Philippine Journal of Interdisciplinary Research (PJIR)
Volume I, Issue 1 (January 2025)

An Innovative Test Generation and Scoring System for Accountancy and Business Management Courses

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Received: 28 Mar 2023; Accepted 11 May 2023; Available online: 08 October 2024

Abstract. Educators have an ever-increasing number of accountabilities, some of which are testing and test scoring. And to speed-up the assessment processes, institutions of higher learning approve the use of technology-propelled assessments. To minimize the adverse effects of computer-based assessments, one of which is a high Internet cost - the proponents of this paper introduce a system of test generation and test scoring for Accountancy and Management courses without being online. The Agile Extreme Programming software development methodology has been utilized in this project, which is an Excel-based system. Moreover, the respondents of the study shall answer a five-point Likert Scale based on the software quality evaluation tool articulated in ISO 25010. During the pilot implementation of the system in a select institution of higher learning, user acceptance testing has been conducted. By user acceptance testing, a very satisfactory result has been attained. The system developed by the proponents is not applicable for essay and identification types of questions. Thus, the said system may be enhanced to add value to the software. The possible monetization of the system may also be carefully studied.

Keywords: *test generation, scoring system, Agile Extreme Programming, ISO 25010, monetization*

INTRODUCTION

Educators have an ever-increasing number of accountability, some of which are testing and test scoring. And as a result of these inevitable tasks, diminishing job satisfaction, and burnout have become apparent (Smith & Holloway, 2020). In another aspect, the COVID-19 pandemic prompted leaning institutions to embrace virtual learning. Such circumstance intensified further the anxiety, not only of the students, but the academicians, as well (Daniel, 2020).

Beyond a doubt, the construction of test questions is challenging, an intricate undertaking (Kurdi et al., 2019). Therefore, to speed-up the assessment processes, institutions of higher learning approve the use of technology-propelled assessments (Pillai et al., 2021). Though a computer-based assessment expedites tasks, this type of assessment requires access to the Internet (Kharbat & Abu Daabes, 2021). And speaking of online learning, one of the studies conducted in the Philippines reveals that high Internet cost is one of the major challenges during the pandemic (Barrot et al., 2021).

This applied research aims to significantly reduce (if not to totally eliminate) the reliance on the Internet with respect to test generation and test scoring. The proponents of this paper introduce a system of test generation and test scoring for Accountancy and Management courses without being online. The type of question that may be generated and the corresponding test result to be measured is limited to multiple choice.

METHODOLOGY

The Agile Extreme Programming (XP) software development methodology has been utilized to develop the said test generation and scoring system; and it is an Excel-based system. To wit, the Agile software development methodology gained a relative popularity because it lessens the effect of recurrently varying requirements during the course of software development (Biju, 1970).

Moreover, the respondents of the study shall answer a five-point Likert Scale based on the evaluation tool of ISO 25010, which is the basis of a software product quality evaluation system (Molnar et al., 1970).

Requirements, Logical and Other Specifications

The application discussed in this paper is basically Excel-based. To work offline, the entire system may be stored inside the USB drive and then send and install the same to the recipients' personal computers and/or mobile devices with Excel application. The examiner may opt to send the system through email. The figure shown next depicts the data flow diagram of the system.

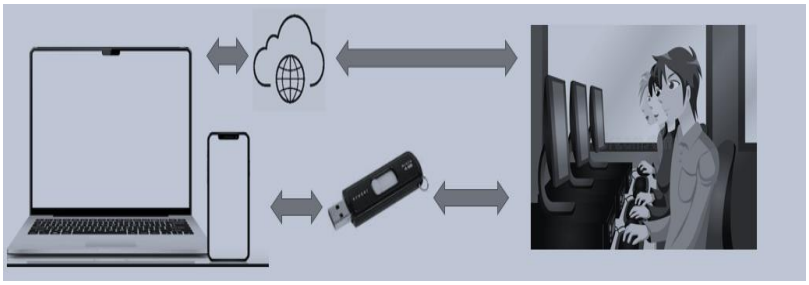

Figure 1. *Data Flow Diagram for the Test Generation and Scoring System*

Figure 1, represents personal computers and/or mobile devices (with Excel application), which may be used to transfer the system from the examiner to the examinees.

Also, the following supplementary minimum specifications are essential for the system to become operational: processor [Pentium of one *Gigahertz*], Random Access Memory [two gigabytes], hard disk space of three gigabytes, display [32-bit, 800 x 1280].

RESULTS AND DISCUSSION

The system's graphical user interface (Figure 2) depicts two modules which are visible to the examinees. The other two modules are hidden but the same are disclosed to the examiner.

