

DESIGN AND IMPLEMENTATION OF AUTO TECH RESOURCE SHARING SYSTEM FOR SECONDARY SCHOOLS IN DELTA STATE.

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Abstract

This paper presents the design and implementation of Auto Tech Resource Sharing System for schools in three senatorial districts of Delta State for effective teaching of the skill acquisition subjects introduced in our secondary schools by both Federal and the State Governments. The investigations revealed that less than 10% of the introduced subjects are being taught due to lack of essentials facilities and manpower. The structured system methodology and administration of questionnaires were employed in the proposed system design and implementation. The proposed system was virtually implemented by simulation. Test was carried out on the designed system to ensure efficient performance of the system block units. The test carried out confirmed that the designed system worked according to the designed objectives. If the necessary infrastructures and facilities for teaching in the proposed design are implemented, it will bring to realization of the Government aim of producing self-reliant school leavers.

Keywords: Skill Acquisition, Auto Tech Resource Sharing, School Leavers.

1.0 Introduction

Education is the bedrock of socio-economic development of a nation and an effective tool for positive social mobility of citizens in every society [1]. Sound education both formal and informal prepares one ready to embrace a purposeful life. Education has a dynamic role to play in the lives of individuals and society at large. One main purpose of education is to equip people with the skills needed to operate in the society so as to achieve individual and national integration. When rightly applied, it is a means of achieving self-reliance. It also stands as an avenue for self-discovery and fulfillment. Education is important in social and national development. Recent scientific and technological advancement are all products of education. Post-primary education significantly impacts the social, mental and career being of a child thus, education at this formation level should be harnessed to achieve effective learning which shows itself in the positive contribution of the learner to societal development. A good number of students who have completed their secondary education but do not wish to continue with higher education are in dilemma because they are not well equipped with necessary skills to empower themselves. The training acquired at the end of secondary education seems inadequate to make the school leavers competent and self-reliant.

Having realized the effectiveness of education as a powerful tool for national progress and development and also a strategic measure to combat the unemployment that ravages our country, the skill acquisition courses should not be limited to only technical and Vocational schools. In this view, the Ministry of Education which co-ordinates the activities of primary and post primary schools both at federal and state level has adjusted the post primary school educational system to incorporate diversified curriculum that integrates academic with technical and vocational subjects with the intention of empowering the young school leaver for self-employment which will make him useful to himself. Nonetheless, the educational system seems not to achieve its purpose as majority of schools fail to judiciously adhere to the curriculum especially as it concerns with skill acquisition both in theory and practice. The study in [2] revealed that the curriculum was appropriate in terms of goals

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and content but weak in its method of implementation. This agrees with the findings in [3,4,5] which affirmed that the current curriculum used by technical and vocational education is very much relevant for the training of skilled oriented students for the purpose of national development and self-employment but it is more of theory than practical. The data collected from different schools in the three Senatorial zones reveal great negligence of these skill acquisition subjects by post primary schools. This is due to great challenges involve in its successful implementation.

Generally, the quality of education delivered by teachers and the academic achievement of pupils/students of any school is affected by several factors ranging from poor funding, inadequate facilities, inadequate skilled teachers [6,7]. Factors affecting entrepreneur skill acquisition in secondary schools are synonymous to those affecting the effectiveness of technical and vocation education. Inadequate facilities, most technical education departments in Nigerian Universities do not have laboratories or workshop space, let alone useable equipment and where they exist, they are grossly inadequate, as the workshops only have items or equipment that were provided when the departments were first established of which most of them are already obsolete or grounded [8] It is quite unfortunate and surprising too to know that most technical education departments still depend on engineering workshops and lecturers to teach technical education concepts in this 21st century. The available facilities are inadequate quantitatively and qualitatively and besides, they are outdated. Inadequate funding and lack of commitment by government as was observed by in [9] has weakened technical education in Nigeria, because without facilities which serve as pillars of support for effective teaching and learning, technical and skill acquisition education cannot found their base. As he puts it, without the availability of functional infrastructures in the schools, the skill-based curriculum will not be effectively implemented in Nigeria, and youth would lack skill acquisition and economic empowerment [10].

