Journal of Education and Practice
ISSN 2222-1735 (Paper) ISSN 2222-288X (Online)
Vol.4, No.14, 2013

Provision and Management of School Plant as a Correlate of Science Students Academic Performance

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Abstract
The current trend in the development of science and technology which cut across medicine, engineering, telecommunication, nano science, security, architecture, manufacturing, security, media and environmental science calls for a serious review of the effectiveness and efficiency of educational institution in an attempt to inculcate scientific knowledge and skills in Nigeria. Equally worrisome is that the budgetary allocation by successive governments in Nigeria to education is depreciating when people are beginning to appreciate the importance of education especially in Northern Nigeria. This study therefore sought to establish the relationship between provision and management of school plants and science student academic performance in Gwagwalada Area Council of Abuja, Nigeria. The research employed survey/ descriptive method and questionnaire to gather information from ten Secondary Schools. T-test and percentages were used to analyze the data and the result shows that performance of students in private schools are better than those from public schools. A major implication is that provision and management of school plants should be upgraded to cater for modern advancement in science and technology as public schools bear the burden of population explosion which make enrolment into the schools to be on the rise.
Keywords: Amortal, Rapid economic growth, Rapid educational growth, School plants and Standard educational product

Introduction

The basic focus in any institution is on plant and administration of facilities, because, effective and efficient running of the system depends on proper maintenance and use of available structural units and facilities. What prevail in most public school plant which was installed over fifty years ago has undergone wear and tear. This is because they have been used above their estimated amortal age and as such are begging for both minor and major repairs. On the other hand, some of these plants such as building and physical structure are so poorly constructed that they don't last as they are expected (in terms of human resources, they are so poorly maintained that they are not working effectively).

Organization of the available human and material resources in our educational institutions leaves so much to be desired in view of the fact that there have been rapid population growth on one hand and technological advancement on the other hand which most schools have failed to make provision which result in insufficient and inadequate school plants. The selection of site or locations of most school, particularly in the cities are such that encourages interruption of teaching/learning process. These problems have the tendency of affecting the academic performance of students in a negative dimension and as such this study therefore sought to establish if there is any relationship between all the listed problems affecting school plant provision and management and science students' academic performance. Specifically, the study seeks to investigate the following problems in Gwagwalada Area Council of Abuja, Nigeria:

- How properly planned are school plants in both public and private schools;
- To understand if school plants are available, adequate in function and sufficient enough to cater for today's advancement in technology and population explosion;
- How satisfactory are the school sites with respect to student academic performance; and
- Is there is any differences in the performances of science students of different schools on the basis of planning, availability, adequacy and maintenance of school plant.

The paper seeks to draw the attention of both Federal and State government to the connection between investment in effective school plant planning and management on one hand and rapid economic growth of any Nation on the other hand. It is hoped that the clients will realize the importance of paying their fees as at and when due. Also it is hoped that this will draw the attention of the clients to the relationships that exist between the variables and the relationship between school plant and science student academic performance in the

following ways:

- Client will be able to make proper choice of schools for their wards;
- Private practitioners will realize the importance of not sacrificing the quality of educational services for maximum profit;
- Teachers will recognize school plants as a motivator to teaching- learning process and as such show interest in efficient planning and management of school plant ; and
- Government, both at the federal and state level, in conjunction with the local communities, will realize the importance of making provision for school plants in public school and also make provision for its efficient management.

Research Questions

This research work seeks to answer the following questions:

- Is there any significant difference between public and private school with respect to availability and functioning of school plant?
- How has the available school plant met the changes in population and technological demands?
- To what extent does the private school serves as alternative to public schools with respect to their performances in relation to school plant? and
- How does school location affect science students' academic performances?

Hypotheses

- There is no significant difference between public and private school in terms of availability and functioning of school plants.
- There is no difference between public and private school in terms of how they satisfy population growth in school in respect of school plant.
- There is no difference between public and private school in terms of how they satisfy technological challenges in respect of school plant (modernization).
- Location of school has no significant impact on science student academic performances.
- Sufficiency of school plants will not enhance science student academic performances.
- On the basis of school plant planning and management, there is no significant difference in the academic performances of science students in public schools and those in private schools.

