Chapter Three

Empirical Investigation – Methodology

Introduction to chapter three

This chapter is organized to reflect what the researcher has to do in order to achieve the goals of the research outlined in chapter one and to describe the process of research during the period of fieldwork, in addition to the approach taken for analysis.
This study explores the development of student teachers (S.Ts.) by focusing on their performance in the mathematics classroom. All Mathematics student teachers that registered in the first semester of the academic year 1999/2000 were involved in this study as a sample. They were seven student teachers; therefore, the qualitative approach was the suitable choice to achieve the goals of the research.
The main features (aspects) of student teachers' performance are: lesson planning, instruction strategies, classroom management, instruction assessment, and mastering content knowledge.
We have seven case studies and the consequences for cases at Jordan University. Those students were distributed to four cooperating schools, two are public schools and the others are private, two are girls' schools, the others are mixture schools, the student teachers were five girls and two boys. At the same time there were three supervisors, and one member of staff of the Curriculum Department, which is a special area, is Mathematics education. The training course is going on under his responsibility and his supervision in cooperation with the university supervisors and the cooperating teachers (Co. Ts.).
The methodology that could be used in this case is qualitative research.
This chapter will present the methodology to be used in the research, and will be structured as follows:

3.1 Study Sample
3.2 Approaches to data collection:
1.Observation (Videotape): of the student teachers' performance,
2.Interviews: of the cooperating teachers,
3.Questionnaire: (for the student teachers.)
4.Self-report: prepared by the student teachers during their practice teaching
3.3 Approaches to data analysis:
1.Translation,
2.Transcription,
3.Classification,
4.Tabulating,
5.Discussions,
3.4 Research plan.

3.1 Study sample

The first step was to find out: How many people are involved? How many supervisors? How many co-operating teachers? How many student teachers are on the course? And what kind of schools are they located at?
This information was obtained by the researcher himself and the results are as follows:
In the first semester of the academic year 1999/2000 two university supervisors, seven co-operating teachers and seven student teachers were involved in the initial teacher training for

Mathematics. Taking into consideration the aims of the study, the number of people, and the time available to collect the data and the methodology to be used, the researcher accepted the schedule of distribution of the different schools as it was. Two of them were public schools, two mixed private schools, five female co-operating teachers and two for women. Hence the final number of the sample was seventeen. It comprised: seven student teachers, seven co-operating teachers, two supervisors, one instructor from the university, and one supervisor of the M O E as an evaluator for the videos, besides the two supervisors of the university. The following table illustrates this distribution:

Table 1 S.Ts. and Co. Ts. Distribution of schools

	Name of school	Type of school	Number of S.Ts	Gender of S.Ts(M/F)	Gender of Co.Ts(M/F)
Private schools	Model school	Mixed /private	2	M F	M M
	Creativity school	Mixed /private	1	M	F
Public schools	Aum Manee school	Girls/ public	2	F F	F F
	Aljubaiha school	Girls/ public	2	F F	F F
Total	4		7	5F 2M	5F 2M

According to the sample, the following table (table 2) gives the reader some information about the cases of the study that were collected from their records at the university of Jordan:

Table 2 Information about the seven cases.

Cases and gender.	The average before practice teaching out of 4.	The average after practice teaching out of 4.	# Of courses that failed during study.	High school's Average. (Tawjehi)
1 /M	2.82	2.89	0	82.1%
2 /F	3.24	3.32	0	86.7%
3 /M	2.47	2.57	4	82.9%
4 /F	2.43	2.59	4	70.2%
5 /F	2.5	2.65	4	83.4%
6 /F	1.97	2.12	6	74.1%
7 /F	2.96	3.01	0	96.5%

It is interesting to mention that the cases 1, 3, and 7 have a relative who worked as a teacher in their families. This person could be a father or mother. And at the same time all the student teachers of those cases have positive attitude towards the teaching career as they expressed at the beginning of the training course.

3.2 Approaches to data collection

Given the size of the sample it was possible to adopt four approaches for data collection: the observations, the interviews, the questionnaires, and the self-reports.
In addition the following methods were used to provide relevant data:

i) Documents from Jordan University, including documents regarding regulations of student's admission and curriculum documents, regarding the Math-teacher education program, and documents regarding marks of student teachers during the theoretical courses. (See table 2).

ii) Perspectives of the pupils in the cooperating schools about their new teachers (student-teachers). My question is focused on the student teachers' performance, comparing them to the cooperating teachers, and the researcher's conclusions from the general discussion with the pupils.

