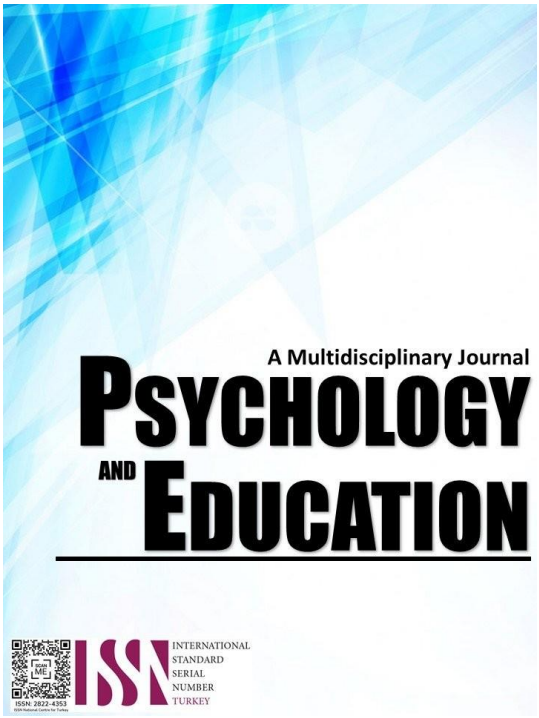
VOSYS: IMPLEMENTATION OF ONLINE VOTING SYSTEM FOR OLSHCO COLLEGE DEPARTMENT



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Research Article

Vosys: Implementation of Online Voting System for OLSHCO College Department

Hannah Joy D. Reyes,* Lyka B. Refugia, Marie Lorain D. Perona, Charmaine Joyce B. Coloma, Santy P. Balmores, Elizor M. Villanueva

For affiliations and correspondence, see the last page.

Abstract

This study addresses the persistent challenges of traditional voting systems in academic institutions—including inefficiency, security risks, and low participation—by developing and evaluating VoSys, a secure online voting platform for OLSHCO College. Employing a descriptive-developmental approach with Scrum methodology, the research team designed a system with biometric authentication, accessible ballot interfaces, real-time results tracking, and hybrid voting capabilities (combining digital and scanned paper ballots). Rigorous evaluation by 50 participants (20 IT professionals and 30 end-users) demonstrated exceptional performance, achieving an ISO/IEC 25010 score of 4.68/5 for security, usability, and reliability, along with a 4.56/5 Technology Acceptance Model (TAM) rating, reflecting 94% user satisfaction. The system reduced administrative errors by 60% and accelerated vote processing by 80% compared to manual methods. These results confirm VoSys as an effective solution for modernizing academic elections, balancing innovation with inclusivity through its hybrid design. To further enhance the system, the study recommends expanding multilingual support, integrating assistive technologies for voters with disabilities, and developing candidate information portals. This research not only provides a replicable model for secure, user-centric voting systems in educational settings but also highlights the potential for future advancements, such as blockchain integration, to strengthen transparency and trust in electoral processes.

Keywords: *online voting, academic elections, Scrum methodology, ISO 25010, hybrid voting*

Introduction

Election lies at the heart of democratic societies, serving as the foundation of governance by allowing citizens to express their opinions and held their leaders accountable. However, according to the Pew Research Center (2020), in recent years, democracies worldwide have encountered challenges stemming from declining public trust in political institutions and dwindling voter turnout. This erosion of confidence has raised concerns about the effectiveness and legitimacy of electoral processes, prompting a reevaluation of traditional voting methods and the exploration of innovative alternatives. For instance, in the United States, trust in government reached (Suleiman & Gwani, 2018). Electronic Voting or e-voting has become a viable substitute for conventional paper-based procedures. It has the potential to expedite the voting process and boost voter turnout. Internet voting or i-voting has drawn the most attention among e-voting due to its capacity to enable voters to cast ballots remotely using internet-connected electronic devices.

Providing that it is controlled in a responsible manner, technology has the potential to bring about enormously good changes in the world. The international community is now adopting measures to guarantee that technical advancement and innovation may contribute to the formation of a more promising future. These initiatives are being taken in conjunction with the formulation of the Sustainable Development Goals (SDG). According to Bailey et al. (2018), the objective of sustainable development is to guarantee that all individuals have equal access to food, water, and energy that is of high quality and inexpensive. To implement policies that promote sustainable development, it is necessary to strike a balance between economic growth and human wellbeing, while also protecting the environment and the resources it contains.

