

Development of Computerised Students' Results Processing System

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Abstract

This paper examined the inadequacies involved in the manual method of compiling students' result in Kwara State, Nigeria Government Secondary Schools. To achieve that, preliminary investigations about the current manual record keeping was examine in some selected government secondary schools in Kwara State, Nigeria. The problems with the manual result processing identified, and a new computer software application system was developed and implemented to facilitate the automated processing of the results. A software package was developing using C# programming language and SQL-SERVER, a relational database management system in designing the database. The produced expected results from the system show that teachers do not need to draw vertical/horizontal lines on a broad sheet of paper for recording students test, examination scores, and calculations, as the system does virtually everything reducing the stress teachers have to undergo to prepare students results. Similarly, individual student's results can be print on A4 size paper or embossed cardboard paper that appears like a certificate and looks more beautiful at a lower cost compared to the cost of printing result booklets. This software will make the teacher's job less stressful by cutting down the time and effort spent on result preparation, thereby, allowing the teacher more time for teaching and other instructional issues. This new system is flexible and can be modify to suit any kind of students' record keeping and data processing in both public and private secondary schools.

Keywords: Automation, Records, Examinations, Scores, Result, Processing

Introduction

Computing is any goal-oriented activity requiring benefiting from and creating computers or applications running on a computer. Thus computing includes designing and building hardware and software systems for a wide range of purposes processing structuring and managing various kinds of information doing scientific studies using computers making computer systems behave intelligently finding gathering and keeping information relevant to any particular purpose. Computing is the systematic study of algorithmic processes that describe and transform information.

A management information system (MIS) is a broadly used and applied term for a three-resource system required for effective organization management. The resources are people, information and technology, from inside and outside an organization, with top priority given to people. The system is a collection of information management methods involving computer automation (software and hardware) or otherwise supporting and improving the quality and efficiency of school operations and human decision-making.

Many schools have their own system to manage students profile and assessments. Common practice is by recording the student information in a record book. Students' information obtained from the registration form completed by the parents when they registered their children for the first time. This

practice has some weaknesses such as the longer time to search the student profile; the possibility of misplacement of record book and vulnerability of student record to be accessed by unauthorized person. In many state's public secondary schools, several assessments are prepared to evaluate student performance. Types of assessments that are common to all the secondary schools are assignments; monthly test; and end of term exams. At the end of each assignment; test and examination; the class teacher records student's marks and grades in the record book or in basic computer software such as Microsoft Excel for teachers with knowledge and access to computer. After that, the class teacher needs to determine student's position (ranking) in class based on their performances. However, it takes time to do these tasks because they need to formulate their own calculation for class position (ranking). These tasks will be much easier if all calculations for class position (ranking) can be automatically done when the teacher enter assignments; test and exams marks. Students result is the criteria for the measurement of the student's capability in terms of academic performance in the school.

1. It is used to measure a student's capability in each subject offered by the student;
2. because the student result is very important to the student and his/her parents; there is need to avoid common mistakes made during the result processing; this can easily be achieved by an automated result processing system;
3. The system is an effective; efficient and error free results processing system designed and implemented for public secondary schools in Kwara State for proper running of the schools results processing.

Therefore, the researcher developed an automated student information processing system (ARPS) in order to manage student information and assessments. This system helped school administration (principal and clerk) to manage student profile and class teacher to manage students' assessments.

The significance of this study in essence is to provide a more efficient means of managing activities in secondary schools, which include records, and information of staffs and students through an electronic medium. The development of the proposed Electronic Secondary School Management Information System has immense benefits to the management of the school over the orthodox school management practice.

Lack of accurate and timely data has long been the bane of policy formulation and management of secondary school education system in Nigeria. To obtain accurate data on enrolment; teachers; non-teaching staff and even facilities appears to be a difficult task for the school managers. The school managers and teachers appear to lack adequate cognitive development in the areas of data collection; analysis and storage. Apart from this lack of capacity of the school managers; school data collection and analysis seem to be marred by other socio-politico-economic factors such as fraud; politics of national resource allocation and social apathy; thus; the need to develop an electronic secondary school management system.

The aim of this paper is to develop a Computerised Students' Results Processing System for Kwara State Government Secondary Schools.

