

DEVELOPING TEACHING ENVIRONMENT USING ANT TECHNIQUE IN TEACHER TRAINING

(From the point of Educational Technology)

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Introduction:

Countries dwell upon the quality in teacher training when rising the young generations. Teacher is the one who trains the young generations as good consumer, good producer and as the acquirer of the self-interest of their country in both the borders of their country and the globe. In international teacher training, all countries from USA to Taiwan, have designated their standards and needs for the quality of teacher training.

It is an obvious fact that, many research and studies are being done in teacher training in Turkey. Many methods and techniques have been used in teacher training. *Ant Technique* is a new technique used in teacher training and developing instructional environment.

Making teacher trainees orientated to cooperation and make use of innovations and making them apply these things in to their teaching speed up the change and development.

Problem:

Is it possible to provide better teaching and learning environment using the present opportunities in training schools and teacher schools in the process of training teachers?

Aim:

To train teachers as individuals who are more sensitive toward their environments and to teach them to use the opportunities in their surroundings in the best way;

To make them grasp the importance of carrying innovations into schools is only possible with the use of educational tools and material development and to make them apply this knowledge;

To make them aware of the fact that the lack of educational tools and materials can be filled by using the opportunities in the environment in the best way.

Method:

This research was conducted with the students of the Technical Education Faculty who were the participants of the teacher training program. Video recordings of the teacher trainees in their training schools, teacher reports, student dossiers were evaluated and interpreted.

Findings:

1. 1. Teacher trainees applied the knowledge that they gained in the theoretic lessons into their teaching practice.
2. 2. They got the zeal of providing new educational tools to the schools.
3. 3. Guide teachers saw teacher trainees as real teachers and developed materials with them.
4. 4. Teacher trainees showed the possibility of preparing the best teaching-learning environment with the limited opportunities and materials.
5. 5. Students prepared their training dossiers during the practice.

Conclusion:

Teacher candidates can adapt more to teaching when they are guided and when they see that the things that they say "we cannot do" become real. As a result of the use of the self-developed educational materials and the use of recent instructional methods, teacher trainees perform better ways of teaching which are observed and exemplified by the students of the Vocational High Schools as well.

Recommendations:

To make the Ant Technique widespread all over the country;

To develop the creative thinking of the students and develop a new method of training teachers with the existing opportunities.

To apply the Ant Technique in a coordinated way by the Ministry of Education and by the universities and to increase the instructional standards one step further.

(DEVELOPING TEACHING ENVIRONMENT USING ANT TECHNIQUE IN TEACHER TRAINING

While Atatürk indicates that the new generations are the products of teachers, Bismarck emphasizes that the development of a country is in the hands of primary school teachers. The existence or non-existence of the countries depends on the quality and the number of the trained young generations. Qualified generations become different with the application of their knowledge, skills, attitudes and modes which they gained from the education they took into their lives. Education strategy, techniques and methods play important roles in becoming different. These three bases should be framed by the teaching art practice.

Education strategy, is the art of using educational tools, materials and human resources in the right places in order to reach to the aims and objectives indicated by the educational policy. The modern education struggle is the art of making the education reach to the aims and objectives of the education of the nation or nations using the technical, economical, political, and cultural strengths all together. In the presentation of modern education as formal and informal education lie the power principle, safety principle and economics strength principle. This is the application of the strategy of the military power in the war field into the teaching-learning environment.

Technique is the methods, materials, tools, and the ways used in the education in order to realize the teaching-learning practice. The talents, skills and creativity of the individuals play an important role in the application of the technique. Technique is the whole of the ways of the application of the methods to reach the final behaviour and to production of the scientific knowledge. Technique in education is the skill, the procedure or the way which should be used for any of the art, production or the educational process. Technique, is the direction of the educational activity, and also the principals related to creativity and the skills needed for the application of the educational activity.

Method is the way of teaching. It is a way of communication of information transfer in educational process. It is a way followed in doing a job or a study. After the indicated terms, the developments in teaching-learning, instructional environment requires to mention shortly for the sake of the aims of this presentation.

Many different instruction and learning techniques, methods and strategies have been used since the formation of the earth. The societies that made use of those three elements have reached the socially, economically, technically and technologically maximum and superior countries level. These societies or countries were always superior to other societies and countries as a result of their education. Technical, technological, economical and socio-cultural development are constructed by the education. The parallelization of the education according to individual needs, skills and interests which have been going on since Bacon and have been developed in 19th cc rapidly with the

national needs, and the presentation of the more knowledge related to real life encouraged the development and the improvement of the countries. (Henson 1988) (Armstrong- Savage, 1990). The development of the individuals occurs in the family in the school and in the environment formally or informally. These three social foundations affect the development of the countries. The educational foundations which provide individuals planned and formal educational activities affect the family and the environment and go on their mission hand in hand with them. (Varış, 1985; Doğan, 1997; Baytekin, 1998). Teacher is the person who directly shares the skills, knowledge, attitudes, and experiences mutually with the students. On the basis of indicated fact, discussing the teacher quality but not the number became more obvious after the 19th century. New courses on technology and economy were inserted into teacher training programs, and the content of the existing courses were updated according to the recent situations. In the 20th century, with the use of technological tools to the developments in the 19th century education programs, it was made possible for students to reach the information more quickly. All nations emphasized the quality of teaching staff and the teacher training. Because, teachers are the ones who train the individuals who will take part in every different level of the society. Teacher is the artist who forms the clay that given to him/her, and who makes that clay something useful. Being a teacher means raising humans and equipping them with the necessary information, skills and attitudes. In the last decade, the future performance of the teacher training programs and the education and the training of the teachers have been emphasized in the USA, Europe, Japan and in other countries.