The survey carried out in the course of this study reveals that secondary schools in the state lack adequate infrastructural facilities and equipment mostly due to poor financing which agrees with study in [11] on investigation of school facilities in public secondary schools of Delta state which reveals that the school facilities are generally in state of disrepair. Most of the existing few are not functional as a result of poor maintenance culture. This sad state of infrastructural facilities and equipment in Nigerian secondary schools which is grossly affecting the productivity of the young school leavers stirred up this study which aims at designing a platform for cost effective provision of durable infrastructural facilities and learning equipment for secondary schools in Delta state of Nigeria.

2.0 Materials and Methods

The following methods were employed to realize this work.

(1) The structured system method (2) administration of questionnaires (3) Simulation.

The questionnaire was randomly administered to selected schools to ascertain the state of skill acquisition subjects, their successes and challenges in secondary schools in Delta State. The participants used for the questionnaires were Principals, teachers and students of senior class. The questionnaire consists of two sections, section I focused on demographical variable which requires participants to indicate their senatorial zone, school, status (i.e. principal, teacher or student) and subject area. Section II contains 17 items questionnaire which was not structured in a particular pattern because of the nature of questions which was aimed at getting information concerning the skill acquisition subjects done by each school, the available tools for their practical work, frequency and effectiveness of the practical works carry out. It also contains other logistic questions that will assist in the design of proposed system. The questionnaires were administered to the three senatorial zones; Delta North (DN), Delta South (DS) and Delta Central (DC)

The data gathered from the questionnaire revealed that apart from convectional science subjects, more than 97% of secondary schools in Delta state do not take up to 10% of the skill acquisition subjects. The questionnaire also revealed that the reason for this negligence is due to lack of essential facilities needed for the teaching and learning of the subjects both human and machine resources. This lack of study/training facilities stirred up the idea of proposing a *Senatorial Central Practical Pools* as remedy to this crippling challenge to skills acquisition initiatives in secondary schools.

2.1 Subjects Introduced into the Post Primary School Curriculum:

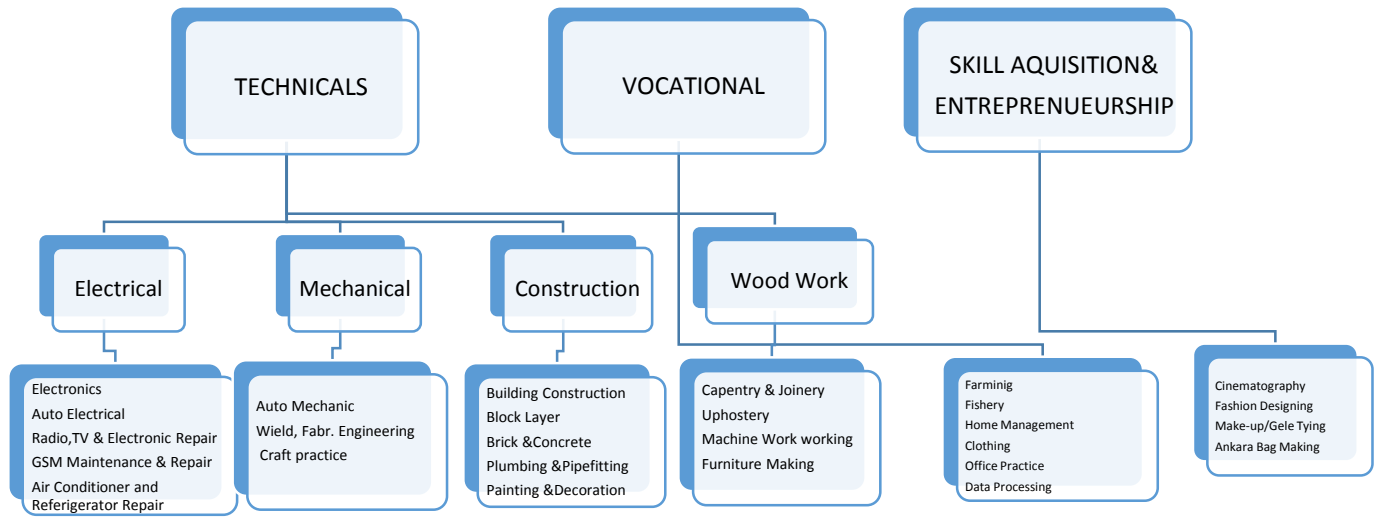


Figure 1: Skill Acquisition Subjects

Figure 1 shows the subjects that were newly introduced into secondary school curriculum.