The major focus of this paper is centre on creating windows based application, which provided an electronic means of managing staffs and student's records in Kwara State secondary school as a domain. The major feature includes: Login panel; Managing Student records; Managing Staff records; Process Student's results and generate report sheet.

The project is strictly a window-based application that is intended to manage Secondary School activities electronically. However; the project is limited to managing student and staff records; process result and provides a local search mechanism through which information can be gotten faster for Kwara State Secondary schools

Education and the Nigeria Perspective

There is no gainsaying the fact that education is very vital to the pace of social, political and economic development of any nation. This is why most nations of the world strive to devote a sizeable proportion of their Gross National Income to develop the educational sector. In Nigeria, between 7.6% and 9.9% of our annual expenditure is devoted to education. Management of secondary education refers to the process of planning, organizing, directing, staffing, coordinating and reporting on secondary education system. (Durosaro, 2000).

Secondary education in Nigeria refers to the education which children receive from the age of 9 years to 17 years plus. It is the medium level of the educational system that runs for six years and it is aimed at identifying basic career development areas. The structure of our population in Nigeria is such that about 37% of the people are within the age bracket of nine to sixteen years. According to the provisions of National Policy on Education, this is the corresponding age group for secondary education. (Durosaro, 2000).

Obviously, the enrolment pattern in the educational system follows the pyramidal structure of the nation's population distribution. The primary level has the largest enrolment, followed by the secondary level and then the tertiary level. This enrolment structure, no doubt, depicts the structure of our social demand for the various levels of education. The secondary education level, being the bedrock of the child's career development, is a very vital aspect of the nation's educational system that deserves to be handle with great care and caution. Any error committed in the organization and management of this level of education may reverberate on other levels and thus seriously mar the lives of the people and indeed the overall development of the nation. (Durosaro, 2000). This is one good reason why all the stakeholders must show enough concern for those issues that concern the organising and managing of our secondary education system.

Manual Result Processing

Sometimes the delay in declaration of results cause heavy losses to the students, as generally they cannot join further studies or appear in competitive exams because of the non-availability of examination result in time (Mohini & Amar, 2011). Some of the limitations of the existing system are as follows:

Repetition of Work: There is repetition of work in the existing system because the same data is record in different branches of the examination. This leads to data duplications, and the institution to purchase papers spends huge amount of money. In existing system, managing of students' record is very tedious. Retrieval of students' records through manual registers, maintaining of records and data reconciliation etc. are very time consuming.

Tempering of student Records: In manual school management system, there are chances of tempering with student's records. Sometimes fake results are prepared and there is no online verification of the results. This leads to unfair practices and it mars the credibility of an institution. A number of problems associated with student academic record management include improper subject registration, late release of students' results, inaccuracy due to manual and tedious calculation and retrieval difficulties/inefficiency (Eludire, 2011).

In most cases, the data generated by academic institutions are usually stored in non-delineated files for use by different departments/units within the institutions with the same data appearing on several of these files. This means that a simple change of address would have to be process in two and probably three or four places, depending on the number of other files on which these data appears. The development of database concept is the answer to these problems where the amount of redundant data is reduce and the possibility that data contained on a file might be inaccurate because they were never updated. Other problems associated with course system management include improper registration, late release of students' results, inaccuracy due to manual and tedious calculation, and retrieval

difficulties/inefficiency. To proffer solution to the setback associated with manual system of result processing, an application called Student Academic Record Management System using Microsoft Access to handle the task of creating, storing, accessing and maintaining files and database records is develop.

According to Eludire, (2011), the choice of Microsoft Access was because it is simple, easy to code, and available with forms and reports. It is also accessible in terms of distribution with versions of Microsoft Office. MS Access version 2003 was chose for the implementation.

Some previous works that have been carries out in this area to address the problem of manual result processing are the works by Moses (2008), Ukem and Onoyom-Ita, (2011). In this work, Moses (2008) employs Microsoft Excel Spread sheet program to build an Intelligent Knowledge-Based System (IKBS), making use of various programming facilities provided by that application (Excel). The central issue here is that the programming is hardcoded into the cells, and cell referencing is use to monitor and track students' performance. The system has been report to be working fine.