The human resources advisor of the World Bank, Arvil Von Adams highlights training qualified teachers directed to recent developments. (IVETA 98,99) Adams' emphasis on the quality of teachers is based on his belief that individuals should be raised as good consumers, producers, and as aware of the self-interests of their nations in the national and global level for the countries. The countries such as the USA, England and Taiwan, give priority to the evaluation of education according to standards of ISO 9000. As a result, they have to develop new programs for ISO 9000 using the past, present and future plans in teacher training. This situation has caused the use of new strategies, techniques and methods in teacher training.

Altun (1999) explains the Protect teacher training program in England while exemplifying the training programs out of Turkey. This program mentions training qualified teachers in their subject area. Altun explains the studies of the developing teaching skills and presenting opportunity to teach on the basis of academics content of the program. He indicates that the evaluation of the teachers is based on literature review 20%, exams 40%, group project 30%, and attendance and contribution 10%. The courses of the each

training program are different, but practice, observation and peer-teaching are also included into the programs.

Toprak and Akboy (1999) mention a new teacher training model, PGCE (Post Graduate Certificate) and QTS (Qualified Teacher Status) in England. They indicate that PGCE applies a field work and professional program after high school between 2 and 4 years, QTS applies one year program to the graduates of university. In recent times, while world nations are dwelling upon the quality of the teachers, they also emphasize the teachers' knowledge, culture and skills.

Some recent teacher training models have been started to use in Turkey, as well. After 1982, with the support of the World Bank, Ministry of Education and Higher Education Council coordinated teacher training programs. Despite the all efforts in teacher training, Gürman (1993) states that political powers made some mistakes in teacher training philosophy and policies, and those mistakes caused decrease in the quality of the education and the human power, Gözütok and Pektaş (1999) state that the teachers' instruction in the class is not sufficient, and the teachers do not check the basic objectives and the aims of the lesson, Alkan (1993-1995) states that the indicated essentials of the Kemalist teacher training profile are not used, and Baytekin (1998) indicates that the teacher training in Turkey is so far from the objectives described by Atatürk. The efforts for teacher training in Turkey, and the results of the projects were presented by Habcıoğlu (1993). However, the efficiency of the trained teachers and their effectiveness in raising students according to the national goals can be evaluated from their professional life and the products of those teachers. Education gives results in 10-5 years time (Variş, 1987). According to this theory, we have to wait for three generations to see the result. On the other hand, scientists agree upon that the learning outcomes should be evaluated in a short time using the effective methods, techniques and strategies in the learning environment (Variş 1987; Alkan 1995; Doğan 1997; Demirel 1999; DPT Development Reports 2000).

There are four main types of courses in teacher training programs;

- a) a) Branch and additional branch courses; the main knowledge that the teacher will share with the students at schools.
- b) b) Cultural courses; courses that broaden the teachers' vision both in national and international perspective.
- c) c) Courses for the teaching profession; the presentation of the knowledge in the instructional environment, knowledge related to students and to the process and management of education.
- d) d) Social Activity courses; healthy life, communication, social relations.

From the beginning of the program, these four types of courses are presented to the students within different proportions. If the education is a life long process, then teacher training programs should be constructed as life long and future oriented.

As in other professions, teachers will present a product or a good to the consumer, will exhibit it and then will sell it. In order to achieve this, s/he should share the thoughts, emotions and attitudes of the people s/he is facing with. Teacher has a different side in front of the class. Teacher carries his/her students to the objectives of the lesson by equipping them with necessary knowledge, skills, and emotions. A teacher should take care of some principles while carrying students to the objectives of the lesson. These are;

- a) a) Teacher should motivate students to learn and should drag them into the course with that motivation.
- b) b) Teacher should know that students perceive him/her as a photo camera.
- c) c) The attitudes and the modes of the students toward teachers should be perceived.
- d) d) An interest toward lesson should be raised.
- e) e) Teacher should gain attention of the students and carry on that attention during the lesson.
- f) f) Teacher should explain the objectives and the reasons of the taught lesson subject.
- g) g) Students' ideas should be taken into consideration.
- h) h) Achievement contract should be done with the students and some examples should be given.
- i) i) Students should be informed about the testing, evaluation and ranking, and students should take these exams as motivated.
- j) j) Group projects should be given in order to make students work as a group.
- k) k) Information about the awards, rewards and support should be given at the right point.
- l) l) Students should feel free and comfortable. This will bring success for the students. (Henson, 1988 p.260-285) these indicated behaviours should be gained by the teachers during their training, if not; the probability of the applications of missing behaviours during training is so low.