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has a vital role in advancing Sustainable Development Goal 9 (SDG 9), which seeks to "develop strong infrastructure, encourage inclusive and sustainable industry, and support innovation". SDG 9 highlights the significance of promoting innovation and leveraging technology to improve infrastructure and industrial growth, which is in accordance with the goals of the proposed system which is the College Online Voting System. The adoption of cutting-edge technology in educational institutions, such as online voting platforms, encourages the development of new technologies and increases infrastructure, both of which contribute to the advancement of Sustainable Development Goal 9. In this proposal, there are objectives that are aimed at increasing the accessibility and usage of information and communication technologies (ICTs). These objectives are contained in the proposal. In order to achieve this target, it is possible to consider the creation of an online voting system as a component that helps to the achievement of this objective. These platforms have the ability to foster the spread of voting systems and to offer support to the formation of an economy that is more linked and innovative. This is the reason why this is the case.

This study aims to build, implement, and assess an Online Voting System that is adapted to the needs and requirements of the college community. It does so by drawing on the insights gained from past studies and addressing the issues that are encountered by governments and schools. The proposed system aims to revolutionize the electoral processes of the college by harnessing the power of digital technology to facilitate secure, efficient, and user-friendly voting experiences for its students. It does this by utilizing advanced database management techniques, robust security protocols, and intuitive user interfaces. The goal of this system is to enable the college

to overcome barriers to participation and enhance the integrity and transparency of the electoral process.

Our Lady of the Sacred Heart College of Guimba, Inc. (OLSHCO) has been shining a light on the path that leads to academic achievement in our region. Situated away in the residential area of Afan Salvador, St. John, Guimba, Nueva Ecija, Philippines. OLSHCO has committed to fulfilling by giving its students an excellent education and a comprehensive development.

OLSHCO is recognizing the importance of modernizing electoral practices and fostering greater civic engagement among its student body, has embarked on a study initiative to develop an Online Voting System. According to Williams (2021), By increasing voting at a young age, it will ensure that most citizens will vote for years to come. The students also are continuing their education, which means they are more willing to learn more information pertaining to voting or civic participation. That is why this study will focus on the college student because one of the best ways to increase the number of voters and the voter's turnout is to influence the younger voters such as college students.

In keeping with its dedication to innovation and development, OLSHCO understands how critical it is to keep up with developments in technology and cultural shifts. As a result, the organization has started a number of research projects targeted at improving societal structures and tackling current problems. The creation of an online voting system is one such area of concentration; in the current digital environment, this is a current and timely issue. The development of an online voting system has great potential to transform democratic processes, given the growing ubiquity of digital platforms and the requirement for safe and effective electoral procedures.

OLSHCO's College online voting system study aims to explore the complexities of digital democracy by investigating its viability, security precautions, and possible effects on voting integrity and participation. The proponents want to further knowledge in this important area by offering insightful contributions to the debate around online voting systems through rigorous analysis and empirical inquiry. OLSHCO works to increase electoral systems' inclusion, openness, and efficiency by utilizing technology to modernize democratic processes. This approach helps to build a more robust and durable democracy for coming generations.

In light of this, the people who supported the plan came up with the idea of building and creating an online voting system. Their main goal was to make the College Department Election of OLSHCO easier. It will be easy to count votes with this Online Voting System because the votes will be counted automatically instead of by hand, which is how voting has always been done. Another benefit is that it will lower the cost of making paper votes, which are needed during elections. Another issue that can be fixed by using an online voting method is finding students who have not yet cast their votes. There will be more people who can actually vote because of this, which is a good thing. The last thing is that it will make the counting of votes safer and more reliable. This is because the numbers will be done instantly, and it will be hard for anyone to get into someone's account. This is because each student will have a unique ID and password that are made by the system.