2.2 The Needed Resources for Effective Teaching and Learning of these Subjects

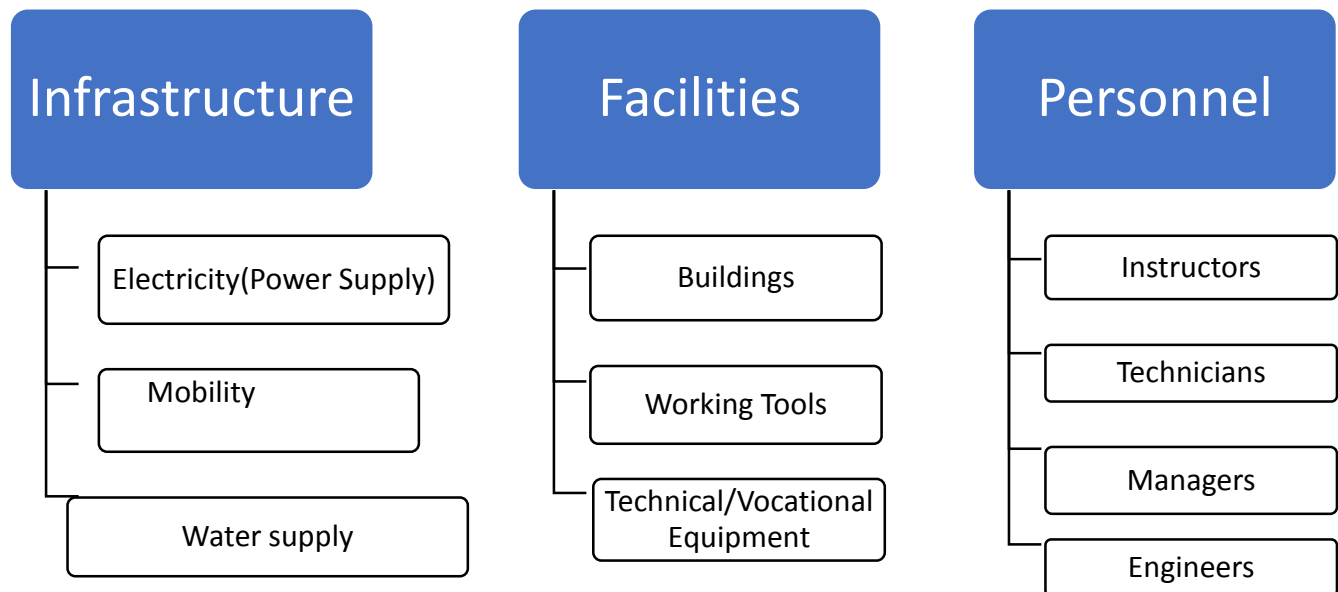


Figure 2: Resources for Effective Teaching and Learning of the Subjects

2.3 Proposed Auto-Tech Resource Sharing System Block Diagram:

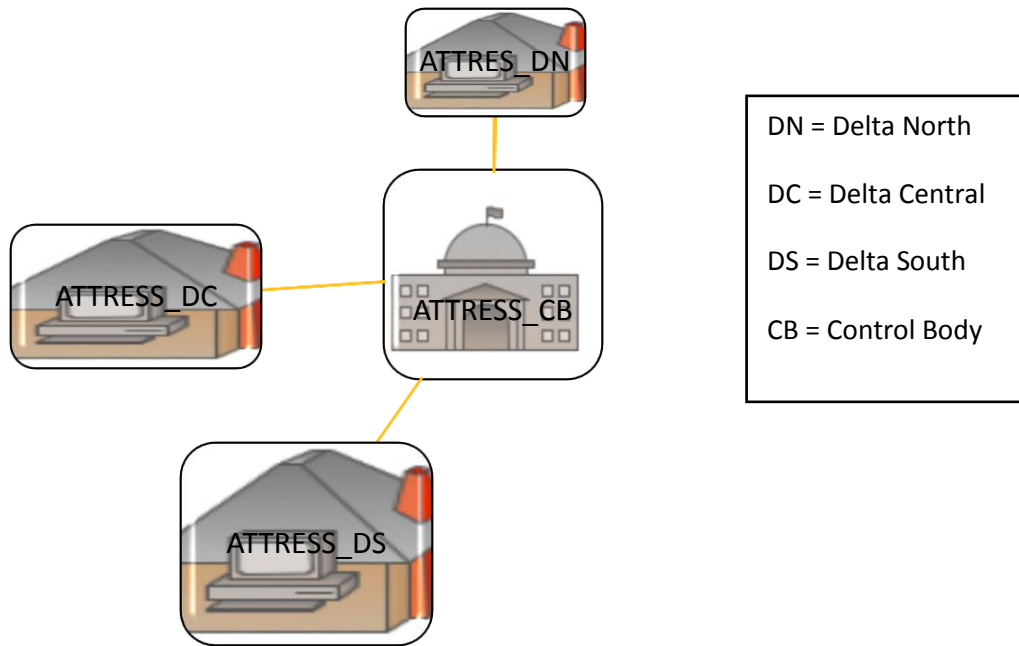


Figure 3: Component Diagram of ATTRESS (Researchers)

Figure 3 is the component diagram of the ATTRESS depicting the Resource Centers at the respective senatorial zones in Delta state. ATTRESS_DC, ATTRESS_DN and ATTRESS_DS the Technical Resource Sharing Centres in Delta Central, Delta North and Delta South senatorial zones respectively, while ATTRESS_CB is a control point located at State Education Board for supervision and coordination of the activities at the three senatorial zones. The ATTRESS_CB communicates with the centres through wireless metropolitan network.

Architectural design for the ATTRESS_DC, ATTRESS_DN and ATTRESS_DS is shown in Figure 5.

2.3.1 Architectural Design for ATTRESS_CB

An office in the State Education Board can be used for this, where a computer system with internet access point, dedicated as server can be installed to host the Realtime Resource Sharing and Allocation application software. This point will serve as Control and Monitoring Centre for three Senatorial Centres which will be made to communicate through Virtual Private Network (VPN).