For that reason, the teachers were trained before the profession with the Micro Instruction Technique started in 1956. This teachers training technique is one of the techniques that provides effective training for the teacher at pre-professional stage with the use of educational technology (Bromme 1992, Baytekin, 1972).

Training effective teachers with the Ant Technique is started at the second year of the university with the video recordings, producing educational tools from waste materials and with the recent opportunities of the country.

The problem is that are the teacher candidates trained according to the situations of the country in "Teaching Practice Lessons" effectively? Can the Technical Education Faculties and State Schools make use of existing situations in order to prepare more effective, efficient, more productive teaching-learning environment? Can Ant Technique be effective in preparing a new teacher training program.

The aim is to make teacher trainees aware of the opportunities in their practice schools, and to make them make use of those opportunities in the best way.

To make teacher trainees know the existing opportunities at schools and transfer those opportunities in to best teaching environment.

To show the ways of making students effective and productive in teaching learning environment with the Ant Technique.

To teach them to enjoy the cooperation and the production of that cooperation process.

To repair or to get repaired the broken educational tools and materials at schools with the Ant Technique.

To carry a new vision to schools and to show them the application of knowledge into the life.

To teach developing educational materials and tools for the courses using the existing opportunities with the use of educational technology.

To support the teacher training efforts from the educational technology perspective with the Ant Technique.

The importance

countries are aware of the fact that the teachers are important in the development and the improvement. All countries train the best, the most effective and the most productive teachers within the limits of opportunities. The importance of the quality in work power is known by every country. To develop teaching environment with the existing opportunities will show that these countries will have better or the best equipments in the future, and this will bring technical, economical development, socio-cultural modification and modernization to the country.

Assumptions:

The fact of use of knowledge at the appropriate place will be realized not the acquisition of the knowledge.

With the parts of the broken tools and equipments, new tools and materials can be produced.

Innovations can be carried in to schools by teacher trainees.

Methodology

Because of the earthquake, the course "Instructional Techniques and Material Development" which had been offered in third year, was started to be offered in the first term of the second year in November 1999. In the practice part of this course, the

second grade students of the Technical Education Faculty started to develop educational tools for different school levels and subjects with the use of waste materials. These tools were exhibited on March 16th 2000, on the day of Anniversary of the foundation of the Teacher Training Schools in Turkey. This project was thought to be continued with the fourth year students in 2000. The result of the literature review was shared with the students. Because the education faculties form a big universe, Kocaeli University Technical Education faculty was chosen as the sample group. And from that group, the fourth year students of "Computer Teaching" department. The students who started to the course on the very first day of the term were chosen as subjects. The total number of the students taking that course was 52, and the number of the subjects was 43.

The application of The Ant Technique;

- 1) 1) Teacher training courses that were offered to students in four years were summarized.
- 2) 2) Trainees were asked to prepare ten minutes of teaching in their own subject area, and they were informed that video recordings would be done.
 - a) a) the plan of the ten minute lesson
 - b) b) to develop of educational material to use in that lesson
 - c) c) to develop an educational tool
 - d) d) to develop models and scale models
 - e) e) to nidicate the relation of subject matter with the real life and experinces
 - f) f) To prepare the educational tools such as; board, OHP, OHP transperincies, tables and charts and to use them while presenting the lesson
- 3) 3) in order to have a good classroom management, to apply theoretical knowledge in to practice
- 4) 4) to use at least four different teaching methods and techniques very effectively and to develop a teaching-learning strategy
- 5) 5) To finish the preparations in the first month and be ready after then.
- 6) 6) To be ready for the presentations in the practice school after the peer-teaching sessions at university
- 7) 7) To detect the deficiencies of the practice schools wtih the help of the quide teachers, to find the ways of fillling these deficiencies together
- 8) 8) To repair the broken computers of the practice schools within groups of four, to produce software for that schools, to provide net-work connection and internet connection, to help the teachers with the classrooms and students, to discuss the theory and the application with their guide teachers and to share knowledge and experince with them

- 9) 9) To help teacher candidates to develop the consciousness of the responsibility of their mission and job.

The first application of the Ant Technique was in 1998-1999 education year, in İzmit Vocational High School with 15 automotive machine department students. The educational tools and material related to machines were exhibited on June 16, 1999.

In order to apply the Ant Technique effectively, the practice schools were visited with the list of teacher trainees, the principles of the technique were explained, the opportunities of the school were detected, and the guide teachers were decided in March 2000. At the first day of the practice, all the students tried to be in their practice schools.

The first problems faced with were the cost to be paid to schools decided by the Ministry of Education and Higher Education Council (YÖK), the broken machines' being office stock, and the schools support for the classic education system. These problems were overcome by the explanations at first meeting. Schools were phoned and then visited and the solutions to those problems were discussed. Within this process the schools principles' recognition of the teacher trainees and the lecturers was an advantage. School principles allowed for the video recordings, and also they supported the process.

The practice schools in Ant Technique project were; Gebze Technical High School, Gebze Anatolian Technical and Vocational High School, Alikahya Sabancı Anatolian Vocational High School, STV Technical and Vocational High School, Darıca Aslan Çimento Technical and Vocational High School.