3.2.1 Observations

Observation is the main tool that explores the phases of development for each case individually during the training course observations consists of three stages. i.e. observations were represented by three videos during the time of the training course:

Stage one:
The beginning of the training course. At the end of the first month of the training course, the researcher himself recorded the first video-tape (15 minutes), which raised the main aspects for each case:

- The starting steps for the S.T.
- Level of performance in general.
- The degree of carrying out basic educational concepts: individual differences, motivation, and feedback. During this stage the student teacher has to perform about fifteen minutes so that the partial practice teaching gave student teachers the chance to start the teaching gradually and partially.

Stage two:
In the middle part of the training course (after 2 months), the researcher recorded the second video-tape (30 minutes). The purpose of this video was to form a clear idea about the level of the student teacher's performance during this phase. And to determine the progress that was achieved. The supervisors should focus more and more the changes of the situation with respect to the time of the training course and to address that progress for each case.
The philosophy of this phase is built on the development of the student teacher that was achieved during the previous time of the training course. Thus the student teacher should perform one or two objectives from the lesson plan which takes about 30 minuets.

Stage three:
During the final part of the training course (after 15-16 weeks) the researcher recorded the third video-tape (40-45 minutes), which reflected the degree of the ability of student teacher's competencies in teaching a whole lesson. Actually, at this moment the observer could notice the changes and the development that was achieved during the last period of the training course. Supervisors should evaluate the level of the student teacher's performance in the final stage of the training.

Cohen (1994) and Fowler (1993) recommend the self-completion observation as an effective way of gathering data in educational research. In addition, the observation prompts the researcher sets to investigate the relationships, may be established between the different perspectives of the research (Roberts, 1992).

The prime objective of the observation was to obtain visual information from a large sketch of the lesson, which was performed by the student teachers during their practice teaching.

The student teachers performed three times for recording videotape during the stages of the training course. The student teachers should have 3 videotapes, the initial one (15 minutes), the intermediate video (30 minutes) during the partial practice, and a final one (40-45 minutes) during the final practice.

All the observations for the seven cases were (21 lessons) videotaped by the researcher with cooperation of the university of Jordan, which provided camera and an experienced technician to prepare the tapes.

The researcher obtained many forms of lesson evaluation. The first one was done during the workshop at the university of Jordan (1997), the second one was prepared by Prof. Dr. Abele (Jordan/Math- workshop, 1999), and Prof. Dr. Ralf Hans prepared the third one (Germany, 1998), the fourth form was presented in Enjoying teaching (Horst Heoerner, 2000), and others prepared at the Universities of Jordan, or the MOE in Jordan. (See appendecies, 1-5).

The researcher read, classified, and analyzed all of them and then developed a new form called “lesson evaluation form”, which was applied to the observations by three evaluators (two supervisors from the university while the third one was from the MOE).

In connecting with the forms of evaluation, they have common factors shaped them. In other words, the following areas of teachers’ performance shaped the forms:

(1) Objectives; in some forms you will find more details about the objectives: written in a professional way, measurable or not and explained or not;

(2) Pre-learning; it is dealt with some forms under the title of the introductory phase or lesson concerning content or a preface to the new concepts by reminding the pre-knowledge of the topic;

(3) Methods of learning / teaching; while the form of Math-Workshop focused on the methods if it uses as pupil-centered and adequate to the topic or if they have a positive impact on the pupils’ achievement which gives this point more reinforcement as a special form for Mathematics;

(4) Media is present in all forms while it takes a special frame in the form of Math-Workshop, which was characterized by effective concerning learning achievement.

While the following points some part of one or two forms: (1) Achievement of learning objectives is assessed or not (form of Math-Workshop; form of Enjoying Teaching); (2) Learning activities are used in a meaningful way or not which means understanding for pupils (or not) while this term issued in the Jordan University form and in the MOE form but in another face or type such that activities are described as local or coming from the environmental of pupils which seem to have a meaning for them more than others select randomly.

One of the forms (Ralf’s form) is pointed to some aspects of the lesson which are: (1) Mistakes in implementing the lesson in: content, methods, teacher-behavior, media;

(2) Contact or reactions in classroom; (3) Languages of both teacher and pupils; and (4) Advice to the teacher at the end of the lesson.

