A STUDY OF THE NEED FOR AN ELECTRONICS COURSE IN THE JUNIOR HIGH SCHOOL OF TURLOCK, CALIFORNIA

by

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ABSTRACT

The purpose of this study was to determine a need for an electronics course in the junior high school of Turlock, California.

The method employed in developing the instrument was to analyze the content of junior high school books recommended by publishers who specialized in materials in electricity and electronics at this level.

Interviews with a selected 48 non-professional industrial agencies within the city limits of Turlock were used for the study.

A set of questions was drawn up after completion of the review of literature and was used in the interviews with the industrial agencies. The questions were designed to determine the number of electronics workers employed in the community, the requirements for securing employment in the electronics work in the community, and the future outlook for employment in the electronics industrial work in the community.

The study points out that the electronics industry is a very rapidly growing industry with unlimited possibilities both nationally and in the Turlock area.

The education requirements were a college education for securing employment in the large national electronics industries. The industrial agencies of Turlock required the electronics workers to have a high school education.

One of the purposes of the junior high school is to let the students explore as many activities of interests as possible.

The junior high school students have reached the state of readiness and this is the point of their lives at which they should explore as many vocational fields of interest as possible in the selection of their vocational goals.

CHAPTER I

INTRODUCTION

Technology of electronics, in recent years, has become a way of life for men in industry and science. The discovery, application, and usefulness of the knowledge of electronics now reaches into the most remote corners of our society. It is not surprising that thoughtful and forward thinking educators have considered the science of electronics as part of the school curriculum.

In the secondary schools the study of theoretical electronics has traditionally been within the realm of the physical science department. The practical application has been demonstrated and explored in vocational subjects. Some of our industrial arts and science programs cling tenaciously to the early concepts of parallel and series circuits construction. With the great technological advancement in electronics circuits, our school curriculum appears to be inadequate to handle this advancement in the physical science departments of the traditional vocational courses.[10]

Gerrish[9] states that "the lag in curriculum development is caused by the lack of in-service training, insufficient budgetory allotment, and unsympathetic administrators." Making certain allowance for the customary lag in education, we now must face the study of electronics and include it in the educational pattern.

In a changing technological world, the school must have a program of continuous curriculum evaluation in order to meet the new needs of society and of the individual. It is important that the students of today who will be the leaders, the producers, and the consumers of

tomorrow, be given an opportunity to receive an education which includes up-to-date knowledge and experience. Education in general, and particularly secondary education, cannot remain static; it must keep pace and adjust to the needs of the changing society.

Statement of Problem

The purpose of this study was to determine whether the impact of the growth in employment in the electronics industry on our society would cause a need for an introductory course in electronics in the junior high school of Turlock, California.

Definition of Terms

The term electronics, as used in this paper, is defined as follows: "That branch of science and technology which relates to the conduction of electricity through gases or in a vacuum."[1]

The electronics industry includes prime manufacturers that manufacture military and space equipment, industrial and commercial products, consumer products, and components that have an electronics circuit or circuits which includes electronics tubes, semiconductors, or photosensitive devices.

The divisions of the electronics industry as used in this paper includes communications, industrial measurements, testing equipment, controls, medical, and various military applications.[14]

The electronics course taught in the junior high school should include simple circuits used in amplifiers, radio concepts of electronics, electronics control devices, simple electronics network, radiation, vacuum tube amplifiers, and some suitable laboratory work in actual construction electronics circuits.

CHAPTER II

REVIEW OF THE LITERATURE

A review of literature was done at Montana State University Library, Bozeman, Montana, and Stanislaus State College Library, Turlock, California. The review of literature was made to determine employment factors in the electronics industry that have had an impact on our society and warrants a change in the school curriculum.

Background of The Electronics Industry

"Electronics is a very young science and even younger industry," states Professor A. M. Low.[13] Most of the authors point out that the developments in the electronics industry have taken place during the last 35 years. During six of these years scientists and manufactures had to concentrate on research or to manufacture primarily from the military point of view.[13]

One of the most important aspects in the electronics industry is growth in the field of communications, particularly in the form of radio, electronic tubes, and broadcasting equipment.[5] For the first half of its existence, since its inception before World War II, the science of radio communication underwent slow development and the general public knew little about it.[5] In the last generation radio has emerged from its status as an odd looking and poor sounding gadget in the enthusiasts' workshops to full status as an almost indispensable item.[5]

