ACTION RESEACH ON REFLCTIVE TEACHING IN THE PLASMA CONTEXT: THE CASE OF MENELIK II PREPARATORY SCHOOL

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ACRONYMS

GEQAEA: General Education Quality Assurance & Examinations Agency.

ICT: Information and Communication Technology.

PTA: Parent-Teacher Association.

STP: Situation Target Plan.

TGE: Transitional Government of Ethiopia.

ABSTRACT

The present study has been conducted for fifteen weeks during the first semester of the present academic year. Disciplinary problems, lack of preparedness of students before coming to school, lack of direct involvement of students in classroom exercises, problems of posing questions and of organizing their own notes have been identified and tackled with contextual solutions along the study.

Classroom observations, test and exam results, focus group discussion with students and the deliberation of the research report to the general teaching staff members were the instruments for data gathering. Reflection on the contextual problems led me to design appropriate strategies, actions and observations along with data collection were the next steps; the cycle ended up with the recognition of change with respect to the strategies interventions.

The attendance problem of grade twelve students have been improved, students became aware of the knowledge reconstruction paradigm and had demonstrated in their conceptions of the necessity of preparedness before coming to school as part and parcel of the classroom .activities. Their tendencies towards attempting classroom activities, how to probe into new ideas and the habit of organizing their own notes have been improved through the process. Their progressive tests and final exam results were also enhanced, though they faced them without any prior orientations and couching, as a strategy so as develop a habit of independent learning. Dialoguing became the feature of my class and we were friendly by narrowing the teacher-student dichotomy.

My conclusion is that reflective teaching was a fruitful approach to teaching chemistry in the plasma context.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Starting from 2003, Chemistry and other seven subjects have been offered by the plasma lessons' presenter via the satellite transmission nation-wide, in the Ethiopian High School as well as preparatory schools. The transmissions are received with 57 inch plasma screen, installed in each classroom. As to my understanding the role of the classroom teacher is concentrated on taking regular attendance, watch over the classroom discipline, presenting introduction before the plasma transmission, supervising and offering help for needy students during transmission, resume classes if at all the machine stops working, and giving summary of the lesson after each transmission. Moreover, the Ministry of Education clearly states the necessity of educational research to be the objective of the new education and training policy (TGE, 1994:15). According to this policy, the teaching-learning process shall emphasize problem-solving by making curriculum relevant and by adapting appropriate methods.

Furthermore, at the beginning of the academic year (2007/2008), the school management (Menelik II School) offered to its teaching staff members a workshop so as to initiate us in effecting towards attaining the 'quality' of education.

Besides, I have attended courses on curriculum development and research methods, in my graduate study. I decided to conduct action research by considering it as an appropriate research method; can be practical by a teacher at classroom level; despite the fact that the High school teachers are limited to carry on research work, especially in action research due to lack of support, incentives, and experience (Seyoum,

1998; Yibeltal, 2006; Ashenafi, 2007). I was encouraged to do action research in my assigned sections with the support of my advisor.

Action research helps to study a real school situation with a view to improve the quality of actions and results with in it. It aims also to improve one's own professional judgment and to gain insight into how better to achieve desirable educational goals. Action research offers a means for changing from current practice towards better practice (Schmuck, 1997:28).

Since the introduction of plasma program is new in its kind, our way of teaching and learning should be in harmony with the advent of the technology methods.

Parker (1997: 31) puts the role of a reflective teacher as follows:

> Each school, each classroom, is seen as unique by dint of its qualities, meanings and challenges. Consequently reflective teachers develop their practice through their own action- research performed in the actual context in which their teaching takes place, upon and with the specific population which it concerns. This ferment of practice and research is informed by knowledge of theories of education; but reflective teachers retain a critical perspective on these, their meaning, their veracity and their applicability within their own classroom, with its unique set of interests and relationships.

According to Parker's remark, the remedy to solve the classroom plasma transmission problems are to be enlightened with educational theories and being reflective teacher to be critical according to the nature of the problems. Therefore, it was high time for me as a graduate student and at the same time a classroom teacher, to do action research on the plasma context classroom.

Bev Beasley (1981, cited in Carr and Kemmis, 1986), discusses the importance of individual self-reflection in a paper on 'the reflexive spectator': the action researcher must in any case clarify her or his understandings as a basis for thoughtful interaction with others (p.200).

The aforementioned writer's paper is a good reminder to classroom teachers to be self-reflective during classroom interactions as a reflective teacher with her/his students, for improvement.

More extensive professional autonomy and responsibility require that teachers themselves build educational theory through critical reflection on their own practical knowledge (Carr and Kemmis, 1986: 41). That is, to be critical is the solution for contextual problems.

According to Schon (cited in Villar, 1994: 6215) "Reflective teaching involves the development of strategies and techniques to deal with the complex, uncertain, unstable, and unique situation of the teaching practice." Which means a reflective teacher designs a number of teaching strategies for her/his action.

Teaching is a dynamic act of a teacher where the instant challenges are given tentative solutions intuitively and actively and latter driving to a long lasting solution for its moral sake. So, teaching has no fixed scheme of action as a result (Villar, 1994: 6215).

According to Villar' point of view, reflective teaching is a dynamic process where intuitive solutions are being generated, now and then, to be scrutinized objectively as to the context, and to bring forth for discussion for their validity.

Therefore, action research is appropriate to classroom teachers to solve their contextual problems. The research method is helpful to solve specific problems which cannot be solved by the routines of traditional research methods.

1.2. Statement of the problem

Before the advent of plasma, I used to teach Chemistry both in classrooms and school's laboratory. I used both lecture and discussion methods in classrooms, and demonstrations in laboratories. I usually raise questions to motivate students. The questions usually focused on recalling facts and formulas that could strengthen concepts to solve problems.

I usually encounter problems, at least for a month or two, until students adapt to my way of teaching. I believe that teachers apply different approaches in teaching the same subject. As a result, students got puzzled when teachers are changed. Students usually 'appreciate' teachers who do not ask questions, but give exercises and work out themselves. In my part, I was inspired by the discussion method of teaching.

John Dewey (1997:198) criticized spoon-feeding as follows; "For teacher or book to cram pupils with facts which, with little more trouble, they could discover by direct inquiry, is to violate their intellectual integrity by cultivating mental servility".

Teaching is a process that fosters independent thinking, interest in the subject matter, and being committed to open discussion and respect to new ideas and evidences (Elliott, 1991:49-50).

By considering these ideals, I have tried to design different strategies to help self-reliant students: able to comprehend, think and design a plan to solve their own problems. Such private strategies could be made public through action research.

When I started my graduate studies, in the College of Education, Addis Ababa University, I got a chance to read works of different educators. John Dewey (1997) in his famous book 'How We Think' posits it as:

> Material should be supplied by way of stimulus, not with dogmatic finality and rigidity. When pupils get the notion that any field of study has been definitely surveyed, that knowledge about it is exhaustive and final, they may continue docile pupils, but they cease to be students (P. 198).

- Nowadays, students are taught by both plasma presenter and virtual teacher. The subject chemistry is one of the disciplines transmitted by the satellite, from the Ethiopian Educational Media Agency. In this case, understanding the situations of students and designing appropriate strategies, so as to support the learning activity of students is demanding.

- Because of lack of independent learning experience; the rate of our student's learning experience could not go with the speed of the presenter. A reflective teacher who is open-minded, responsible, and wholehearted is required so as to alleviate problems in the educational process (Villar, 1994: 6215). So, active and persistent reflective teacher is required for the process (Dewey, 1997:6).

Chemistry has its own language and perspectives to substances and conditions. The televised program of the subject utilizes both the lecture and demonstration methods simultaneously and hastily.

The role of a teacher in the development of the curriculum is limited; but teachers have the authority to modify the pedagogy according to the situation. Elliott (1991) put it this way: "The curriculum could be more apparent when the pedagogy is reflectively processed" (Elliott (1991:11).

The syllabus of chemistry in the preparatory school level focuses on basic skills and principles. It requires descriptions on a given phenomenon with chemical equations and interpretation of its significance. This, in turn, demands the skill of decoding chemical formulas and structures of different substances. That is, students at the preparatory level should be

reflective: able to think and act simultaneously. To do so, the teacher must be reflective beforehand. When a reflective teacher reflects on the past, the present, and on the future, then s/he could plan a strategy and act on it (Schmuck, 1997:34). When a reflective teacher makes her/his strategy public, then it would be an action research (Bailey, 1997 emphasis).

The teacher undertakes research into a practical problem and on these bases s/he changes some aspects of her/his teaching style (Elliott, 1991:23). The development of understanding precedes the decision to change teaching strategies; reflection initiates action. That is, a school teacher should conduct classroom action research so as to bring about a change on her/his teaching style.

That is why I intended to study my reflective teaching approach, which is strange in schools, through action research, so as to refine my teaching methods and solve problems of teaching-learning process along with the plasma guide instructions. I want to know exactly the number of teaching strategies that I could generate; to study their impacts on student's attitudes towards industriousness, thinking, and apprehending what they are supposed to do.

For the reflective teacher, problems do not exist 'out there', ready made, well defined and waiting to be solved. Instead, a problem is seen as a human construct which arises out of a particular perception or interpretation formed about a unique educational context with its values and ends (Parker, 1997: 40).

As an implicit hypothesis, however, I wish to see students, who are competent in conceptualization and interpretation of chemistry, plan how to solve chemistry problems, appreciate the subject-chemistry, and respect rules and regulations of the school.

The research attempts to answer the following three questions.

1. How many applicable teaching strategies could I generate and apply?
2. How much is student's mind changed from cramming formulas to conceptualizing Chemistry problems (by first planning the strategy rather than hunting for formulas)?
3. To what extent are students changed with respect to the school's rules and regulations?

1.3 The Research Setting

Menelik II is the first modern school in the history of the country (Marew, 2000:104). The level of the school is in between general high school and the University College. It offers lessons which are adopted from the previous freshman courses (Girma Gamessa, 2004).

The school's classrooms are installed with the 57 inch plasma screens and runs full day program. There were forty one to fifty eight students assigned in the three sections in which I was assigned to teach.

Four periods per week are allocated for chemistry, in each grade level. The duration for a period is forty two minutes: two minutes for introduction allocated to the classroom teacher and thirty minutes for the prearranged plasma program, and the remaining ten minutes for the classroom teacher to do the summary work. If there is power interruption or other technical failure, the classroom teacher is supposed to resume with her/his chalk and talk method.

At present there are 129 teaching and twenty five administrative staff-members. Eleven of them are chemistry teachers, with two masters (from Soviet Union) and the remaining B.Sc. holders in chemistry. This year, the school has enrolled nearly 3000 students in its regular program.

These days due to scarcity of supply of financial and material support, the tendency of teachers towards classroom research is not observed; even though the modules for the teachers' profession development are being studied on departmental level.

1.4 Objective of the Study is to improve my teaching practice and students' learning strategies by using action research. That is, as a reflective teacher, I intended to improve my teaching style and students' learning activities, in the context of plasma instructions.

As long as it is an action research, the immediate objective of this study is to test my intuitive strategies along the plasma transmission: whether or not reflective teaching is applicable in our context in the process of getting self-reliant students. If my study is successful, then I will serve as a facilitator to conduct a collaborative action research with my department colleagues, so as to expand reflective teaching as a means to alleviate students from traditional learning process (Carr and Kemmis, 1986:201). I believe that teaching is a teamwork which is done by the interest of individual teacher. So, to convince colleagues, a research of this kind could be a means in our context; the discussion among colleagues would not be coercion but serves as an instrument to convince each other.

1.5 Significance of the Study Reflective teaching is not a common practice in schools. The study therefore motivates teachers to conduct action research on their methods of teaching; practical classroom problems of teachers could be solved by themselves and would bring out their strategies for group discussion. Such practices encourage teachers to be open for discussion and improvement. This is one of the means to create a democratic society. That is why action research is thought out of the traditional applied research so as to involve teachers in the research culture.

1.6 Delimitation of the Study The study is limited only to one school and only three sections, because of my original plan that I want to study the application of reflective teaching in the plasma context, in which I am presently engaged. Besides, the school administration, the teaching staff-

members and my students are hypothetetically plausible to test my intuitive strategies with minimized difficulties.

1.7 Limitations of the Study when ever I conducted classes without the plasma transmission, I would be the source of information and it overrides my observation and recording time. As a result, my data were largely affected due to such engagement. In addition to this, due to lack of co-operation of my colleagues, I was getting minimal benefits from their opinions. However, I conducted the research with the collaboration of students; affected directly by the strategies.

While I was conducting this study, I was a regular teacher; all the time available in my classes. So, there was vivid shortage of time for the full-fledged period-wise reflections and reading journals.

Besides, I have done only one deliberation to the teaching staff-members because of time constraints. More over, my immature skill to conduct action research is taken as limitation of the study.

1.8 Definition of terms

Action research is a research paradigm originated from the critical educational science applied for the improvement of quality of action within it, like teaching for teachers.

Proactive model of action research is the approach of Schumck (1997:31) in which the educator acts and then studies effects on the actions prior to collecting data and analysis of the data for the action research.

Reflection involves more than thinking and includes reasoning, the creative production of ideas, problem solving, and the awareness of all these mental activities. Or it can be defined as a means to solve problems by critical thinking.

Reflective thinking is critical consideration of any supposed form of knowledge with regards to the grounds that support it and conclusions derived consequently.

Reflective teaching refers to a process of critical analysis whereby teachers develop logical reasoning skills, thoughtful judgments, and attitudes supportive of reflection.

CHAPTER TWO

REVIEW OF LITERATURE

The portrayal. of the review of literature ranges from the essence of educational research to action research and reflective teaching. The themes are: the essence of educational research, action research and reflective teaching, and chemistry, ICT, and reflective teaching.

More emphasis has been given to the significance of reflective teaching in conducting chemistry classes with the guide of the plasma transmission, since my research topic focuses on reflective teaching.

2.1. The Essence of Educational Research

The paper has focused to demonstrate the development of educational research out of metaphysics, to the stage of critical educational science. The positivist paradigm and the hermeneutics interpretive view are considered in between the two paradigms. The aim of this review of literature is to show the significance of reflective teaching and action research as a legible approach to the classroom teacher.

2.1.1 The era of metaphysics

In the past it was thought to be the philosopher's task to give a comprehensive and rational account of the nature of reality and of man's place in the scheme of things. From Plato's day until comparatively recently, metaphysics in one form or another has been the main area of traditional philosophical activity. Plato, Aristotle, Descartes, Spinoza and Hegel, were to a large extent occupied with giving something like an overall picture of reality supported by arguments of a rational kind (Moore, 1982: 2)

Plato, for instance, gives a general theory of education in the dialogue known as the Republic, in which his aim is to recommend a certain type of man as worthy to be the ruler of a distinctive type of society.

As posited by Nasr, (2002: Xii, cited in Amare, 2005)

> The educational paradigm that we are using in modern education is grounded on the post 16th century enlightenment project of the European manufacturing economics and rigid hierarchical human relations underpinned by power, king of man, which replaced the European medieval education system, which was founded on wisdom, the kingdom of God.

During the enlightenment period, the process of education was led by the Greek philosophers. Since from the time of Francis Bacon, realism became the dominant paradigm over idealism, and science overtook the power of religion (Carr and Kemmis, 1986:61).

2.1.2. The era of applied science (positivism, grounded theory)

Although there are wide variations in the way the term is used, 'positivism' is usually taken to refer to a style of thought that is used, and 'positivism' is usually taken to a style of thought that is informed by certain assumptions about the nature of knowledge. The most important of these assumptions is what Kolakowski calls' the rule of phenomenalism'; the claim that valid knowledge can only be established by reference to that which is manifested in experience. It is, then a claim to the effect that the label 'knowledge' can only be ascribed to that which is founded in 'reality' as apprehended by the senses (Carr and Kemmis, 1986:61)

The rationale of the positivist is that the researcher should be free from bias; the researcher observes the effect of a variable factor imposed on a

certain situation. The same authors emphasized the significance of science by putting as: "Science, and only science, offers a neutral stance because it alone employs methods which guarantee knowledge which is not infected by subjective preferences and personal bias" (Carr and kemmis, 1986.62).

The rationale of the social scientists so as to adopt the natural science methods is because they are systematic so as to conduct a research as well as to convey the outcome to public as valid object.

When applied to the social sciences, however, positivism is usually taken to imply two closely related contentions. The first is the belief that the aims, concepts and methods of the natural sciences are also applicable in social scientific enquiries. The second is the belief that the model of explanation employed in the natural sciences provides the logical standards by which the explanations of the social sciences can be assessed (Carr and Kemmis, 1986:62).

Because the method is full of standards, the practical problems of education were studied by the professional researchers, sociologists and psychologists. That is, the solutions are suggested from the outsiders as to be implemented by the teachers, in their classrooms.

The 'methods' themselves are broad spectrum, which are supposed to be implemented in any context. As a consequence both the classroom teachers and students are passive acceptors of the result, since their fate is to exercise the prescriptions given from above.

However, Dewey (2006:114) commented on the method as: "An end established externally to the process of action is always rigid. Being inserted or imposed from without, it is not supposed to have a working relationship to the concrete conditions of the situation".

Now if the assumptions and beliefs incorporated in a dominant paradigm are imposed on the scientific community, then science itself begins to

resemble something like an ideology and the original arguments supporting the scientific approach to educational theory begin to crumble (Kuhn, cited in Carr and Kemmis, 1986:75).

This means, the move is from dogmatic approach to a rigid system; undermines the values and beliefs of the practitioners; it reduces the teacher into a technician that assembles the already manufactured parts and applies techniques.

According to 'applied science' view, the professional expertise of teachers does not derive from any over-ridding concern with educational values and goals. Rather, it stems from the possession of the technical skills required to apply scientific theories and principles to educational situations" (Carr and Kemmis, 1986:30). Since education is a practical enterprise, these problems are always practical problems which, unlike theoretical problems, cannot be resolved by the discovery of new knowledge, but only by adopting some course of action. And the course of actions is contextual like classroom situations.

