College Aptitude Test Simple Checker (Version 2)

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Abstract – *All enrolees of the Cagayan State University are required to take the College Aptitude Test (CAT). The CAT result serves as a basis for recommendation and admission to a specific course or field of specialization, thus, result must be accurate. The study aimed to develop a computerized College Aptitude Test (CAT) Simple Checker of Cagayan State University – Lasam Campus to facilitate and to reduce the time of the guidance counsellor in checking many aptitude test papers as well as to ensure accuracy of result. It followed the framework of Design Science Research in Information Systems which consists of six steps such as problem identification and motivation, definition of objectives for a solution based on the identified problem, design and development of the system, demonstration of the system to the guidance counsellor, evaluation of the system's functionality and impact and communication which involves documentation and publication. A combination of Visual Basic 6 as the programming language and SQL Server 2005 as the Database Management System (DBMS) were used in the development of the system. As a result, the system provides support to the guidance counsellor in performing the assigned tasks by reducing the time consumed in checking aptitude test papers that makes the guidance counsellor more effective, efficient and productive.*

Keywords – *College Aptitude Test, Computerized Checker, Design Science Research, Guidance and Counselling*

INTRODUCTION

Aptitude tests or ability tests are used to predict students' future performance in a new situation or setting. They measure students' potential capacity or ability to learn or acquire knowledge and skills when given an opportunity. As such, they are designed to predict students' future learning, behavioral, or performance outcomes. However, because it is impossible to isolate aptitude from past learning experiences, aptitude tests may indirectly measure what has been learned as well as what can be learned. Likewise, aptitude tests aim to measure specific kinds of abilities across a wide range of academic and occupational fields. Among the most commonly used aptitude tests are those measuring verbal, mathematical, spatial, mechanical, and clerical aptitudes or abilities [1]. In addition, Macklem [2] said that aptitude tests measure a student's overall performance across a broad range of mental capabilities. But aptitude tests also often include items which measure more specialized abilities such as verbal and numerical skills that predict scholastic performance in educational programs.

Cagayan State University (CSU) requires all incoming freshmen to take aptitude test. The test is conducted before the semester starts through the assistance of the guidance counsellor. The result of the test is use to determine the field of specialization that could best fit to the students' abilities. The test has a total of 160 items equally distributed in four categories such as Language Usage, Verbal Reasoning, Numerical Reasoning and Abstract Reasoning. Scores are analysed through Stanine Scaling Method.

CSU has a collective total of 40,324 enrolees (887 from Lasam Campus) during the first semester of school year 2014-2015 from the eight campuses and all of them took the aptitude test. Checking of aptitude test papers using manual process consumes time, likewise, accuracy is not guaranteed.

The study aims to develop a computerized College Aptitude Test (CAT) Simple Checker of CSU particularly at Lasam Campus to facilitate and make the checking of aptitude test faster with accuracy. Likewise, to reduce the time of the guidance counsellor in checking many test papers. The result of

the study could make the guidance counsellor more effective, efficient and productive. Moreover, the system would be beneficial to the institution by providing accurate CAT result that could increase the institution's integrity and could build the confidence and trust of its clients. CSU as a higher educational institution would not also be left behind in terms of new and improved technology by adopting the computerized College Aptitude Test (CAT) Simple Checker. In addition to this, the system envisions to deliver a prompt and quality service to the clients.

Conceptual Framework

The study is guided with the Input-Process-Output (IPO) model to design and develop a computerized CAT Simple Checker that enables the users to enter data, process data, produce information, and store them in a database.