As the automation enthusiast sees it, electronics slaves are

everywhere, doing everything that is routine, and many things that are not, and doing it more cheaply than human labor. Dunlop[6] points out that "the two greatest slaves are the electronics computer and the data-processing machine. These machines have certain capacities that are almost human, such as remembering, learning from past experience, recalling, and quickly using a multiplicity of facts and instructions." Electronics slaves also makes a major contribution to the industrial process. One can now compute quickly, in advance, the stresses or strains of a bridge or other structure when subjected to storms, floods, or earthquakes and can rapidly incorporate the necessary corrective design features.[6]

Dunlap[5] points out that "electronics technology is envisioned as a boon to many activities in human life. In it lurks the germ of entirely new international relationship. It looms as a revolutionary social force. It threatens radical changes that will speed the tempo of a slow pulsing industrial world, the wheels of which are stopped or moved irregularly in the throes of a business depression. Electronics technology may be the hero of the hour as it emerges from the research laboratories to answer the call of a new era."

Growth of The Electronics Industry

The increasing rise in expenditures by the United States Government for military and space electronics products has been one of the main reasons for the growth in the electronics industry. Military and space

electronics industry has increased its shipments from 1.8 billion dollars in 1957,[3] to 5.5 billion dollars in shipments in 1963.[2] Military and space products accounted for approximately one-half of the estimated 10.7 billion dollars in total electronics products shipped in 1963.[2] Industrial commercial equipment and consumer products each accounted for roughly one-fifth, and components produced as replacement parts make up the remaining one-tenth.[2]

The growth of employment in the electronics industry has increased from 450,000 workers in 1957[3] to 900,000 in 1963.[2] Of the 900,000 workers in the electronics industry in 1963 about 850,000 were employed in manufacturing plants.[2] The remaining employees worked for the Federal Government, universities, or nonprofit research centers, in such activities as research, development, and the negotiation and administration of contracts.[2]

The occupational group that felt the greatest impact by the electronics industry was the white collar group. Based on the employment of 100 percent of workers in all electronics manufacturing, the white collar workers have increased from 20.7% in 1957,[3] to 45% in 1963.[2] The groups of white collar workers are the engineers, scientists, technicians, administrators, and supervisors.[2] The greatest increases in white collar workers were the engineers and the scientists. They increased from one out of every 18 workers in 1957,[3] to one out of every 7 workers in 1963.[2] The reason for the increase is the emphasis on research and development by the large production plants.[2]

The technicians are the scientists assistants, engineers aids, and laboratory workers.[2] This occupational group has increased from 7.1% in 1957,[3] to 22.2% in 1963,[2] which makes up one out of every 10 workers of the 900,000 workers employed in the electronics industry.[2]

The administrative and supervisory workers are the purchasing agents, sales executives, personnel workers and advertising personnel.[2] This occupational group in the electronics industry has increased from 4.4% in 1957,[3] to 12.6% in 1963.[2]

The skilled, semiskilled, and unskilled, which are the plant workers, have not felt the great impact of the electronics industry. The comparison of two labor bulletins pointed out that in 1957, three-fourths of the workers employed by the electronics industry were plant workers,[3] while in 1963, three-fifths of the workers employed by the electronics industry were plant workers.[2] The reason for the slow rise in plant workers is because the assembly line operations have become more mechanized and automated.[2]

The educational requirement for jobs in the engineering and scientific fields is a college degree in either of the particular fields.[2] The technician's training is at least a high school education, which included the completion of courses in chemistry, physics, and mathematics.[2] Most technicians have one or more years of college training in a scientific field.[2] Most of the electronics industries require a college degree for positions in the administrative and supervisory fields.[2]

The skilled workers in the electronics industry make up the technical

assemblers, inspectors and testers, processing workers, machinists, metal workers, tool and die makers, carpenters, electricians, and plumbers.[2] The requirements for the skilled jobs are quite high both physically and mentally. Most skilled jobs require workers with good color vision, manual dexterity, high school education, and the ability to understand technical publications.[2]

The semiskilled and unskilled workers in the electronics industry make up the assemblers, fabrication workers, shipping and receiving, material handlers, custodial and janitorial workers.[2] The formal training for this group of plant workers requires a completion of high school. Job applicants may have to pass an aptitude test and demonstrate skill for the particular types of work.[2]