Gauthier (1963, cited in Carr and Kemmis, 1986), says:

> 'Practical problems are problems about what to do ... their solution is only found in doing something". Educational problems arise when expectations about practical situations are not congruent with the practical reality itself. In other words, an educational problem denotes a gap between a practitioner's theory and practice (p.108).

Parker (1997:36) discussed positivism as a paradigm which is devoid of the significance of reflective and philosophical thinking of teachers, but only with presenting the summarized results of the philosophical thinking of others.

Consequently, educational theory was invariably perceived as a self-contained academic pursuit different from, and unrelated to, the educational practice it was supposed to illuminate and inform. As a consequence it appears too-ready to apply its generalizations to all contexts; it is also paradoxically, over-hasty in its desire to universalize from a limited range of data. This effectively obliterates the distinctive features of each context under imperatives of similarity or identity.

the dilemma was not to totally abandon the positivist approach, because it offers causal explanations that can be used to manipulate and control an educational situation or the interpretive aim of revealing the different understandings of educational situations that various participants already possess, so that they can become more aware of what they normally take for granted (Carr and Kemmis, 1986:104).

2.1.3. The era of hermeneutics interpretive view

The other paradigm which pays tribute to the practice of teachers prior to formulation of educational theory from objective data is the 'interpretive' view. According the educational theory of the 'interpretive' view, the researchers are closer observers of the practices of teachers by giving their interpretations and offering an educational theory that could solve the present educational problems of teachers. Carr and Kemmis (1968) state the origin of interpretive view, in their book as:

> This 'interpretive' view of the nature of the social sciences has a long history. It was first elaborated by seventeenth-century protestant theologians who wanted to develop a method that would show how the meaning of the Bible could be directly understood from a reading of the text-without the intervention of any ecclesiastical explanations the technical method developed for this method of interpreting meanings was called 'hermeneutics'(p.86)

Of course, the method suffers from subjectivity; because the theory is evolved from mere interpretation of the observer. In this case, the educational theory reflects the practice in a better way than the positivist; the theory is evolved from the practice of teachers, but devoid of objectivity.

Regarding the 'interpretive' approach, it rejects the image of the practitioner as a consumer of scientific theories and recognizes instead that educational research must be rooted in the concepts and theories that practitioners have themselves acquired and developed to serve their educational purposes (Carr and Kemmis (1986:117). It is, therefore, entirely correct to insist that educational research cannot rely on methods and techniques designed to produce scientific theories, but must instead adopt procedures for uncovering the theories in terms of which educational practices are conducted and made intelligible. If this connection between the theoretical accounts produced through research and the practitioner's own mode of thinking is not made, then the research will be divorced from the theoretical context in which educational practices are conducted and any educational character it may have will be hard to find.

So, it was the time to design another theory which encompasses the strength of the two, which is the scientific method that regards the values and beliefs of the practitioners.

2.1.4. The era of Critical Educational Science

Research is mandatory for the teaching profession: s/he has to investigate her/his contextual educational problems, by using appropriate methods that s/he should be able to derive a contextual educational theory. That is, teachers should not be excluded from searching solutions for the problems they encounter in their classrooms (Parker, 1997:32).

In justifying the need for a teacher to be a researcher; Hawes (1976:17708; cited in Seyoum, 1998) observes that;

> The classroom teacher as a potential research worker starts her/his task with very great advantages. S/he knows her/his own local conditions better than any one else is likely to do; s/he has the support and confidence of those with whom s/he works; the children, the parents, the community members... (p.5)

If teaching is to become a more genuinely professional activity, Carr and Kemmis, (1986) argue the necessity of three sorts of development as follows:

> First, the attitudes and practices of teachers must become more firmly grounded in educational theory and research, though educational practitioners already have some understanding of what they are doing and an elaborate, if not explicit, set of beliefs about why their practices make sense, they must already possess some 'theory' that serves to explain and direct their conduct. Secondly, the professional autonomy of teachers must be extended to include the opportunity to participate in the decisions that are made about the broader educational context within which they operate; that is, professional autonomy must be regarded as a collective, as well as an individual matter. Thirdly, the professional responsibilities of the teacher must be extended so as to include a professional obligation to interested parties in the community at large (p.111).

Education is no longer viewed as a process of adapting or accommodating the mind to structure of knowledge. Instead it is viewed as a dialectical process in which the meaning and significance of structures are reconstructed in the historically conditioned consciousness of individuals as they try to make sense of their 'life situations.' The mind 'adapts with' rather than 'adapts to' structures of knowledge (Elliot, 199:19-10).

Elliot (1991:51) went on to explain the necessity of reflectiveness in practice as follows: "Reflection directed towards the realization of values might be described as practical philosophy". Such description directs our attention to the role reflective critiques of the value interpretations embedded in practice can play in improving it. Such philosophical critiques enable practitioners to continuously reconstruct their concepts of value in ways which progressively illuminate practical problems and possibilities.

Action research may be seen as to winter (1989:66; cited in parker, 1997:37), "reflective teaching's systematized attempt to overturn this hierarchy, to emancipate the teacher-researcher from the oppression of the positivist's division of theory and practice within a rational process of change".

Carr and Kemmis (1986:183) emphasized in their book how action researcher meets the 'objectivity' and 'subjectivity' of the two paradigms as follows: Action researchers are distinct from interpretive researchers in adopting a more activist view of their role; unlike interpretive researchers who aim to understand the significance of the past to the present, action researchers aim to transform the present to produce a different future. While interpretive researchers are relatively passive, action researchers are deliberately activist. While positivist educational researchers may often be described as 'objectivist', emphasizing the objective status of knowledge as independent of the observer, and interpretive educational researchers may be described as 'subjectivist', emphasizing the subjective understandings of the actor as a basis for interpreting social realty, critical education researchers, including educational action researchers, adopt a view of rationality which is dialectical. Hence, they recognize that there are 'objective' aspects of social situations which are beyond the power of some particular individuals to influence at a particular time and that to change the way people act it may be necessary to change the way these constraints limit

their action. At the same time, they recognize that people's 'subjective' understandings of situations can also act as constraints on their action, and that these understandings can be changed.

The action researcher attempts to discover how situations are constrained by 'objective' and 'subjective' conditions, and to explore how both kinds of conditions can be changed. That is action research is an alternative way of describing the sort of ethical reflection outlined.

In the field of education, the term 'action research' was used by some educational researchers in UK to articulate an alternative paradigm of educational inquiry which supported ethical refection within the domain of practice. It improves practice by developing the practitioner's capacity for discrimination and judgment in particular, complex, human situations. It unifies inquiry, the improvement of performance, and the development of persons in their professional role (Elliot, 1991:52).

The action researcher attempts to discover how situations are constrained by 'objective' and 'subjective' conditions, and to explore how both kinds of conditions can be changed. In short, the action researcher attempts to see the interplay between so-called 'objective' and so-called 'subjective' constraints on knowledge and action, and to achieve a perspective from which the contributions of both sets of factors can be understood in constraining social reality (Carr and Kemmis, 1986:183-184).

The knowledge developed by action researchers about their own practices is of this kind; it includes what Michael Polanyi (1962, cited in Carr and Kemmis, 1986), calls 'personal knowledge'. Such knowledge, he says, cannot be termed either 'subjective' or 'objective': Insofar as the personal submits to the requirements acknowledged by itself as independent of itself, it is not subjective; but insofar as it is an action guided by individual passions, it is not objective either; It transcends the

disjunction between subjective and objective' (Carr and Kemmis, 1986:189).

Action researchers can transcend the positivist view of rationality, with a view which consciously and dialectically interrelate theory and practice, individual and society and retrospective understanding and prospective action. In this sense, the self-reflective spiral of action research does not merely reject the positivist view; it also enacts a view of rationality as dialectical, as constructed in social practices, and as embedded in history (Carr and Kemmis, 1986:187).

Schon (1983; 1987, cited in Neville & David, 1995), clearly writes about reflection that is intimately bound up with action. "Rather than attempting to apply scientific theories and concepts to practical situations, they hold that professionals should learn to frame and reframe the often complex and ambiguous problems they are facing, test out various interpretations, and then modify their actions as a result".

2.2. Action Research and Reflective Teaching

The intent of this writing, under this theme, is to show that reflective thinking represent the 'theory' of the practitioner and action research the 'practice' arena. The essence of action research and reflective teaching are discussed below.

2.2.1. The essence of Action Research

Action research is simply of self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice, their understandings of these practices and the situations in which the practices are carried out (Carr and Kemmis, 1986:162).

kurt Lewin (1946:34-36; cited in Carr and Kemmis,1986:162) coined the phrase 'action research' described the process in terms of planning, fact

finding and execution: planning usually starts with some thing like a general idea. For one reason or another it seems desirable to reach a certain objective. Exactly how to circumscribe this objective and how to reach it is frequently not too clear. The first step, then, is to examine the idea carefully in the light of the means available. Frequently more fact finding about the situation is required. If this period of planning is successful, two items emerge: an 'over all plan' of how to reach the objective and a decision in regard to the first step of action. Usually this planning has also somewhat modified the original data. The next period is devoted to executing the first step of the overall plan.

Lewin's early action research work was concerned with changes in attitudes and conduct in a number of areas of social concern and his ideas were carried quickly in to education. However, after a decade of growth, educational action research went into decline (Carr and Kemmis, 1986:166).

The initial resurgence of contemporary interest in educational action research arose from the work of, the 1973-76 Ford teaching project; under the direction of John Elliott and Clem Adelman, in Britain (Carr and Kemmis, 1986:166). This project involved teachers in collaborative action research into their own practices, and its central notion of the 'self-monitoring teacher' was based on Lawrence Stenhouse's views of the teacher as a researcher and as an 'extended professional' (Carr and Kemmis, 1986:166).

Schmuck (1997) modified the steps in a some what practical mode as reflection precedes action research as:

> Start by reflecting on the past and on the future. Prepare a solitary dialogue and incorporate in to your thinking the 'force-field analysis" and the 'STP' concepts. Then move to action research to gather data, involving students, parents, colleagues, and the principal. As you proceed, strive to reflect on the present. Move effortlessly into problem solving and continue reflection and carrying Out action research as an integral part of your professional practice(p.34)

Action research is, therefore, the plausible method to study a real school situation with a view to improve the quality of actions and results within it. It aims also to improve one's own professional judgment and to give insight into how better to achieve desirable educational goals. It offers a means for changing from current practice toward better practice (Schmuck, 1997:28).

Schmuck and Runkel (1994; cited in Schmuck, 1997) bridging reflective teaching with action research with ten categories: setting clear goals, assessing the situation, creating action strategies, implementing action plans, monitoring one's own action, assessing other's reactions, evaluating what others have learned, confronting oneself with the results, reflecting on what to do next, and setting new goals (p.8).

What are then the minimal requirements for action research? It can be argued that three conditions are individually necessary and jointly sufficient for action research to be said to exist. Carr and Kemmis (1986:165-166) delineate the conditions in their book as:

Firstly, a project takes as its subject-matter a social practice, regarding it as a form of strategic action susceptible of improvement.

Secondly, the project proceeds through a spiral of cycles of planning, acting, observing and reflecting, with each of these activities being systematically and self-critically implemented and interrelated.

Thirdly, the project involves those responsible for the practice in each of the moments of the activity, widening participation in the project gradually to include others affected by the practice, and maintaining collaborative control of the process.

Collaborative participation in theoretical, practical and political discourse is a key feature of educational action research. There are occasions when such discourse is essentially solitary only prefiguring public discussion. Many individual teacher-researchers are forced to accept this solitary reflection because they lack the interest and support of colleagues (Carr and Kemmis, 1986:200).

Bev Beasley (1981, cited in Carr and Kemmis, 1986:200) discusses the importance of individual self-reflection in a paper on 'the reflexive spectator': the action researcher must in any case clarify her or his understandings as a basis for thoughtful interaction with others.

The action researcher distinguishes between practice as habitual or customary, on the one hand, and informed committed action of praxis; on the other. The action researcher is interested in theorizing practice in the sense of setting practice in a critical framework of understanding which makes it rational, appropriate and prudent (Carr and Kemmis, 1986: 190).

Moreover, by observing the action taken and the consequences of the action, the action researcher deliberately arranges things so that these understandings and commitments can be critically examined.

As was indicated in relation to the self-reflective spiral, the action researcher deliberately analyzes the correspondences and non-correspondences between understandings, practices and the structure of educational situations, and searches for contradictions within and between them.

In short, action research is a deliberate process for emancipating practitioners from the often unseen constraints of assumptions, habit, precedent, coercion and ideology. The significance for action research stems from the requirement that theory should begin with reflection upon the local context, since that context is manifestly different from or similar to other local contexts in ways that cannot be determinately and finally settled by the blind application of a universal description favoring some given sets of criteria for judging sameness (Parker, 1997: 40).

More extensive professional autonomy and responsibility require that teachers themselves build educational theory through critical reflection on their own practical knowledge (Carr and Kemmis, 1986: 41).

The primary characteristics of this social reconstructionist conception is its commitment to reflection as a communal activity where teachers can support each others' knowledge for the reason that the role a reflective teacher is to build a critical society as a result (Zeichner and Taba Chnik, 1991; cited in Villar, 1994:6217).

(Dewey (1933:9; cited in Villar, 1994), suggests that reflection is the "active, persistent and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and further conclusions to which it tends" (p.6215).

2.2.2. The essence of reflective teaching

Progress may be achieved through a dialectical process in which the theoretical or conceptual oppositions, generally referred to as thesis and antithesis, are reconciled in a synthesis which moves beyond present oppositions to a further dynamic of new oppositions. The preference for dialectic over the application of general laws is symptomatic of reflective teaching's commitment to the uniqueness of each educational context (Parker, 1997: 36).

Winter (1989, cited in Parker, 1997:37) argued that reflexivity brings modest claim that any contextual judgment arises from the nearby and perceptible examples from various experiences but not from the representative samples of universally agreed category; so intuitive solutions necessarily arise from the context itself.

Reflective teaching has the aim of transforming education, as a factor which entails revision to the traditionally dominant scientific aims of explanation and understanding which instead become placed in the service of the transformative process itself (Carr and Kemmis 1986:156; cited in Parker, 1997:38).

Reflective teaching on one hand is a process in which critical analysis of teachers develop logical reasoning skills, thoughtful judgments, and attitudes, supportive of reflection. On the other hand, reflective teaching may be thought of as a construct that emphasizes the need for understanding and resolution of contradictions in order for teachers to develop professionally (Villar, 1994:6215).

Critical thinking is, therefore, one of the dispositions of the reflective teacher; it is suspended judgment, and the essence of this suspense is allowing inquiry to determine the nature of the problem before proceeding to attempts at its solution. Since suspended belief, or the postponement of a final conclusion pending further evidence, depends partly upon the presence of rival conjectures as to the best course to pursue or the probable explanation to favor, cultivation of a variety of alternative suggestions is an important factor in good thinking (Dewey, 1997:74-75).

A teacher is prompted in reflective teaching when trying to determine the rationality and justification of ideas and actions in order to develop new understanding and appreciation of phenomena (Villar, 1994:6215).

Elliot (1991:51, cited in Parker, 1997) indicated that: For the reflective teacher engaged in action research values as ends cannot be clearly defined independently of and prior to practice. The ends are defined by the practice and not in advance of it (p. 38). Therefore, reflective teaching and action research are the two sides of a coin of problem solving, in which a maturing professional participates in problem solving to achieve continuous improvement (Schmuck, 1997:10).

To sum the reflective teacher is one who attempts to bring about improvement, in her/his practice by applying critical thinking to her/his situation; an approach which is modulated by her/his appreciation of that situation's uniqueness and its resistance to ready-made descriptions and interpretations(Parker, 1997:31-36).

A reflective teacher must have at least the following three dispositions: open-mindedness, whole-heartedness and responsibility (Villar, 1994:6215; Noffke&Brennan, 1988; cited in Nevile and David, 1995; Pollard and Tann, 1994:13-15, cited in Parker, 1997:32).

2.2.2.1. Open-mindedness and reflective teaching

Dewey (1933, cited in Villar, 1994:6215) described Open-mindedness as "A cognitive component that suggests the predisposition to seek out and construct alternative structures in an educational field of study. Open-minded teachers welcome risk-taking and would not automatically accept or reject a teaching hypothesis or the predefined educational orthodoxy of a school or classroom" (P.6215).

Open-mindedness as to Dewey (1933, cited in parker, 1997) is: an active desire to listen to more sides than one, to give heed to facts from whatever source they come, to give full attention to alternative possibilities, to recognize the possibility of error in the beliefs which are dearest to us (P.48).

Winter (1989:42-3, cited in parker, 1997:48) put it as: open-mindedness involves consideration of all the relevant evidence and different perspectives that are available, abhorring conclusions drawn from partial, incomplete evidence. Open-mindedness also involves subjecting ones own beliefs and conclusions to rigorous, rational public interrogation as a means of increasing their validity.

2.2.2.2. Whole-heartedness and reflective teaching

Where as, whole-heartedness of reflective teaching is an affective component. It implies that attitudes are not confined to particular teaching situations or disciplines, but permeate the whole of the teacher's instructional and political life. That is the reflective teacher has holistic approach; sees different activities as integral part of the system. The opposite of reflective teaching is the mindless following of learning theories or unexamined teaching practices (Villar, 1994:6215).

2.2.2.3. Responsibility and reflective teaching

The third outlined disposition of a reflective teacher is responsibility. Responsibility as Paul (1984; cited in Siegel 1988:40, cited in Parker, 1997:48) put it: responsibility is a performance component which engages teachers in the consideration of long-term as well as short-term consequences of action. The concept of rationality is seen as embodying absolute standards against which particular cases of reasoning must be judged; standards such as consistency, avoidance of fallacy, commitment to the 'laws of thought' and to bivalence (Parker, 1997: 52).

Responsible teachers take an essentially moral stance, emphasizing a conception of teaching and learning in which attention is paid to the social, political, and economic context of educational decisions. Furthermore, responsible teachers inquire about their actions in the light of ethical considerations (Villar, 1994:6215).