We found one of the forms (Univ. of Jordan form) focused on the preparation of the lesson and the actions of the lesson that will happen in details, which gave the teachers and the student teachers the impression about the scenario of the lesson in advance.

At the same time the Jordanian forms (Universities and MOE) focused on some aspects of the performance of the teachers in both in-service and pre-service teacher training, which are:
(1) Mastering content knowledge; (2) The parts of the lesson are sequential or not; (3) Encouraging the pupils to participate in the lesson; (4) Use of motivation or not; (5) Use of reinforcement during the lesson or not; (6) Using questioning technique or not and what is the type of the questions;
(7) Concerning pupils' responses; (8) Searching variations of the answers; and (9) Classroom management.
The researcher and three supervisors (one of them from the MOE supervisors) observed and evaluated the videotapes in order to have credibility, transparency, and consistency for each case, by computing the rate of agreement or disagreement between the observers.
The following form is the "lesson evaluation form" which highlighted all aspects of the performance in Mathematics classroom; including fifteen terms; and the following is the description of those terms:
On the left side of the form the different aspects are listed, on the right you will find the rating scales, beginning with 1(best) to 6(unsatisfactory).
We deal with the cases on the bases of 1 and 2 are satisfied and 3, 4 are not sufficient satisfactory; while 5 and 6 are not satisfactory at all.
Professional teaching behavior was the major concern when estimating these aspects of performance.
The Evaluation Form used to evaluate the second video and the third, while the first video evaluated by the evaluators' opinions on the bases of data that collected and observed from the sketch (V1), The evaluators believed that V1 was not a complete lesson, thus, Lesson Evaluation Form should not use in this case, and they decided to estimate the mark of this video by taking account the general notes that observed and discussed among them about the performance, and then they agreed in their estimations. At the same time, the evaluators believed that the Lesson Evaluation Form should be used for a complete lesson, and they used it for V2 and V3.
Now the following details and comments coming from the listed in the form in order to explain the terms of the form.

Objectives

Lesson has some objectives; written in a specific way so that the teachers are able to explain the topic in different learning phases. So the objectives should be organized as learning sequences where the teacher or/and observer could note the verification of the goals; otherwise; the objectives are not measurable.

Pre-learning

As you know Mathematics concepts are related to each other (if you are talking about ratio or proportion you will find yourself talking about factors or some operations). The teacher is the best person who knows the sequences of the concepts; moreover, teacher could be the appropriate one who selects the concept as a request for the learning of others. Actually; this pre-learning should be prepared in before of the new topic; it's the first part of the lesson.

Lesson concerning content correct and specific

The concept of the lesson is correct and specific influenced each other; the correctness depends on specification as well as the specification should be corrected. When we are talking

about Numbers and Operations; it is a must to explain specific details about Numbers while the operations defined in Mathematical language.

Helping pupils in performing their tasks

Is the teacher able to anticipate learning difficulties of the pupils during the implementation of the lesson? Could the teacher consider the evaluation steps during the lesson in order to test the learning process of the pupils?

Learning/teaching methods

The teacher selects the appropriate methods depending on: pupils' levels; the type of topic (abstraction; analysis; calculation;); the goals of the lesson; and different phases of the learning process; sometimes the teacher is compelled to change some strategies depending on the learning situation in Mathematics classroom; and it is difficult to imagine this situation before implementing the lesson. Is the selection of methods appropriate to the situation or not?.

Media are effective

Are learning media necessary to achieve the goals? Are the media appropriate for the pupils' level? We are talking about two types of media: one is prepared already as a catalyst, which supports the learning/teaching process, like the illustrative material for teaching mathematics. The other media is an aid demonstrated during the lesson by the teacher or/and pupils to help them in understanding the topic.

Learning activities

There are three types of learning activities: receptive; reproductive; and productive. Are the pupils permitted to decide on the goals; the methods; and the learning aids. Are they allowed to decide spontaneously or are all activities dictated? Are they motivated? Do the activities have a real meaning concerning the local environment of the pupils?
To present something in a meaningful way means understanding it very well.

Achievement of learning objectives is assessed

It is necessary to assess whether the pupils have achieved the goals. It is a kind of feedback for the teacher to know whether the applied methods were effective. The assessment can be explicit or implicit; for example: explicit assessment could be a questionnaire; while the implicit approach could be a classroom discussion.