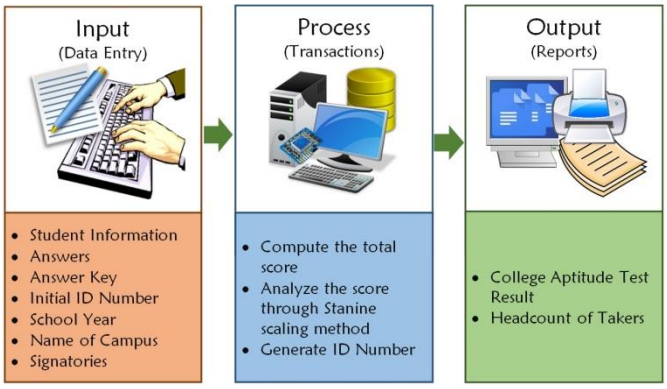


Figure 1. The Conceptual Model

OBJECTIVES OF THE STUDY

The general objective of the study is to develop a computerized easy-to-use CAT Simple Checker based on the status of the existing manual process. Specifically, the study aims to replace the manual or traditional process in checking of test papers, reduce the time in checking of test papers, ensure the accuracy of test results, and eliminate duplicate Student ID number in the entire university.

MATERIALS AND METHODS

Research Design

The researcher used the Design Science Research (DSR) in Information Systems (IS) to properly address the needed requirements in the development and completion of the College Aptitude Test Simple Checker. According to Vaishnavani and Keuchler [3], DSR is yet another "lens" or set of synthetic and analytical techniques and perspectives for performing research in IS. It involves the creation of new knowledge through design of novel or innovative artifacts (things or processes) and analysis of the use and/or performance of such artifacts (algorithms, human and computer interfaces, and system design methodologies and languages) along with reflection and abstraction in order to improve and understand the behaviour of aspects of Information Systems. Hevner et al [4], mentioned that DSR requires the creation of an innovative, purposeful artifact to address an important organizational problem. It must be described effectively, enabling its implementation and application in an appropriate domain. Peffers [5] added that DSR is a process model consisting of six steps such as problem identification and motivation, definition of the objectives for a solution, design and development, demonstration, evaluation, and communication.

As such, the researcher applied the different steps as follows: first, the researcher identified the problems of the guidance counsellor in checking the aptitude test papers through series of interview. The guidance counsellor is the sole informant of the study because the aforementioned employee is the only employee who administers the aptitude test; second, the researcher defined the objective of the study based on the problems identified and that is to develop a computerized CAT Simple Checker to support the checking of aptitude test papers; third, the researcher analysed the requirements based on the identified problems and the objective, then created the design of the desired interface and functionality of the system which involves the creation of the operational framework and program structure. Based on the created design, the researcher developed each feature of the system which involves programming and preliminary testing, and integrated all the features for testing and for deployment; fourth, the researcher deployed the CAT Simple Checker for production or use which involves end-user training and support. Further, it involves experiment or testing and series of modifications to minimize or eliminate unfavourable impacts. The researcher compared the result of the system and the result of the previously checked test papers; fifth, the researcher interviewed the guidance counsellor regarding the functionality and impact of the CAT Simple Checker to evaluate if it meets the requirements and the objective of the study especially in reducing the time consumed in checking test papers; lastly, the researcher makes the availability of this paper to present the problem and its importance, the CAT Simple Checker as the artifact, its

effectiveness, innovation, design and its success to the researcher and other interested individuals such as practicing professionals. Moreover, the researcher deposited the artifact in the National Library of the Philippines to give him legal protection and rights to the artifact as his original work.

Operational Framework

The system is intended only for a single user. Accessing the system requires password to control unauthorized users. All features are accessible to the authorized user.