According to Schon (1987, cited in Villar, 1994:6215), reflective teaching involves the development of strategies and techniques to deal with the complex, uncertain, unstable, and unique situations of the teaching practice.

For the reflective teacher problems do not exist 'out there', ready made, well defined and waiting to be solved. Instead, a problem is seen as a human construct which arises out of a particular perception or interpretation formed about a unique educational context with its values and ends; the values, interests and action of its habitants; and, crucially, the particular relation of these features to a theoretical perspective which describes and explains them and their interrelations (Parker, 1997: 40).

2.3 Chemistry, ICT and Reflective Teaching

The syllabi of preparatory school chemistry are adopted from the previous freshman program of the University College courses inline with the preparation of students for chemistry major or to give sound background for related areas of specializations (Girma, 2004).

Basically chemistry is the study of composition, structure, properties and uses of substances. It is also concerned about conditions in which chemical reactions take place. In higher education, compositions of substances are both analyzed and synthesized; structures are elucidated, properties are characterized, and their uses are proposed. When these situations are extrapolated into preparatory school context, students ought to be enlightened about the concepts of the above mentioned contents.

The science/ chemistry curriculum should aim, at mastery of understanding of principles and generalization in chemistry as well as the developing of abilities to observe, classify, use numbers, measure, communicate, predict, infer(data interpretation), formulate hypothesis,

control variable, experiment and so on (Pendaagl, 1976, cited in Temechegn, 2002).

What is then the help of ICT with this regard? What do authors and educators recommend regarding to teaching chemistry (or science in general)? Which approach of teaching is fit for Plasma context classroom situation? The following paragraphs may give the answers for the questions.

ICT becomes the environment of our schools: computers and the plasma screens are the prevailing technology products that pervade throughout high schools. Chemistry contents of the different grade levels are organized and prearranged in a series of lessons and are being transmitted from one center: from the Ethiopian Educational Media, to render service to all high schools of the country at the same instant.

Through the plasma screens, introductions, presentations, exercises and demonstrations of each lesson have been transmitted within thirty minutes of a period. There is pause for seconds, clearly seen on the screen, for exercises given through the plasma. The role of the classroom teacher would be to monitor the process and give summary works at the end of the transmission, within ten minutes left. It offers adequate information with good foreground: narration, demonstration, views of objects relevant to topics; though, Dewey (1997: 13) criticized the idea by writing "Books, pictures, and even objects that are passively observed but not manipulated do not furnish the provision required".

Essentially TV presents all at ones and it develops a habit of learning with minimum effort (Amare, 1998); reduces the thinking potential of the learner as a consequence. Dewey (1997:1) underlined the case by saying that; "We think (or think of) only such things as we do not directly see, hear, smell, or taste."

Instruction in subject-matter, that does not fit into any problem already stirring in the student's own experience, or that is not presented in such a way as to arouse a problem, is worse than useless for intellectual purposes (Dewey, 1997:199).

Melvin, (1977, cited in Adem, 1989) suggests that in order for instruction to be effective, the learner must first of all participate in the instructional situation.

Material should be supplied by way of stimulus, not with dogmatic finality and rigidity. When pupils get the notion, that any field of study has been definitely surveyed, that knowledge about it is exhaustive and final, they may continue docile pupils, but they cease to be students (Dewey, 1997:198).

More over, the presenters are not natives as a result the slang and fluency is another encounter to our students. Recurrent occurrence of errors year-after-year is the common feature of the program; the tool cannot 'learn' from its mistake, which is rather the sole vocation of human being. To revise the program yearly is beyond our grip.

Above all, the transmission could be interrupted due to technical failure of the appliance or power. For all these discrepancies, the classroom teacher should be active and reactive so as to sustain the class activities.

Ebbing and Wrighton (1999) authors of General chemistry book put the following remark in the preface their book:

> The problem-solving in this book has received high praise; each in-text example highlights a broad class of problem and includes a detailed solution. We have always tried to show the student the thinking process in problem solving. In this edition, we have added problem strategies to the worked-out examples to strengthen this aspect of problem solving (p.xxvii).

Various educators also release their research works that the learner should be the experimenter and the interpreter of contents; at least with the help of their instructors, but not like depositing money in bank (Paulo Freire 85 emphasis). As much as possible, the organization of the skills in text-books and or in laboratory manuals should take into account the need for unstructured activities (Temechegn, 2002). It is such activities that help students to exercise their critical and creative thinking skills: skills that are necessary for solving problems in their daily and academic problems.

Only by a pupil's own observations, reflections, framing and testing of suggestion can what s/he already knows be amplified and certified (Dewey, 2006:335).

"Development of scientific literacy" is one of the major goals of science education, recent research findings have shown that many science students do not possess the basic thinking skills that are essential to the attainment of this goal (Dorin,et.al., 1990:30, cited in Temechegn,1997b).

In order to achieve this goal, a science program should provide a range of activities from the close ended activities (answers known in advance) to the completely open-ended ones (answers to be learned through the activity) (Temechegn, 2002).

For such classroom environment, the traditional teacher-center method is obsolete, becomes the order of the day is 'plasma-centered'. And yet the guide of the teacher is inevitable. Reflective teaching in its democratic feature suits to the environment so as regulate the situation and solve contextual problems accordingly.

Directives of the Ministry cannot solve contextual classroom problems from the distance, but the reflective teacher who handles classroom problems with appropriate intuitive solutions. For example, s/he resumes classes during the disruption of the plasma transmission and

gives corrections to script errors of the plasma program, to respond to the questions of students, at different levels, and monitors the classroom disciplines thoughtfully.

To sum Therefore, reflective teaching is the right teaching approach either in terms of knowledge reconstruction or the coercive plasma classroom context.

CHAPTER THREE

RESEARCH METHODOLOGY

I have adopted a qualitative practical action research as the method of my study. It has the nature of self-emancipatory kind from traditional way of teaching and serves as a means to collaborative work for the future. I believe that reflective teaching demands open-mindedness to new ideas and practice based on reason (Siegel, 1997). Three reasons govern my choice of this method and are discussed below.

3.1 Personal Experience I had been teaching chemistry without the guide of the plasma for a long time until recently. There is a great difference between the two in time allocation for presentation of the daily lesson, for discussion, evaluation of students, and summarizing the given lesson. These days, due the advent of the plasma program, only twelve minutes are left to me out of the total forty two minutes of a period, in the plasma context.

We faced the new plasma environment without any proper orientation. This has led me to design different strategies so as to support students. Reflective teaching comes in its own time: I had to attentively listen to what the presenter was saying and at the same time think of exercises to students' level. Sometimes, I would be obliged to give corrections which were wrongly presented by the presenter. In certain occasions, even the screen might black out in the middle of the lesson. This time, I should be active enough to take over the responsibility. This is true because the plasma presenter never gives either makeup class or the chance to rewind the record to adjust to my own pace. I therefore, felt practical action research is the remedy to solve such problems of teaching in this context.

3.2 Paradigm Shift Action research is a recent research paradigm that makes the teacher a researcher; it librates the teacher from traditional conceptions of being dependent on the external researcher. A reflective teacher is an open-minded person who stands to improve her/his practices at its initial stage rather than looking scientific solution from the outsiders. Secondly, the reflective teacher permits her/his students to be free to learn by reflection through their own construction of knowledge. Winter, (1989:66; cited in parker, 1997), emphasized the case as "reflective teaching's systematized attempt to overturn the hierarchy, to emancipate the teacher-researcher from the oppression of the positivist's division of theory and practice within a rational process of change" (p.37).

3.3 To serve as a springboard research culture is not yet rooted in schools; therefore an action researcher or a reflective teacher in a school becomes instrumental for further collaborative action research. The experiential knowledge would also help me to tackle personal problems for the rest of my life; and to create critical community in our school context (Attrichter et.al, 1993:6; Paulo Fereire, 1972; Carr and Kemmis, 1986:201).

Action research can be conducted by an individual teacher on her/his classroom situation, by reflection on the past, the present, and on the future of her/his experience (Schmuck, 1991:3). Of course, it has been done with the consultation of my advisor; in cases where, action research begins as a more private and isolated concern, external consultants are often involved (Attrichter et.al, 1993:6).

Reflection should be followed by a number of plans-actions- reflections in a spiral fashion. In other words, there cannot be an action research without reflection. By reflection, problems are solved by thinking; by action research, problems are solved based on collected data. Therefore

reflective teaching is the implicit hypothesis or theory of the researcher and the action research the practice of the researcher. As a result Theory-and-Practice goes hand-in-hand.

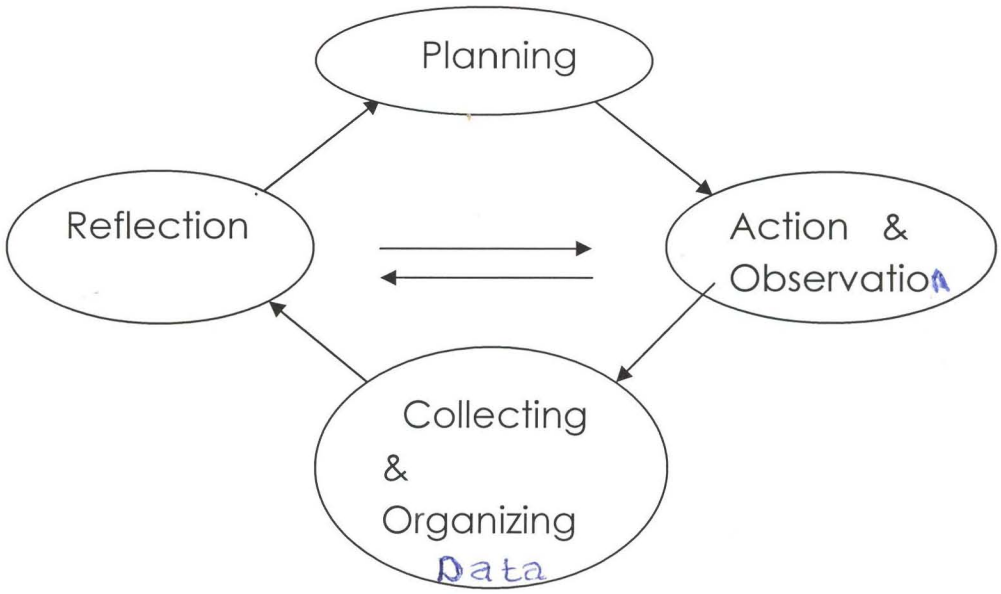

Fig.1: The Action Research Process

As shown in figure 1, reflection-planning-action and observation-collecting and organizing activities is not linear; reflection could be followed by planning or both reflection and action dynamics could take place alternatively (Schmuck, 1991:4). In the first case, reflection is on the past action so as to devise a new and appropriate strategy that could be tested through the forthcoming action. In the second case the reflective teacher could think of any intuitive solution while s/he is doing.

Elliott (1991:23) delineates how teachers reflectively develop their practice: the teacher changes some aspects of teaching in response to a

practical problem and then self monitors its effectiveness ... through the evaluation of the teacher's initial understanding of the problem is ... changed. The decision to adopt a change strategy therefore precedes the development of understanding.

3.4 Cases: Corey (1953:14 cited in parker, 1997:38) defined action research as "Research-in-action", it is a research which studies a particular, actual population instead of one which is theoretically constructed as 'random' or 'representative'.

I have been engaged in my study starting from October 8th 2007 to January 25th 2008, for fifteen weeks. The total number of periods was sixty to that of twelfth graders and forty nine for eleventh graders. The school is Government owned with minimum coast sharing and runs for full day program.

I was assigned to teach chemistry to one section from grade eleven and two sections from grade twelfth; with prearranged plasma-lessons. There were forty one to fifty eight students in each class; where the majority of the students were males (76.2% in 11^{14} and 53.2% in 12^{J}&12^{K}).

3.5 Procedures

Being a classroom teacher and enlightened with action research and reflective teaching, I was fascinated to apply the theory into practice in the plasma context. At first, I tried to reflect on the classroom problems; according to schmuck (1997:34) proactive mode of action research that I considered hindrances to our teaching-learning process, and then I contemplated on the respective strategies and planned how I could apply them; followed by my daily actions and observations so as to collect data. Finally I reflect the change in my analyses.

I have been using daily classroom observation (self-observation, subjective in its nature), discussion with students and department colleagues, class tests, and deliberation with the general teaching staff

members as instrument to collect the data. My data are therefore my diary, test and exam results of students, Annexes of focus group discussion and deliberation with teaching staff members.

The cycle of my action research begins with reflection and ends with reflection of the achievement of the cycle, for that particular problem. Here follows the general reflections, action-plans, actions and observations of each problem. The data and their analyses along their respective reflections are presented in chapter four independently.

3.5.1 Reflection Problems I realized as hindrance in my classroom activities were many: students' discipline, lack of preparedness of students before coming to class, lack of direct involvement of students in classroom exercises, how to pose questions, and dependence of students' on my notes.

Regarding disciplinary problems, I encountered two cases: absenteeism of students from school and lack of uniformity in wearing students' uniforms.

The case of students' absenteeism had been pronounced with respect to twelfth graders.

Once they have been warranted by completing the form that comes from GEQAEA (the General Education Quality Assurance and Examination Agency) and became legible candidates to sit for the National exam, the majority of this grade level students gradually evacuate from the classrooms. Such phenomenon is observed usually at the middle of the first semester. This means, students of the grade level did not practically attend 50% of the required lessons and consequently the same amount of the grade level syllabus would be left uncovered.

Sometimes, the tendency of absenteeism advances even to the third month of the semester. With such excessive absenteeism, no one could properly discharge her/his responsibility (discourse of a reflective teacher emphasis) in covering the specified contents. Consequently, deficiency of

education definitely affects maturity of a student in the rest of her/his life.

I believe that, without active participation of classroom teachers, the school problem cannot be alleviated by the effort of the school management alone. So, I was determined to follow up the case in my study so as to improve the situation; at least to keep the majority of students preserve in class until the end of the semester.

Regarding lack of uniformity of students' uniform, the school management, in collaboration with the school's PTA, assessed and decided the kind of students' uniform: blue vests with white shirts underneath, and blue trousers. And yet, the tendency to take off their blue vests and to appear with their white shirts was a common phenomenon of students: in classrooms as well as in the school compound; even though students pass the school's gate under the supervision of unit leaders and of the school principals. So long as responsibility is one of the discourses of a reflective teacher; I personally determined to improve the situation through my study. Therefore, I decided to study the case as a problem of our school.

Regarding lack of preparedness of students before coming to class, I usually refresh the memory of students with questions. Except a few, the majority of students did not give weight to this part of class activity. Their participation appears to be low because students did not read on topics of the lessons before coming to class (the researcher implicit hypothesis). Or else, they consider the task as the teacher's duty, to make them ready for the daily class activity. However, for knowledge reconstruction, good schemata of students are prerequisites. So, I decided to study it as a problem of students as deficiency in knowledge reconstruction process.

Regarding low participation of students in class exercises, usually very few numbers of students, attempt classroom exercises. I look for the final

answer among the participants. I observed that the number of participants was limited because students attempted questions by recalling only their memory (the researcher's assertion). However, it had to be done from what they sense, from their memory, and their imagination; since the interplay of these three is 'effective' thinking (Hullfish & Smith, 1961:36). So I had to cultivate their good thinking skills in my class. And at the same time, I had to expand the number of respondents in classroom exercises and also to consider their reasons, how to justify their answers.

Regarding the problem of students in posing questions, usually students worry about exam. That is why their tendency was to memorize facts from books, as an ultimate goal. As a result, they either demanded me to focus on exam oriented presentation, by ignoring the plasma transmission, or pose shallow questions for the sake of gathering discrete facts. The two approaches never make them creative at all (the researcher's view). So I had to deconstruct the two approaches, by making them focus on concept construction and seeking for reasons through dialogue. Only then, I could understand the level of comprehension of a student in the class.

Regarding problem of demand of students for my notes, though they are preparatory students, both students and I had forgotten the requirement of the level. It demands self note organization. The tradition of high school education however, is providing detailed notes to students; by then students develop dependence on teacher's note. Usually I give short notes and relevant exercises on the chalkboard, alongside to the plasma transmission. I observe them depending on my note than to the plasma program, which is again the legacy of high school experience. So, I decided to abandon such a tradition and foster students to organize their own notes, from any available sources, in order to make them independent learners. After crystallizing the problems, I had to think over

my action plan. What comes next is my action plan which is believed to bring solutions.

3.5.2 Action plan Though the problems were many, I was limited only to few representative action plans so as to go with schedule of the study as follows.

Regarding absenteeism problem, first of all, I had to be available in class on time so as to be good example of students. Next, I planned to count and register the number of late comers. The third step was to take period-wise attendance in order to identify absentees with their roll numbers.

Regarding lack of uniformity of students in their uniforms, at first I planned to create awareness on the necessity of students uniform; wearing uniform and to respect the school discipline as ground rule in my class. The next plan was to register names of students who violet our ground rules. The last measure was to expel a negligent student from my class, only for that instant.

Regarding lack of preparedness of students before coming to class, my initial strategy was to conscious students about knowledge reconstruction on individual basis. That is, I planned to give them a fifteen minutes orientation, at the end of the school hour, for two continuous weeks. I decided to remind them to read the daily lessons before coming to class. I decided also to devote the two minutes introduction time to make them reflect on their readings, before the transmission.

Regarding lack of participation of students during class exercises, my initial strategy was to entertain the response of the available student

without giving any clue. The second strategy was to ask the responding student how s/he reasons out for her/his answer. That is, I planned to give more weight to the perspectives of students than to final answers. My third plan was to expand the number of respondents, not by accepting the instant answers automatically, but by first counting their hands and registering the total number of respondents.

Regarding problem posing status of students, the only strategy I designed in this regard was to constantly open dialogue on the proposed questions. I decided to stop giving answers straight from my memory. I rather preferred to re-direct their questions back to other students so as to gather ideas from students for the dialogue. My second strategy was to allocate a three minutes group discussion, right after the end of the plasma transmission, then after to allow students to pose group questions rather than treating individual questions.