Mistakes

In teaching /learning mathematics' methods; it is difficult to determine the wrong way or the right way, but it is more appropriate to use the suitable way on a scale from not suitable at all to the best suitable way. But when we are talking about content knowledge; it is necessary to use the two categories of right or wrong knowledge, concerning the situation as well as in teacher behaviors; and media. Mistakes are representing the bad situation for the student teacher's performance, but in a normal situation a mistake is not the appropriate word to describe the situations.

Guidance of class

When we are talking about guiding the class, we are talking about classroom management. In other words, could the teacher guide the class to achieve the learning goals? Of course without any obstacles or/and with the down level of difficulties.

Contact with pupils

Is the teacher telling the pupils what a fraction is? He gives an example and has them complete many similar exercises. This is definitely easier for the teacher, but the pupils will be on the loser's side, thus, the contact through discussion, questioning, whatever it is, this is the best way for both teacher and pupils to organize the learning /teaching of Mathematics.

Reaction/ Interaction

When planning any kind of lesson, a teacher must decide how the pupils will learn it best. There are five different social forms of classroom action/interaction: working individually; working with a partner (group of two); working in a group; working in group's discussion; and classroom teaching (class as a whole group). It is important for the teacher to take the decision that one is appropriate for his/her performance. There are many factors influence this decision but the teacher should know what to do.

Use of questioning technique

The type of questions used should reflect our understanding of how our pupils learn. The use of related questions motivates the pupils and gives them a chance to synthesize their work. This technique is needed all the time for the learning/teaching process. Timing and level of difficulty should be planned carefully in advance; because questions should help the pupils in learning not confuse them.

Motivation

Is the teacher able to motivate the pupils in learning Mathematics by using a suitable way that encourages them to participate in Math-Class discussion and in performing activities during the lesson? Was this participation-taking place in the form of group work or/and individual work?
We take into our account the situations of pupils in a Math-classroom, which is characterized by the low interest, level of pupils for learning Mathematics and what the teacher offer in his/her Math-class to help them. In other words, how does teacher motivate his/her pupils during the lesson to improve their learning? Especially when they evaluate their learning, it should be reflected in their achievement.

Reinforcement

It is important for the teacher to use promotion technique so that the pupils have an opportunity to interact more efficiently. Especially when the teacher used this technique in an equal way.

Sometimes it takes the form of giving gifts for some performances or some responses coming from pupils during the lesson, it needs a skillful teacher to manage the situations in an appropriate manner.

As we mentioned in the first chapter, the curriculum in Jordan is organized into subject, where each subject has a separate textbook. In case of Mathematics teaching, each trainee has to teach two to three textbooks during the training course, it depends on the load of co-operating teachers, and which classes he or she teaches.

The appendix on page 198, shows the mathematical content knowledge of the videos. This table is presented to assist in visualising the content of the lessons during the three videos. Read horizontally, the content knowledge of the three videos for each case. Read vertically, the content knowledge of the seven cases for each video.

Lesson Evaluation Form

	Rating scales (best					unsatisfactory)
	1	2	3	4	5	6

1. Objectives are:
   Organized as learning sequence;
   Explained;
   Measurable.

2- Pre learning is adequate:

3 Lesson concerning content correct and specific

4 Helping pupils in performing their tasks is related to the learning situation

5 Use of learning /teaching methods is pupil centered and adequate to the topic.
6 Teaching/learning media are effective concerning learning achievement.

7 Learning activities are used in a meaningful way.

8 Achievement of learning objectives is assessed.

9 Mistakes (content, methods, teacher-behavior, media)

10 Guidance of the class

11 Contact with pupils

12 Reaction/interactions

13 Motivation & Feedback

14 Use of questioning technique

15 Reinforcement

The level of satisfaction calculated by: 100 – the sum of points collected from the rating scale.
So, the best possible mark is 100 – 15 = 85,
And the lowest mark is 100 – 90 = 10.