The future employment in electronics industry during the next 10 to 15 years is expected to grow more rapidly than in the past 10 years. The demand for engineers, scientists, and technicians is expected to increase at an especially rapid rate because of the terrific rising expenditures for research and development and the trend toward production of increasingly complex equipment.[2] For much the same reason, the demand for skilled assembly inspectors and testing workers is also expected to grow at above-average rates.[2] The demand for unskilled and semiskilled workers may rise more slowly because line operations are expected to become more mechanized and automated.[2]

The Effect of Electronics Technology on Education

From the accomplishment of the computer and our inventions and developments in the electronics industry, there has resulted a tremendous increase in knowledge. President Kennedy[15] illustrated the dimension of the explosion in his 1963 "Message to Congress" on education: "In the last 20 years, mankind has acquired more scientific information than in all previous history. More and more education and training have this prime function to perform in keeping up with this change."

There is no phase of the school curriculum that has caught the interest of the electronics industry as has the study of electronics. Evidence of this was pointed out by Feirs and Lindbert[8] who stated, "the interest is shown in the fact that many of the major electronics industries have produced teaching equipment and course material designed specifically for high school electronics programs."

Ressler[16] points out that "many electronics industries have found it necessary to develop their own training programs and the school can do much to improve this by at least training the students in methods of learning; and by presenting the basic information on which to build after they are employed by industry." The basic information Ressler[16] pointed out, includes "knowledge in arithmetic and the laws of physics, the ability to communicate through written and spoken words, and the ability to listen and learn." The study of electronics would include practical application in all of these basic skills.

Educators must become increasingly aware of the changing world of work and its impact on the public schools. Lois Edinger[7] states, "During the sixties nearly 40 percent more young people will enter the labor market than entered it during the fifties and with this increase our schools need to teach the knowledge, skills, and values needed in an urban industrial society. Electronics industry is also raising the skill requirements of many jobs, making necessary more and more education and training."

Many authors bring out the point that the junior high school years are considered the most formative in the development of vocational interest and leisure time activities. Cardinale[4] supports the theory that "interests are formed and established at the age of 14; and continues to conclude that the years that follow it become merely a matter of horizontal expansion of interest."

Super[18] states that, "Self-concepts have begun to take definite form at the age of 14. Some students experience significant changes during adolescent and early childhood years, but these are most often related to endocrine changes and less often to changes in self-concept resulting from having attempted to fit into an inappropriate pattern. Vocational interest patterns generally have a substantial degree of permanence at this stage. For most persons, adolescent exploration is an awakening to something that is already there."

Cardinale[4] points out that "the more varied the junior high school curriculum becomes, the more purposeful it is in aiding the adolescent to stabilized self-concept and interest." Gerrish[9] points out that "you

must teach more and more in smaller allotments of time and that it is a difficult job to select and emphasize those divisions of subject matter, so that you can conscientiously state that you are meeting the needs of the junior high school students."

Gruhn and Douglass[11] pointed out that the current exploration functions of the junior high school are as follows"

> To lead pupils to discover and explore their specialized interests, aptitudes, and abilities as a basis for decisions regarding educational opportunities.
>
> To lead pupils to discover and explore their specialized interests, aptitudes, and abilities as a basis for present and future vocational decisions.
>
> To stimulate pupils and provide opportunities for them to develop a continually widening range of cultural, social, civic, avocational, and recreational interests.

Exploratory opportunities have been one of the strong claims for the junior high school. Exploratory experience courses in the junior high school have been accomplished through elective courses, by extending it into every subject area, and through extraclass activities in the educational program of the junior high school.[11]

Summary of The Previous Studies

This review of literature shows the electronics industry to be an ever growing and expanding industry with unlimited possibilities. The fastest growth in the industrial employment will be among professional and technical occupations, especially engineers, scientists and

technicians. The more mechanized and automated electronics industries have caused a slow rise of employment in the unskilled and semiskilled workers.

The educational requirements are at least a high school education and a good physical skill for unskilled and semiskilled jobs. The professional jobs required a college education or equivalent in the selected professional fields.

Many authors and industrial agencies express the idea that our schools and school systems need a continuous curriculum revision to keep up with the rapid increase of knowledge in electronics technology.

The junior high school students are receptive, curious, and question new ideas to which they are introduced and are interested in how things happen. At this interval in his education there is time to explore and to find himself. These characteristics make a fertile ground on which to cultivate those qualities needed for successful living.