Regarding dependence of students on my note, the strategy was to remind students about the level of education that they are found. That is, as preparatory students they had to exercise organizing their own notes. So, I decided to quit giving notes and to observe and instigate them to scribble their own notes; at least from the plasma presentations. What came next was my action and observation, which I had conducted.

3.5.3 Actions and observations A brief description of my actions and observations, on the five problems, are presented below.

Regarding late arrival of students, my constant presence in class was a good notice; especially right after the break-time. Due to my intuitive strategy, awareness was created and a number of students were seen

rushing to their classes. Still, some of the students did not realize the significance of their presence before the commencement of the transmission.

When I started taking attendance on individual basis, after the issuance of roll number, I was able to identify students who were frequently absent in my class. At the beginning I gave the notice to students who were absent for more than five periods. For available students I also informed them the lesson topics that they had missed during their absence, by reading the record from my diary. It was at the same time a strategy to aware the remaining students how I seriously follow their absence. I gave the instruction, for those who were absent for over five periods after the commencement of checking attendance with role numbers of the respective students; to come with their guardians to the school. The total number of students in this case was four. Among the four, one student remained absent for over twenty days; I reported the case to the school principal to take appropriate measure. Finally she was prohibited from taking the first semester exam; despite the act of the girl had appeared in the exam room.

Regarding students' uniform problem, I consistently check students' uniform before the commencement of the daily lesson. A few numbers of students had appeared in class without their vest uniforms; I started writing names of students who failed to wear their uniforms, where the strategy became ineffective. I tried to remind the forgetful ones with my facial expression and those found resorting were expelled from my class, for that instant as the final strategy. The process continued until the end of the semester.

Regarding lack of preparedness of students before coming to class, before the daily lesson is transmitted, I usually refresh the memory of students with questions. Except few, the majority of students did not participate in this class activity. Later I abandoned refreshing students' memory

with my questions but enhance them to reflect on their on their readings; at least to remind us the daily lesson topic and give us idea about the contents of the daily lesson. But participation was low and the time prearranged for introduction was only two minutes and was inadequate to entertain students' opinion at large. Still I continued reminding students, throughout the semester that reading the daily lesson before coming to class is part and parcel of the class activities.

Regarding low participation of students in class exercises; attempting class exercises was a common feature of students. Responding their answers in public was the problem. At the beginning, very small number of students raised their hands to give their answers. Later, I was interested to listen to their strategies, as how they approached the problem rather than their final responses. I extended also my strategy to respond in mass after I have counted and registered the number of respondents' hands; the number of respondents increased from time to time as a result. My additional effort was to make them use the three components to 'effectively' think: to use their senses, memory, and imagination in a dynamic state. However, they relied more on their memories of formulas than flashing for new conceptions.

Many of the students were gone mad whenever I ask them how they solved the problem. Through time, they got accustomed to dialogue and minimized being embarrassed with their 'wrong' answers. The strategy made me more knowledgeable than I had before; because every time I see things with open-mindedness.

Along the process, I saw students changing their approach from simple recall of formulas, to arguing with reasons without fear of their classmates' ridiculing. This phenomenon has been revealed when students become involved in attempting class exercises. At the end of the semester we were friendly to chat on even private issues in front of students.

Regarding the problem of question posing of students; usually students are annoyed when a comment is given to them. They were annoyed when I insisted to strictly follow the plasma program; because students from some other sections were successful in changing the mind of their chemistry teachers according to their wants; but I resisted on their needs (Amare, 1994).

Secondly their questions were hunting for additional facts; where as my approach was strengthening concepts with reasons: as how they could be able to master concepts prior to running in to a dilemma of matching formulas with the question, based on their memories. Of course they are advised to use formulas during exam time, but not during the mastery of new concepts. The process was time taking and tiresome; but essential. Through time, they were accustomed to dialogue and seeing questions from different perspectives, gradually relying on themselves than my generosity.

When I shifted my strategy to three minutes group discussion, they enjoyed it to settle down their doubts from the plasma transmission. Some what sensible and matured questions have been generated; every body opens her/his eyes to listen to my reaction on the questions they raised. Usually I was the one to respond to their questions, because the questions were over their level of maturity.

In sum the semester work ends with change of students' attitudes towards posing questions and dialoguing to each other as well as with me. At the beginning of the semester, they were hunting for formulas and skills how to easily solve chemistry problems. They also envied when their classmates attempt questions. Finally they started relying on understanding the nature of a question and play with their prior knowledge and reason (rationale) to arrive at the conclusion; rather than running for trial-and-error with the supposed similar formulas.

In addition to this, students had demanded me to give them clues about the nature of their tests or exam beforehand. My position was not to give orientation about the prospective test or exam. I always counsel them to rely on their understanding rather than seeking external help. In this regard, I dictated questions of the two class tests so as assess their cognitive, affective, and psychomotor skills. I could judge their cognitive and psychomotor skills, from their test papers and their affective from their reaction towards my test-giving style.

Regarding enforcing of students to make their notes, when I oriented them to organize their independent notes, as preparatory students, from the available sources, it was frustrating at its initial stage. But it was a transcendental process. I kept it up until the end of the semester work. However, many of the students had spent more time in gazing on the plasma screen than scratching note from it.

3.5.4 Data collecting instrument My data collecting instrument were observations, class tests, focus group discussion, and my deliberation with the general teaching staff members. The documents were my diaries followed with memos that I occasionally produced, test results, photographs, audio recordings.

3.5.4.1 Observations Because I am regular teacher of these sections students, there was no clear separation between my teaching duty and observation activity. I was in between teaching and scribbling my observations. I used to record regularly the date, week number, lesson number, and total number of students available in each section, roll number of absentees, the number of students reminding the class about the daily lesson, number of students attempting class exercises, and number of questions rose in each class. It was my period-wise practice to write my reflections right after the end of each period. It took me almost

four weeks to come up with these patterns (see the copy of my diary on Appendix D).

3.5.4.2 Memos At the end of my six week (fourteen lessons of grade eleven and twenty six lessons of grade twelve have been covered), eleventh week (where nineteen lessons of both grade levels had been covered) and fifteenth weeks of observation (sixteen and fifteen lessons respectively had been covered), I produced my respective memos so as to analyze my data before it is matured to be the final data. Especially the first memos clearly indicated me what I was doing and were helpful to me so as to consolidate or modify my strategies.

From the experience of writing memos, I was able to produce four papers, reflections on my two class tests, one mid-semester test, and first semester result that to be circulated among my department colleagues to share my experience.

3.5.4.3 Class tests traditionally we give class tests by writing questions on the chalkboard in front of students. They had to first copy the questions and show their answers on their test papers. I intended to change this tradition by dictating them the questions; the strategy explicitly indicated me how my students were in a problem of decoding symbols of elements and formulas of compounds; as a result of devoid of independent learning.

3.5.4.4 The Focus group discussion at the end of my thirteenth week of observation (on 12/01/08) eleven volunteer students appeared in one of the classrooms of the school, on a weekend, with the knowledge of the school principal. Earlier, I announced in each section that I was in need

of five students (three male and two female students) for discussion on the forth coming weekend. The criteria invited those who regularly come to my classes, one who was expressive of her/his opinions, volunteer and willing to come on the forth coming weekend. Among the expected fifteen students only eleven were available, honoring their promises. I prefer to volunteer students because I wish to gather reasonable and critical comments than from students who appeared by coercion; to come on their rest time and against their interest.

Four of them were from grade eleven, and the remaining seven from grade twelve; gender-wise, three were females and the rest eight were male students. I was the one monitoring the discussion by raising semi-structured questions. They showed me their agreements to take photographs and audio recordings to strengthen my data gathering effort. They were pro and against my strategies.

3.5.4.5 Deliberation with teaching staffs of the school With knowledge, permission, and collaboration of the school principals, I was able to deliver my study to the general teaching staff members of the school, at the beginning of the second semester work. 66.7% of the teaching staff members attended the session. I was able to deliberate the result of my study along the educational theories behind the study. I was able to collect the data from the minutes of the session, photographs and audio recordings.

3.5.5 Methods of data Analysis and Interpretation My data are analyzed using both quasi-statistics (interpretation of data with the help of figures) and verbal expression. Becker (1970, cited in Maxwell, 2005:113) coined the term "quasi-statistics" to refer to the use of simple numerical results that can be readily derived from the data. Numbers are tabulated and analyzed by percentages and arithmetic means.

The description of each item (value) is presented under the respective headings. The description starts by highlighting the problems observed

in our classrooms, then after with my action-plans and actions and observations. The data are organized in tables and the description ends with recent reflection as an achievement of the study. The annex of the focus group discussion and the deliberation are presented independently for the sake of clarity of information.

3.6 Ethical Issues

Right after the notification of the research topic, it was my immediate task to make it official to the school principal, department colleagues and the students: it was through letter to the school principal, it was by releasing information in the department meeting, and when I was giving orientation about individual learning to the students respectively.

No name of a teacher is listed in the text for the same reason. The same is true to students, who did decoding errors in their class tests. Names of discussants had been coded for the sake of safety of students. The tape-recorded opinions of the discussants had been transcribed by me; of course I made them informed them that the recording will not be transmitted any where; except as supportive data in my presentation, before we had started the group discussion.

3.7 Validity

I have conducted the research at my place of work, with the knowledge of the school management, members of chemistry department, with the collaboration of my department colleagues, and students of the sections in which I was assigned to teach.

It was my twelfth year of experience in the same school. I hold discussions with my department colleagues, once in a month, for four Continuous months (26/10/07; 02/11/07; 21/12/07; and 16/01/08). I

was also able to communicate with my colleagues through my papers, for four times; after each class test, mid-semester test, and the first semester exam. In addition to this, with the school management facilitation, I deliberate my research report to the school teaching staff members: about the essence of educational theory along with the improvements that I have came across through my study (see Annex on Appendix C).

For that matter, the school has accepted my attendance format and made announcement to all teachers to adopt it during the second semester work time (see Appendix E). Two department colleagues showed their inclination towards the adaptation of the attendance format that I had adopted. Two other department colleagues raised issues and discussed with me about points that I had considered in my reflections (papers). Other teachers, after my deliberation, make fun when they wish to comment their friends' errors which were against ethos my presentation. That is there has been exhibition of reflections on their routine activities.

I have seen also openness of students to dialogue on issues which they considered it as hindrances for their learning activities; like commenting on the irregularities of their classroom situations.

The same style of teaching: teaching students how to learn has resumed during the second semester and I have been trying to cultivate the habit of openness in my life style: at home, with my neighbors, friends and in our school community at large.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATIONS

Essentially I was determined to improve the following five contextual problems of the three sections: disciplinary problems, lack of preparedness of my section students before coming to class, lack of direct involvement of students in classroom exercises, problem of posing questions, and the problem of the students in organizing their own notes. Some of the respective strategies were intuitively generated and applied in consecutive weeks for one semester (from 04/10/07 up to 25/01/08).

The data were collected through classroom observations, class tests, the mid-semester and the first semester exam, from focus group discussions, and deliberation with the general teaching staff members of the school.

This chapter is devoted to the analysis and interpretation of the data. However, each classroom based problem is treated from its reflection to the achievements or the recent reflections. The respective action plans, actions and observations are also discussed under each problem.

The following paragraphs show the self-reflective spiral of action research.

4.1 Disciplinary problems The disciplinary problems were absenteeism of students and lack of uniformity of students with their uniforms, in the respective classes. The following reflections, action plan, observations, data are discussed regarding students' disciplinary problems.

4.1.1 Reflection I considered absenteeism and lack of uniformity of students with their student uniforms as disciplinary problems of the school. The process of knowledge reconstruction is viable on the basis of day to day interactions of students with the learning materials (like the plasma program), with each other, and teachers of the respective disciplines in the school.

Students' uniform has a role (more psychological) for the teaching and learning process. That is both physically and psychologically presence of students is necessary for the process; without the warrant of the two, commencing the daily lessons would be meaningless. So, I decided to study their improvements, in our context.

The school is running a full day program starting from this academic year; it has its office to follow up the attendance of students. Homeroom teachers are directly responsible to check attendance of students; subject teachers are also expected to take attendance period-wise.

From my experience, grade twelve students have the tendency to cut periods and stay somewhere outside classrooms; they ascribed to studying privately in the school library, in the name of preparation for the national exam.

These days, they developed a trend of abandoning classes starting from the day they have completed the form that comes from GEQAEA (General Education Quality Assurance & Examinations Agency), which takes place at the middle of the semester work. Even until then, students have attended classes on-and-off. I therefore, felt that the intervention against the trend could account for the smooth running of the school activity, and the mastery of the subject matter which is required for their higher education and their lives at large.

Regarding students' lack of uniformity in their uniforms; it is the directive of the Ministry of Education that students should wear their school uniforms; during their stay in schools. The principle behind is to avoid unnecessary competitions among students and its psychological impacts. As a result, the school has its students' uniform: blue vests with white shirts underneath and blue trousers.

Students are checked at the gate of the school with the school principals, unit leaders and the school guards. However, after passing the gate,

quite a number of students take off their vests and appear in their white shirts. The picture below depicts the phenomenon.

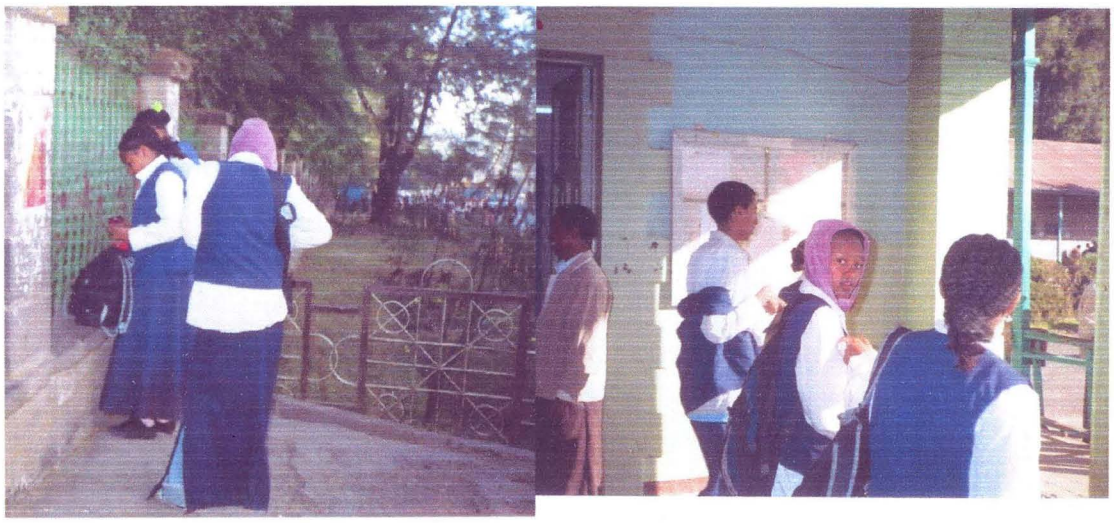

Fig. 2 Students and their uniform manipulations before and after the school gate.

According to figure 1, on the left side, female students are seen wearing their uniforms out side the school compound and to the right some other students are seen on the way of taking off their vests; after successfully passing the school gate.

It is also common to see students with and without their vests inside classrooms. What is then the use of checking students at the gate without serious follow up of its practicality? As to my perception, the practice of checking students, only at the gate, is valueless unless teachers implement it inside classrooms. As a responsible teacher (reflective teacher), I decided to study the sustainability of this student culture in the three sections.

4.1.2 Action plan Regarding students absenteeism problem, I decided first to make students aware of the danger of absenteeism: the information gap that they are creating and termination from the school

as a consequence. To its implementation, I intended to take attendance and check absentees period-wise.

Regarding students lack of uniformity in their uniforms, I planned to open discussion on the necessity of students' uniform and next to it, to make period-wise follow-up of students' uniform.

4.1.3 Actions and observations As to students' absenteeism as a problem, I was checking the number of late arrivals and the total number of students available in class before their roll number had been issued. After that I was able to check absentees in person (see the format on Appendix E).

The case of lateness was observed after break hours. To cut the number of late comers, I appear in class on time as a strategy so as to embarrass the late comers.

After the issuance of students' roll number, at my sixth week observation time, I was able to identify absentees individually; so that I was able to notify the frequency of their absenteeism in person. Not only that, but also the lesson topics they had missed when they were absent. I consulted them to fill the education gap they had created by their own means.

I remember four cases of grade twelve students, who were absent, for over ten days: I announced in class that I was about to report the case to the school principal. Three of them appeared the next day with various reasons: one produced medical certificate from one of the hospitals of the city. The rest two could not produce any supportive evidence for their disappearance from class. The remaining one had been absent throughout the semester; in spite of my frequent notice to the class.

The three could take their makeup tests and the one who had been continuously absent for over twenty days has appeared in the exam room. She was not allowed to take the exam by the decision of the school

principal; this has happened probably because of my prior written report to the school principal.

With respect to students' lack of uniformity in their uniform problem, I opened discussion on the issue. Some claimed that they did not feel comfort especially with their vests. They complained on its artifact but not of its color. Any way, we came to finding the middle ground and take it as ground rule to my section students to appear with their uniforms. Sometimes, they put their jackets over it, when they felt cold. I think their vest-uniform is tempting to be easily taken off and appear with their white shirts. Its efficacy to keep them warmth is weak.

Though there was no full accord, I continued checking their uniforms: writing names of forgetful students, reminding them with my facial expression, and even coerce her/him to leave my class if s/he had no uniform at that instant.

For the first two weeks, I was in between instilling and convincing students about the necessity of students' uniform. Starting from the third week, I started registering number of students who appeared with out their vest-uniforms. I did it because there was no significant improvement. I started registering names of students who were found with out their blue-vests. Even, I was obliged to push out one or two students from my class, in the middle of my fifteenth weeks of observations.

4.1.4 Data collected Regarding students' absenteeism, the data are organized in Table 1. The table is organized on the average number of absentees, in each week of the three sections (11^{14}, 12^{J} & 12^{K}), for the fifteen week. See table 1 on page 55).