Delimitation of the Study

The researcher intends to:

- Collect data of JSS III student academic performances from five (5) public school and five (5) private schools in Gwagwalada Area Council, to collect the last joint integrated science and technical science result; and
- Sample the teaching and administrative staffs' opinion on school plant planning and management.

Literature Review

School plant, otherwise refers to as educational facilities include both human and materials resources which help to facilitate educational program. As cited in Ogbodo (1995), Castaldi (1977), defined educational facilities as those things of education which enables a skillful teacher to achieve a level of instructional effectiveness that far exceeds what is possible when they are not provided. According to Onyene(2000), "in any institution, the basic focus is on plant and administration of facilities. This is so because effective and efficient running of the system, proper maintenance and use of the structural units and facilities are quite accurate and imperative". Also, Adeogun (2001) in this direction, opined that "reform in science through high achievement of educational objectives in science subjects, should focus on effective school plant planning and management."

In the past, little consideration was given to the effect the school plant would have on the teaching- learning process and to the achievement of the laid down educational goals. Ogbodo, (1995), citing Ezewu, (1983); Bloom, (1978); McCabe et al ,1975, stated that "a well designed, functional school building provide effective delivery of the school's curriculum and are positively related to academic achievement". Accordingly, Oyesola (2000) stated that "well planed and maintained school plant or educational buildings and facilities will not only enhance good teaching process but also facilitate learning". In his opinion, school buildings and educational goals are closely related and interwoven.

School plant enhances the comfort, safety of pupils and teachers by increasing their performances. School plant enhances the quality of instruction. Oyedeji (2000), citing Adesina (1980), noted that the quality of education received by pupils bears a direct relevance to the availability or lack of physical facilities and overall atmosphere in which learning takes place. The site of schools should be such that accessibility of the school and it situation in relation to other features in the locality is considered. Oyesola (2000) suggested the coordinated effort of the professionals and non-professional members of the community, the parent and teacher association (PTA) and the ministry of education officials in the selection of school site. In his view, the following criteria are required to site a school:

- Type of school proposed and grade level of the students and the educational program envisaged;
- The educational need of the community in which the school is situated and meant to serve;
- Accessibility of the school;
- The safety of the school; and
- The soil condition and topography.

He concluded that school site should be such that discourage the interruption of teaching/learning processes (that is, away from market, high way, industrial site etc).

Ogbodo (1995), stated that "many urban schools are in a terrible state of disrepair and lacking even in basic facilities" comparing it to their counterpart in rural areas, he stated that "urban schools are generally better maintained and equipped". In Gwagwalada environs and in most other part of F C T, you find this terrible state of disrepair affecting most schools and lack of basic facilities such as laboratory structure and laboratory facilities in most of our schools. This problem is mainly complicated by the over populated classes where you have two to three classes joined together for teacher who find it difficult to control the crowd, aside the fact, the classes were certainly not designed for such crowd and there is no plan to expand the facility soon.

If at all there has been standard in our educational system, which assumed to have fallen, a number of factors have been responsible for the fall in standard. These factors range from general increase in student's enrolment, inadequate supply of qualified teachers, teacher's job satisfaction, poor funding of educational sectors which arise from lack of altruistic visionary leaders to inadequate physical facilities and poor maintenance culture towards the available facilities. In a number of public schools visited in the federal capital territory while supervising teaching practice students, there ware classes that contained as much as 120-130 pupils. In these classes, chairs /desk were inadequate; teachers could not effectively manage the classes which translate to very poor teaching/learning environment/experiences. In an interview granted to Eduquest magazine, (Oct-Dec, 2010) Professor Jibril Aminu, he stated that "where a teacher had 22 students before, now he has 100 to 150 students".

The tremendous growth of student enrolment in our educational sector is not adequately catered for. Oyesola (2000), suggested the need for adequate provision, utilization and maintenance of appropriate school buildings and facilities such that ensures effective teaching/learning situation. Citing American school board journal (1963), it was established that the students taught with adequate teaching facilities and under conducive environment perform better than their counterparts who were taught without teaching facilities and in conducive environment. The situation in most of public schools is contrary to the national policy on education which proposes that it will make provision that ensures even and adequate distribution of educational system. Taiwo (2000), equated the importance of provision of facilities to the importance of their maintenance .This is because usage of any utilized material is bound to depreciate the value of such material with time. School facilities are not left out. This has significantly affected school laboratories which are either inadequately provided for or are poorly maintained.