3.2.2 Interviews

Interviews were used for exploring the co-operating teachers' perspectives. The researcher interviewed each co-operating teacher individually. The purpose of these interviews was to ascertain in more detail the teachers' views about the situation of the student teachers in the initial, intermediate, and advanced stages in ordered to support data that came from the videos.
This approach is chosen to provide the freedom to adapt the sequence of the questions, and the opportunity to add to them and explain them.
Thus, the interviews focused on: investigating the perceptions of those teachers who were close to the student teachers, and exploring their perspectives about the student teachers' performance from time to time during the training course.
The researcher designed open questions from the main features of the pre-service teacher trainings' performance, and that data could be gathered in supporting the research questions. The interview questions asked the cooperating teachers were as follows:

1. Describe any improvement of the student teacher in the area of lesson plan? Did you see any growth in the following areas? Please describe it:
Preparing a lesson plan, Writing objectives of the lesson, Type of activities, Pre-learning, Time management, Preparing materials.

2. How did you evaluate his/her mastering of content knowledge?
Is it growing with time?

3. How did you evaluate his/her methods of teaching?
Are you finding any one of the following?
Questioning, Discussions, Group Teaching, Learning by doing, Paying attention to pupils' responses, Active listening to the pupils suggestions, Arrangement of ideas to be sequential, Presentation from teacher to pupils, and Using materials.

4. How did you find his/her dealing with pupils?
Is there any one of the following?
Improving positive attitudes towards Math-teaching, Encouraging pupils to participate, Reinforcing pupils' responses, Accepting the pupils' ideas (opinions), Doing well in urgent cases, Being concerned about the social situations of pupils, And what about dealings with the teachers in school?

5. How did you find his/her performance in the assessment of teaching?
Did you give him/her an opportunity to construct an exam? If you did, how did you evaluate this work?

6. Describe his/her classroom management?
Did you observe him/her always following up work and observing pupils during class activities or did he/she not care about it?

As one can see, the questions are focused on the knowledge, competencies, and skills required by the student teachers, which reflect the level of practice teaching.
The interviewees were given a written copy of the questions to be asked ten minutes before the interview started. This helped them to prepare for it and gave them an idea about the areas

that they would be asked about, and helped the researcher to manage the time of the interviews effectively.
Of course, the co-operating teachers were interviewed in Arabic, because they can communicate more fluently and effectively.
All the interviews were audiotaped in a relaxing and informal atmosphere, where the interviewees were given a chance to talk freely about their opinions, and the researcher tried to keep them on track through interference.

3.2.3 Questionnaires

Questionnaires were used for exploring student teachers' perspectives about each component of the training process. It was held at the end of the practice teaching.
The researcher developed seven an open-ended questions. And then gave them to three members of the staff at the university of Jordan in order to judge the question or give feedback about the suitable question that could be asked to the trainees.
The following questions are the content of the questionnaires:

1. Evaluate your experience with your supervisor.
   (What do you like to say about the supervisor's role during your practice teaching?).

2. Evaluate your experience with your cooperating teacher.
   (What do you like to say about the cooperating teacher's role towards you during practice teaching?

3. Did you find yourself acquiring knowledge about pupils during your practice teaching? How was it? And did you use that knowledge to modify and reconstruct your personal image of self as a teacher?

4. How did you see your classroom management?
   Did you develop standard procedural routines that integrate classroom management and instruction?

5. Did you think this job is suitable for you?

6. How many classroom-visits did you have from the supervisor during practice teaching? Do you think these visits are enough to have a feedback about your performance? How did you find the supervisor's feedback, useful or not?

7. After your graduation: Have you got a motivation to work as a Mathematics teacher?

3.2.4 Self-reports

An important task for student teachers during their practice in cooperating schools is to prepare a "self-report". The self-reports describe their type of experience gained during a course, and the perspective student teachers have about the process of training itself.
The mission of student teachers in building the self-report during their practice teaching is both beautiful and difficult. It is not easy to establish a purpose for improvement and to put your work as a teacher at the center of the process of the training. In other words, the student teacher should be engaged playing the role as well as the role of the teacher, these two roles are complement each other within the range of teaching/learning process. So, too much

energy has been spent from student teacher to built the self-report professionally. So that the accurate of self-report measured through the criteria and norms that hold the work among these rules to be profession, the researcher believes that professional self-report enables student teacher to take the responsibility for his/her professional growth. Moreover, professionalism in this task enables both the student teachers and the educators to aware the process of teacher training as steps and to take some important considerations.

As a result for this, the student teacher that writes and commits to this process will be impressed with what he/she discovered and reflected about his/her performance.

We are looking at this task as a work will enable trainees to assess their readiness for improve and innovation in educational practice.

This task for the trainees is common sense in many world universities.