A cording to table 1, students of section 11^{14} were not available during the first two and a half weeks due to their late registration. Until then, 21.6% of grade twelve students were absent in class. Then after the

problem of absenteeism continued to the six week of my observation (14/11/07), which is practically until roll number of students has been issued. Then after checking absenteeism became on individual basis.

Table 1: Average number of absentees of students per week

weeks	Grades and sections							
	11^{14}		12^{J}		12^{K}		Total	
	No	%	No	%	No	%	No	%
1	-	-	3/53	5.7	9/58	15.5	12/111	10.8
2	-	-	3	5.7	7	12.1	10	9
3	-	-	14	26.4	10	17.2	24	21.6
4	2/41	4.9	18	34	13	22.4	33/152	21.7
5	1	2.4	12	22.6	6	10.3	19	12.5
6	2	4.9	13	24.5	8	13.8	23	15.1
7	7	17.1	6	11.3	6	10.3	19	12.5
8	4	9.8	11	20.8	4	6.9	19	12.5
9	9	22	24	45.3	23	39.6	56	36.8
10	2	4.9	11	20.8	6	10.3	19	12.5
11	3	7.3	6	11.3	9	15.5	18	11.8
12	2	4.9	4	7.5	5	8.6	11	7.2
13	2	4.9	16	30.2	17	29.3	35	23
14	5	12.2	13	24.5	12	2.7	30	19.7
15	10	24.4	34	64.2	50	86.2	94	61.8

After the validation of checking absentees in person, the percentage drops to 7.2% during the twelfth week of my observation (from

Table 2: Average number of students who did not wear their uniforms.

weeks	Grade and section							
	11^{14}		12^{J}		12^{K}		Total	
	No	%	No	%	No	%	No	%
3	-	-	10/53	18.9	17/58	29.3	27/111	24.3
4	13	31.7	14	26.4	9	17	36/152	23.7
5	4	9.8	11	20.8	8	13.8	23	15.1
6	1	2.4	1	1.9	-	-	2	1.3
7	-	-	3	5.7	-	-	3	2
8	-	-	3	5.7	-	-	3	2
9	2	4.9	1	1.9	4	6.9	7	4.6
10	1	2.4	-	-	4	6.9	5	3.3
11	-	-	1	1.9	-	-	1	0.6
14	-	-	1	1.9	1	1.7	2	1.3
15	1	2.4	-	-	-	-	1	0.6

When the two grade levels are compared, except for the fourth week, when grade eleven students were new comers to the school, eleventh graders were observed with the least percentages of the problem as compared to the other grade level where the maximum of 29.3% of 12^{K} students.

In the focus group discussion, no one has objected the act of checking students' uniforms (see the Annex on Appendix B); except that they did it because of negligence to do it.

During the deliberation of the report, no one has commented either in favor or against the strict attendance checking.

4.1.5 Reflection The problem of absenteeism has been highly observed in the case of twelfth graders; though 80% to 90% of these section students were available in class. That is, the majority of students attended the expected lessons of the grade level. I can say the serious attendance checking and the corrective measures taken accounted for the improvement.

Students were absent in mass at the beginning and at the end of the semester work; the week ahead from the mid-semester test is also the time when students were absent in mass. Moreover, the late issuance of roll numbers to students accounted for absenteeism of students.

Through the observation, I was able to identify the lesson topics that an absent student missed; as a result, I was able to counsel absentees to narrow down the education gap by their own means.

The school office has recognized the recently developed attendance format and showed their enthusiasm for its practicality in the second semester work; it was the "reward" to the study.

As a coincidence, I was assigned to teach 12^{A} students, during the second semester. Almost the class was nil from the very beginning and I could not see the majority of students to open discussion and convince them; where as, the number of students sustained in my former sections. I had announced to the then available students that class attendance could worth thirty marks. The strategy could not entice the majority of this section students. As a result, they missed the mark as well as the discussions of the remaining portions of the syllabus; whereas, my earlier section students have appeared up to the end of the second semester work and achieved good attendance mark as well as experience from the class discussions.

Although I mentioned the significance of the attendance format, on my report to the school teaching staff members, no one has uttered a word either in favor or against. It seams that taking attendance of students as optional to subject teachers; in spite of the fact that it is vital for knowledge reconstruction. My effort was to show the efficacy of attendance for knowledge reconstruction and vitality of the strategy for classroom teachers to bring about attitudinal change of students (see the Annex on Appendix C).

Regarding lack of uniformity of students in their uniforms, what I have understood from my study is that, if a teacher is seriously pursuing classroom disciplinary problems; then s/he could settled down the problem during the first six weeks of the commencement of the semester work.

For some of us, the issue of students' uniform might not be a big deal; for me, however, it gave me sense because I considered the phenomenon as a sign of negligence which might have been connected to other personal problems.

For example negligence or forgetfulness of uniform might be the reflection of personal problems of a student. As to my experience, those who frequently encountered uniform problem are low achievers in their class tests, or else, they are the one exhibiting the tendency to copy answers from the nearby classmates. They might have even other problems behind which engage their mind overwhelmingly.

In sum, realizing the situation of classrooms before going to the daily lesson is the underpinning of classroom discipline. Without discipline smooth running of classroom activities is unthinkable.

Therefore for knowledge reconstruction the presence of a mentally ready student is indispensable.

4.2 Lack of Preparedness of students before coming to class

> For teacher or book to cram pupils with facts which, with little more trouble, they could discover by direct inquiry is to violate their intellectual integrity by cultivating mental servility. This does not mean that the material supplied through communication of others should be meager or scanty.
>
> John Dewey, 1997:198

> Education is suffering from narration sickness.
>
> Paulo Freire, 1970:57

Under the theme reflection on the problem, the action plan I had planned, my actions and observations, data collected, and the result of the intervention is discussed below.

4.2.1 Reflection Preparedness of students before coming to school is reading of lessons before coming to class, in our context. I doubt that students did not have the due consideration, especially these days, to reading the daily lesson before coming to school as the prerequisite for the classroom activities. That was why the tendency of students to attempt questions, during the introduction time was pathetic. Probably they might have considered it as extra task for them but the teacher. However, learning without prior reading and good background cannot be effective.

A student comes with certain schemata and goes with new schemata; according to the theory of knowledge reconstruction epistemology. Reading books before the class creates a good schema that could make the individual ready for class activities. Therefore I decided to improve the students conditions by making them prepared before coming to school.

4.2.2 Action plan Regarding lack of preparedness of students before coming to class, I intended to give a brief orientation on how knowledge is constructed individually from ones own background. Next to this, it was my plan to remind students periodically, to read the daily lessons ahead of the class. It was also one of my strategic plans to devote the two minutes prearranged introduction time for their reflections.

4.2.3 Actions and observations With respect to lack of preparedness of students before coming to school, students were not pleased by the time I asked questions, on the prospective lessons; for me to assess their reading background.

Very few students attempted questions from their memories because the intention was to refresh their memories. When I changed my strategy from refreshing students' memory to reflection on the prospective daily lesson, then every body kept quite for the first time. The new strategy was to instigate students to read ahead of the class.

At the beginning they had considered the strategy as wasting of time, because I abandoned the tradition. Gradually they took it as the norm of my class and have started reflecting on what they have read on the daily lesson. At least they were able to remind the class about the lesson topic and shade light on it. When I constantly instigate them to exhibit their reflection, they considered it as if I was deficient to give introduction on the prospective lesson. The sacrifices that a reflective teacher pays until students realize the advantage of the approach through time. Even some of the students were not pleased to hear reflections of their classmates, but only from me. This was true because our schools are overwhelmed by the narration of teachers (Paulo Freire, 1970:57).

At the out come, they became familiar to my style of teaching but the time was inadequate to entertain more.

4.2.4 Data collected With respect to the problem of preparedness of students before coming to class, though the strategy was vital, the time allocated in the plasma program was only two minutes. So, I could not properly record the number of students participating in the process and produce quantitative data. However, the strategy could not produce roughly more than three students, in each section; in spite of my constant effort in reminding the significance of the strategy.

Whereas, the reaction of the discussants, during our focus group discussion was encouraging; among the eleven participants, 9.1% does not agree with the strategy at all, another student considered reading books ahead of the class as optional task of a student, to be done as to the interest of the individual. Others, 81.8%, agreed on the necessity of preparation before coming to class (see Annex on Appendix B).

During the deliberation of the report to the general teaching staff members, no one has uttered a word either in favor or against the strategy. I interpreted from this that the strategy is not argumentative to be implemented along with the plasma program; despite the fact that the time allocated is too short to be effective.

4.2.5 Reflection With respect to lack of preparedness of students before coming to school, as much as possible, I never go to the plasma transmission without inquiring them to reflect on their reading, on the daily lesson. The scenario was open to air any view they had at all; we were friendly to converse even why they did not make preparation ahead of the class. Some ascribe to shortage of time: being busy in doing their homework, giving hands to their families etc.

The strategy, to make students reflective, was not that much effective due to the following reasons:

- Students did not critically understand the significance of the strategy.

- Students were not accustomed to express their ideas in public; the reason might have been ascribed to the culture they are grown up.
- Time allocated to the introduction part before the plasma transmission (two minutes) was not adequate.

No matter our tradition is found to be a hindrance to our exercise and time allocated is negligible, our students are subjects to take part in the reflection of their readings before the commencement of the plasma transmission.

4.3 The problem of lack of direct involvement of students in classroom exercises Reflection on the problem, action plan to solve the problem, my actions and observations along with obtained data, and the outcome of the interventions are presented below.

4.3.1 Reflection Lack of direct involvement of students to classroom activities was high at the beginning of the semester. I was worried by the problem and was engaged in thinking over the solution.

I suspected that they were reserved to classroom exercises due to two basic factors: number one is lack of reading preparedness before they come to class and number two lack of knowhow how to handle exercises. I thought that if students acquire the skill how to effectively think (Hullfish & Smith, 1961:36 emphasis): by starting from the nature of the exercise and combining their memory about the subject and their imagination; they could manage problems reasonably.

During the plasma transmission, a number of exercises and questions are presented by the video teacher. The majority of students were indifferent to the given exercises. Those attempting the exercise rely on applying formulas than reflecting their strategies on how to solve problems. As a result they run out of time.

Learning, according to social reconstructivist view, is self-search of knowledge or experience with effective thinking: by starting from what they sense (context) and utilizing their memory along with imagination. Otherwise, learning would be mechanical and cannot generate the required disposition.

4.3.2 Action plan Regarding lack of direct involvement of students to classroom exercises, I planned not to give clues for the exercises given by the video teacher. I also intended to ask the responding student about her/his mental steps to express it verbally. This strategy itself led me to make dialogue with students; if I disagree to the perspectives of the individual. The overall interest lies on concept reflection than being indulge in calculating to the numerical value.

Finally I designed a strategy to expand the number of respondents by making them respond in mass.

4.3.3 Actions and observations Regarding lack of direct involvement of students to classroom exercises, students were supposed to raise their hands before they randomly utter their answers. Giving always to the one who raised first was turned out to be creating consumer. That is, only few individuals were advantageous over the mass.

To expand the number of respondents, I shifted my strategy to mass-responding: I had to wait to exhaust the number of respondents by counting the number of their hands, and to the end of the allocated time, I instruct them to pronounce their responses in mass.

In the mean time I ask students individually as how they approached the exercise. When ever I conducted classes without the guide of the plasma, which was 18% to 21% of the total periods, I could not effectively count the number of hands to write in my diary due to inconveniencies; so I might have missed to record the data properly as a result.

Some of them might have considered the strategy as my academic deficiency and seeking clue from their arguments; unless I demonstrate my aptitude by uttering the steps beforehand. This is also the expected sacrifice to be paid for a reflective teaching in our context.

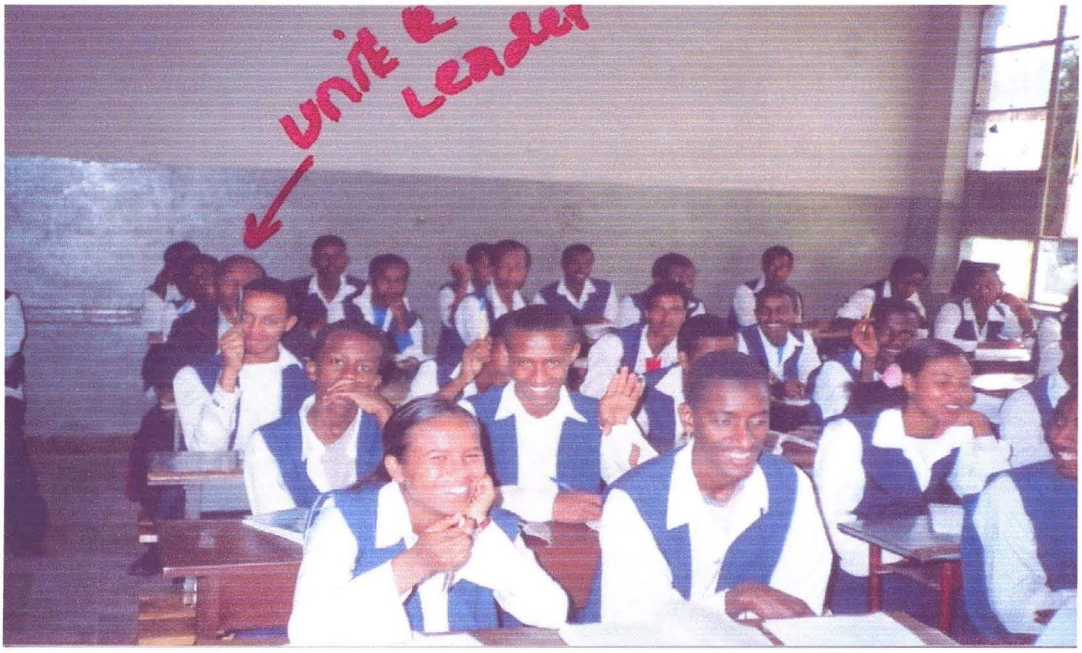

Fig. 3 11^{14} Students were signing with their hands to respond

Figure 3 depicts the photograph of 11^{14} students while they were signing their readiness to give their answers for a given exercise.

4.3.4. Data collected Regarding lack of direct involvement of students to classroom exercises, the data are organized in table 3 below on page 66.

Table 3 Average number of students who attempted classroom exercise

week	Grades & sections							
	11^{14}		12^{J}		12^{K}		Total	
	No	%	No	%	No	%	No	%
2	-	-	4/53	7.5	3/58	5.2	7/111	6.3
3	all	100	3	5.7	8	13.8	11	9.9
4	7/41	17.1	2	3.8	6	10.3	15/152	9.9
5	5	12.2	3	5.7	4	6.9	12	7.9
6	8	19.5	1	1.9	4	6.9	13	8.6
7	5	12.2	4	7.5	5	8.6	14	9.2
8	2	4.9	3	5.7	3	5.2	8	5.3
9	3	7.3	2	3.8	2	3.4	7	4.6
10	4	9.8	2	3.8	4	3.4	10	6.6
11	3	7.3	2	3.8	2	6.9	7	4.6
12	10	24.4	3	5.7	5	8.6	18	11.8
13	8	19.5	2	3.8	5	8.6	15	9.9
14	9	22	2	3.8	5	8.6	15	9.9
15	4	9.8	1	1.9	1	1.7	6	3.9

Table 3 is organized by taking the average number of students who attempted classroom exercises in each week. The table is devoid of recordings starting from the first week due to immaturity of the strategy itself by then. Table 3 has the following representations.

The maximum number of respondents was observed during the twelfth week of the observation period; it was 11.8% of the total number of students on the average. The mode percentage was 9.9% and it was scattered from the third week to the fifteenth week of the observation period.

When the two grade level students' performance is compared, those of the grade eleven students participation has surpassed almost by twofold to that of grade twelve students participation.

Among the eleven discussants, in our focus group discussion, only one favors the strategy and another one did not appreciate responding in mass; others prefer to talk about the problems why many of the students resist from giving answers than to take side. The problems outlined by these students were all-around. The following were some of the problems.

- Lack of understanding of the plasma presentations
- Lack of confidence
- Fear of reaction of pears to wrong answers
- Lack of openness to be expressive in public
- Negligence

4.3.5 Reflection Lack of direct involvement of students to classroom exercises was the serious issue. The strategy ought to be dynamic so as to win the favor of students along with sustainable interest of the teacher.

Looking for the majority and until then counting the hands of signaling students was one of the strategies that exhibited expansive effect upon the respondents, with the minimum confrontations. I was able to see some hesitant students joining to the responding group.

The dialogue that we had as a result of verbal interaction opened us a new chapter to our situation: intimacy and recognition to each other. The recognition has extended to our relationship even outside the classrooms.

When ever they come with questions, outside the classroom, I focused on how to approach the problem; I usually left the routine calculations for

them; they agreed to my approach. The approach was against our school's tradition where we make effort to show every step to students.

What I have realized is that the teacher should give guide to her/his students, not to be indulged into routine calculations. As a result students would focus on strategies with reasons than cramming techniques of individuals.

The habit of dialoguing in class makes students strong in generating reasons and could tend to convince their conversant. And also had the effect of narrowing down the dichotomy between students and me, as well as among themselves. The dialoguing strategy makes them academically strong so as to face new topics of the subject by their own.

The dialoguing strategy is also helpful to students to untie their private problems as well. Though some students, especially grade twelve students considered dialoguing as wasting of time; their interest lies on covering portions than critical understanding of concepts through dialogue. Over here, I was trying to keep the balance, not to totally discourage the interest of deviant students.

And yet, it is the 'right' strategy to see change on attitudes of the learner. I my self became rich in offering analogies because of dialogue. The strategy has also helped me to understand the student's talent and inclinations.

4.4 Problems of students in posing questions Reflection on their problems, the plan of action that I had intended, actions and observations, along with the data obtained are presented, interpreted, and achievements are reflected below.

4.4.1 Reflection Another problem that I had observed was the problem the way students pose questions. It is in their school age that students

learn the culture how to pose questions. The questions should be contextual (critical) and probative that could lead to a certain tangible knowledge.