Citing United Nation Educational, Scientific and cultural Organisation (UNESCO) (1984), Ogbodo (1995), suggested that maintenance involve maintained item building, furniture and equipment as far as possible in their original condition. Since school plant is the space interpretation of the school curriculum, facilitating teaching and learning processes, it is therefore positively related to (science) students' academic performance. It also ensures effective delivery of school curriculum, standard in educational productivity in terms of quantity and quality of product, rapid growth in a nation's educational sector and consequently rapid economic growth. Science and technology is key in education sector of any nation. The failure to have science subject properly established by any nation's educational system will reduce the nation's economy/power drastically. Effective school plant planning should scrutinize the need of science education in our national economy. To this end, a well planned and maintained school plant will ease the inculcation of scientific skills and attitude in our student; it will enhance the comfort, safety of pupils and teachers, thereby increasing their performances.

The quality of education received by the students bears direct relevance to the availability or lack of physical facilities and the overall environment in which learning takes place. Availability of adequate and sufficient school plant, when properly planned and maintained is thus expected to reflect positively in the academic performances of science students.

Theoretical Frame Work

- Effective school plant planning and management, in terms of human and material resources, ensure effective delivery of school curriculum .These factors are positively related to the quality of educational product;
- Standard educational products can automatically boost the nation's economy; and
- Effective school plant planning and management is therefore directly/indirectly related to rapid educational and economic growth of a nation.

The success of these, therefore depends on the extent to which these are achievable in public or private school.

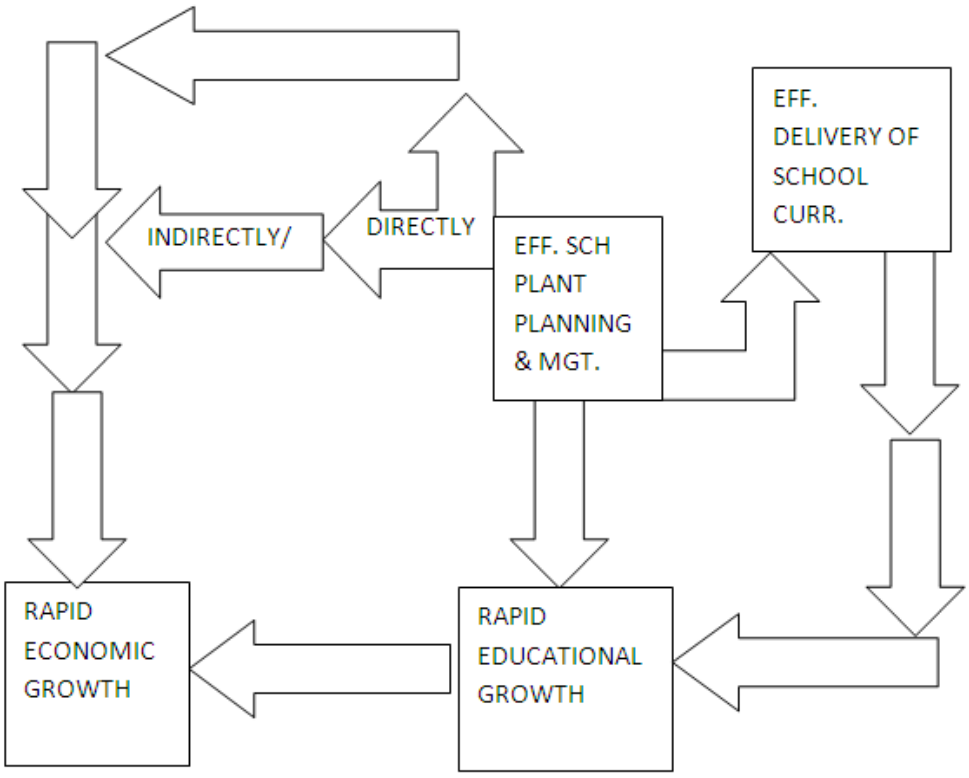

Figure 1: Effective School Plant Planning and Management

Figure 1 shows that effective school plant planning and management can lead to the following:

- Effective delivery of school curriculum;
- Standard educational products;
- Rapid educational growth and ultimately; and
- Rapid economic growth.

