To achieve this, you have been selected to participate in the study. I kindly request you to fill the attached questionnaire to generate data required for this study. This information will be used purely for academic purposes and will be treated in confidence and will not be treated in confidence and will not be used for publicity. Your name and that of your school will not be mentioned in the report. Your assistance and cooperation will be highly appreciated.

Thank you!

APPENDIX I: QUESTIONNAIRES FOR TEACHERS AND STUDENTS

The information you give will be of benefit to the researcher in accomplishing her academic goal. Please respond to the items to the best of your knowledge and as truthful as possible.

Section A: Background information

1. Name of school/office _____

2. Kindly indicate your gender Male ☐ Female ☐

3. What is your highest academic qualification? Diploma ☐ Degree ☐ Masters ☐

4. What is your age below 25 ☐ 26-35 year ☐ 36-45 ☐ 46-55 years ☐
above 55 ☐

5. How long have you been in the teaching profession? Less than 2-5 years ☐

6-10 years ☐ over 15 years ☐

1. For how long have you taught in your current school? Less than years 2-5 years ☐
6-10 ☐ 11-15 years ☐ 15 years and above ☐

SECTION B: QUESTIONS

Questionnaires to be filled by grade 9th natural science students

Dear participant, the purpose of this study is to collect data on the research entitled as “the effects of teachers’ instructional practices and students’ academic achievement in west wollega zone”. You are invited to participate in this research study. Thank you for agreeing to help me by completing this questionnaire which should take less than 20 minutes. Your responses are crucial for the successful accomplishment of this study. Therefore, you are kindly requested to read all the questions and fill with genuine responses. Please, feel free to indicate your opinion because no response is treated as wrong. Furthermore, your responses will not be used for other purpose except for academic purpose and remain confidential. Please do not leave the questions unanswered.

Thank you in advance for your cooperation!

Personal Information:

Sex A. Male B. Female.

Age A. up to 16, B.17-20, C. above21

In this section, please indicate to what extent you agree or disagree .Indicate your answer by indicating an (x) for the response of your choice on the number in the box on the right. The numbers have interpreted as follows.

1=strongly agree, 2=agree 3=undecided, 4=disagree ,5=strongly disagree

1. The areas in which teachers practice deferent teaching styles to improve student academic achievement. The following are some of the areas that the teachers practice deferent teaching styles to improve student performance. Please provide appropriate answer by putting (x) mark in one of the alternatives.

Instructional strategies used by chemistry teachers in west wollega secondary schools

No	1. What types of instructional strategies are used by Chemistry teachers in west wollega secondary schools?	Level of agreement				
		1	2	3	4	5
	Interactive lecturing and questioning					
1	Prior to lecturing an instructor may organize seats into a circular or semi-circular shape.					
2	Chemistry teacher encourage students to ask questions.					
3	Effectively manage time between questions, and also encourages students to answer their own questions.					
	Team based learning					
4	Team based learning is practiced by chemistry teacher in classroom					
5	There are permanent group in your chemistry classroom					
6	Chemistry teacher promote active student learning through small group activities throughout an entire semester					
	Brainstorming					
7	Teacher encourage ideas exchange, requires group work and relies on generating as many new and sometimes astonishing(surprising) ideas as possible as well as on providing solutions to problems					
8	The teacher creates the sense of freedom and competition.					
9	After all possible ideas are collected, evaluation takes place					
	Lecture approach					
10	In your chemistry class you put all of your focus on the students and the students talks					
11	The students exclusively follow the lesson					
12	During activities, students work alone, and collaboration is discouraged.					

Chemistry teachers' pedagogical skill

No	Teachers teaching style	1	2	3	4	5
1.	Chemistry teachers appropriate classroom activities that initiate students' performance					
2.	Chemistry teacher facilitating and monitoring all class activities					
3.	Chemistry teacher organizing the students in group as they can do together					
4.	Chemistry teacher teach how to use technology in chemistry instruction					
6.	Chemistry teachers motivate their students to take part in classroom activities.					
7.	Chemistry teachers identify desirable and undesirable practices in classroom activities in order to improve their students' chemistry achievement.					
8.	students are equitably relaxed by their instructor on few representative practical examples and classroom activities within specified time					
9.	chemistry teachers teach their students how to assess their learning in chemistry class					
10.	Chemistry teacher teach important chemistry in context that are closely connected to real life situations.					