I saw confusion between forwarding demand as a 'right' and asking academic questions. At the beginning of the semester, they demanded me not to pursue the plasma program but to focus on exam oriented couching. I refused to meet their demand because we teachers are obliged to pursue the nationwide guide of the plasma program.

Their alternative strategy was to raise questions from the national exam papers; sometimes ahead of the daily lesson. For me it was a dilemma: if I offer the answer; then they indirectly met their demand; if I rejected their questions; then it would be a sign that I could not offer answer for their questions. What I did was to echo the question to the rest students to attempt the questions, and latter to treat it. At least the questions become common to all students of the class.

4.4.2 Action plan Ten minutes are left, after the plasma transmission, for the classroom teacher to stabilize the daily lesson. I allocated this time for students to ask questions so as to make clear their doubts. Moreover, at the beginning of the semester work, I planned to treat individual questions; I found it was wasting of time on private questions that might not attract both the rest students as well as I.

So, I shifted my plan from entertaining individual's question(s) to group questions by devoting three minutes for group discussion and then to accept the group questions. With the remaining time, almost seven to eight minutes, I was treating the group questions.

4.4.3 Actions and observations Regarding question posing problem of students, during the first few weeks, students were demanding me to repeat what I have already explained them, by voicing in mass the phrase 'we do not understand'. I discouraged them rather to be specific and

individually able to pose questions; because it was difficult to give a broad spectrum answer that fits to the problems of all individuals.

At the beginning, students were disappointed with my approach; because I could not meet their immediate demand or wants. I rather echoed their questions back to students so to see their reactions than attempting or giving straight answers.

Due to this approach, I saw indignant faces of the question poser; they might have also assumed that the strategy was designed to search for clue from their answers rather than understanding as to expand students' participation.

However, students enjoyed the three minutes pause for group discussion; at the end of the plasma transmission and to listen to my reaction towards the group questions.

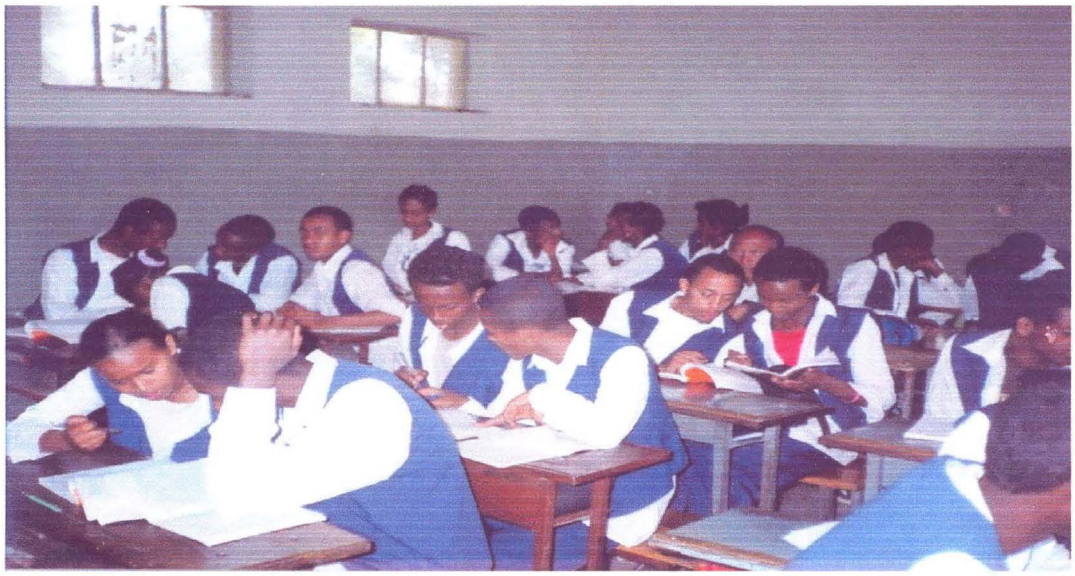

Fig. 4 11^{14} students were engaged in the three minutes group discussion

Figure 4 presents the picture when 11^{14} students were engaged in the group discussion. They were found satisfied because this time I was the one to face their questions independently; since the questions have been crystallized through group discussions. I could see students hastily scribbling notes from my reactions; partly the strategy met their wants.

4.4.4 Data collected With respect to question posing problems of students, the data are organized in table 4 below.

Table 4 Average number of question posers, in each week

weeks	Grades and sections							
	1114		12J		12K		Total	
	No	%	No	%	No	%	No	%
1	-	-	2/53	3.8	4/58	6.9	6/111	5.5
2	-	-	4	7.5	4	6.9	8	7.2
3	1/41	2.4	4	7.5	4	6.9	9/152	5.9
4	1	2.4	3	5.7	3	5.2	7	4.6
5	2	4.9	2	3.8	2	3.4	6	3.9
6	1	2.4	-	-	1	1.7	2	1.3
7	2	4.9	1	1.9	1	1.7	4	2.6
8	4	9.8	3	5.7	3	5.2	10	6.6
9	3	7.3	1	1.9	2	3.4	6	3.9
10	3	7.3	3	5.7	3	5.2	9	5.9
11	6	14.6	4	7.5	5	8.6	15	9.9
12	4	9.8	2	3.8	4	6.9	10	6.6
13	4	9.8	4	7.5	6	10.3	14	9.2
14	4	9.8	1	1.9	4	6.9	9	5.9
15	4	9.8	3	5.7	2	3.4	9	5.9

The following points are extracted from table 4.

The maximum number of question posers was registered during the eleventh week of the observation period (from 24/12/07 to 28/12/07). Around 9.9% of the total number of the three section students was registered as maximum figure. Probably has happened due to the introduction of the time three minutes pause for group discussion, after the end of the plasma transmission.

However, the most frequent percentage was 5.9%, which occurred starting from the third week (22/10/07) to the last week of the observation period (25/01/08).The highest percentage, 14.6%, of participation was observed in grade eleven students. That is, they were by far better in posing question for the sake of mastery of the grade level lessons.

In the focus group discussion, unanimously they appreciated the three minutes pause for discussion and posing group questions. They went on to state its advantages as follows.

- Doubts about the plasma presentations would be cleared out at their level.
- Challenging questions would be screened out through group discussion
- Problems could be discussed through dialogue between the poser and me.
- For those who arrive late, could make up the missed topic
- From their questions, I could understand the level of understanding of students and could give them analogy to avoid confusion.

Teachers during my report did not utter a word regarding the strategy.

4.4.5 Reflection I continued allocating the ten minutes time for students to clear out their doubts, rather than engaging them listening and copying to my narration and notes respectively, which is not the discourse of a reflective teacher.

After the introduction of the three minutes pause, for group discussion, things were running smoothly: For one thing, students could clear out their doubts, without hesitation. And the other thing representative questions of the class would have been emerged.

For me it was interesting because 'basic' questions were raised during the discussion session. This time, I had the opportunity to evaluate students' maturity and to reflect the relative truth of the subject by adding analogy for better grounding of concepts of the subject.

Students who came to class and were slow to apprehend the plasma transmission, due to lack of self preparedness, could be benefited to clear her/his blurred vision during the group discussion. The strategy was helpful to develop intimacy among students, because they occasionally created front to challenge my arguments.

I am sure the discussion would have been continued even I left the class. The strategy could foster them to read further so as to find themselves on the side of the winner.

I reached to this conclusion because all my section students showed me warm welcome when I met them along the corridor; the reflection of likeness to each other. Such attitude has positive impact towards the subject. One of the discussants has determined to be a teacher because of the present influence (see the Annex on Appendix B).

When ever there was no plasma transmission, the three minutes pause has shifted to the beginning of the period, to consolidate their reading through discussion.

I favored the three minutes pause for discussion because it could enhance the homogeneity and socialization of students: gender, experience, ethnicity... etc.

4.5 problems of students in organizing their notes Reflection on the problem is briefly treated along the corresponding action plan; actions and observations, data collected, and the improvement observed are presented and discussed below.

4.5.1 Reflection Preparatory program has been designed as a transitional program from the general high school to the tertiary level of education (Girma, 2004). Along the program students are expected to make smooth transition from high school tradition to the higher form of education. Students are expected to organize their own notes from their access; none the less, they are found within the same compound and atmosphere.

4.5.2 Action plan With respect to the problem of organizing their notes, I planned to gradually decrease my support in giving short note on the chalkboard.

4.5.3 Actions and observations Regarding to the problem of organizing their notes, at the beginning of the semester, I used to write exercise on the chalkboard which were relevant to current topics, but a little bit challenging. Students were satisfied by the then given exercises, because the exercises could assess their shortcomings. I gradually left the strategy and instigate students to scratch their own notes from any source they get; minimum from the plasma presentation and class discussions.

Fig. 5 while we were pursuing the plasma presentation

Figure 5 depicts the photo where we all watch the presentation of the plasma program. For me it was by and large to fill the information gap.

Besides, I was seriously watching the scene for the preparation of students' questions; whereas to students was to comprehend the daily lesson and to make their own notes.

Whenever there was no plasma transmission (18% to 21% of the total periods), I usually pose questions to discuss. Then after I gave them time to make their notes, with their own caliber.

Initially, there was high demand to give them notes on the chalkboard, which I considered as a sign of resistance to my strategy. They considered it as the act of a 'cruel' person who enjoys on the suffering of others. Gradually they adapted to the strategy prior to my persistent character.

Lately, I introduced the three minutes interval for group discussion; they could join any group they wish to discuss freely and loudly before my presentation, as long as there was no plasma transmission.

The other thing, I did not go to check their exercise books because students know the tradition of getting mark with neat handwriting. As to my assertion, those who are smart in handwriting are 'weak' in their cognitive potency. So it was not my interest to engage students in this routine task.

Though I was not successful to see students offering analogy from their perception, I was engage in the same effort during the first four or five weeks of my study time.

4.5.4 Data collected Regarding the problem of organizing their own notes, I could not gather quantitative data on the spot. I rather had observed few students taking note from the plasma screen and make their own from the questions and my reaction.

Many of the students visit their exercise books when ever exercises were given by the video teacher; most of the time gazing only at the scene. I did not attempt to measure their note caliber as usual from their exercise books but from the type of questions they raised and from their test and final exam results.

Table 5 bears the data of 11^{14} students, where their poor decoding ability of students is revealed which was extracted from their oral test from which they had taken orally.

Table 5: Decoding problem of 11^{14} students

What they were expected to write	what they had written
1. Sodium plus	N^+
2. Chromium	Chromanium
3. Atomic	Atonic
4. Electron	Ectron
5. Phosphorus three minus	Phosphones -3
6. Terms	Thurnes
7. Species	Spiches
8. Write	Right
9. Certain	Serten

According to table 5, writing N^+, instead of Na^+, chromanium instead of chromium, Atonic instead of Atomic, is unbearable as a preparatory and science student. These symbols of elements have been given since from the second cycle of primary school chemistry syllabus.

The case was seriously reflected on five students (13.2%) out of the total thirty eight students.

Similar errors were observed in the class tests of grade twelve students. They are organized in table 6 below.

According to Table 6, students of this grade level were found mistaken in decoding symbols of elements and formulas of compounds. That is, they could not differentiate the symbols of Gold and Silver, Silver and Iron, Potassium and Phosphorus, at this grade level.

Table 6 Decoding Problems of 12^J &12^K Students

What they ought to write	what they actually had written
1. Electrolyte	1. Electrolight
2. Steel	2. Stell
3. Graphite	3. Grafate
4. Chloride	4. Chloride
5. Cathode	5. Catode
6. Sulfate	6. Slefate
7. Nitrate	7. Nitret
8. Potassium chloride	8. $KClO_3$
9. Gold three chloride	*9. AgIIICl
10Silver nitrate	*10. $FeNO_3$
11Potassium sulfate	*11.PSO_4

*Serious errors

The case becomes serious when a student of this grade level writes PSO_4 when s/he is instructed to write the formula of potassium sulfate. Writing $FeNO_3$ for silver nitrate was a sign of serious corruption in our way of teaching and learning.

The strategy of giving class test has released such defects of our students. In our discussion with department colleagues, I raised the issue and emphasized the danger. If we do not give the freedom to organize their notes, copy teacher's not alone is disastrous.

In our focus group discussion, all claim that they have been taking note from the plasma presentations. 63.6% of the discussants claimed that they make note from the students' text-book in addition to the plasma

note. 36.4% of them ascertained that they organized their notes from questions and answers that we make after posing their questions, in addition to the plasma presentations. Only one student has insisted on teacher's note giving trend. To the experience of one student, he was organizing his chemistry notes from other general chemistry books.

They did not outwardly oppose my strategy or critically criticized it. I sense a shift from depending teacher's note to self note. I found it encouraging because it is the route to independent learning.

4.5.5 Reflection Regarding the problem of organizing note of students, I materialized what preparatory students are supposed to do. They were left, with freedom, to make their own notes.

With their test results I came to understand how they had been deficient in writing symbols of elements and formulas of chemicals independently. The strategy might have accounted for their improvements; at least they became aware of their deficiencies.

I could not see the danger of giving freedom to take their own notes as long as they are competent students with their exam results; without any orientations and couching before they had taken the exam.

Preparatory students should be treated as to their levels. I think we are misleading our students if we are not reflective as to the context. The means justifies the end.

To tailor the strategies, one has to start with attendance of students for continuous reconstruction of individual knowledge of regular students. Being present is not the ultimate goal of education; one has to react to classroom activities, for that matter reading preparation before coming to class becomes crucial.

So, I underline the presence of a student in class and coming to class prior to reading the daily lesson are the underpinnings of classroom teaching learning practices.

CHAPTER FIVE

DISCUSSION

This chapter is devoted to look at the achievements of the study, congruency of the research questions and the study along the literature. They are presented accordingly as follows.

5.1 Achievements of the study I claim the following points as the achievements of the study.

5.1.1 Establishment of attendance format From the organization of the diary, I have developed an attendance format; economical both in space and time (see Appendix E). It specifies the frequency of absenteeism of a student and guides me to inform the lesson topics a student has missed. As a result, I was able to correct the cases of the three grade twelve students; from running in to complications, though one girl had been expelled from the exam room, because of serious absenteeism and my report.

5.1.2 Adaptation of three minutes pause in our context I adapted the 'wait-time' technique (Rowe, 1986 cited in Seime, 2002) to three minutes pause, at the end of the plasma transmission or before the daily lesson, in the absence of the plasma transmission. The group discussion in the interval was instrumental to narrow down the education gap among students. I received appreciations of the discussants during the focus group discussion.

5.1.3 Detecting defects of my section students in decoding symbols of elements and chemical formulas By the technique of dictating questions of the two class tests, I was able to detect the deficiencies of the three sections students, in writing symbols of elements and chemical formulas, which would have been mastered in the previous cycles (see table 5 & 6 on page 84 & 85).

5.1.4 Its transcendental effect from giving feedback to deliberation of report We High School teachers were busy in giving feedbacks, through the questionnaires of graduate students, during the second semester. My friends also expected me the same kind of format; but I turned it in to a new trend, deliberation.

I could manage to deliberate the report to our teaching staff members. We remained ignorant of the conclusions they have derived, let alone to be enlightened with their visions. The process of empowerment of teachers through action research has been experimented with the school 'reflective teacher'.

The discussion was continuum right from the day and date of the deliberation; that was my vision at the out set.

5.1.5 Cultivating independent learners My three sections students were fostered to reflect on their readings before the presentations of the daily lesson, to attempt class exercises with reflective thinking, to pose questions to seek for rationale, to trust on group discussion, to develop a habit of taking class tests and the first semester exam without prior clues and couches.

Their respective achievements were encouraging as compared to other sections students (see section 4.6.4 on page 83).

5.2 The congruency of the research questions with the result of the study my research questions were three: The first was to check the number of intuitive teaching strategies that I have adapted in our context and observe the improvements they have attained. The second was to observe the change of attitudes of students in working out chemistry problems from sticking to formulas to seeing the rationales. The third was to see the improvements of students' attitudes towards valuing the school's disciplines.

Devoting the introduction time to students' reflections, expanding the number of respondents by making them respond in mass, persuading students how to pose (probe) questions, fostering students to organize their own notes, pausing for three minutes for group discussion, dictating test questions, and pressing students to produce analogies, as a means to ground chemistry concepts were the strategies adapted through out the first semester study. That is I was able to generate seven strategies all in all.

Those who were seen reflecting their reading background were spearheading of the class especially in attempting classroom exercises. Effort has been made to transcend students from simple recall to effective thinking: combining the nature of the problem (the context), their memory and imagination (Hullfish & Smith, 1961:36, emphasis). Counting the number of respondents' hands up to the last few seconds has the effect of expanding the number of respondents than entertaining snapshot answers.

Improvements regarding posing sensible questions, a shift from seeking for discrete facts to probing for rationale, has been observed. Gradual development of students in organizing their own notes has also been observed as positive impacts of the study.

Gradual adaptations of the strategies and orchestrating their learning techniques accordingly, attending classes regularly throughout the semester, and even coming on their weekends for the sake of the focus group discussion were signs and symptoms of the change in their attitudes.

To conclude, every teacher gives intuitive solutions for her/his class problems, but do not register and make further observations and experimentations on the functionality of the same solutions in different contexts (Bailey, 1997 emphasis). Sometimes we try to solve problems by coercion which the solution could not be long-lasting, reliable, and

stable. I believe that external pressure is not contextually tailored to bring reliable change.

5.3 Relevance of the study to the literature The study has fulfilled the minimum requirements for action research. It can be argued that three conditions are individually necessary and jointly sufficient for action research to be said to exist.

Carr and Kemmis (1986:165-166) delineate the conditions in their book as: Firstly, a project takes as its subject-matter a social practice, regarding it as a form of strategic action susceptible of improvement; secondly, the project proceeds through a spiral of cycles of planning, acting, observing and reflecting, with each of these activities being systematically and self-critically implemented and interrelated; thirdly, the project involves those responsible for the practice in each of the moments of the activity, widening participation in the project gradually to include others affected by the practice, and maintaining collaborative control of the process.