However, it appears to be rather restrictive, and calls for substantial expertise in programming. Similarly, in the work by Ukem, and Onoyom-Ita, (2011), Adobe Dreamweaver an Integrated Development Environment is use to create the Graphic User Interface and to write the codes. MySQL, a Relational Database Management System (RDBMS), is use to create the database tables and data. Personal Home Page Pre-Processor (PHP) is use to communicate with and manipulate the database. This application, though tested and found to be working as expected, has however not been put to use widely. A computer software application is develop in Java programming language in the form of a database, employing MySQL RDMBS to facilitate the automated processing of the results (Ukem, & Ofoegbu, 2012).

The developed software performed well and produced expected results on completion. With it, it was possible to compute Grade Point Average and Cumulative Grade Point Average for each student based on examination scores entered. The application was successfully developed, tested, and found to be working as expected. It is capable of storing and processing student's results with high speed and accuracy, and presenting output in certain required forms. It is easy to use due to the use of a GUI rather than command line approach, reasonably secure, and enforces data integrity resulting from the use of a relational database management system. With this application, the processing of students' results can be automated largely, thereby reducing processing time and increasing accuracy.

The outlook of the work is to make the application web-enabled, which would greatly enhance its use. Users could then access the application from anywhere via the Internet, and be able to carry out their work, students with proper authorization would be able to view their results on-line. According to Ukem, and Ofoegbu, (2012), the issue of security also looked into, with a view to improving it so that users would have greater peace of mind knowing that their data would not be compromised.

The Need for Automated School Management System in Schools

With automated school management system in institution of learning, there will be many benefits to derive which will provide the necessary conveniences for the students, teachers and managements in the school. The benefit of computerize data compilation, information safety and security and result publication cannot be overemphasis, Atabong, et al (2010), identify the following as benefit of computerize test, taking, Marking and results publication:

(i) Automation Minimize Human Intervention: There will be lesser human intervention (as much as possible) in result processing by automating all the concerned activities.

(ii) **Automation Facilitate Management:** The Computerized Statistical Analysis of Data will facilitate the management to see trends in result at various levels. MIS reports will facilitate the Top Level Management to make strategic decision in favour of the institutions and students.

(iii) **Automation Minimizes Redundancy:** The use of RDBMS for storage of students' data will help in minimizing the redundancy in database in addition to maintain consistency, integrity and security of data. In an educational community, information is highly essential for correct students' record and examination data. Student information, if not properly created and stored, will cause many errors in usage. Nearly, every section of the educational system requires information processing (Okonigene, et al, 2008). This new system must be flexible and modified to suite any kind of record keeping and data processing.

Description and Analysis of the Existing System

The existing system comprises of results and other meaningful information about students, which compiled by each teacher according to the subjects he or she handles by calculating (addition and division) each student's Test and Exam scores. For every student in question, the teacher will add what the student scored in 1st & 2nd Continuous Assessment Test and Exam to get the total for that subject, for example in ICT, teacher repeats this process for the rest of subjects offered by the same student just to get all the total scores for each subject. To get the average score for this student, the teacher will further add all the total scores for each subject offered then divide by total number of subjects offered by the student.

The whole process repeated for the remaining 68 students. After that, the teacher starts looking for the highest average score and the one that follows and so on to get (1st, 2nd, 3rd, 4th40th positions in the class). This process of result compilation is very stressful and time consuming. Problems associated with the existing system are as follows:

- (a) **Inaccuracy:** The results produced by the manual system may not be accurate due to calculations that involve ordinary calculator and human reasoning.
- (b) **Lack of security of results:** The results processed are stored in files. Insects such as termites or other pest sometimes attack these files
- (c) **Late processing of results:** The short period available for the processing of results, makes the teachers involve in a period of very tough work, because of this most of the times the results are produce late
- (d) **Production of ineffective results:** because of miscalculations in the manual results processing system, the results produced are ineffective.

Proposed System

The computerization of secondary school results processing system has the following importance;

- (a) **Efficiency:** - Because of the ever increasing number of students enrolling in secondary schools, it is becoming progressively harder to cope with the paper worked involved in the manual system of processing. A computerized system will make the job a lot more efficient and students will obtain their results soon after the marking of the scripts is completed.
- (b) **Accuracy:** As in all manually operated systems, there are often errors a very moderate degree and when it occur, can be easily identified and, corrected. This is achieving by the use of interactive processing.