Data Presentation and Analysis

Data was collected from the population and the result of Junior Secondary School Certificate Examination (JSSCE) of the ten selected secondary schools in Gwagwalada Area Council, with respect to integrated science. The schools were made up of five private and five public schools as shown in Table 1-24

The following sectors of the school plants: Administrative Block, Social Unit, Physical Properties, Material Properties and Equipment and Human Resources were considered independently in order to make a valid and specific judgment of each of the sector under consideration. This is because, no school completely satisfy the requirements completely. Table 1–20 show t-test of difference between means of private and public schools.

Administrative Block

The following items: Director/principal office, General room, Secretariat, Lounge and Teachers' work room were considered in terms of availability, modernized, sufficiency, and adequate functioning of school plant. The result is shown in Table 1–4.

Table 1: Availability	N	X	D	T cal	T tab	remark
Private	5	4.8	0.4	3.29	2.31	Significant
Public	5	2.2	1.72			

Table 2: Modern	N	X	D	T cal	T tab	remark
Private	5	4	1.26	2.39	2.31	Significant
Public	5	1.6	1.85			

Table3: Sufficiency	N	X	D	T cal	T tab	Remark
Private	5	4.6	0.8	3.50	2.31	significant
Public	5	1.6	1.74			

Table4: Adequate functioning	n	X	D	T cal	T tab	Remark
Private	5	4.4	0.8	3.06	2.31	significant
Public	5	1.8	1.72			

Where N= number of schools, X= mean score, D = standard deviation, Tcal = calculated t- value and Ttab = table or critical t-value

Social Unit

With respect to social unit: availability, modernized, sufficiency and adequate functioning are considered in terms of Students' dining room, Indoor extracurricular room and Students' union building/room . The result is shown in Table 5 – 8.

Table 5: Availability	N	X	D	T cal	T tab	Remark
Private	3	5	0	1.22	2.45	Not significant
Public	3	4	1.41			

Table6: Modern	N	X	D	T cal	T tab	Remark
Private	3	5	0	3.40	2.45	significant
Public	3	1.67	1.70			

Table 7: Sufficiency	N	X	D	T cal	T tab	Remark
Private	3	5	0	3.40	2.45	Significant
Public	3	1.67	1.70			

Table8: Adequate functioning	N	X	D	T cal	T tab	Remark
Private	3	5	0	1.22	2.45	Not significant
Public	3	4	1.41			

Physical Property

The physical properties were considered in term of availability, modernize, sufficiency and adequate functioning of the following: Road network, Lighting, Ventilation, Sunlight protection, Furnishing and Sanitary equipment. The result is shown in Table 9 – 12.

Table 9: Availability	n	X	D	T cal	T tab	Remark
Private	6	4.67	0.75	1.32	2.23	Not
Public	6	3.33	2.36			

Table 10: Modern	n	X	D	T cal	T tab	Remark
Private	6	3.3	1.38	1.45	2.23	Not significant

Table 11: Sufficiency	n	X	D	T cal	T tab	Remark
Private	6	3.67	1.50	0.88	2.23	Not significant
Public	6	2.67	2.36			

Table 12: Adequate functioning	N	X	D	T cal	T tab	Remark
Private	6	4.33	1.50	0.88	2.23	Not significant
Public	6	3.33	2.36			

Material Properties and Equipment

With respect to availability, modernized, sufficiency and adequate functioning, the following items (a – h) were considered and the result is shown in Table 13 – 16.

a) Library
b) Library equipment
c) Workshop/equipment
d) Computer program (educational software)
e) Cassettes (educational)
f) Agricultural tools/materials
g) Sanitary material/equipment
h) Toiletries

Table 13: Availability	n	X	D	T cal	T tab	Remark
Private	8	4.38	1.32	0.598	2.14	Not significant
Public	8	3.88	1.96			

Table 14: Modern	n	X	D	T cal	T tab	Remark
Private	8	4.25	1.30	4.106	2.145	significant
Public	8	1.375	1.49			

Table 15: Sufficiency	n	X	D	T cal	T tab	Remark
Private	8	3.75	1.39	1.72	2.145	Not significant
Public	8	2	2.18			

Table16: adequate functioning	n	X	D	T cal	T tab	Remark
Private	8	4.375	1.32	0.598	2.145	Not significant
Public	8	3.875	1.96			