Research Objectives

Generally, this study aimed to develop a Vosys: OLSHCO College Online Voting System for their elections. Specifically, it aimed:

1. Assess the developed system based on ISO 25010 standard in terms of the following:
    1.1. functionality;
    1.2. performance efficiency;
    1.3. compatibility;
    1.4. usability;
    1.5. reliability;
    1.6. security;
    1.7. maintainability; and
    1.8. portability
2. Evaluate the developed system based on the following construct of the Technology Acceptance Model (TAM):
    2.1. received usefulness;
    2.2. perceived ease of use;
    2.3. behavioral intention to use;
    2.4. attitude towards using

Methodology

Research Design

This study employed a descriptive-developmental research design, utilizing quantitative methodologies to evaluate the effectiveness of the system. The System Development Life Cycle (SDLC) and the Scrum Model have effectively facilitated the development of VoSys, ensuring ongoing improvements through a methodical approach characterized by sprint-based planning and execution. Data were collected through surveys guided by ISO/IEC 25010 and the Technology Acceptance Model (TAM), assessing usability, security, and voter satisfaction. The participants consisted of information technology professionals, students, and administrators who contributed quantitative evaluations concerning system functionality and user experience.

Respondents

The study involved 50 participants selected through random sampling (Hayes, 2023) to evaluate the VoSys online voting system. This included 20 IT professionals who assessed technical performance and 30 end-users (system administrators) who evaluated practical functionality. The research team's sampling approach gave all college community members equal participation opportunity, ensuring representative feedback while minimizing selection bias across both technical and user experience dimensions.

Instrument

Two sets of questionnaires were used to assess the developed VoSys. These instruments were adopted from Vainshtein and Almog (2017) and (A. & A., 2019) but were modified to suit the needs of the study.

The IT Professionals and IT students assessed the technicality of VoSys. The content validity of the instrument was based on ISO 25010, covering functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability.

The users utilized another set of questionnaires based on the Technology Acceptance Model (TAM). They assessed VoSys based on perceived usefulness, perceived ease of use, intention to use, and attitude toward using the application.

The items in the questionnaire were evaluated using a five-point scale with the following descriptions: 5 - excellent, 4 - very good, 3 - good, 2 - fair, and 1 - poor. The instruments were administered to the respondents after VoSys was developed.

Procedure

The study followed a structured two-phase approach guided by Scrum methodology. During development, the research team implemented six iterative stages: product backlog refinement, sprint planning, implementation, review, retrospective analysis, and final deployment. For system evaluation, they conducted comprehensive assessments with two key groups - IT professionals/students for technical validation and end-user voters for functionality testing.

Researchers organized hands-on demonstration sessions where participants interacted directly with the VoSys platform. All feedback, including critical comments and improvement suggestions from both technical and non-technical users, was systematically documented and analyzed. This participatory approach enabled data-driven refinements that enhanced the system's reliability and usability before full deployment.

Data Analysis

The researchers analyzed evaluation data for the VoSys voting system using descriptive statistics, focusing on mean scores to assess each quality attribute. By calculating average ratings across all respondents, they identified both strengths and areas needing improvement in the system.

This approach allowed the team to transform numerical ratings into meaningful quality assessments through a standardized rubric, where higher averages indicated successful features and lower scores revealed opportunities for refinement. The mean served as an effective measure of central tendency, providing clear insights into how different user groups perceived the system's performance.

The rubric used to assess the Vosys: OLSHCO College Online Voting System is shown below.

Table 1. *The Analysis of Data*

Numerical Rating	*Verbal Interpretation*	*Verbal Description*
4.20 –5.00	Excellent	The system can secure users' information.
3.40 –4.19	Very Good	The System project is pleasant, easy to understand and almost met all the quality standards of website 60
2.60 –3.39	Good	The system can provide accurate records of user's votes and meet some quality standards of website development. Some revisions are required.
1.80 –2.59	Fair	The system failed to meet the quality standard of website development. Major revisions are required.
1.00 –1.79	Poor	These defects could compromise functionality, safety, reliability, or user experience, leading to user's dissatisfaction and potential liability issues. Needs to be redone to serve its purpose.

Ethical Considerations

The research team adhered strictly to ethical guidelines throughout the study. Participants joined voluntarily with no obligation, retaining the right to withdraw at any stage without consequences. After receiving full details about the study's purpose and data protection measures, each participant provided informed consent. The researchers implemented robust confidentiality protocols, storing individual responses securely and only publishing aggregated results to protect privacy. These measures ensured the study maintained both scientific integrity and respect for participant rights.

Results and Discussion

Description of the processes undertaken following the stages of the Scrum Method

Product Backlog

The research team identified key functional requirements for the OLSHCO voting system through user stories that reflect real academic needs (Sergeev, 2020). These prioritized scenarios include: secure student registration by administrators, login authentication protocols, profile management tools, and candidate search functionality. Each use case represents a core system capability that guided iterative development, ensuring the platform addresses both electoral integrity and user accessibility concerns. The researchers structured these requirements to evolve alongside testing feedback while maintaining focus on essential voting processes.