Ten principles were emphasized in this process;

- 1) 1) to provide teacher trainees with the necessary experience and to make them apply the knowledge that they gained from courses in to practice. In order to realise this, the video recording of different educational environments in Turkey and Germany by Baytekin were discussed with the students from the teachers, students, and the technological development point of view in order for students to see their rights and wrongs.
- 2) 2) Kocaeli Technical Education Faculty's second year students' educational tools were presented to the fourth year students by video recordings, and their opinions, critics and interpretations were taken, and some information about developing educational tools was given.
- 3) 3) In the practice schools, teacher trainees were frequently asked whether they enjoyed the process and they also asked to compare the situation with their own high schools.
- 4) 4) Groups of four or five were formed at practice schools, and their coordinated cooperation was carried on. The guide teachers at practice schools worked with the groups and guided them as well.

- 5) 5) In order to improve the teaching learning environment in the practice schools, guide teachers and teacher trainees worked together, developed materials and educational tools, and teacher trainees helped their guide teacher as well.
- 6) 6) It was proved that the best education environments can be made out of the worst opportunities at schools.
- 7) 7) Teacher trainees worked on their practice dossiers, they collected realted laws and written regulations, read those laws and the lformal procedures at school were presented to teacher trainees by the school principles and teachers.
- 8) 8) Teacher trainees wrote journals in order for lecturer to see how serious they took using the Ant Technique.
- 9) 9) Whether the guide teachers saw teacher trainees as friends or as teachers were tried to be found with the evaluation of their reports and observation.
- 10)10) Computers regained to the schools were used with the documents and the video recordings of the principles and the teachers.
- 11)11) Within this process, 43 of the teacher trainees were recorded and other 9 trainees were just observed and evaluated using some criteria.

In the evaluation of crieteria, the observed values of the students' arithmetic average = $\frac{\sum nx | x |}{n}$, correlation coefficient formula and standard deviations were used. And then p values were found.

These values were interpreted and the differences between top and bottom groups were studies. The values gained in the findings were done according to the statisrical data analysis of Excel program.

Findings

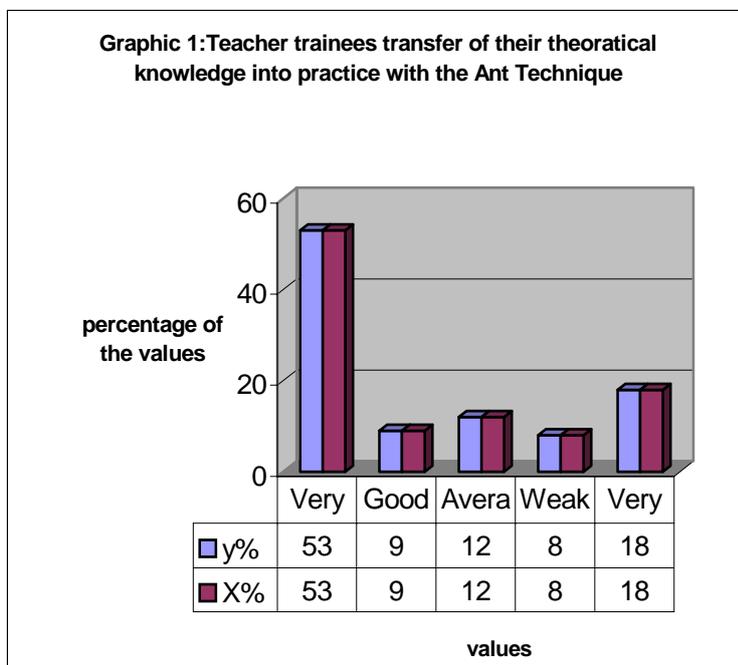
Changing national and international conditions guide nations and individuals to new seeking and to the different forms of the creativity. Individual has run out of the frames and limits, and has started to depend more on nature, and other ways of reaching to knowledge and to the information. This change puts pressure on the ones who will take part in future teaching-learning environments and in education programs as they should reveal the skills, creativity and the talents. Different brain storming techniques have been widespred in this process. The results of the studies done with the teacher trainees of Kocaeli University Technical Education Faculty are given below at the observation tables.

Table 1. will be presented after the Reference section. In Table 2. teacher trainees' transfer of theoretical knowledge into practice in their training program by using that knowledge in preparation before going to practice school was found as $r=1,00$, the standard deviation value was $s=1,9$.

Arithmetical Average was found to be 3,7 . With the use of Ant Technique, the transfer of theory into practice was found to be quite high. You can observe the same results in Graphic 1. Here, 53%of the students could transfer their theoretical knowledge in to practice, however 18% of the students were so weak.