Staff at the faculty of education sciences at the university of Jordan in Amman developed a self-report for documenting development of student teacher through the training course in four areas:

(1) Progressive issues in aspects of performance.
(2) Documents that the S.Ts used in his/her practice teaching, especially, the form of observation during the first month. And the process of preparing examinations in Mathematics and analyzing results.
(3) Reflections: through reflecting on teaching practice, S.T develop autonomy, this engages them in thinking about what they were doing, and how could he/she develop.
(4) Self-evaluation: the S.Ts. should have described two cases diagnosing, about his/her performance, first about the situation of weakness he/she felt, and second one about the situation of strengths.

The university of Memphis require student teachers to keep file (report) to document demographic data and placement conferences; to conduct performance reviews in six areas:(1) planning, (2) communication, (3) leadership, (4) teaching strategies, (5) classroom management, and (6) evaluation. (Chance & Rakes, 1994).

Staff at the faculty of education at Wayne state university in Detroit developed a portfolio process for documenting development for student teachers in ten areas; they want evidence showing that the student teacher:

(1) Knows content knowledge and a variety of teaching methods;
(2) Organizes and implements effective instructional programs;
(3) Demonstrates appropriate classroom management techniques;
(4) Stimulates pupils' creative and critical thinking;
(5) Has knowledge of human growth and development;
(6) Is committed to pupils and their learning;
(7) Using listening, speaking, reading, and writing skills effectively;
(8) Behaves in an ethical, reflective and professional manner;
(9) Understands the importance of multicultural perspectives; and
(10) Applies an appropriate assessment.

(Synder et al. 1993, 56)

In the same context; Wolf (1996) believes that reflective commentaries are important parts of report; which examine the teaching and reflect on what teacher and pupils learned.

Glatthorn (1996) believes that the process of reflection beings with awareness –an awareness of teachers' feeling and thought, an awareness of their teaching decisions and an awareness of their pupils' reactions.

3.3 Approaches to data analysis

All the techniques used in this study provided sources of qualitative data. In this research the qualitative analysis was drawn from and informed by the quantitative findings, that are: the number of responses (answers) that agreed on one area or issue of concern, and the ratios of some categories. The data has been generally exposed to three processes: “data translation, data transcription, and discussion”.
Thus data analysis has gone through four stages. These stages are explained as follows:

3.3.1 Translation

All the interview questions were designed in Arabic, up to the stage of applying them in the field: as the fieldwork was done in Jordan, it was necessary to translate them into English after conducting the research in the field. The co-operating teachers’ interviews and the student teachers’ observations (videotapes) were conducted in the Arabic language and this necessitated translation of the transcriptions into English.
The researcher translated all the documents that were applied in the fieldwork from Arabic into English.

3.3.2 Transcription

The co-operating teachers recorded interviews were conducted in the Arabic language and this necessitated translation into English. To save time, when transcription took place, the interviews were translated simultaneously.
The student teachers’ observations (videotapes) were evaluated; as such in Arabic by three supervisors two of them from the university while the third supervisor was from MOE. Then, the final evaluation was estimated as the average of the whole evaluations, and the written feedback from supervisors translated into English, for the purpose of analyses.
It is interesting to mention that in some cases the evaluators were disagreeing about the scores of some figures and then the final decision took the average, while agreement was the major feature of the evaluation of the videos.

3.3.3 Classification of findings

After the translation and transcription stage the responses were grouped and classified into categories in order to established patterns in the data. For each question separately (interviews and questionnaire), a number of categories were establish and the number of answers that raised points in these categories.
The aim of this step was to find out how many times each category appeared. Some times the main category was divided into sub-categories to find more patterns among the answers. The process of developing the categories has gone through several stages of revising and reviewing before the final list of data was established.
According to the videos, the main terms of the evaluations were compared among the cases, while each case was estimated separately as a total of sub-evaluations.
Tabulating:
All the patterns that appeared were fitted into tables showing the main category with the respective number of answers that referred to it.

The same process was used for self-reports and questionnaires in order to compare the responses. At the same time, summary tables presented to draw a picture at the end of the analyses of each part, and at the final step of advance analyses.