One of the purposes of the junior high school was to give the students an opportunity to explore their interests, aptitudes, and abilities in future vocational areas and in selecting future education activities; it also gives students an opportunity to orient themselves in cultural, social, recreational, and avocational pursuits.

CHAPTER III

THE ELECTRONICS INDUSTRY IN TURLOCK

Electronics manufacturing industries are located in nearly every state. California ranks in the top seven states in number of workers employed by the electronics industries.[2]

The writer interviewed the owners and supervisors of 48 non-professional, industrial agencies within the city limits of Turlock, California, to determine the number of workers employed in the electronics industries in the community. The electronics industrial workers were workers employed by the industrial agencies who could read and understand electronics circuit schematics and could test electronics circuits without the aid of an automated circuit tester. The structure of the questions asked in the interviews with the owners and supervisors of the industrial agencies is as follows:

Purpose of the Questions

The questions (Appendix A, page 24) used in the interviews were developed following a review of literature and were designed to determine the answers to the following questions:

1. What is the total number of full time workers employed by the 48 industrial agencies in Turlock contacted by the writer?
2. How many of the 48 industrial agencies had workers employed in the electronics industrial work that either worked as assemblers, purchasing agents, sales personnel, advertising personnel, inspectors, testers, processing, repairmen, or maintenance men?
3. What is the total number of full time electronics industrial workers

employed by the industrial agencies in Turlock?

4. What requirements must the applicants who wish to secure employment as electronics industrial workers meet in order to secure employment in the industrial agencies of Turlock?

5. What school subject areas were most helpful for the electronics industrial workers who work for the industrial agencies of Turlock?

6. What is the future outlook for the growth of employment in the electronics industrial agencies in Turlock?

Workers Employed by the Industrial Agencies

The interviews (Table 1, page 15) held with the owners and supervisors of the 48 industrial agencies in Turlock revealed that the agencies had a total work force of 335 full time workers. Only 24 industrial agencies of the 48 interviewed reported that they had workers employed in the various phases of electronics industrial work. The 24 industrial agencies that had workers employed in the electronics industrial work had a total work force of 138 full time workers of which 80 workers were employed as electronics industrial workers.

All 48 industrial agencies pointed out that all of their workers are associated with electronics industrial work and must have a basic knowledge of electronics technology in order to take care of minor electronics circuit break downs. The minor electronics circuit break downs they mentioned were the fixing of electric cords, checking tubes, soldering broken connections, etc.

TABLE 1. RESPONSES OF THE INTERVIEWS ON ELECTRONICS EMPLOYMENT WITH THE INDUSTRIAL AGENCIES THAT EITHER SOLD OR SERVICED ELECTRONICS PRODUCTS IN TURLOCK, CALIFORNIA

Industrial	Agencies Contacted		Workers employed		Agencies with electronic workers		Workers employed		Electronic workers employed	
	No.	%	No.	%	No.	%	No.	%	No.	%
Total Agencies	48	100	335	100	24	100	138	100	80	100
Hardware	5	10.4	31	9.3	3	12.5	23	16.8	6	7.5
Radio &TV sales & service	5	10.4	15	4.5	5	20.8	14	10.2	14	17.5
Office machines & equipment	2	4.2	2	1.5	2	8.34	4	2.9	4	5
Public utilities	2	4.2	38	11.3	2	8.34	38	27.6	26	32.5
Refrigeration, air conditioning & heating	6	12.5	40	11.9	6	25	40	29.0	16	20
Automatic electrical sales & service	2	4.2	6	1.9	2	8.34	5	3.6	5	6.25
Electrical service	2	4.2	5	1.5	2	8.34	5	3.6	5	6.25
Furniture	5	10.4	24	7.1	2	8.34	9	6.5	4	5
Jewelry, Auto & etc.	19	39.5	171	51	0	0	0	0	0	0

Requirements for Securing Employment in the Electronics Industrial Agencies

All 24 industrial agencies (Table 2, page 18) in Turlock which had electronics industrial workers employed pointed out that the applicant must have a high school education before he could be hired in any phase of the electronics industrial work. The main reason which was pointed out by most industrial agencies was that high school drop outs are not so steady and reliable a worker as the applicant who has completed high school.