Table 2: Teacher trainees transfer of their theoretical knowledge into practice with the Ant Technique

Value	Criteria	nfx	X%	Xp	X2	nfy	y%	p	Y2
Very good 5		23	53	115	575	24	53	120	600
Good 4		4	9	16	64	5	9	20	80
Average 3		5	12	15	45	3	12	9	27
Weak 2		3	8	6	12	3	8	6	12
Very weak 1		8	18	8	8	8	18	8	8
Total		43	100	160	704	43	100	163	727



In Table 3, the students' development of educational tools and materials from the waste things and use of these tools in their practice according to what they had learned in the courses was studied. In this situation $r=1,07$, $p=0,5$, standard deviation 1,9, and arithmetic average is 3,5. this shows that most of the trainees can prepare and develop their own materials

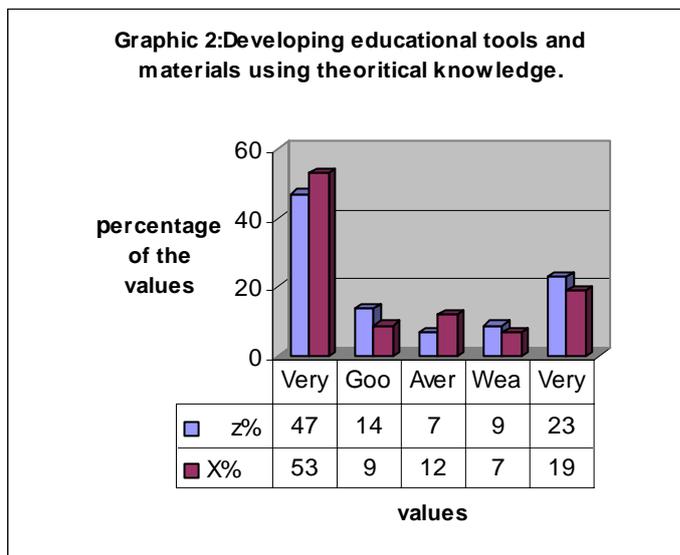
related to their subject matter. Educational tools, materials, models, charts, tables were developed and used by 46% of the trainees very effectively; however, 23% of the trainees were weak in developing and using the educational tools and materials. Using

waste materials in producing educational tools, played an important role in trainees tendency and perception of the teaching profession.

Table 3: Developing educational tools and materials using theoretical knowledge.

Value	nfx	X%	nfz	z%	Xp	X2	Zp	z2
Criteria								
Very good 5	23	53	20	47	115	575	100	500
Good 4	4	9	6	14	16	64	24	96
Average 3	5	12	3	7	15	45	9	63
Weak 2	3	7	4	9	6	12	8	36
Very weak 1	8	19	10	23	8	8	10	10
Total	43	100	43	100	160	704	151	705

r= 1,07 standard deviation= 1,9 p=0,5 arithmetic average=3,5



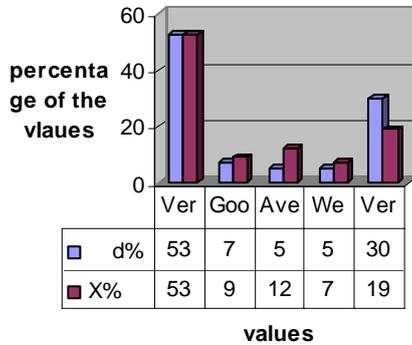
When we look at the Table 4. we see that enjoying the use of Ant Technique is quite high; r= 1,01; p=0,18; arithmetic average= 3,88 and standard deviation=30. The enjoyment and the pleasure of being a teacher is high, but no change occurred in the numbers of trainees who did not enjoy teaching.

Table 4: Getting pleasure from the teaching profession while applying the knowledge gained with the Ant Technique

Value	nfx	X%	nfd	d%	Xp	X2	Dp	d2
Criteria								
Very good 5	23	53	23	53	115	575	115	575
Good 4	4	9	3	7	16	64	12	48
Average 3	5	12	2	5	15	45	6	18
Weak 2	3	7	2	5	6	12	4	8
Very weak 1	8	19	13	30	8	8	30	30
Total	43	100	43	100	160	704	167	679

r= 1,01 standard deviation= 30 p=0,18 arithmetic average=3,88

Graphic 3: getting pleasure from the teaching profession while applying the knowledge gained with the Ant Technique



In Table 5, the guide teachers' perception of teacher trainees was analysed. Here; $p=0,6$; arithmetic average=3,55; standard deviation=1, Guide teachers at practice schools evaluated 52 % of teacher trainees as very good, and 23% of them as very weak and indicated that they had many deficiencies.

Table 5: The evaluation of teacher trainees by their guide teachers at Ant Technique practice schools

Value	nfe	e%	ep	e2
Very good 5	22	52	110	550
Good 4	4	9	16	72
Average 3	3	7	9	27
Weak 2	4	9	8	16
Very weak 1	10	23	10	10
Total	43	100	153	675

standard deviation= 1,6 $p=0,6$ arithmetic average=3,55

Graphic 4: The evaluation of teacher trainees by their guide teachers at Ant Technique practice schools