3.3.4 Discussion

Unlike data drawn from questionnaires and interviews, the data in case of self-reports naturally less organized and high impressed personal through the cases, therefore, rigorous effort was exercised to work towards a mechanism of gradually coding, classifying, and eventually interpreting the data. The first step in this direction was skimming through the cases in order to have a general idea about the overall worth of the data.
A second step was reading which made during scanned to identify recurring themes and concerns in an attempt to formulate a scheme of analysis. Categories that covered similar issues were grouped together, moreover; the self-reports were given to some colleagues who were asked to read them and suggest a list of categories they thought the reports contained. Then the researcher find out later a suitable system was reached: which split the data into four parts; respect with time of training course: first month (observation); second month (partial practice); third (full practice); and fourth month (full time practice).

Organizing the data in this way had several advantages. It facilitated the process of dealing with the data in direct relation to the study objectives and questions, it made it easier to point the raised, and to discuss, interpret, and compare perspectives of the participants.
The following figure shows us the three steps of the process that the research goes through. These steps are gathering data by using four tools, data analyses from the first point to the stage of discussion, and the step of drawing conclusion.

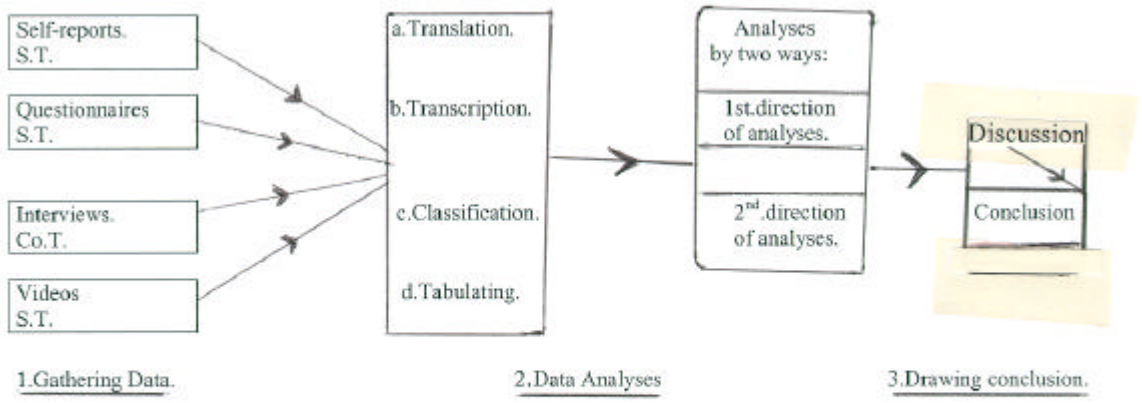


Figure-1: The main process of the research line.

3.4 Research plan

The following paragraphs show the plan of research that verifies the goal. The research questions are:

1. **How does the performance of student teachers develop with respect to time?**
2. **What difficulties do S.T. face performing during the training course?**

3. **What are the facilities that help in developing S.Ts'. Performance during the training course?**
4. **What are the factors related to performance? Are they personal, social, methodological, or related to mastering the curriculum?**
5. **What is the relation between S.T. performance and supervision?**

The following paragraph shows the research plan that was determined in advance to draw the final answers (conclusions) for the research questions. In other words, the plan draws a picture of relevant data with the research questions; in more details with the following plan:

To answer the first question, the following methods were used to provide relevant data:

1. **How does the performance of student teacher develop with respect to time?**

1.Observations:

1.1 Observations that videotaped three times for the S.Ts'. Performance during their practice teaching. The first video (v1) was at the beginning of the second month of the training course. It was just 15 minutes long, the student teacher should verify one goal from the lesson plan that had bee prepared in advance. The second video (v2) was in the third month of the training course, it was 30 minutes long. And the student teacher was supposed to verify the whole plan of the lesson as well as the teacher; in full responsible teacher at the end of practice teaching.

1.2 Observations that the supervisor of Mathematics has received during the training course, such that the supervisor should visit the student teacher in his /her Mathematics classroom weekly (once as a minimum). The university supervisor should write a report of the weekly visit for each student teacher among his group. Furthermore, the supervisor and the student teachers have to discuss items of the weekly report, which has been prepared by the supervisor, this process is a must by the regulation of the university for pre-service teacher training.

2 Interviews with cooperating teachers, especially question one and two of the interview.

3 Self-report: the student teacher should reflect some component related to the development of his/her performance; 1 Progressive issues as to aspects of performance as he/she felt,

2 Through reflecting on teaching practice he/she develops autonomy engages them in thinking about what they were doing and how it could be developed.