Human Resources

Availability, qualification, sufficiency and adequate functioning were considered in terms of administrative personnel, science teachers, mathematic teachers, English teachers, laboratory assistance, cleaner and security personnel with respect to Human resource needs as shown t Table 17 - 20:

Table 17: Availability	N	X	D	T cal	T tab	Remark
Private	7	5	0	0	2.179	Absolutely not significant
Public	7	5	0			

Table 18: Qualification	N	X	D	T cal	T tab	Remark
Private	7	5	0	1.67	2.176	Not significant
Public	7	3.57	2.26			

Table 19: Sufficiency	N	X	D	T cal	T tab	Remark
Private	7	5	0	3.96	2.18	significant
Public	7	3.43	1.05			

Table 20: Adequate functioning	N	X	D	T cal	T tab	Remark
Private	7	5	0	0	2.179	Absolutely not significant
Public	7	5	0			

The result of integrated science student in both private and public schools were analyzed using statistical tools as shown in Figure 21 - 24.

Table 21: Private Schools Integrated Science Result

School / Grade	I	II	III	IV	V	TOTAL	PERCENTAGE (%)	CONCLUSION
A	12	17	10	13	6	58	21	PASSED (85%)
B	16	25	18	17	8	84	30	
C	19	28	11	22	13	93	34	
D	7	8	4	7	5	31	11	FAILED (15%)
E	4	3	1	2	0	10	4	
TOTAL	58	81	44	61	32	276	100	

Table 22: Public Schools Integrated Science Result

School / Grade	I	II	III	IV	V	TOTAL	PERCENTAGE (%)	CONCLUSION
A	47	39	34	72	39	231	10	PASSED (59%)
B	82	45	62	89	58	336	14	
C	202	198	191	154	103	848	35	
D	89	73	178	112	197	649	27	FAILED (41%)
E	84	32	77	71	64	328	14	
TOTAL	504	387	542	498	461	2392	100	

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Table 23: The school location /Result of integrated science students

PRIVATE SCHOOL		Grade (performance)						PUBLIC SCHOOL		Grade (performance)					
SCH NAME	LOCATION	passed			Poor		TOTAL	SCH. NAME	LOCATION	Pass			Poor		TOTAL
		A	B	C	D	E				A	B	C	D	E	
CHELSTON INT'L NUR/PRI SCH	Along Gwagwalada-Zuba express way	12	16	19	7	4	58	GOVT. SEC. SCH. G/LADA	Along Lokoja-Abuja express way	47	82	202	89	84	504
		20.7%	27.6 %	32.8 %	12%	6.9 %				9.3 %	16.3 %	40.1 %	17.7 %	16.7 %	
		81.1%			19.9%		100%			65.7%			34.3%		100%
CHELSTON ACADEMY INT'L SCH	Along Gwagwalada-Zuba express way	17	25	28	8	3	81	GOVT SEC SCH T/MAJE	Tunga maje	39	45	198	73	32	387
		21	30.9	34.6	9.9	3.7				10%	11.6 %	51.2 %	18.9 %	8.3 %	
		86.5%			13.5%		100%			72.8%			27.2%		100%
ADONAI NUR/PRI & SEC SCH	Behind Christ academy, Gwagwalada	10	18	11	4	1	44	GOVT DAY SEC SCH G/LADA	Along specialist hospital, Gwagwalada	34	62	191	178	77	542
		22.7%	40.9 %	25%	9%	2.3 %				6.3 %	11.4 %	35%	32.8 %	14.2 %	
		88.6%			11.3%		100%			53%			47%		100%
CHIRST ANGLICAN COLLEGE	Secretariat road Gwagwalada	13	17	22	7	2	61	GOVT DAY SEC SCH G/LADA	Hajj camp, behind Kotongora estate	72	89	154	112	71	498
		21.3%	27.9 %	36%	11.5 %	3.3 %				14.5 %	17.9 %	30.9 %	22.5 %	14.3 %	
		85.2%			14.8%		100%			63.2 %			36.8%		100%
AL-MOHAS INT'L NUR/PRI & SEC SCH	Old kutunku (off market road).	6	8	13	5	0	32	GOVT SEC SCH DOBI	Along the road, Dobi	39	58	103	179	64	461
		18.8 %	25%	40.6%	15.6 %	0%				8.5 %	12.6 %	22.3 %	42.7 %	13.9	
		84 .4%			15.6%		100%			43.4%			56.6%		100%
TOTAL		58	84	93	31	10	276	TOTAL		231	336	848	649	328	2392
%TOTAL		21	30.4	33.7	11.2	3.6	100	%TOTAL		9.66	14.1	35.5	27.1	13.7	100

The outcome of testing hypotheses 1-3 is summarized in Table 24.