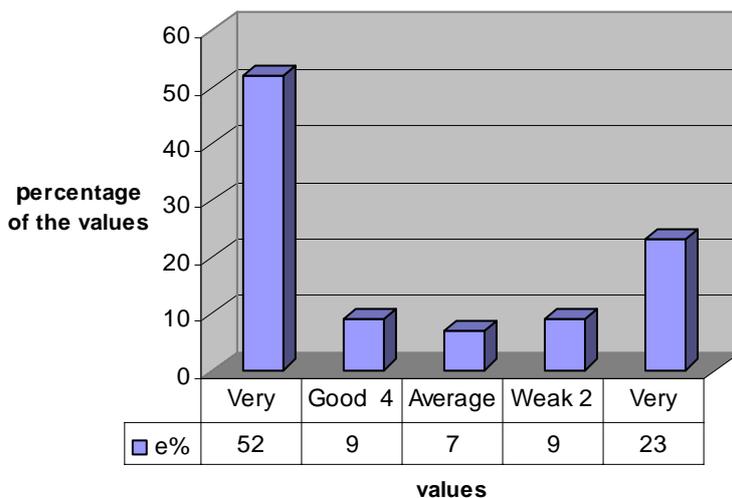
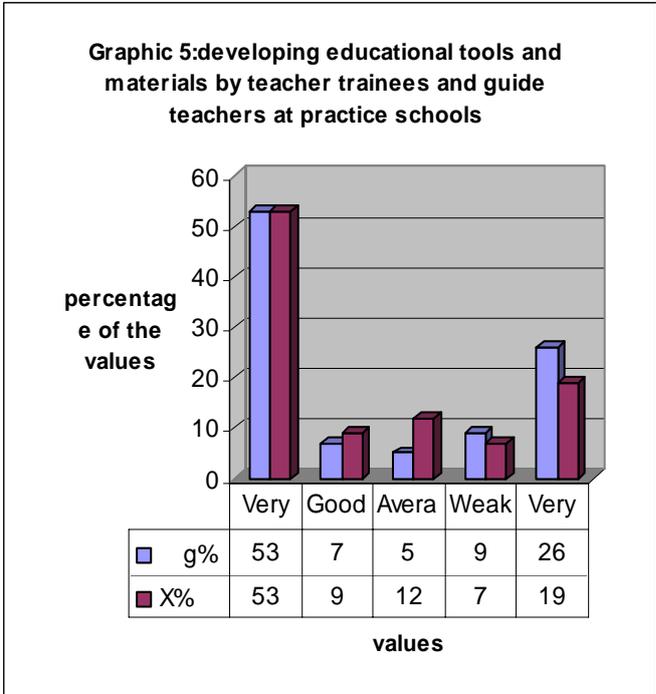


Table 6 indicates the teacher trainees' developing educational tools and materials and making some repairs with their guide teachers at their practice schools. Here; $r=1,06$; $p=0,2$; arithmetic average= $3,88$ and standard deviation= $4,4$. when we look at the values we can see that teacher trainees had opportunity to apply what they had learned in a cooperative way with the use of the Ant Technique. This shows the effectiveness of the Ant Technique. The same can be analysed at Graphic 5.

Table 6: developing educational tools and materials by teacher trainees and guide teachers at practice schools.

Value	nfx	X%	nfg	g%	Xp	X2	gp	g2
Criteria								
Very good 5	20	53	23	53	115	575	115	575
Good 4	4	9	3	7	16	64	12	48
Avarege 3	5	12	2	5	15	45	6	18
Weak 2	3	7	4	9	6	12	8	16
Very weak 1	8	19	11	26	8	8	26	11
Total	43	100	43	100	160	704	167	668

$r= 1,06$ standard deviation= $4,4$ $p=0,22$ arithmetic average= $3,88$

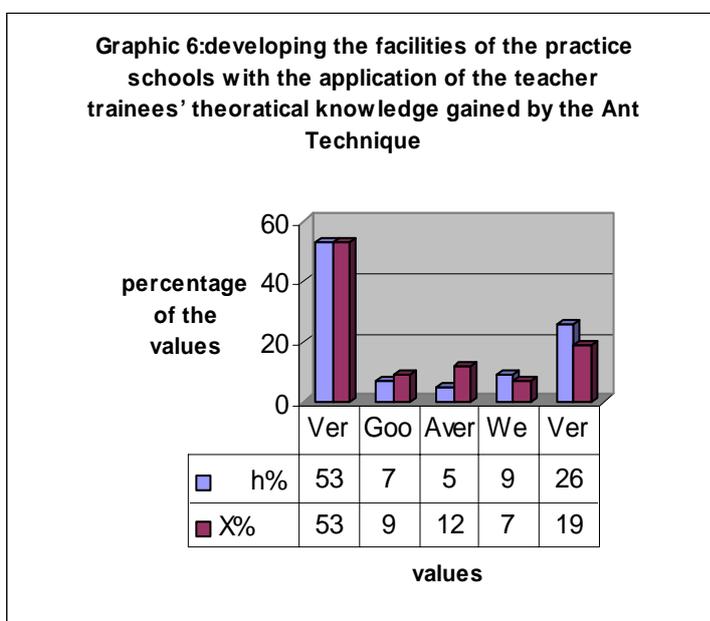


In Table 7, one can observe the teacher trainees' application of their theoretical knowledge in order to develop the best teaching environment in practice schools. According to analysis of the data; $r=1.00$; standard deviation= $3,4$; $p=0,54$; and arithmetic average= $3,4$. This table shows the success of the trainees in developing the classrooms and the workshops. One can observe the same success in Graphic 6, as well.