2. **What difficulties do S.T. face performing during the training course?**

To answer the second question that was related to difficulties; the following methods were used to provide relevant data:

1. Self-report: In all norms of self-report we can derive relevant data.
2. Interviews with cooperating teacher; especially terms: 3, 4, and 5,6
3. Questionnaire for student teacher: especially terms 1 to 5.
At the same time; the supervisor is keeping in touch with school, teacher, and student teacher; which means he could observe or hear some difficulties that were related to the development

of student teacher's performance during the training course, specifically during the regular meeting which was held weekly.

3. What are the facilities that help in developing S.Ts'. Performance during the training course?

To answer the third research question that was related to facilities that helped in developing performance of student teachers during training course, the following methods were used to provide relevant data:

1. Observations could give the chance to show the facilities, which were used in the Mathematics classroom.
2. Self-report: when the student teacher describes his/her suffering from loss of facilities in schools or universities.
3. Interviews: terms one and three.

4. What are the factors related to performance? Are they personal, social, methodological, or related to mastering the curriculum?

To answer the fourth research question that was related to factors influenced by the performance of student teacher during the training course, the following methods were used to provide relevant data:

1. Observations: the tow components of observations; videotape and supervisor's observations could give us data about personal effect of the student teacher's performance.
2. Interviews with cooperating teachers; especially terms 2, 3,and 4.
3. Questionnaire for student teachers especially terms: 1, 2, 4, 5, and 6.
4. Self-report; may be it could be the best source investigating the factors that were related to the pre-service teacher training process
5. Documents from The University of Jordan: including their marks in theoretical courses in academic records in university, their averages in high schools, their records which describe attitudes, hopes, social aspects about their life and their economic situation. One can see some of these information in table 2 at the first chapter.

5. What is the relation between S.T. performance and supervision?

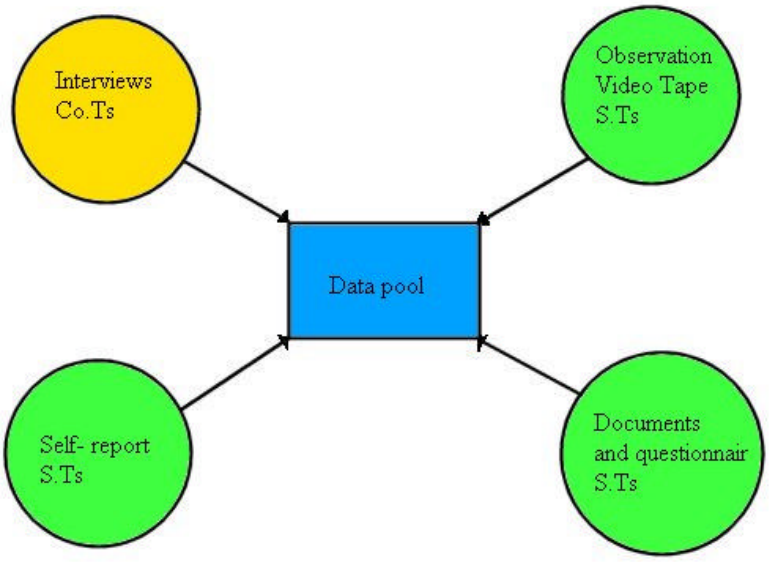
To answer the fifth research question that was connected to supervision; the following methods were used to provide relevant data:

1. Observations: the last video (v3) shows us the change of many features that were supported by supervision. At the time of this video the supervisor should have observed the student teacher in minimum during 7 to 10 visits. It depends on the situation of each student teacher as an individual case, if he/she needs more visits and more feedback to support him/her in performing practice teaching.
2. Questionnaire: especially numbers one, two, and six.

Thus, it was not easier to draw answers to the questions that this study is addressing, about areas of knowledge, skills, competencies, and other issues related to performance of student teachers during the training course.

Conclusion

Finally, as one can see in the following diagram:



We have two types of data; the first was gathered from the student teachers (see the shaped circles), while the second type was the profession component that gathered from the co-operating teachers.
Thus, the researcher gathered information from many sources, i.e. co-operating teachers, self-reports, lesson observations, and some documentation that were related directly to the student teachers, their marks during theoretical courses, and their general attitude toward the career of teaching. This is what called “triangulation”, which gives the research more creditability, transparency, and consistency for the purpose of analyses and drawing the final conclusion.