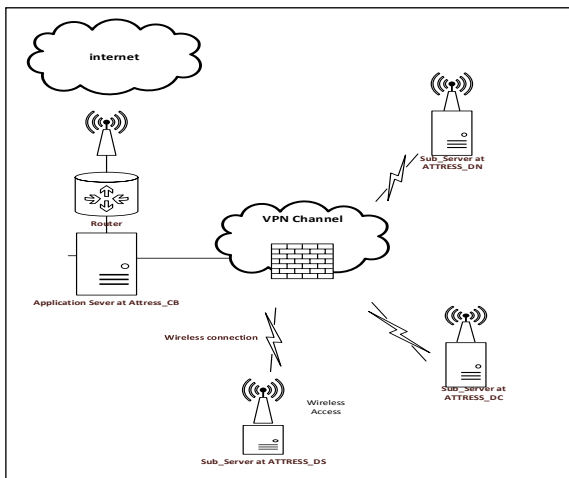


Figure 4: Architectural Design for ATTRESS_CB

The minimum requirement for the server system is 2C (2cores) processor with a least 2.0GHz speed, 4Gb RAM,500GB hard disk. The operating system will not be later than Server 2008. The activities in each senatorial resource centre should be montored remotely by an administrator from the control point.

2.4 Factors to Determine the Location of each Resource Centre in a Senatorial Zone.

For each senatorial zone, the following factors should be considered before the choice for site for a Resource Centre.

1. Availability of land for building necessary structures.
2. The centrality of the location in respect to all participating schools.
3. Availability of good access roads to the site from different points of the zone.
4. Number of participating schools in each zone will determine the need for more than one centre.

2.5 Architectural Design of each Resource Centre.

Figure 4 depicts different resources that should be made available in each of the Resource Centres. The Resources should be automatically allocated to all participating schools concurrently without collisions using Real-time Auto Tech Resource Sharing software through a wireless metropolitan network.