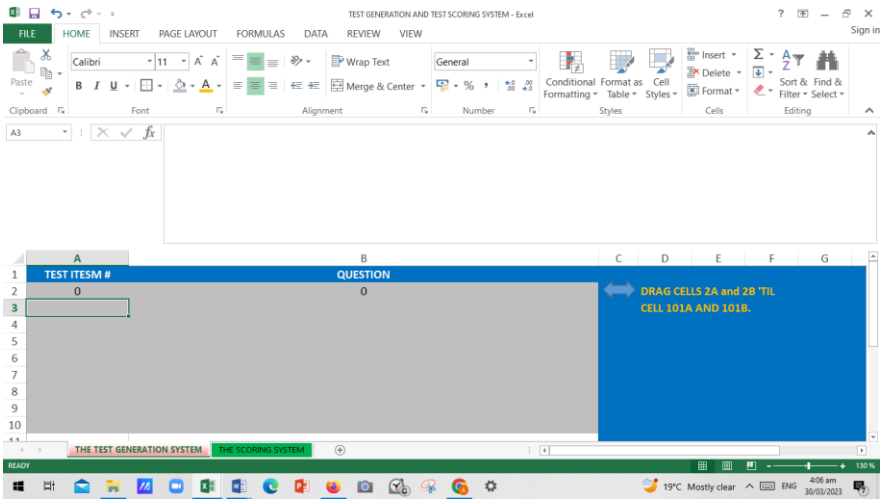

Figure 2. *Graphical User Interface of the Test Generation and Scoring System*

The test generation module shows the examination questions previously encoded by the examiner in another module which is concealed. The second module represents the answer sheet of the examinee. The scoring system is similarly hidden to the examinees; the same shall be revealed only upon submission of the Excel system to the examiner.

On the other hand, the table presented next depicts the result of the system's evaluation in terms of product quality.

Table 1. *Mean Scores-Using the ISO 25010 Standard*

Criteria of Software Product Quality	Mean
Functional Suitability	4.47
Performance Efficiency	3.13
Compatibility	4.02
Usability	4.95
Reliability	4.97
Security	3.91
Maintainability	4.90
Portability	4.61

During the pilot implementation of the system in a select institution of higher learning, user acceptance testing has been conducted. In user acceptance testing, system users provide feedback about the hidden problems that may arise therefrom (Poston et al., 1970). Based on the responses, a grand mean of 4.37 (very satisfactory) has been obtained. The respondents consisted of forty BS in Accountancy students across all year levels, seventy-

seven BS in Business Administration (from year level one to four), four CPA faculty members, one faculty from the BSBA program, the dean of the Institute of Business, and two information technology experts.

Conclusions and Recommendations

By user acceptance testing, a very satisfactory result has been attained. It is also apparent that two software quality metrics obtained a satisfactory result, and these are the aspects concerning performance efficiency and security. The implementation of the test generation and scoring system shall expedite the creation of examinations and test scoring even in the absence of Internet connection.

Implications for Future Research

The system developed by the proponents is not applicable for essay and identification types of questions. Thus, the said system may be enhanced to add value to the software. The possible monetization of the system may also be carefully studied.

Conflicts of Interest and Funding

The proponents of this research attest that conflicts of interest do not exist. Likewise, funding for this undertaking has never been sought.

Ethical Considerations

All plausible ethical concerns have had been considered, plus a consent form has been adopted.

REFERENCES

Barrot, J. S., Llenares, I. I., & del Rosario, L. S. (2021). *Students' online learning challenges during the pandemic and how they cope with them: The case of the Philippines - education and Information Technologies*. SpringerLink. Retrieved March 21, 2023, from https://link.springer.com/article/10.1007/s10639-021-10589-x

Biju, S. M. (1970). *Agile software development methods and its advantages*. SpringerLink. Retrieved March 22, 2023, from https://link.springer.com/chapter/10.1007/978-90-481-9151-2_105

Daniel, S. J. (2020). *Education and the COVID-19 pandemic - prospects*. SpringerLink. Retrieved March 20, 2023, from https://link.springer.com/article/10.1007/s11125-020-09464-3

ISO 25000 Portal. iso25000.com. (n.d.). Retrieved March 22, 2023, from https://iso25000.com/index.php/en/iso-25000-standards/iso-25010/

Kharbat, F. F., & Abu Daabes, A. S. (2021). *E-proctored exams during the COVID-19 pandemic: A close understanding - education and Information Technologies*. SpringerLink. Retrieved March 21, 2023, from https://link.springer.com/article/10.1007/s10639-021-10458-7

Kurdi, G., Leo, J., Parsia, B., Sattler, U., & Al-Emari, S. (2019). *A systematic review of automatic question generation for educational purposes - International Journal of Artificial Intelligence in Education*. SpringerLink. Retrieved March 21, 2023, from https://link.springer.com/article/10.1007/s40593-019-00186-y

Molnar, A.-J., Neamţu, A., & Motogna, S. (1970, January 1). *Evaluation of software product quality metrics*. SpringerLink. Retrieved March 30, 2023, from https://link.springer.com/chapter/10.1007/978-3-030-40223-5_8

Pillai, K. R., Upadhyaya, P., Prakash, A. V., Ramaprasad, B. S., Mukesh, H. V., & Pai, Y. (2021). *End-user satisfaction of technology-enabled assessment in Higher Education: A coping theory perspective - education and Information Technologies*. SpringerLink. Retrieved March 21, 2023, from https://link.springer.com/article/10.1007/s10639-020-10401-2

Poston, R., Sajja, K., & Calvert, A. (197). *Managing user acceptance testing of Business Applications*. SpringerLink. Retrieved March 22, 2023, from https://link.springer.com/chapter/10.1007/978-3-319-07293-7_9

Smith, W. C., & Holloway, J. (2020). *School testing culture and teacher satisfaction - educational assessment, evaluation and accountability*. SpringerLink. Retrieved March 20, 2023, from https://link.springer.com/article/10.1007/s11092-020-09342-8