Table 24: Research Findings

		Hypothesis 1		Hypothesis 2	Hypothesis 3
S/N	Differences between public & private school plants	Availability	Adequate functioning	Sufficiency	Modernity/Qualification
1	Administrative Block	Significant	Significant	Significant	Significant
2	Social Unit	Not significant	Not significant	Significant	Significant
3	Physical Properties	Not significant	Not significant	Not significant	Not significant
4	Material properties	Not significant	Not significant	Not significant	Not significant
5	Human resources	Not significant	Not significant	significant	Significant

Hypothesis 4: Table 23 shows that there is difference in integrated science students' academic performance which depends on school type, not school location. *Hypothesis 4* is therefore accepted.
Hypothesis 5: There is significant difference between public and private schools in terms of sufficiency of administrative block, social unit, and human resources which translate into better performance of integrated science students in private compare to public schools, therefore, *Hypothesis 5* is rejected.
Hypothesis 6: The result of integrated science students is consistently better in private schools than in public schools. This is because curriculum implantation through the means of school plant planning and management is more effective in private schools than in public schools. *Hypothesis 6* is therefore rejected

Discussion of Finding
The analysis data shows that there is significant difference in terms of availability of administrative blocks. But in terms of availability of social units, physical properties, material property/ equipment and human resources, there is no significant difference between private and public schools in Gwagwalada Area Council. There is significant difference in terms of adequate functioning of administrative blocks. In terms of adequate functioning of social units physical properties, material properties/ equipment and human resources there is no significant difference between private and public schools in Gwagwalada Area Council. There is a significant difference in the in terms of modernized administrative blocks, social units, and material properties/equipment. With respect to modernized physical properties and qualified human resources, there is no significant difference between the private and public schools in Gwagwalada Area Council.
Though there is a significant difference in terms of sufficiency of administrative block, social units and human resources, but there is no significant difference in the aspect of sufficiency of physical properties and material properties/equipment between private and public schools in Gwagwalada Area Council. Since 85% of student in private school and 59% of student in public school passed integrated science, private and public schools in terms of sufficiency of administrative block, social units, and human resources, it means that adequacy of school plants have significant relationship with science students' academic performance. This accounted for by sufficiency and modernization/qualification of material resources /human resources.
In general, the analysis shows that the extent to which school performs well are rather a function of school type (private / public) is further differentiated by some other interacting factors (like sufficiency, adequacy and functioning of physical plant, material resources and human resources) rather than school location. The implication is that in as much as it is not encouraged to build school in noisy area, as supported by Oyesola (2000), the reality on ground is that urbanization has made it difficult for all schools to be located in a desirable environment. The same interacting factor has made it easier for parents to prefer a school in the neighbourhood than a school in a choicer environment which is associated with difficulty in transportation of their wards. An example is a school in Deshi (along Dobi) which start their day late and close late, although the location is very good. Consistently, even when private and public schools are located along the same area those in private school perform better because of their small class size.

Conclusions
- If curriculum in science education is to be effectively delivered, there is an urgent need for the government to focus their attention on bridging the gap between private and public schooling in term of availability and functioning of administrative blocks.
- There is an urgent need to upgrade the standard of the available administrative blocks, social units and workshop/laboratory to a minimal level which can significantly improve on science pupils' academic performances.
- A more disturbing issue which should concern all educationists is the issue of population explosion in public schools, a major factor in the gap of academic performance between the private and public schools. This calls for a serious review in the budgetary allocation to educational sector which is in serious need for expansion to match population expansion resulting from enrolment, particularly in public school.
- Sufficiency and functioning material resources should be greatly exploited for the purpose of establishing scientific knowledge and skills in the youth of our Nation. Government should seriously re-think the development of manpower resources through the available human resource training centers.

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