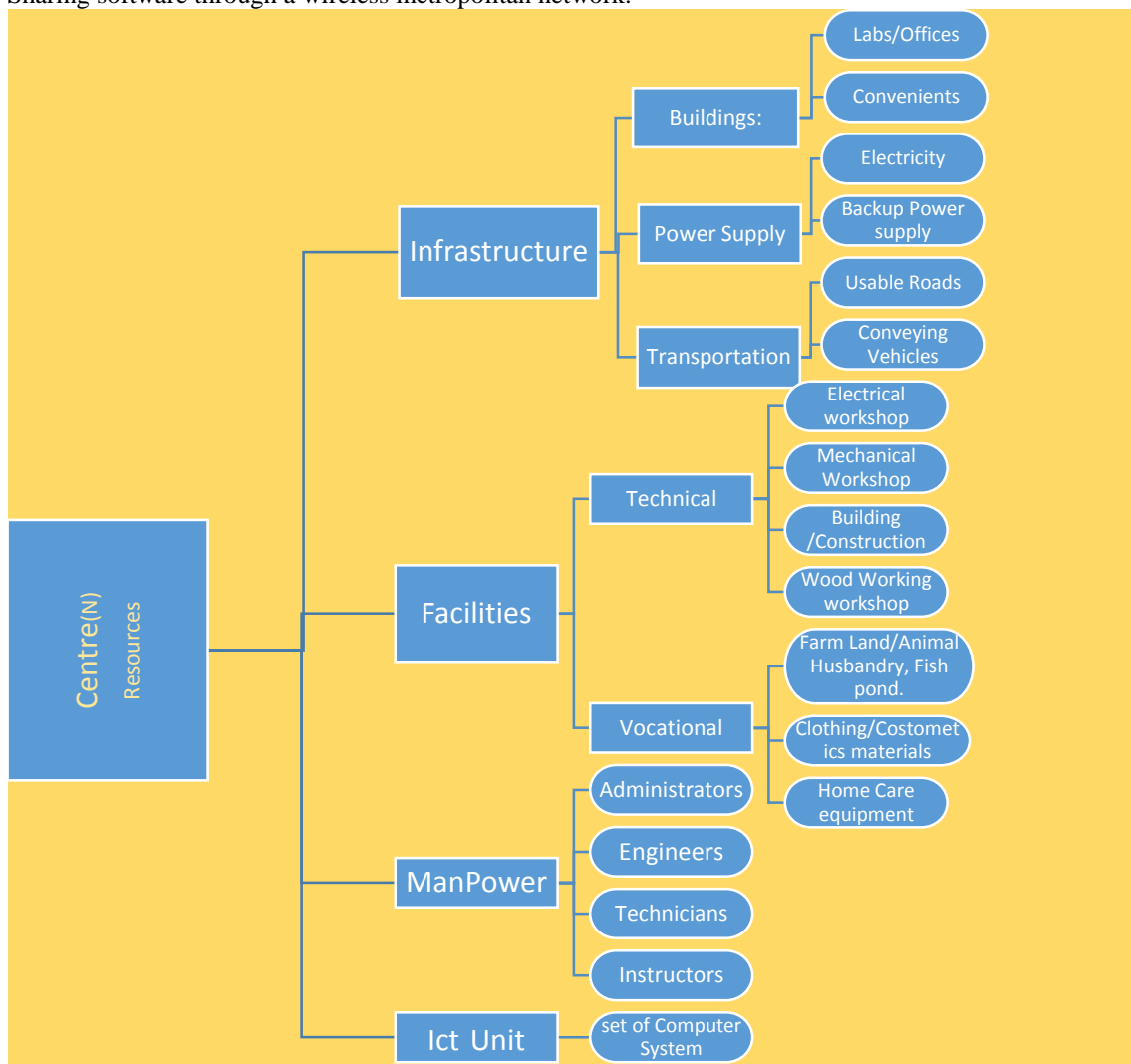


Figure 5: The Architectural Design of ATRESS Resource Centre. (Researchers)

Figure 5 depicts the design of each resource sharing Centre for the three senatorial zones. As is shown in the diagram, the resources to be shared are infrastructure, facilities and manpower.

Infrastructure

This includes all the structures needed for installation of equipment, offices and lavatory, constant power supply which may be solar system or electric power generator with backup inverter with capacity not less than 10KvA, and transportation. For transportation, availability of usable road and good vehicle for conveyance of the students from their various schools to the Centres should be considered.