As a classroom teacher, I was supposed to check the attendance of students in class and guide them how to learn than feeding discrete information. Therefore I met the cited first criterion. I did interrelated spiral cycles of action research: Planning, acting, observing, and reflection as outlined in the citation, as the second criterion. Thirdly, the students themselves were engaged in the improvement of their learning style and also my department colleagues and the general teaching staff members were involved in our monthly discussion schedule and deliberation of the report at the end of the study, respectively.

5.3.1 About the focus group discussion I held focus group discussion with eleven volunteer students among the three sections.

> Schmuck (1997) modified the steps in a some what practical mode as reflection precedes action research as: Start by reflecting on the past and on the future. Prepare a solitary dialogue and incorporate in to your thinking the 'force-field analysis" and the 'STP' concepts. Then move to action research to gather data, involving students, parents, colleagues, and the principal. As you proceed, strive to reflect on the present. Move effortlessly into problem solving and continue reflection and carrying out action research as an integral part of your professional practice(p.34)

Beforehand, I set criteria how to determine the number and kind of discussants, nominate the discussants, when, where and how long the discussion could take place. For the first criterion, I decided to make fifteen students among 111 of the three sections. That is, 13.5% of the population was fair representative sample number of the population. I had invited any five, regularly attend my class, expressive, willing to appear on weekend, and volunteer students (three male and two female) to be registered for the focus group discussion (Maxwell, 2005:90 emphasis).

The discussion had been conducted with semi-structured questions (see Annex, on Appendix B), for over two hours, focusing on the classroom strategies and with enthusiasm. They unanimously agreed with the three minutes pause for group discussion and then after setting group questions posed to me.

There were pros and cons on other strategies, but strongly opposed on strict attendance in particular. This was true because twelve grade students would like to spend their time outside classroom in the name of examination preparation, which was against knowledge reconstruction.

5.3.2 Deliberation of my report to the general teaching staff members of the school As an action researcher, I had to deliberate my

report with the general teaching staff members of the school for the sake of validity of the study.

Bev Beasley (1981, cited in Carr and Kemmis, 1986:200), discusses the importance of individual self-reflection in a paper on 'the reflexive spectator': the action researcher must in any case clarify her or his understandings as a basis for thoughtful interaction with others.

I did it prior to the consent and facilitation of the school principals. 66.7% of the teaching staff members have attended my report. I got the opportunity to present my classroom strategies and their improvements as well. I outlined the dispositions of reflective teaching and the unity of reflective teaching and action research (adopted from the literature to share with). In my report, I underlined the necessity of reflective teaching as a means to liberate us from traditional conceptions and practice; there by, to our students too.

They raised questions on the feasibility of the strategies or on how to implement them in their class contexts. They expressed their fears if they abandoned giving notes to students. My intention was to create doubt about knowledge transmission paradigm and to reconsider their epistemology in terms of knowledge reconstruction; but not to give directives.

5.3.3 Around the classroom strategies Probably, as a beginner researcher, I was a little bit ambitious to tackle multidimensional problems at a time.

Basically the strategies were supportive or prerequisites to each other. For example, the presence of a student regularly in classroom is the underpinning of formal education far the proper guides and continuous assessments by the respective classroom teachers, for the group and project works, and for effective class activities.

Sometimes, we consider checking students' uniform as mainly the task of unit leaders or the school authorities. In short, we are not rational to see things with reasons as long as school work is collective in its nature.

A reflective teacher is open-minded and is rational; not governed by traditional practices, but by reasons rationally and to the interest of more to students or marginalized groups. It does not mean that the reflective teacher is doing whatever students want, but by balancing with what they need (Amare, 1994 emphasis). However, taking period-wise attendance is not favored by many of our students, as I have evaluated from the focus group discussion with eleven students (see Annex on Appendix B).

If we insist on reading assignment; then students could develop the habit of reading before coming to class and with sound background s/he could be active participant of the class activity. To the contrary, we give more attention in offering assignments on routine calculations, for the mastery of a given lesson; students will be playing with their memories but not with their rationales, as if knowledge is in its finality (Dewey, 1997:198 emphasis).

In my study, I was trying to go against the tradition; where the classroom teacher is found doing every activity: from introduction to stabilization and giving the summary work. As a result the student is devoid of contribution in her/his own learning.

It was interesting to see the development of students reflecting on their readings; nonetheless time pre arranged for such purpose was negligible; despite the fact that the plasma program is devoted on narration than conception. It should not be then fair to continue narration, with the remaining twelve minutes, by the classroom teacher.

By virtue, the plasma program is against knowledge reconstruction paradigm, though it alleviates the shortage of teaching materials as well

as teaching staffs. So, the classroom teacher should be aware beforehand to fill the gap that erodes the vocation of man (Paulo Friere, 1970:79, emphasis).

The reading background of students becomes good foreground during presentation; those who had no reading background would face blurred foreground and become slow until they could discern with difficulties. That was why students have revealed their appreciation for the three minutes pause for group discussion. This time, the reflection of students prior to the daily lesson serves as good background even for the group discussion.

My argument or thesis is that, reading before class and to be all the time available in class is the underpinnings of formal education. We teachers have a role to cultivate the culture of reading and being punctual in our duty. Otherwise, the knowledge reproduction paradigm remains with us in the vicious circle: birth-physically growth-and-death.

When I say prior reading of lessons before coming to class, I do not mean that cramming and memorization of facts; but logical concept construction, where the former is connected to the latter. Trying to solve problems by only recalling similarities among solutions is mere memorization; it deteriorates the creative potency of human being.

A problem should be solved from its context: from what is given and what is required and by combining the past experience along with imagining new insight; this is what really effective thinking (Hullfish & Smith, 1961:44).

Even the self-prepared student ones, in my sections, depended mostly on her/his memory (reading). When the approach of a question is changed, then they would be in a problem to solve. That is why I was trying to guide them how to pose questions (how to search for truth). That is, I was trying to substantiate questions of students.

When I asked them to tell me how they approach a problem, rather than the final answer, was a sign of valuing logical or reasonable approach. In short my approach was not to inculcate scientific information for exam, but how to handle and solve problems based on its context, past experience and thinking for alternatives.

The judgment reached based on these elements would be reliable; repeated success leads to self-confidence. So, it was my intention not to focus on sharing my scientific information but how to solve problems based on the dispositions which I have already delineated.

5.3.3.1 Reactions of the three sections students, colleagues, teachers, and the school principals towards the study My interaction was limited to my section students, my department colleagues, the school principals, and teaching staff members.

Reactions of students to my classroom observation were encouraging. This was probably true because the role of the classroom teacher is minimized, more or less, to keeping the discipline of the class, responding to questions of students and giving short notes as summary work. That was why the study focused on improvements of these variables, in the eye of knowledge reconstruction paradigm. Due to our differences of epistemologies, there were serious arguments, at our initial stage to persuade each other. However, it was not a revolution but evolution, not by coercion but through series dialogue we came to certain consensus.

The dichotomy between students and I gradually have narrowed down: we argue logically and rationally to reach in to a certain consensus by respecting individual's perspectives; despite the fact that the subject chemistry is free from subjectivity.

As to my assertions, the immediate goal of grade twelve students was to manage their exams and passes (because they several times raise the

issue); whereas, the common feature of both grade level students was to focus on breadth than depth of lessons. For them, working on foundation is wasting of time. Because of this approach, I had encountered a number of disputes at the beginning of the semester work.

The first task of a reflective teacher is to realize the present context that s/he is engaged and care for interests of both parties (the teacher and students). That is prearranged strategy might not be effective in practice.

The dispositions of open-mindedness, whole-heartedness and being responsible solve contextual problems. At the beginning, many interests had emerged to determine the direction of our classes. For example, there were serious complaints against my strict attendance checking, there was a demand to close down the plasma screen and to resume with exam oriented coaching. I had rejected on the spot; they were against ideals.

In sum if a teacher has firm stand, based on reasons, then gradually students will come to consensus and work together harmoniously. That is, I did not encounter any serious problem that hindered my reflective practices.

Where as, my department colleagues were more or less showed me their cooperation; at least the seven of us, among the total eleven members, met for four times for briefings. The other four did not clearly show their inclinations to join the group. Even the available ones were not in their full attention to listen to my presentation; except the two, in pinpointing me the problems that I could encounter in my study. Others have been found passive from the beginning to the end; though I produced and offered them my reflection papers in person. To be honest, two other colleagues, at the end of my study, showed me their tendency to adapt my attendance format, in the second semester.

Collaborative participation in theoretical, practical and political discourse is a key feature of educational action research. There are occasions when such discourse is essentially solitary only prefiguring public discussion. Many individual teacher-researchers are forced to accept this solitary reflection because they lack the interest and support of colleagues (Carr and Kemmis, 1986:200).

With respect to the general teaching staff members, most of them have rich teaching experience, under the hegemony of knowledge transmission. Speaking in favor of action research and reflective teaching, in front of them, seams propaganda.

Very few of them, who did their masters during the previous years, were supporting me in elaborating the advantages of action research for the teacher her/himself. The advantage of developing the profession with masters program has been reflected in our discussion time.

With respect to the school principals, unless a teacher-student is sponsored by the Government agents, they considered as headache for their practice; they had the experience that self-sponsored teacher-students cut their classes. Like our students, they rely on their past experiences; except at my terminal stage, they did not show me any sympathy to me as well as to my study.

CHAPTER SIX

SUMMARY, CONCLUSION, & RECOMMENDATIONS

This chapter deals with the summary work of the study: conclusion and recommendations of the researcher. The summary is the reflection of the study in its concise form. The conclusion and the recommendations are generated more from the impressions and inspirations of the researcher based on the achievements of the study. They are more of reflections than interpretation of the data.

6.1 Summary These days, the Ministry of Education is fostering teachers to conduct research by offering seminars. I was motivated to conduct action research so as to combine the theory that I have gained in my graduate courses and the need of change in my teaching style under the plasma guide.

The study has focused on the contextual problems of the three sections students. The contextual problems were: disciplinary problems, lack of preparedness of students before coming to school, lack of direct involvement of students to classroom exercises, the problem of posing questions and organizing their own notes.

Vulnerability leads to a virtue I will call "moral perception". It is the ability to see the unique needs, desires, and interests of our students in unique contexts and to respond to them with our own unique style so as to secure our and our students' best possibilities (Garrison, 1997:19).

As a proactive model of action research (Schmuck, 1997:31), I started the cycles of the action research by first reflecting on the problems mentioned above. As a reflective teacher I had to give intuitive solutions for the respective problems. The intuitive solutions had been tailored from the problems context themselves. To make it action research therefore I had to draft the strategy in the cycle; actions and observations on the respective strategies have been implemented in the three sections

continuously. The data were gathered and analyzed to check the improvements as a result. So the cycle has been completed, for the time being, by the reflections of the recent improvements.

The data collecting instruments were classroom observations, test and exam results, mark lists of other teachers, focus group discussion(see Annex on Appendix B), and the deliberation of the report to the general teaching staff members of the school. The duration of the study was one semester long (fifteen weeks altogether, from 08/10/07 to 25/01/08). The results of the study are forwarded as follows.

6.1.1 Regarding disciplinary problems Serious absenteeism of grade twelve students and lack of uniformity in their uniforms were observed. In the first case, disappearance of grade twelve students, after they have filled out their registration forms, was a common phenomenon in our school context; necessarily affects the education process. The latter problem, which was the disparity of students in their uniforms inside classrooms, was contrary to what they have exhibited at the gate of the school; it was a sign of confrontation to the school discipline: There at the gate, the respective authorities are always standby to check ID cards and students' uniform. I thought that negligence of classroom teachers, not to check students' uniforms might have been the cause of the inconsistencies.

The respective strategies were to conscious the values on the items and to take period-wise attendance and check students whether they were in their complete uniforms or not.

For that matter, 80% to 90% of the grade twelve students attended classes throughout the semester as a result of my serious attendance follow up. Even the norm has extended to the second semester work. I realized the effect when I was assigned to teach a new section, during the second semester, while my former section students remain present.

The problem of lack of uniformity of students in their uniforms was reduced to the minimum of one or two negligent students (see table 1&2 on page 60 & 62).

6.1.2 Regarding to lack of preparedness of students before coming to class was observed during the first week of observation; the strategy was to give chance to students to reflect on their readings. Since the time prearranged by the plasma program was only two minutes, I was not successful to implement the strategy effectively; so, I had no quantitative data so as to qualify the effect of the strategy.

6.1.3 Regarding to the problem of lack of direct involvement of students in attempting class exercises which is the continuation of the previous problems. When ever there is no good background, through reading daily lessons ahead of the class, the consequence is to be passive for the time being, in attempting class exercise; until they comprehended it through time. That is, they were found slow to apprehend the daily lesson.

I oriented them how knowledge is reconstructed individually; starting from the schemata of individuals. I abandoned inquiring the final answer but how s/he has approached and plan to solve that particular exercise. In addition to this, I introduced a strategy that expands the number of respondents: by not accepting the first student who raises her/his hand, but by counting exhaustively the hands of respondents, for that particular exercise, and sign them to pronounce their answers in mass.

The strategies have brought improvements both qualitatively and quantitatively (see table 3, on page 66).

6.1.4 Regarding the problem of students how to pose questions I had several instances. The first instant was their demand to repeat what I have already discussed it; by voicing in mass "we do not understand". I rather approach them to be specific in posing questions than to insist on what they want. To be specific is to clearly articulate their points where they have been in trouble to apprehend. Such questions sprang from students who had no sound reading preparation before class; such students would like to build their knowledge from the mouth of the teacher rather than depending on their own preparedness. I always demand students to direct their questions in search of reasons or to show the fallacy of the teacher's presentation to their prior conceptions.

Finally, I introduced one strategy: three minutes pause for group discussion. For those who had no preparation before class and slow in apprehending the concept was remedial. After the three minutes group discussion, at the end of the plasma transmission, I entertained group questions; by far they were 'representative' questions of the class. The education gap in between the one who has prepared and the not prepared would be narrowed down as a result (see the trend on table 4, on page 71).

6.1.5 Regarding note making problem These grade level students are above the general high school level; they are precollege students. As preparatory students, they had to quit their dependence on short notes of classroom teachers. I tried to conscious them that they are preparatory students and should exercise in developing a habit of independent learning; like making their own notes. I abandoned giving short note and drill exercises on the chalkboard during my four weeks of study. After a number of complaints, they have adapted the habit of scratching note from the plasma screen for their own. I assessed their strength by giving them oral class tests.

Moral perception requires sympathetic understanding. It is necessary to be in touch with our own needs and desires in order to perceive the needs of others. Such knowledge seems to involve suffering and careful reflection on what that suffering means (Garrison, 1997:19).

Though I failed to check their note books, due to time constraint and not to follow the tradition, I designed a strategy to offer them class tests orally by reading loudly twice to all and once at the end for those who could not catch accordingly. I come across to students who could not properly decode symbols of elements and formulas of compounds, at this level (see table 5 & 6 on page 77 & 78).

Validity of the classroom strategies were checked with common mid-semester test, first semester exam, focus group discussion, and deliberation with the general teaching staff members of the school.

6.2 Conclusion My conclusion to this end is that understanding the scientific knowledge by its own does not qualify someone as a teacher; one has to know how knowledge is reconstructed on individual basis. That is realizing knowledge reconstruction paradigm, understanding contextual classroom problems, applying intuitive contextual solutions are basic variables for a democratic classroom atmosphere. For that matter, the teacher her/himself ought to be critical; for that matter, reflective teaching approach was remedial for our plasma contextual limitations.

With reflective teaching approach, students themselves were benefited from it; by doing their action research on their learning activities. Overhere, their action was learning and their action research was reflections on their learning: thinking over the daily lesson-based problems, by connecting their past and present experiences and combining their imaginations.

Absenteeism, lack of uniformity of students in their uniforms, lack of preparedness of students before coming to school, lack of direct

involvement of students in classroom activities, question posing and organizing their own notes were our contextual problems. Regular attendance follow-up and teaching them how to learn: Reading lessons before coming to class, taking part in classroom exercises, probing on reasons, and organizing their notes were our contextual solutions. The improvements that we have scored were encouraging (see section 5.2 on page 82).

Therefore, action research has warranted the efficacy of reflective teaching approach in our plasma-led classroom contexts.

6.3 Recommendations Though my study was limited to the case of a single school, cases of schools have similarities. Therefore, I would like to forward the following recommendations courageously.

6.3.1 to the Ministry of Education

- Practically the two minutes before the plasma transmission are very short to assess the reading background in the population of forty to sixty students in a classroom. Not only that the ten minutes after the plasma transmission are adequate for stabilization of the daily lessons through dialogue; so I suggest the proportion of the time allocation to the classroom teacher better to be fairly proportional. Because I was in a problem to see students' reflections just before the transmission and after the transmission.
- The Ministry should incorporate reflective teaching approach as a supporting means to the plasma program.

6.3.2 to school teachers

- Doing most of the class activities: introduction, posing questions, explanations, and summary work etc. Classroom teachers erode the potency of learners; therefore we teachers should increase the share of our students; by recalling our patience and teach them first how to learn prior to focusing on the mastery of a certain skill.

- By virtue, the presence of a student accounts for knowledge reconstruction. Taking period-wise attendance, therefore, is the underpinning of classroom activities. So, we subject teachers should give the due regard to period-wise attendance, equivalent to the lessons we present in classes.
- Reflective teaching approach is the means to get a critical student; so we teachers better adapt the approach in our context. Doing action research on our respective intuitive solutions makes our solutions valid and contributes towards our educational quality.

APPENDIX A

ADDIS ABABA UNIVERSITY SCHOOL OF GRADUATE STUDIES

COLLEGE OF EDUCATION

DEPARTMENT OF CURRICULUM AND TEACHERS' PROFESSION DEVELOPMENT

The intention of arranging this discussion session is to gather your critical reactions towards the strategies that I have been practicing in your respective sections. As you might have remembered, I have been favoring on knowledge reconstruction paradigm from the very beginning of the semester work; orienting you how to learn and reconstruct your own knowledge with the guide of the plasma program as well as I. As a result, I have been trying to expand your share in the class activities: reflections on the daily lessons, before the plasma transmission, instigate you to attempt class exercises in mass, how to probe for justifications than seeking for pieces of scientific information, and organizing your own notes from the sources available. More over, I have been pursuing strict attendance so as to reduce the number of absentees, which is essential for self reconstruction of knowledge based on the school environment. It was also one of my duties to check your presence in your uniforms.