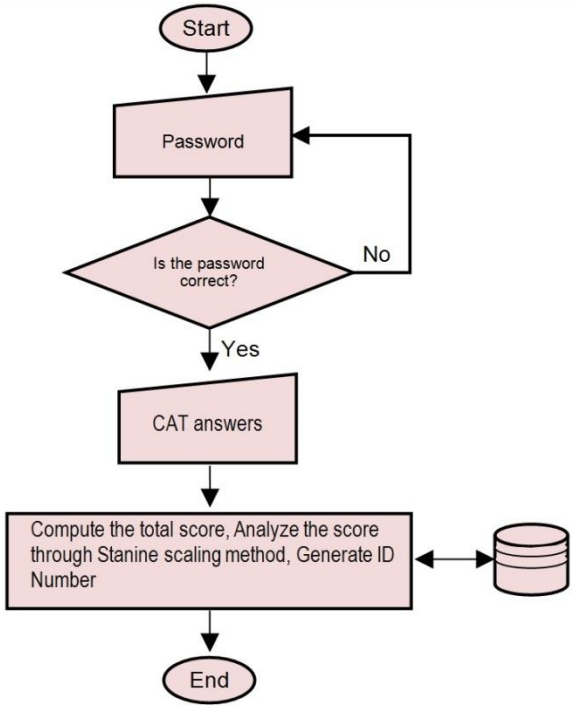


Figure 2. Operational Flowchart

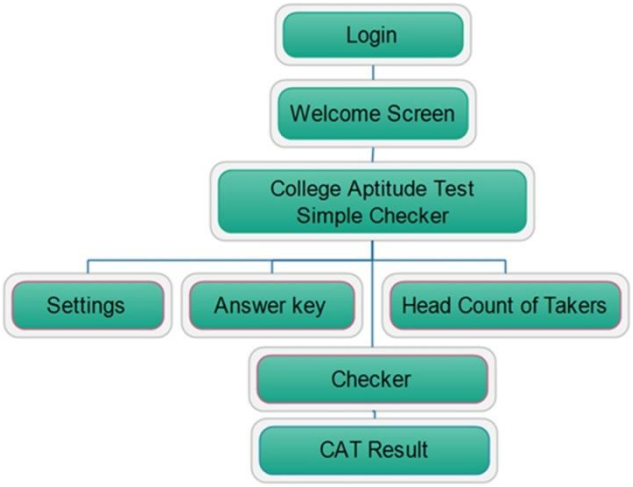


Figure 3. Program Structure

Hardware Components

a. *Computer*. This is use to manipulate the system. Windows 7 or higher with 32-bit OS with 4 GB RAM was used in the study but older version of Windows with lower specifications can also be utilized.
b. *Non-impact printers*. These are printers that use ink instead of ribbon to print characters on the paper. This is use to print CAT result. Any printer of this kind can be used.

Software Components

a. *Visual Basic 6 (VB6)*. The researcher used Visual Basic 6 as the programming language in developing the front-end of the system for its known features and capabilities. Shelly et. al [6] defined Visual Basic Programming version 6 as a tool that allows you to create software applications for Windows operating system which incorporates a set of software technologies called ActiveX that allows the creation, integration, and reuse of software components called controls. Pepito [7] added that VB6 is use to develop computer games and utilities, information systems, computer-aided instruction (CAI), multimedia powered application, and as a front-end business application system for back-end database servers such as SQL Server. Santoro et. al [8] also mentioned that VB6 provides a graphical environment in which you visually design the forms and controls that become the building blocks of your applications. Moreover, he added that VB supports many useful tools that will help you be more productive. These includes but not limited to, projects, forms, class objects, templates, custom controls, add-ins, and database managers which can be used to create complete applications in months, weeks, or even days.
b. *SQL Server 2005*. The researcher used SQL Server 2005 software as the Database Management System (DBMS) in developing the back-end of the system because of its benefits and functionality. It is a relational database management system, or RDBMS, that supports a wide variety of transaction processing, business intelligence and analytics applications in corporate IT environments [9]. According to Dumler [10], SQL Server 2005 provides an integrated data management and analysis solution that will help organizations of any size to build,

deploy, and manage enterprise applications that are more secure, scalable, and reliable; maximize Information Technology productivity by reducing the complexity of building, deploying, and managing database applications; share data across multiple platforms, applications, and devices to make it easier to connect internal and external systems; and control costs without sacrificing performance, availability, scalability, or security.