Table 7: Developing the facilities of the practice schools with the application of the teacher trainees' theoretical knowledge gained by the Ant Technique

Value	nfx	X%	nfh	h%	Xp	X2	hp	h2
Very good 5	23	53	23	53	115	575	115	575
Good 4	4	9	3	7	16	64	12	27
Avarege 3	5	12	2	5	15	45	6	18
Weak 2	3	7	4	9	6	12	6	16
Very weak 1	8	19	11	26	8	8	8	8
Total	43	100	43	100	160	704	147	644

r= 1,00 standard deviation= 3,4 p=0,54 arithmetic avarege=3,4



In table 8, it is obviously seen that, the worst teaching conditions and environmetns can be changed into the best is possible. Here, $r=1,00$; arithmetic average=3,72, $p=0,5$; standard deviation=1,65. This indicates that the bad conditions of teaching can be changed into better conditions. This situation can be observed in Graphic 7.

Table 8: Developing the best teaching environment from the worst conditions.

Value	nfx	X%	nfi	i%	Xp	X2	ip	i2
Very good 5	23	53	24	55	115	575	120	600
Good 4	4	9	3	7	16	64	12	48
Avarege 3	5	12	5	12	15	45	15	45
Weak 2	3	7	2	5	6	12	4	8
Very weak 1	8	19	9	21	8	8	9	9
Total	43	100	43	100	160	704	160	710

r= 1,00 standard deviation= 1,65 p=0,5 arithmetic avarege=3,72

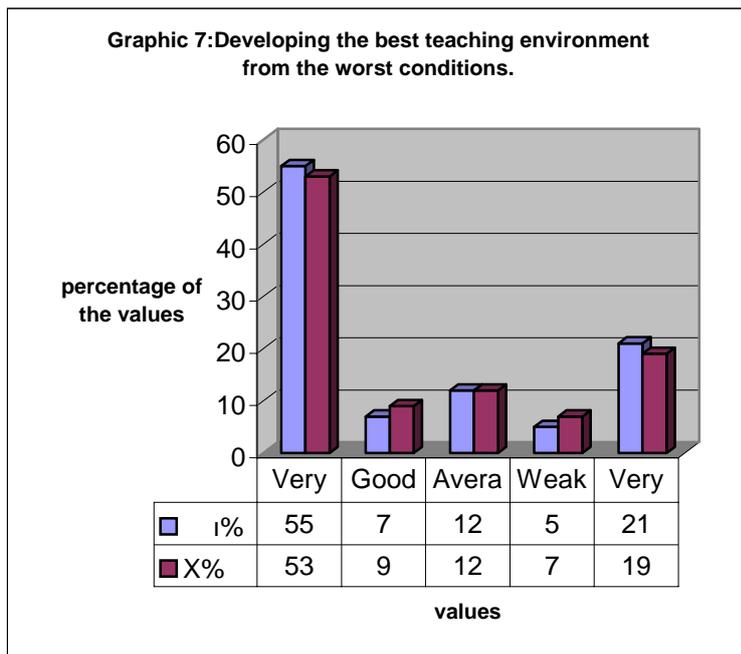


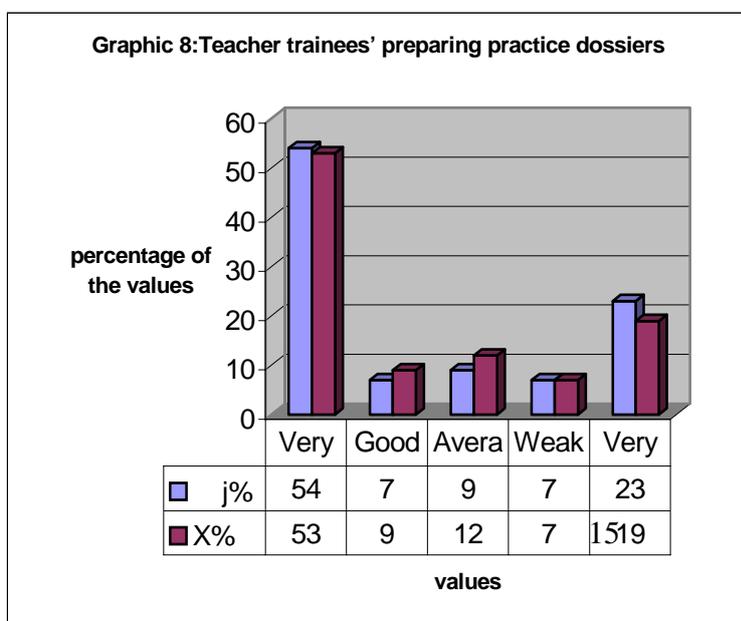
Table 9 shows the teacher trainees' preparing practice dossiers. In this part, $r=1,04$; $p=0,6$, arithmetic average= 3,6 and standard deviation= 1,62. In this situation, teacher trainees show a good performance in preparing their dossiers. They also use their knowledge in real life. The percentage of the trainees who had prepared very good dossiers is more than 50%. The percentage of the weak

and very weak ones is 30%. This indicates that one third of the trainees in the program does not think of being a teacher.