The completion of an apprenticeship course in electronics technology was the requirement for applicants to secure employment in 15 of the 24 industrial agencies. This was a union requirement and only the union industrial agencies required the applicant to have completed the apprenticeship course. The apprenticeship requirements were met by being employed in the electronics industry for two years and by passing a written examination. None of the industrial agencies required the applicant to be a union member.

Only 2 of the 24 industrial agencies required the applicant to pass an aptitude test and receive training through their company. The reason for the requirement of the test was to place the applicant in the electronics industrial work in which he would best serve the agency. Both industrial agencies mentioned the fact that they could do a better job in further training of the high school applicant than vocational schools, because they train the applicant just for the particular job.

All 24 industrial agencies required an interview with the applicant. Only 7 of the 24 industrial agencies required only an interview with the applicant before hiring. The reason pointed out by all 7 industrial agencies was that the applicant's capability for electronics industrial work could be determined by a personal interview with the applicant.

None of the industrial agencies required the applicant to have a college education. The main reason was that the college trained applicants require a high salary and they still have to be trained to do the particular job the industrial agency assigns to them. The high school graduate with a background in electronics technology will work at a lower wage and can be trained to do just as effective a job as the college graduate.

None of the industrial agencies required the applicants to have completed a vocational training course.

TABLE 2. RESPONSES OF THE INTERVIEWS ON REQUIREMENTS FOR SECURING EMPLOYMENT WITH THE INDUSTRIAL AGENCIES THAT EMPLOYED ELECTRONICS WORKERS IN TURLOCK, CALIFORNIA

Industrial Agencies	Requirements for securing employment in electronics					
	Number Contacted	High School	Apprenticeship	Interview only	Aptitude test	Company training
Hardware	3	3	3	0	0	0
Radio & TV sales & service	5	5	3	2	0	0
Office machines & equipment	2	2	0	2	0	0
Public utilities	2	2	0	0	2	2
Heating, refrigeration & air conditioning	6	6	6	0	0	0
Electrical sales & service	4	4	3	1	0	0
Furniture	2	2	0	2	0	0
Total	24	24	15	7	2	2

School Courses Most Helpful for Electronics Industrial Workers

All 24 industrial agencies in Turlock that had electronics industrial workers employed pointed out that the workers should have a good background in mathematics and science. The reason which was pointed out by most industrial agencies was that mathematics and science courses helped the electronics industrial workers understand technical publications.

Twenty of the 24 industrial agencies pointed out that high school manual training courses were good background courses for electronics industrial workers. The reasons were that manual training courses give the workers a background in shop safety, manual dexterity, how to follow directions, and the names and proper uses of tools.

Only 2 of the 24 industrial agencies pointed out that the students should have additional courses in school on how to spell and write legibly. The reasons were that the electronics industrial workers employed by these agencies could not spell electronics component parts names or write so the writing could be read by the secretary.

All 24 industrial agencies pointed out that the study of electronics would be beneficial by giving the applicant a broader background.

Future Outlook for The Electronics Industrial Workers in Turlock

All 24 industrial agencies in Turlock that had electronics industrial workers employed pointed out that the employment in the electronics industries in Turlock was expected to double during the next five years. The reasons given by the 24 agencies were much the same and are as follows: an increased number of television sets being sold, more transistorized appliances being sold, an increased amount of automated equipment being sold and used by various companies, an increased number of people who have electronics equipment as a leisure time activity.

Summary

All workers employed by the 48 industrial agencies need a background in basic electronics technology in order to fix minor electronics circuit breakdowns.

About one out of four workers employed by the 48 industrial agencies is employed as electronics workers.

All 24 of the industrial agencies, that had electronics workers employed, required the applicant to have completed high school and it would be beneficial for the applicant to have completed a high school course in the study of electronics.

Most of the 24 industrial agencies required the applicant to have completed an apprenticeship course, pass an aptitude test, and company

training. None of the 24 agencies required the applicants to have completed a vocational school course or have a college education.

The background in school courses that was most helpful in the electronics industrial work is as follows: mathematics, science, manual training courses, spelling and writing, and how to follow directions.

The number of jobs in the electronics industries in Turlock is expected to double during the next five years.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Since this study attempted to arrive at a conclusion which is associated with the future rather than being based on an evaluation of the past, the study surveyed the current trends of related factors which could affect changes in the junior high school curriculum.