(c) Retrieve ability: - In the manual system information are stored in files, this information can be retrieved by searching for the file that contains it, but with the use of computers one need to do is to punch a few keys on the key board or simply click the mouse and the information is retrieved.

(d) Safety and security: information stored in the computer is safe from animals, insects and intruders. A password is use to make program accessible to only authorized persons.

The Secondary School Management System (SSMS) will replace the paper-based data collection and information exchange system among the various departments of a particular school. The School Management System provides an innovative solution for Today's school record-keeping challenges. This school management software will give teacher room to handle responsibilities whether teacher just starting or are an experienced professional. School Management System opens a universe of opportunities to automate the laborious paperwork involved in proper school management. With the proposed record keeping, processing and management software, school management can more effectively interact with the students as they develop skills and character for success. They will not only have more time to spend with them, but it will be quality time because they will have up-to-date student information to facilitate them.

Architecture of Windows Application

Windows applications are design to run on a client computer that connected to networks or not (internet, intranet, extranet or peer-to-peer). Windows based applications based on the concept of client/server architecture. Client/server architecture, in computer science, is an arrangement used on local area networks that makes use of "distributed intelligence" to treat both the server and the individual workstation as intelligent, programmable devices thus exploiting the full computing power of each. However, the relativeness of this to Windows based applications is that the computer system where the application is installed represent the Client where the back-end or database represent the server, in this case SQLSERVER is used.

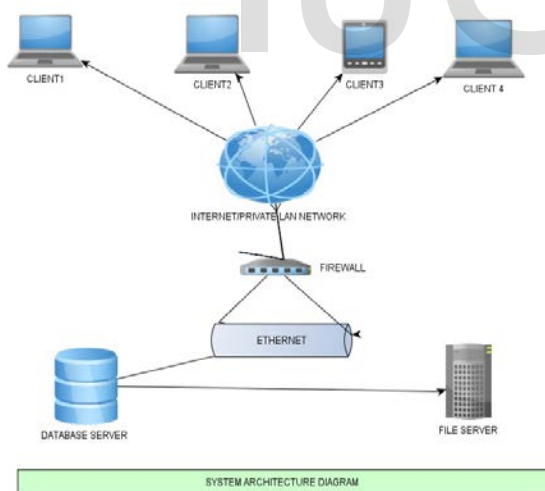


Figure 1: System Architectural Diagram

This system assumes a Windows-based infrastructure as a basis for its technical implementation. This is design by splitting the processing of an application between two distinct components: a "front-end" and "backend" server. The users interact with the application through the GUI in the client side, and store to, delete from or update relevant information in the backend.

The client component is a complete, stand-alone personal computer (versus the “dumb” terminal found in older architecture such as the time-sharing used on a mainframe) offers the user its full range of power and features for running applications. The server component, which is a virtual system in a sense, enhances the client component by providing the traditional strengths offered by data management, information sharing, and sophisticated administration and security features.

Computer components and hardware configuration

These are the touchable and untouchable components requirement of the development software. These include the following components:

Server: is a computer running administrative software that handles access to all or part of the resources of the network to which it belongs. It consists of hardware and software components.

Client: the client portion of the application is optimizing for user interaction whereas the server portion provides the centralized, multi user facility.

Firewall: is a software or hardware based network security system that controls the incoming and outgoing network traffic by analysing the data packets and determining whether they should be allowed through or not, based on a rule set. It builds a bridge between the internal network or computer it protects, upon securing that the other network is secure and trusted, usually an external(inter) network.

Hardware configuration

The minimum hardware configuration of the server and clients for the Secondary School Management System is as follows:

Client: (i) Pentium IV or compatible CPU; (ii) A well ventilated and illuminated environment; (iii) Mouse and keyboard, (iv) At least 1GB of RAM.

Server: (i) Pentium IV (above 1.8GHz speed of processor) or compatible CPU; (ii) At least 1GB of RAM, (iii) At least 40GB of storage; (iv) .NET framework 4.5.

Software configuration

The minimum software configuration of the server and clients for the Secondary School Management System is as follows:

Client: (i) Window 7 or later or any compatible operating system; (ii) Microsoft Visual Studio 2010 or later;

Server: (i) Window 2000 server or later, (ii) Apache / 2.0.59(win 32) server; (iii) ASP (Active Server Page) ;(iv) SQLSERVER or any relational database management system

System Installation

The system installation or setup is the act of making the program ready for execution. The installation is part of larger software deployment process.