Facilities

These are necessary workshops, studios and other materials needed by the students for proper training on these skill acquisition subjects. The size and quantity of the equipment to be installed should be determined by the number of schools and population of the students.

Manpower

- i. Administrator: Each Centre should have at least two administrators whose duty will be to manage the ICT unit and ensure constant communication with all participating schools, updating them with the activities of the Centre.
- ii. Engineer/Technician: Each workshop, laboratory and studio should have at least two engineers and technicians who will always be available for the maintenance of the installed equipment.
- iii. Instructors: There should be at least two skilled instructors for each of the subjects, to train and guide the students on how to use the equipment/materials to achieve expected results.

ICT unit

This should be an office with a set of computer system which will serve as sub server with a high-speed wireless access point which will be able to access remotely the Realtime Resource Sharing and Allocation software hosted in the server at the Control Centre. All the schools for the Centre will be able to hook to it for timely update on the activities of the Centre. The minimum configuration for the sub-server should be Duo-core processor with 2.0ghz speed, 2.0G RAM and 500GB hard disk with not later than windows 7 operating system (o/s)

2.6 Virtual Implementation and Testing

As mentioned earlier, the resources to be shared will be allocated to participating schools concurrently by real-time software through a Metropolitan Area Network (MAN) using wireless infrastructure as shown in Figure 6. The ATRESS was implemented visually by simulation. Test was carried out on the designed system to ensure efficient performance of the system block units. The test carried out confirmed that the designed system worked according to the designed objectives.

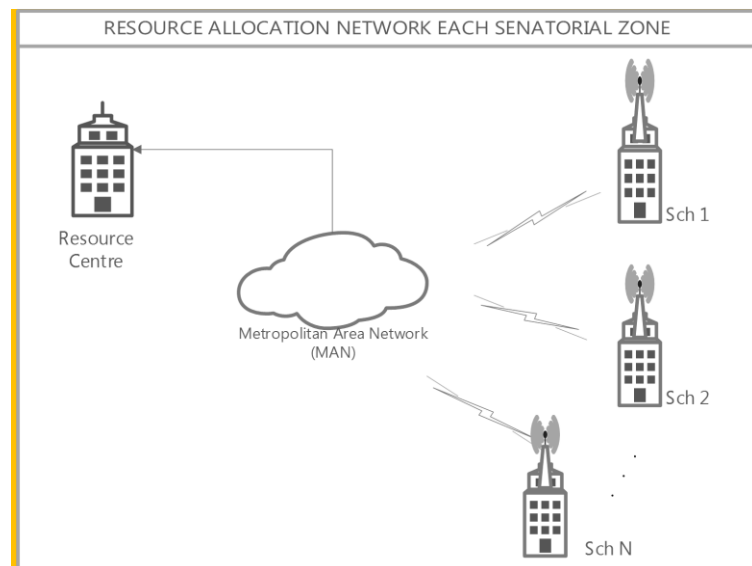


Figure 6: Metropolitan Area Network (MAN) for each senatorial Resource Allocation

3.0 Results and Discussions

The government on quest of trying to curb the challenge of human capital development in Nigeria has introduced into Secondary schools' curriculum subjects for skill acquisition and entrepreneurship development.

The investigations through the questionnaires revealed that about 97% of schools are offering to students less than 10% of the skill acquisition subjects due to lack of essential facilities and manpower. The proposed Auto Tech Resource Sharing System

designed was virtually implemented and tested. The system worked efficiently. The establishment of Resource Centres in each senatorial zone is cost effective and also creates opportunity for students of the participating schools to actually get the intended benefits from these human development subjects. Time and Resource allocation will be controlled by a Realtime system for collision-free management of the centers.

4.0 Conclusion

This paper presents the design and implementation of Auto Tech Resource Sharing System for schools in three senatorial districts of Delta State for effective teaching of the skill acquisition subjects introduced in our secondary schools by both Federal and the State Governments. The investigations revealed that less than 10% of the introduced subjects are being taught due to lack of essentials facilities and manpower. If the proposed designed system, the necessary infrastructures and facilities for teaching are implemented these will bring to realization of the Government aims of producing self –reliant school leavers.

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