Summary

The review of literature indicates that the fastest growth in the employment in the electronics industry will be in the professional and technical occupations. The unskilled and semiskilled jobs are being replaced by automated machines. The education requirements for electronics workers are a college degree for professional jobs and a high school education for skilled and unskilled jobs.

The junior high school student has reached a point of readiness for exploring his interests, aptitudes, and abilities in future vocational decisions and in future educational activities offered in the exploratory educational program of the junior high school.

The study of the electronics industry in Turlock indicates that one out of four workers employed by the Turlock industrial agencies is employed in the field of electronics. The requirements for these jobs include a high school education with a high school subject area background in science, manual training, and a basic knowledge of electronics.

Conclusions

The results of the study of the impact of employment in the electronics industry do not indicate a need for an introductory course in electronics as such in the junior high school.

Even though the employment survey does not necessarily show a specific need for a course in electronics in the junior high school, there are other factors to be considered. A unit of electronics as a part of the existing program in the junior high school is suggested. The factors are as follows:

(1) The junior high student, in terms of his capabilities and interest is ready for the information proposed in this unit. A review of the literature and personal observations of the writer indicates that the students are interested, have the ability, and have reached a point of readiness for exploration.

(2) The function of the junior high school program is to be exploratory and enriching. The student at junior high school age is flexible. He is interested and excited about many things and the proposed unit would offer him a wider, richer program that might be helpful for him in selecting courses in high school. This unit would precede and provide basis for the offering of an electronics course in the senior high school. The unit would give the student a chance to get direction for electing another field before entering high school if he finds he has no aptitude for electronics.

(3) The writer has found that a unit of electronics is an excellent vehicle for teaching certain abstract basic physical science principles.

(4) The unit would give the student a glimpse into the future vocational possibilities of the electronics industry so that he can include the study of electronics in the field of vocation from which his choice will eventually be made. At present in Turlock in the 24 industrial agencies, one out of every four employed is employed in the field of electronics and the number is expected to double in the next five years.

Recommendations

Within the framework of the Turlock Junior High School curriculum, the unit of electronics should use simple electronics devices to demonstrate and explain physical science principles. This would add further meaning and interest to the teaching of the physical science course and would give the students a glimpse into the field of electronics. This may be done in either or both of the following ways:

(1) The unit of electronics would be presented as a unit in itself, or as a very real part of a unit in the physical science course. This unit would include basic electronic circuits, such as crystal sets, vacuum tube amplifiers, and vacuum tube principles to demonstrate the physical science principles of electron flow, wave theories, and radiation.

(2) Many junior high school students take an exploratory course in manual training. Such a course should include a unit in electronics. This unit would include simple circuits used in amplifiers, radio concepts of

electronics control devices, simple electronics networks, and some suitable laboratory work in the actual circuit construction. This unit would include some of the physical science principles, some of the mathematics taught in the junior high school, and also develop the student's vocabulary in the scientific fields.

The interrelation of the disciplines would make the junior high student's education more meaningful.

A Unit Study On Electronics

This unit of electronics uses fundamental electronics devices as a vehicle to explain basic physical science principles. The unit will give the student a better understanding of the physical science principles and give them basic idea of the field of electronics.

Objectives	Suggested Activities
1. Help the student develop an understanding of wave theory	Visualize wave theory by construction of the crystal radio from component parts and show how the component parts change a radio wave into a sound wave
2. Help the student develop an understanding of electron flow	Visualize the reaction of the electron in the capacitors, tubes, resisters, and by other electronics components through actual observation

3. Help the student develop an understanding of radiation	The response of the electron when traveling through a vacuum or space in setting up or exciting a field to produce various responses through actual observation.

APPENDIX

Appendix A

SURVEY QUESTIONS

1. How many workers are employed by the company? _____

2. Does your company have men employed in the electronics fields? _____

3. How many electronics workers do you have employed by your company? _____

4. Which of the following requirements must applicants in the field of electronics meet in order to secure employment in your company?

   a. High school education _____
   b. College education _____
   c. Training through a vocational school _____
   d. Apprenticeship training _____
   e. Training through a special school by the company _____
   f. Aptitude test _____
   g. Interview _____
   h. Others _____

Remarks:

5. In which of the following school subject areas should the electronics worker have a background?

   a. Science _____
   b. Social studies _____
   c. English _____
   d. Mathematics _____
   e. Manual training courses _____
   f. Other areas _____

Remarks:

6. What is the future outlook of electronics employment in Turlock?

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