Monitoring or assessing the progress of learners

No	Teachers teaching style	1	2	3	4	5
1.	Chemistry teachers' Teacher use tests or quizzes to assess students learning					
2.	Chemistry teachers make their Students work individually with the textbook or worksheet					
3.	Chemistry teacher provides hint to students in response to work/answer					
4.	Teacher checks students' exercise					
5.	Chemistry teacher asks students to think of every step of the lesson					
6.	Chemistry teacher state learning goals clearly					
7.	Chemistry teacher asks students to work in small groups according their ability.					

Appendix B: Interview guidelines for secondary school principals

WOLLEGA UNIVERSITY

FACULTY OF EDUCATION AND BEHAVIORAL SCIENCE

DEPARTMENT OF EDUCATION

Interview questions to be filled by secondary school principals and vice principals .

Dear respondents! The purpose of this interview question is to examine “the effect of teachers’ instructional practices on students’ academic achievement in Selected Secondary Schools of west wollega zone of Oromia Regional State”. To this effect, the response that you give as a respondent has great value and it was kept confidential and utilized for academic purpose only.

Thank you in advance!

Part I –personal information

1. age_____
2. sex_____
3. experience _____
4. educational back ground
a) diploma) b) degree c) masters
5. load per week__

Interview questions for principals and vices principals.

A). the type of teachers’ teaching styles practice in schools.

1. What types of teaching styles your school implements?
- 2 Do you think that teachers’ teaching styles affect students’ learning?

B). How chemistry teachers engage learners in classroom activities

3. Do you think your teachers are aware of active learning style to teach chemistry students?
4. What chemistry teachers use to motivate students as they participate in group work Activities?
5. What is your comment concerning active learning especially on group work activities?

C).The relationship between teaching style and students’ chemistry academic achievement.

6. Is there the relationship between teaching style and students’ academic achievement?
7. From both teaching styles (active learning and teacher-centered) which one is related with High score?
8. What you suggest on the relationship between teaching style and academic achievement?

Appendix: C Afan Oromo Version of Questionnaire

Gaaffiwwan barattoota kutaa 10ffaa garee barnoota saayinsiiuummaanguutamu

Kaayyoongaaffiikanaaqorannoomataduree’’ effects of teachers’ instructional practices and students’ academic achievement in west wollega zone ”jedhuufodeeffannosassaabbachuuf.Kanaafuuisinisodeeffannoobarbaachisuakkanaaflaatta niiffilatamtaniijirtu

.Kanaafuumilkaa’insa qorannookanaafgaaffiikanattiyaadaaittilaachuufyerookeessanirraada qiiqaa 20

waangumaachitaniifdursagalatoomaajechuunbarbaada.Yaadniisingaaffiikanaaflaattanhojii qorannookanaafbaay’eemurteessaawaanta’eefgaaffiwwandhiyaatanyadaguutuunergadub bistaniiboodagabateekennamekeessamallattooakkakeessanisin nan hubachiisa.Yeroogaaffiikanaafdeebiilaattanhojiibarnootaakkaadamiiifwaanbarbaachisuuf soda

tokkomaleeakkahojjettanisin hubachiifna.Gaaffiitokkoilleeotuuhinguutinbirahindarbina.

Galatoomaa!

Instructional strategies used by chemistry teachers in west wollega secondary schools

MaladhiyeessiibaruubarsiisuubarsiisotnikemistriiGodiinaWallaggaalixaa

No	What types of instructional strategies are used by Chemistry teachers in west wollega secondary schools? BarsiisotnikemistriiGodiinaWallaggaalixaakessattiargaman mala dhiyeessiibarnootaaattamiittifayyadamu?	Level of agreement				
		1	2	3	4	5
	Interactive lecturing and questioning(mala od-ibsaa fi gaaffii					
1	Mala kanaan barsiisuu osoo hineegalin fuula dura barsiisaan akkaataa teessoo barattootaa bifa geengoo ykn walakkaageengoottinigurmeessuu?					
2	Barsiisotnikemistriibarattootniakkagaaffiigaafataniifnijjabeessuu?					
3	Barsiisotnikemistriiigaaffiiqopheessaniifyeroogaaffichifudhatur maduuttigahumsaqabuu, barattootnisgaaffiigaafatamanyerooisaniifkennamekeessattiakkadeebisannijjabeessuu?					
	Team based learning (Gareenbarachuulaalchisee)					