- i. Making sure that necessary system requirements are met
- ii. Checking for existing version of the software
- iii. Creating or updating program files and folder
- iv. Adding configuration data: configuration files, windows registry entries or environment variables.

Windows Visual Studio

The Windows Visual Studio application was employ in the design and development of this project. From the Windows Visual Studio interface, clicking on the File gave a drop down menu that includes New among others and clicking on it bring a dialog box as shown in Fig.1

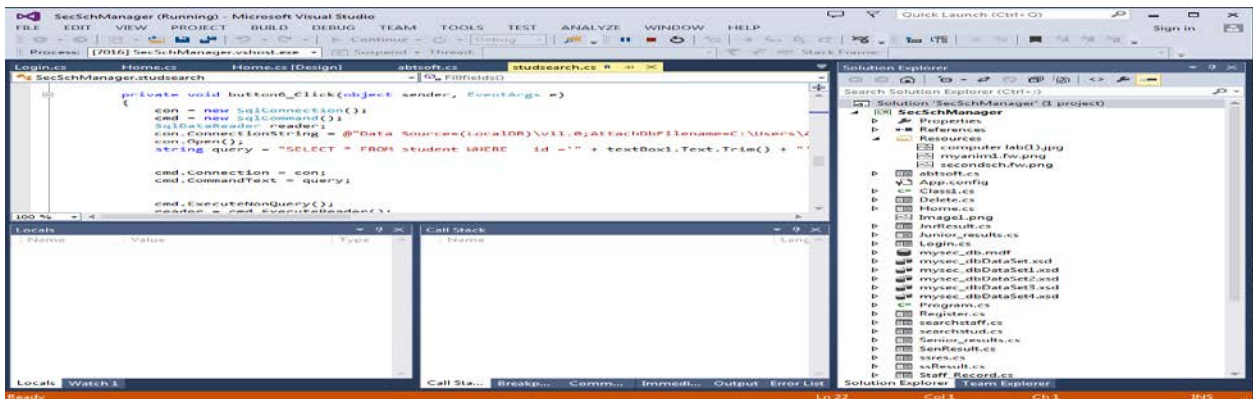


Figure 2: The Windows Visual Studio Interface

Installing the Secondary School Management System

To install secondary school management system, check your system to see Microsoft Visual Studio is installed; if yes copy the folder SecSchManager on the CD. Open Computer, Double click on Document folder, you will see a folder named Visual Studio 2010 or 2013, double click it and you will see another folder named Projects, open it and paste the SecSchManager folder you copied from the CD. From your application menu open Microsoft Visual Studio and when opened, click the file menu, click open and choose project/solution. When a window explorer opens, locate the folder SecSchManager and click, then select the Microsoft visual studio solution file there and click open. When opened you will see build menu at the upper part of the screen click it first, then the play button next

Running the Secondary School Management System

To run the Secondary School Management System

- i. Start Visual Studio
- ii. On the menu bar, Choose file New, Project/Solution
- iii. Expand installed expand Templates Expand Visual C#, and then chosen SecSchManager
- iv. In the name box, specify a name for your project, and then choose the ok button
- v. Choose F5 key to run the project.

Login Panel and all other things

The login panel is the security gate of this application, only authorized user is allow beyond this point. In this case, two categories of user are accepted; Administrator and Teacher requiring a Username and a password. The login form enables the user to enter his \ her password. If the password entered is valid, the software will then display the main menu. Nevertheless, if the password is not valid the user will denied access to the program.

Homepage

The homepage is the next screen of the application after the credentials of the user has confirmed. This page shows different links and navigation to various functionalities of the application.

Staff Registration Panel

This is a platform where staff information are saved

Student Registration Panel

This is a platform where student's information are saved.

Local Search Platform for Staff

This platform helps in retrieving staff information by querying the database.

Result Computation Platform

This platform helps the junior schoolteachers to process their students result and generate report sheet instantly. All subjects are loaded into the database already.

To resolve system crashes using WinDbg, you need the following:

1. a PC with 25m bytes of hard-disk space, a live internet connection and Microsoft internet Explorer 5.0 or later.
2. a PC running Window Server 2003, Window 2000 or Windows XP.
3. the latest version of WinDbg.
4. a memory dump (the page file must be on C: for Windows to save the memory dump file).