Table 9: teacher trainees' preparing practice dossiers

Value	nfx	X%	nfj	j%	Xp	X2	jp	j2
Very good 5	23	53	23	54	115	575	115	575
Good 4	4	9	3	7	16	64	12	48
Avarege 3	5	12	4	9	15	45	12	27
Weak 2	3	7	3	7	6	12	6	12
Very weak 1	8	19	10	23	8	8	10	10
Total	43	100	43	100	160	704	155	672

$r= 1,04$ standard deviation= 1,62 $p=0,6$ arithmetic avarege=3,6



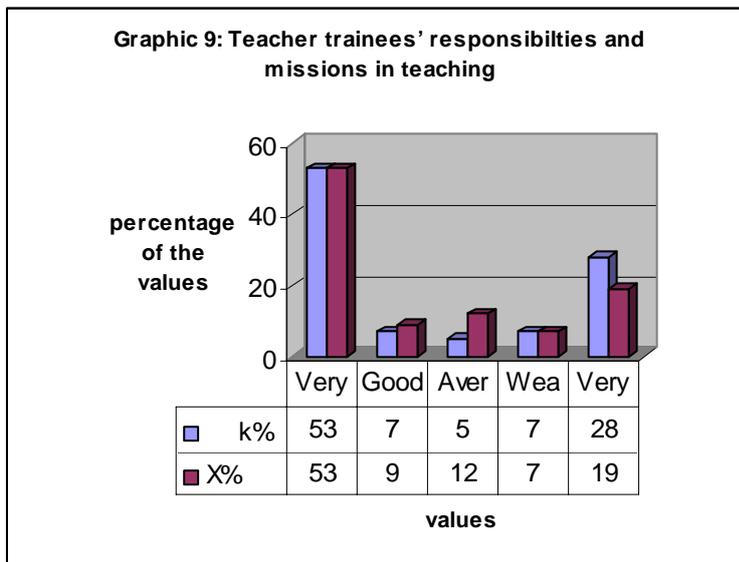
In Table 10. the trainees' taking the responsibility of teaching and learning with the help of their theoretical knowledge is indicated. In this group, $r=0,86$; $p=0,55$; arithmetic average=3,51 and standard deviation= 1,7.

according to these data, the responsibility of teaching and learning is low in teacher trainees. Trainees who were usually very good kept the same values, however, the ones who were very weak increased in number. This shows that trainees who are weak can change their attitudes and thoughts in some situations.

Table 10: teacher trainees' responsibilities and missions in teaching

Value	nfx	X%	nfk	k%	Xp	X2	kp	k2	
Very good	5	23	53	23	53	115	575	115	575
Good	4	4	9	3	7	16	64	12	48
Avarege	3	5	12	2	5	15	45	6	18
Weak	2	3	7	3	7	6	12	6	12
Very weak	1	8	19	12	28	8	8	12	12
Total	43	100	43	100	160	704	151	665	

r= 0,86 standard deviation= 1,7 p=0,55 arithmetic avarege=3,51



With the Ant Technique, both the practice schools and the teacher trainees generally become more creative and productive. Teacher trainees and the guide teachers share the zeal of doing something together for the school. Schools change their vision related to technological innovations as they have observed that education done with materials and educational technology is more effective. Teacher trainees repaired 11 computers in Alikahya Sabancı, Gebze and STV Technical and Vocational High Schools. They also wrote 4 software for the administrative works of the schools and helped to the establishment of the computer laboratory with providing the necessary programs and software.

Conclusion:

Some changes occurred in the thoughts of the students who said "We cannot do it, We cannot succee it" at the beginning of the term with the cooperative work's concrete results. Teacher trainees got great pleasure when the guide teachers used their own materials effectively. On the other hand, guide teachers saw the appropriate use of the board and educational technology with the help of the Ant Technique. Ant Technique can make schools more productive. Teacher trainees had self confidence in teaching at the end of the project and would like to work in the same project any time. By the application of Ant Technique, trainees' responsibility, cooperative working skills, and collaborative skills develop and improve. This is also revealed by data analysis as well.

Recommendations:

If Ant technique become more widespread in Technical Education and in Technical Education Faculties, the lacks of the schools such as educational tools and materials will be fulfilled.

With Ant Techniquei the broken machines and tools at the schools will be re-used, and schools will use the money that will go to purchase of the materials or the repairment of the machines, in any other different ways.

Both the teacher trainees and the guide teachers become more creative with Ant Technique.

Ant Technique indicates that educational environment standards can be increased in case of universities and Ministry of Education work cooperatively.

In order for Ant Technique to be succesful and effective, School Practce I and II courses should be at least 100 minutes so that the practice at the schools can be discussed in a detailed way in the classes, and teacher trainees can observe different teachers from different levels and can develop new ideas as a result of these observations.

The successful run of the Ant Technique depends on the appropriateness of the teacher training program and the school programs.

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