4	BarsiisotniKemistry mala gareenbarachuubu'uureffatedareekeessattinifayyadamuu?					
5	WayitaKemistriiibarattanGareedhaabbataafayyadamtuu?					
6	Barsiisotnikemistry mala baruu-barsiisuubarataagiddu-galeeffatekaraaraawwiigarewwanxixiqqaasamisteeraguutuuhojii irranioolchuu?					
	Brainstorming (Barattootnihundiwal-faanaakkayaadamaddisiisaniifqopheessuu)					
7	Barsiisotnikemistrywal-jijjiiraniifyaadanijajjabeessuu?,gareenhojjechuuirrattinixiyyeeffatuu?,yaadahaaraaakkaburqisiisan,kanneenyaadahaaraaburqisiisanisnionnachiisuu?					
8	Barsiisotnibarattootnisodaamaleeakkabaratanii fi miirawal-dorgommiiakkahoratannitaasisuu?					
9	Yaadawalittiqabuunmadaalliinigeggeessuu?					
	Lecture approach (mala ibsaqofaanbarsiisuu)					
10	Wayitabarnootakemistiriibarattankeessattibarsiisotnikeessanbarattootahundanihordofuu?					
11	Barattootnihundibarnootanihordofuu?					
12	Barattootnidalagaaleeykngochawwanqofaqaafaaisaaniidalaguuyknraawwatuu?gareenhojjechuunhinjajjabeeffmuu?					

Gahumsaogummaamalleenbaruu-barsiisuubarsiisotaKemistriiilaalchisee.

No	Mala baruu-barsiisuubarsiisota	1	2	3	4	5
1.	Barsiisotnidareebarnootaakeessattigochafilatamaabarataaonnachiisunifayyadamuu?					
2.	Barsiisotnikemistiriibarattootakakaasuungochaaleedareekeessattiisaanraawwatannito'atuu?					
3.	Barsisotnikemistiriiaakkaataahojjechuufmijatuttibarattootagareennigurmeessuu?					
4.	Barsiisotnikemistirii,kemistiriibarsiisuukeessattihaalaittifayyadamatekinolojiinibarsiisuu?					
5.	Barsiisotnikemistiriibarattootniisaaniigochaaleegareenraawwatamankeessattiakkahirmaataniiifbarattootaniakakaasuu?					
6	Barsiisotnikemistiriimalleenbaruubarsiisuufilatamaata'eaddabaa suunfayyadamaniiqabxiikeessanfooyyessuufnihojjetuu?					
7	Barsiisotnikemistiriibarattootaisaaniijaarsagareedareekeessaakeessattifilatamuufhirmaannaawalqixaanikennuufii?					
.8	Barsiisotnikemistiriiaakkaittikemistiriimadaalanbarattootaisaanii nibarsiisuu?					

9	Barsiisotnikemistiriibarattootaisaanihaalaqabatamaanaannooisa aniiirrattihundaa'uunnibarsiisuu?					
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Jijjiiramayknfooyya'insabarattootairratimul'atuhordofuu.

No	malabaruubarsiisuubarsiisotaa	1	2	3	4	5
1.	Barsiisotnikemistiriibattallewwangaggabaaboofayyadamuunbar attootaisaaniinimadaaluu?					
2.	Barsiisotnikemistiriibarattootniofdanda'aniakkahojjetannitaasis uu?					
3.	Barsiisotnikemistiriibarattootniisaaniisirriittiakkamadaalamaniif yaadakallattiagarsiisunikennuu?					
4.	barsiisaandabtarabarattootaayerooyeroonn to'atuu?					
5.	barsiisotnikemistiriibarattootniisaaniibarnootadarbetooraanakka yaadataniifnigaafatuu?					
6.	barsiisotnikemistiriigalmabarnootaasirriittiniibsuu?					
7.	barsiisotnikemistiriibarattootniisaaniiakkaataadandeettiisaaniin gareekeessattiakkahojjetaniifnigaafataa?					