The memory dump is a snapshot of what the system had in memory when it crash

Conclusions

In this work, the design and implementation of Secondary School Management System was create to drastically reduce the stress of paper work involved in managing a secondary school using Visual Studio 2013. Csharp (C#) Programming language for its development and SQLSERVER for its database

Relevant literatures to this type of system were review and information gathered were analyse put into effective use during the course of this project development. The developed application platform and the Secondary School Management System created and implemented on a stand-alone system. The system also tested on a local server to confirm its effectiveness.

The development of Secondary School Management System makes it possible for school administrators and teachers to collect and manage student without going through the stress of rigorous paper work, which leads to loss, damage or alterations of any kind from unauthorised people any time. Secondary School Management System helps remove the fear of data loss as a reliable and secure database system. There is security in the system as there is monitoring from the administrator since only registered users can use the special functionalities offered on the GUI and no user will have access to more than his/her account.

Recommendation

1. Individuals, institutions of learning and corporate bodies should be encouraging to employ or adopt the technology so that relevant information can be getting with ease and secured reliably.

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APPENDIX A Results Display

NAME: Muhammed Hammed.		REGISTRATION ID: UBE 0005				SEX: Male								
CLASS: JS1 H														
NO IN CLASS: 41		TERMLY PERCENTAGE(%): 54.3				CLASS POSITION: 25th								
PART A: Performance in Subjects														
SUBJECTS	C. A. 1 (15)	C. A. 2 (15)	EXAM SCORE (70)	TOTAL (100)	CLASS AVERAGE	CLASS HIGHEST	CLASS LOWEST	POSITION	GRADE	FIRST TERM SCORE	SECOND TERM SCORE	YEAR AVERAGE	YEAR POSITION	Remark
English Language	10.0	10.0	38.0	58.0	56.6	74.0	26.0	16th	C		54.0	56.0	29 th	Credit
Mathematics	4.0	7.0	38.0	49.0	67.7	90.0	25.0	38th	P		51.0	50.0	39th	Pass
French	13.0	13.0	30.0	56.0	54.5	79.0	33.0	17th	C			56.0	27th	Credit
Yoruba	5.0	5.0	36.0	46.0	46.6	78.0	14.0	18th	P		56.0	51.0	26th	Pass
Business Studies	9.0	7.0	40.0	56.0	60.7	90.0	32.0	29th	C			56.0	30th	Credit
Cultural And	11.0	11.0	46.0	68.0	68.7	93.0	29.0	24th	C			68.0	17th	Credit

Creative Art														
Pre-Vocational Studies	6.5	9.5	50.0	66.0	67.1	90.0	23.0	25th	C		19.0	42.5	38th	Credit
Basic Science & Technology	5.0	5.0	36.0	46.0	44.7	72.0	14.0	17th	P		64.0	55.0	22nd	Pass
(GRADE: A = DISTINCTION, C = CREDIT, P = PASS, F = FAIL)														
PART B: Behaviour and Physical Abilities														
BEHAVIOUR AND ACTIVITIES	RATINGS		BEHAVIOUR AND ACTIVITIES	RATINGS		BEHAVIOUR AND ACTIVITIES	RATINGS				BEHAVIOUR AND ACTIVITIES	RATINGS		
Punctuality	Very Good		Relationship with students	Good		Attitude to Property	Good				Clubs & Societies	Good		
Class Attendance	Very Good		Attentiveness	Good		Games & Sports	Good				Manual Skill	Good		
Carrying out Assignment	Good		Initiative	Good		Handwriting	Good							
Neatness	Good		Emotional Stability	Good										
Politeness	Good		Attitude to Study	Good										
Relationship with staff	Good		Attitude to School	Good										
<p>No of Days School Open: 114 No of Days Present: 114 No of Days Absent: 0</p> <p>Form Master's Comments: A responsible and well behaved boy.</p> <p>House Master's Comments: Satisfactory</p> <p>Next term Commences: 13th September, 2016</p> <p>Principal's Comments: A fairly good result but you need to work harder. Promoted</p> <p>Principal's Signature: Closing Date: 17th June, 2016.</p>														

Figure 3: Junior Students Report Sheet