Today, we come here to discuss the relevance or irrelevance of the strategies from your individual perspectives. You are free to reflect your own perceptions either in support or against the strategies.

Your opinions are gathered today and will serve as official data for the study; disclosure of your names or handing over the record to the third body with out your knowledge is highly restricted. If at all your opinions worth material benefit, you are legible to claim your own shares.

Thank you in advance. ALEBCHEW ZEWDU BELAY

APPENDIX: B

ANNEXED FOCUS GROUP DISCUSSION

It was a focus group discussion held at the end of the thirteenth week of my observation (on the 12th of January 2008) on a weekend, so as to get relaxed time for our discussion. There were a total of eleven students from the three sections: four from grade eleven and seven from grade twelve. Three were females (27.3%) and the rest eight (72.7%) were males.

Table 9 Composition of Students participating in the discussion

Student	Grade	Age	Sex
A	12	17	Male
B	12	17	Male
C	12	17	Male
D	12	17	Male
E	11	17	Male
F	11	17	Male
G	11	16	Male
H	11	18	Female
I	12	18	Male
J	12	18	Female
K	12	18	Female

The discussion started at nine thirty briefing them about the mission of the discussion: ended up a quarter to twelve; with half an hour break.

The questions were semi-structured and were in to two sections: the first section was focusing on their general perceptions about education, learning and teaching; the second section has focused on the strategies which have been implementing during chemistry classes.

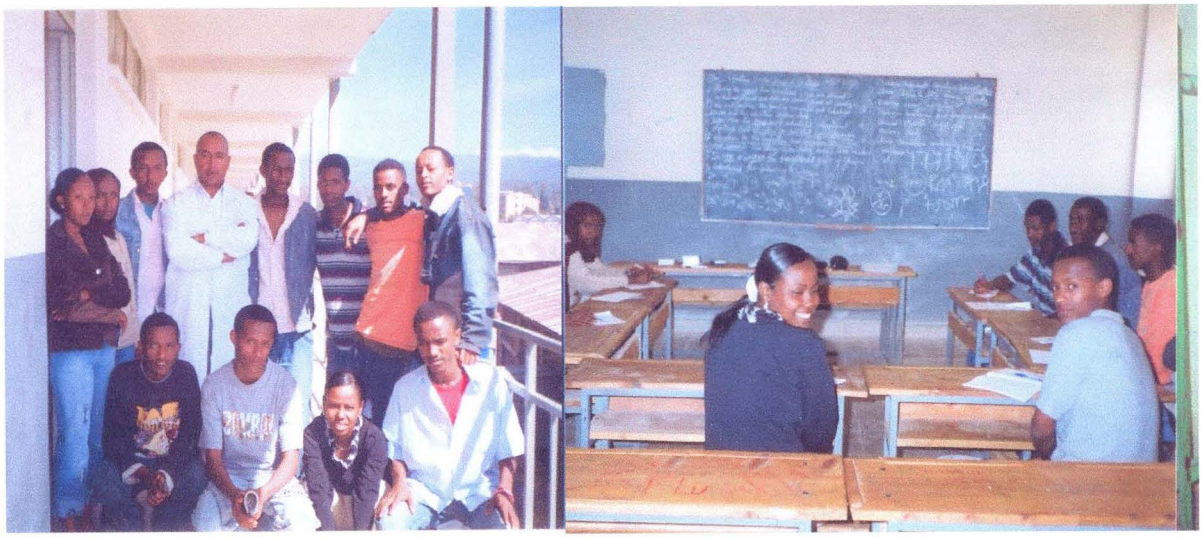

Fig. 6. Discussants' picture

All questions were preceded with brief reminder of the classroom situations, as are presented before their reactions below.

Section 1 General Questions

It was one of my tasks to orient students about the modern theory of education: as learning is the individual reconstruction of knowledge and to narrow down the gap between the teacher and students. Both learn from each other and teach each other. From my questions, I was interested to assess how much they were influenced by the modern theory. My implicit hypothesis was that the major problem of education is lack of proper orientation. The essence of each question and response of the discussants are presented below.

1.1 Asking about the role of Education:

I wish to start my question from the general to specific; thereby to discover their implicit conception about education. I share the assertion that education as a means to alleviate poverty and to lead a better life with mental works.

The number of respondents was limited only to two; their answers were reflecting as the process to gain knowledge and for their future good occupations, by refining their knowledge and avoiding evil things.

It was not my interest to extend the discussion more than this and I shifted to the second question.

1.2 Asking about what leaning is for them:

It is my assertion that our students consider learning is only as the classroom activity. I wish to test their conceptions about learning.

Only one student gave the answer by saying that learning as the interaction of an individual to his surrounding or environment.

The answer has a wider scope; at least learning is not limited only to the classroom. If it is practical it would be good. I consider the above question to warm up my interviewees for my recording. And I went to the next question.

1.3. To test their tendency towards independent learning: In our context students, the teacher, and the plasma presenter meet inside the classroom. My question focused to disclose whom students prioritize. My assertion herein was that if students give priority to the teacher; then knowledge as individual reconstruction remains in question.

They were grouped in to three: 54.5% confirmed that the student is decisive for the learning process, 27.3% said that both the teacher and the students are decisive for the process, and the remaining 18.2% give priority to the significance of the teacher for the learning process.

Mind you, the question was posed by their teacher and quite a large number of students, 54.5% confirmed themselves as the number one person for the learning process. This was what I wish to see the kind of change on their attitudes.

1.4 Question targeting on their perception about teaching:

The question would verify their perceptions about knowledge reconstruction. If they pronounce the vitality of a teacher, still there would be an implicit psychological dependence of students on the teacher. If not, the answer would reinforce the above answer.

Around 33.3% of the discussants said that the teacher should do her/his work until s/he makes understand students. The remaining 66.7% confirmed more or less the teacher as a guide to objectify her/his presentation to their needs.

The response of the learners was encouraging because my effort was to bring about attitude change of students so as to exercise independent learning; librated from the traditional way of learning which erodes the vocation of human creative ability.

1.5 Asking them about their plan what they wish to be:

I have already said it some where, we most of us consider education as a means to alleviate poverty by being hired in an institution with

high payment; but not as a means for the betterment of our day-to-day activities.

Around 44.4% wish to be engineers, 22.2% to be medical doctors, 11.1% to be a teacher, 11.1% to be agriculturalist and the remaining 11.1%, politician so as to solve the problems of the nation.

I do not know how they have arrived to these decisions; but I was so much impressed because one of them took me as a role model to be a teacher.

2 Specific questions on the classroom strategies: The questions are focused on the classroom strategies so as to view their perceptions through their reactions.

2.1 Attendance and uniform problems:

There is no option a regular student must attend classes; but it was a 'chronic' problem of our school. I was not convinced by their rationale for their being absent; so it was my permanent task to take period-wise attendance. I want to listen to their reactions in this regard.

The second thing, some students carelessly wear their student uniforms, they took off their blue vests, in my class.

Around 66.7% outwardly objected the recurrence of strict attendance, while 33.3% of them were positive towards the taking of regular

attendance. Among the oppositions, 85.7% of them were twelfth graders.

There was no opposition regarding checking students' uniform; except ascribing to negligence of students themselves and lack of strict follow-up of the school authority.

2.2 Introduction of the daily lesson and students' reaction:

Both students and the classroom teacher should read the learning materials such as textbooks and related references before coming to school; because both memory and imagination are operational in order to experience the daily lesson. Otherwise leaving the introduction part as a task of the teacher is being unconscious of the reconstruction paradigm. For the same reason I always remind students before the commencement of the daily lesson. I want to know then how they sense the strategy.

Among the eleven participants, only one does not agree with strategy. And another student considered reading text books before coming to the school as an optional. Others, 81.8% agreed the necessity of preparation before coming to school.

2.3 The plasma exercises and reaction of the students:

Practical exercises are given through the screen with fixed seconds. To check the reaction of the students, I raised the issue here as my

question. I instructed students to raise their hands so as to sign their readiness to offer their answers and later to pronounce in mass. I raise the issue here so as to see their reactions.

Among the eleven respondents, only one was positive to the strategy, one student did not appreciate responding in mass; others prefer to mention the problems that students refrain from giving answers. The problems were multifaceted. The following were some of the problems outlined by the discussants.

- Lack of understanding of the plasma presentations

Lack of confidence.

- Fear of reaction pears to wrong answers
- Lack of modern culture, to be expressive in public
- Negligence

If these were the cases, they cannot be resolved by an individual teacher; rather it must be the culture of our schools, where every teacher should take part and exercise as a duty.

2.4 On the problem of organizing their notes:

Traditionally, we teachers usually give short notes on the chalkboard along the plasma transmission. This year I abandoned giving note; I rather focused on discussion on the problems of students raised. That is, my effort was on conceptualization rather than organization of

notes. Organizing note was left to the individual student. I asked them how they are organizing their notes.

All of them take note from the plasma presentations individually. About 63.6% of the discussants organize their notes from the students' text-book; in addition to the plasma source. Others 36.4% organize their notes from the classroom discussion, in addition to the plasma presentations. The remaining 9.1% of them insisted on the note offered from the teacher. And 9.1% has the experience of organizing her/his note from other standard books.

I suspect, students take teachers note naively from classroom and try to master after several readings of the same note; rather it would have been done the other way round: First, to comprehend the concept and then taking the note for critical understanding of the concept. I was trying to deconstruct the first trend in my classes. Except one, the rest did not exhibit their resistance in one way or the other. For me it was a success.

2.5 Analogy

I usually prefer to give analogy when students are puzzled by the new concepts of the subject. I wish to merge the classroom experience to our daily life experience; for me it is the 'grounding' mechanism of difficult concepts. Otherwise echoing the concept verbally is good for nothing. I wish to see the experience in my students' conversations;

but the task was difficult. I now ask them their reaction to my effort offering analogy.

Only 36.4% of the total discussants could recall the analogies that I have offered in class.

Some ironic statements could spur the mind of human being and things would be apparent. The idea could be apparent and long lasting as a result, if the presentation is poetic.

2.6 Reaction of students towards the three minutes pause for group discussion:

One of the aims of education is to make socialization of students and adapt to group work. That is, to develop the habit of solving problems through discussion. At the end of the plasma transmission, ten minute are allocated to the live teacher so as to make summary work of the daily lesson. I rather allocate three minutes for group discussion and later to come up with group questions. I raise the question here so as to see their reactions.

Unanimously they idolize the strategy and went on to mention its advantages as follows.

- Doubts about the plasma presentations would be discussed at their level.

- Challenging questions would be screened out through the discussion
- Matters would be clear through the dialogue between the poser and the teacher
- For those who arrive late, could make up the missed topic
- From their questions, I could understand the level of understanding of students and could give them analogy to avoid confusion.

I can say it was the most effective strategy, which had been adopted from wait time technique (Seime Kebede, 2002), before and after raising a question so as to give time to think and respond rather than hastily giving a random answer. Thinking is time taking process: Sometimes slowness and depth of response are intimately connected (Dewey, 1997:37).

For me I could effectively utilize the potential of some students; when they are engaged in explaining what they have understood and the dialogue was lovely that it created intimacy among ourselves.

2.7 Oral test

Traditionally, we write questions on the blackboard and invigilate class tests; I wish to know the situation if the questions are given in the form of dictation. Doing so might have indicated me the speed and ability to decode symbols and formulas of substances. I have

discovered serious errors which were beyond my expectations from preparatory students. I raise the question here so as to see their reactions to the strategy.

Around 81.8% of the discussants praised the strategy; especially for their further education that demands meticulous practice like the medical doctor.

2.8 introduction of desk number:

A reflective teacher is full of intuitive practices; in one incident I introduced a controlling mechanism by assigning numbers to their desks and instruct students to write their desk numbers on their test papers; I detected six papers with certain resemblance to each other. I presented the issue here to see their reaction.

Among the eleven respondents only seven of them gave their comments. Out of them, two did not see the significance of the strategy because students could easily create a means; such as copying answers from the adjacent desks of students or by adapting answers to their needs. And yet 71.4% the respondents see the strategy as a means that encouraged the students to do an independent work.

As I have already said it, the important thing is to think and seek solutions for our practice. I suppose the strategy could minimize copying if it is coupled with dictation.

APPENDIX: C

ANNEXED DELIBERATION OF THE REPORT TO THE GENERAL TEACHING STAFF MEMBERS OF THE SCHOOL

Action research demands the communication with teachers, students, school authorities and parents about the improvement of the education enterprise (Bev Beasley, 1981, cited in Carr and Kemmis, 1986:200). It was at the same time done for the validity of the study.

The school principals decided to convene the teaching staff members, during the first week of the second semester, and offer me a privilege of making the study public; see its impact upon teachers' attitude towards their teaching approach.

The content of the report focused on the educational theories, essence of reflective teaching and action research.

66.7% of the total one hundred and thirty two teaching staff members, including the two deputy principals, were available in the hall. Time allocated for the report was one hour and for the discussion half an hour, after coffee break. It was the first in its kind.

The report was sectioned into two: the first part focused on the theory of education: reflection on the concepts of reflective teaching and action research. The report focused on the two paradigms: knowledge reproduction and reconstruction. The first approach has considered students as objects; the creating ability of the student is denied. In the knowledge reconstruction paradigm, the student is considered as a

subject who thinks and creates. The new experience would form new schemata. That is, the reconstruction of knowledge differs from individual to individual; despite the fact that all students are taught with the same teacher and learning materials; knowledge reconstruction paradigm pays tribute to the vocation of man as thinker and creator.

In my discussion, I have reflected on the discourses of reflective teaching: thinking and intuitive actions with open-mindedness, wholeheartedness, and responsibility.

In my presentation, the attitude of possessing permanent note for students was strongly criticized, because offering knowledge in its rigidity and finality is not accepted (Dewey, 1997:198).

On the second section of the deliberation I was able to explain how I managed the classroom discipline by taking attendance regularly and checking students whether or not students are in their uniforms. The advantage of the newly established attendance format, over time and space, has been highlighted. The improvements observed over reflection of students on their prior readings, participation of students in classroom exercises, probing for reason than seeking for pieces of information, organizing their own notes have been emphasized with supportive figures from the data already gathered.

After the break, the time was allocated for discussion through questions and forwarding opinions.

A total of seven different subject teachers were involved in either posing questions or giving suggestions: one Chemistry, one English, one Mathematics, two History, one Geography, and one Civic and ethical education teacher. Out of these, two of them gave supplements, one has demanded the school management to offer student's guide to students, and the remaining four has inquired as how to implement reflective teaching in their contexts.

Fig. 9. Partial view of the congregation, while I was deliberating the report to teachers of the school

One of the questions was to get clarity on how reflective teaching is related to the action research, and the other question was on how I could share my experience on the action research to those who had little

experience in research, and the other question focused on the feasibility on reflectiveness of a school guard, which I cited as an example to illustrate workability of reflective thinking in any practice, and also emphasized the vitality of offering note. The forth and the last questionnaire had two essences: one was to know whether or not the knowledge reproduction philosophy is outdated in the global practice, and the other was the danger of facing the student in her/his national examination, if the teacher does not give note, which has been extracted from the plasma screen.

With the collaboration of the two teachers from the congregation, I tried to make clear the necessity of active learning and action research in our practice. Especially my effort was to give impression so as to give room for the creativity of a student in the self reconstruction of knowledge; if we are changed to open-mindedness, whole-heartedness, and responsible stance. Aside from this, I had no intention to offer readymade answers to all problems of individual teachers. For example, the response that I gave for the last question was to be contextual: to identify the problem of the individual student and give guide how to be an independent learner, rather than killing the inquiring time of students by adopting the "note" from the plasma screen to the chalkboard. The conversation was extended almost for one hour.

I have been teaching chemistry in this school for the last thirteen years. I had only one experience in which a team of nine teachers of the school

had presented their research report to the teaching staff members of the school. Probably my report is the second experience, but the first individually where teaching staff members are convened by the school authorities for the same purpose.

For me it was a success per se; because I was the one who has taken the initiative to such new culture to our school: the academic culture in which a classroom teacher is empowered to give lecture on her/his experience to her/his staff members in public. The session was over as of the time table.

After almost two weeks from the discussion, the school authority has announced on the notice board so as to adopt the newly emerged attendance format which I had demonstrated to the school authority as well as to the teaching staff members. For me it was a rewarding to my trial.

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Lesson-14 Chem-3

Electron configuration and orbital Diagram

1-present 40
2- Absent 23 (sick)
3- without –
4- 3-on-1 –
5- Reminding & Flashing
6- Attempting Q & Ex 4, 2 = (3)

7- Posing Q
8- Taking note
9- Analogy
10- Reflection

number of ex/Q X /
Orbital diagram O

- I gave them 3-minutes for discussion
1. The direction of spin in (↑) is it always upward
2. Does it work like ≈'
3. Building principle?
4. Why the p-orbital is 3 d-s
5- Can we use f orbital
6- Hund's rule?

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APPENDIX D

MAY 2008

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My Reflection

40 Students were present and 1 Student absent, will permission of the teacher before me.
- 3 exercises were given by the plasma teacher, 2 of them were attempted by Students.
- At the end of the plasma presentation six Students raised questions, Five of them were strange for class discussion and raised genuine questions, while one Student who usually ask questions raised a ~~question of~~ a critical question. ~~is it~~ In an orbital diagram, orbitals with single electrons, is it always true that the designation of a electrons in the upward direction.
Because of shortage of time and the ~~nature~~ type of question need my explanation, it was me to offer answer for all students' question.
~~The~~ Along my explanation, I came across to the formula of l = 0 to n-1
meta Cognition

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University and that all sources of materials used for the thesis has been duly acknowledged.

Name: Alebachew Zewdu

Signature: _____

This thesis has been submitted for examination with my approval as University advisor.

_____

Dr. Amare Asgedom

Date: _____