Software Migration Method

In deploying the system for use, the researcher applied the Direct Rollout software migration method. Because the system has been tested, the manual system was totally removed and replaced by the CAT Simple Checker.

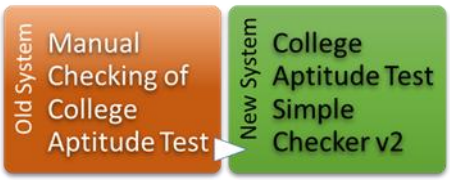


Figure 4. Direct Rollout Migration Method

Measures

The researcher used interview guide in identifying the problems of the guidance counsellor. Results from the interview were used to identify the features and functionality of the system. It was also used after deployment to get feedback from the guidance counsellor regarding the functionality and impact of the system.

RESULTS AND DISCUSSION

The following figures show the features, design and the Graphical User Interface (GUI) of the system.

The features of the College Aptitude Test Simple Checker

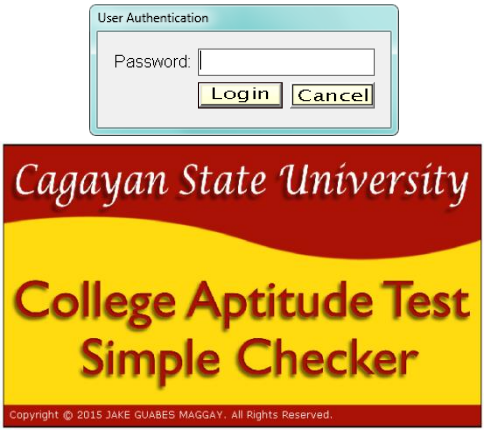


Figure 5. Login Form and Welcome Screen

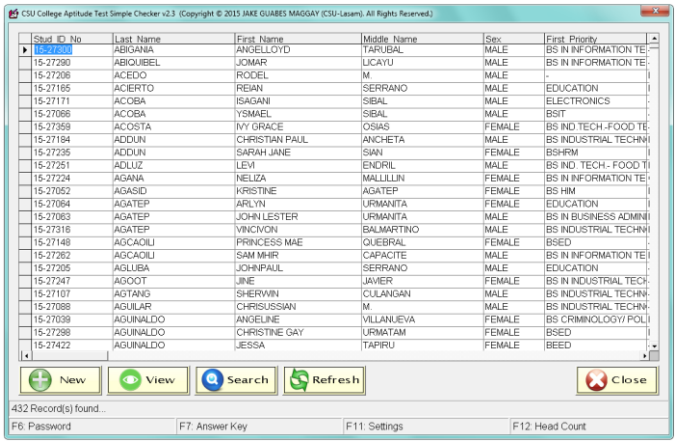


Figure 6. Main Window

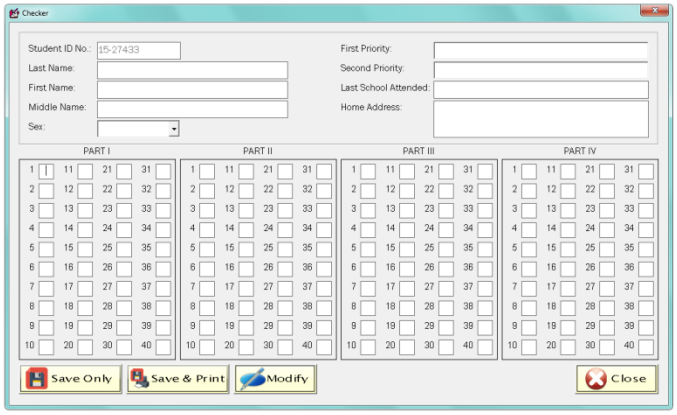


Figure 7. Checker Form

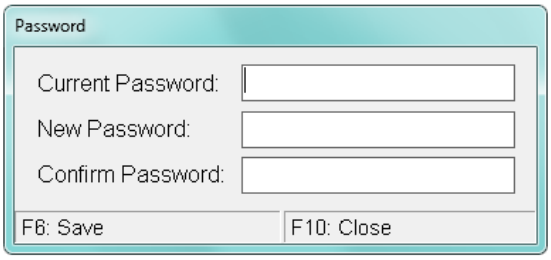


Figure 8. Form for changing of password

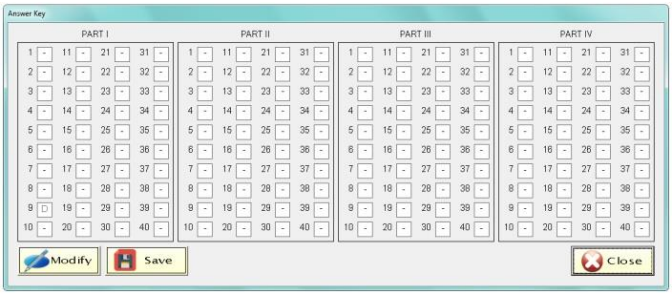


Figure 9. Form for Answer Key

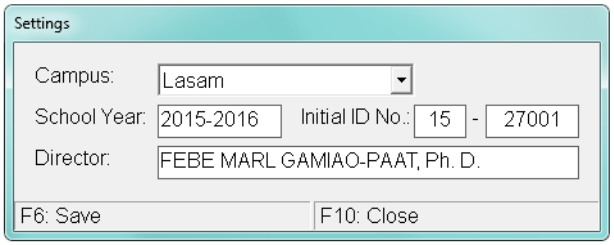


Figure 10. Settings

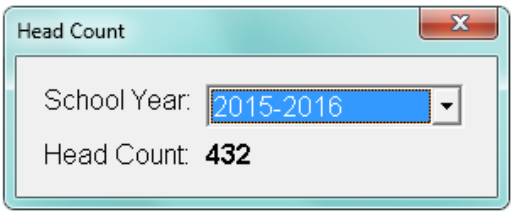


Figure 11. Form for Head Count

Before anybody can use the system, a password is required. A message box will appear if an invalid password is entered in the login form (Figure 12); otherwise, the main window will appear (Figure 6). The user can also change the password but the current stored password is required for verification purposes (Figure 8).

Figure 12. Login form and Message Box

The system will automatically generate ID number of the first student or taker based on the initial value entered by the guidance counsellor in every school year (Figure 10). The succeeding students or takers to be entered will be based on the last stored ID number (Figure 7). This feature ensures that there will be no duplicated ID number in the entire university.

The Checker Form will accept the basic information of students including their first and second priority courses to be taken for the guidance counsellor to give suggestions based on the result of the aptitude test. Likewise, it will accept the answers of the students to be checked (Figure 13) and allows the guidance counsellor to save and print the CAT Result. The system will compare the answer of the student to the stored answer key and will automatically analysed the result of each category using the Stanine scaling method (Figure 14). Furthermore, the system can count the number of takers in a specific school year for reporting and decision making purposes especially in hiring of faculty members (Figure 11).

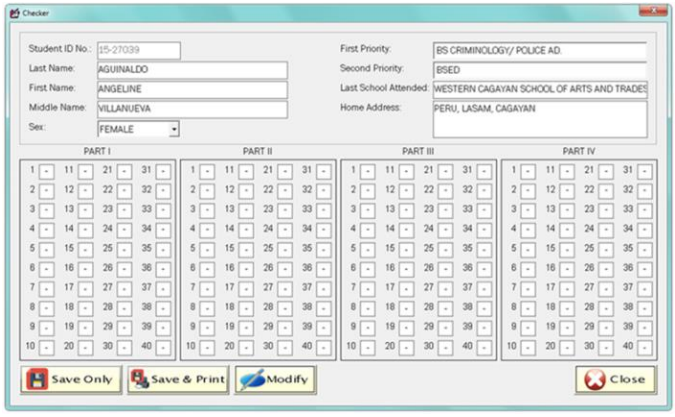
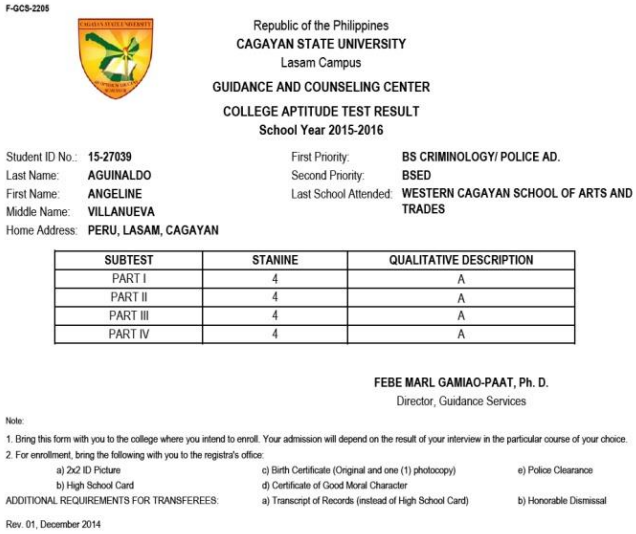


Figure 13. Checker Form with basic student information



F-GCS-2205

Republic of the Philippines
CAGAYAN STATE UNIVERSITY
Lasam Campus
GUIDANCE AND COUNSELING CENTER
COLLEGE APTITUDE TEST RESULT
School Year 2015-2016

Student ID No.: 15-27039
Last Name: AGUINALDO
First Name: ANGELINE
Middle Name: VILLANUEVA
Home Address: PERU, LASAM, CAGAYAN

First Priority: BS CRIMINOLOGY/ POLICE AD.
Second Priority: BSED
Last School Attended: WESTERN CAGAYAN SCHOOL OF ARTS AND TRADES

SUBTEST	STANINE	QUALITATIVE DESCRIPTION
PART I	4	A
PART II	4	A
PART III	4	A
PART IV	4	A

FEBE MARL GAMIAO-PAAT, Ph. D.
Director, Guidance Services

Note:
1. Bring this form with you to the college where you intend to enroll. Your admission will depend on the result of your interview in the particular course of your choice.
2. For enrollment, bring the following with you to the registra's office:
a) 2x2 ID Picture
b) High School Card
c) Birth Certificate (Original and one (1) photocopy)
d) Certificate of Good Moral Character
e) Police Clearance
ADDITIONAL REQUIREMENTS FOR TRANSFEREES:
a) Transcript of Records (instead of High School Card)
b) Honorable Dismissal

Rev. 01, December 2014

Figure 14. Sample CAT Result

Currently, the Cagayan State University particularly at Lasam Campus is using the developed system and totally replaced the manual process. Furthermore, the system reduced the time in checking of test papers from 5 to 6 minutes to 2 to 3 minutes which makes the guidance counsellor more effective, efficient and productive. Moreover, the system produces accurate result based on the printed output.

CONCLUSION AND RECOMMENDATION

The Cagayan State University – Lasam Campus is currently using the CAT Simple Checker and basically, it has many advantages. It facilitates and makes the checking of aptitude test faster with accuracy. Likewise, the time consumed in checking of

test papers was reduced which makes the guidance counsellor more effective, efficient and productive. Student ID number can no longer be duplicated. Furthermore, the system delivers a prompt and quality service to the clients.

The CAT Simple Checker has been successfully developed and deployed. However, it can be improved to have better and more advance application. For future improvement, the system should use or integrate an authenticated answer sheet and a scanner machine to have more accurate and reliable output. Likewise, the system should also be adopted by other campuses of the university because the other 7 campuses are still using the manual process. Moreover, the CAT Simple Checker is really helpful to the guidance counsellor, hence, the researcher highly recommends that the system should be maintained and sustained.

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