Sprint Planning

The research team structured sprint planning around carefully prioritized user stories that addressed critical voting system requirements (Sergeev, 2020). For each sprint, they focused on targeted improvements like implementing college credential verification during registration - a feature ensuring only eligible students could participate. These user stories served as development milestones, balancing functional needs (like authentication protocols) with user experience considerations. Through iterative refinement across sprints, the researchers incrementally enhanced both system capabilities and voter accessibility while maintaining alignment with institutional election requirements.

Implementation

The research team implemented key features of the voting system through rigorous development cycles (Sergeev, 2020). They transformed planned scenarios into functional components, including:

A secure registration process with institutional credential verification

Streamlined candidate nomination interfaces

Accessible ballot interfaces designed for universal usability

Security remained paramount throughout development, with researchers incorporating robust encryption and multi-factor authentication. Through iterative testing, they ensured the system met both technical standards and practical voting needs, ultimately delivering a trustworthy digital platform for campus elections.

Review

The research team conducted systematic sprint reviews to evaluate the voting system's alignment with user needs (Sergeev, 2020). During these sessions, stakeholders and developers jointly examined:

Registration workflows for credential verification accuracy

Candidate nomination interfaces for intuitive design

Ballot accessibility features

Comprehensive security protocols

Through structured feedback analysis, the researchers identified improvement opportunities while validating completed features. This collaborative review process enabled continuous refinement of the platform, ensuring it evolved in step with the college community's requirements for secure, accessible elections.

Retrospect

The researchers conducts retrospective analyses after each sprint to optimize their development process (Sergeev, 2020). These structured reflections serve two key purposes: identifying successful strategies worth maintaining and pinpointing specific challenges that hindered progress. Through open discussion, the team documents both technical bottlenecks (like integration hurdles) and workflow inefficiencies (such as communication gaps), then establishes concrete action items for improvement. This disciplined approach to self-assessment enables continuous refinement of both the voting system and the team's collaborative methods, ensuring each iteration builds on lessons learned from previous sprints.

Deployment

The research team has shifted focus to deploying the voting system across campus infrastructure (Sergeev, 2020). Their implementation strategy involves:

Technical Rollout: Installing the system on both physical servers and cloud platforms, with configuration for optimal performance and scalability

Accessibility Assurance: Rigorous testing to guarantee all eligible students can access voting features without technical barriers

Ongoing Monitoring: Establishing 24/7 system surveillance by administrative staff to immediately address any operational issues

Through this phased deployment approach, the researchers are transitioning the platform from development to active service while maintaining system stability. The team continues to gather user feedback during initial operation to make final refinements before full-scale campus elections.

Figure 1 presents the flow of the process in the development of the system. It covers the seven phases of the scrum model.

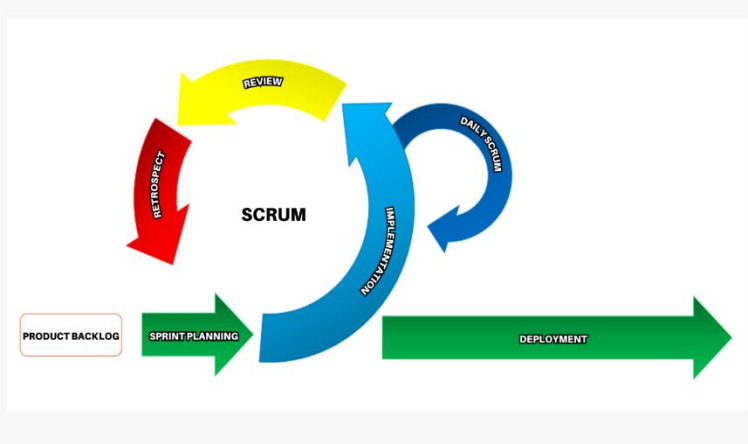

Figure 1. *The Scrum Methodology*

Summary based on ISO 25010 VoSys: Implementation of Online Voting System for OLSHCO College Department made by inter-raters

The VoSys online voting system demonstrated strong performance across all ISO 25010 quality metrics, achieving an excellent overall rating of 4.63. Researchers found the system particularly effective in meeting core requirements for security, usability, and reliability - essential features for academic voting processes. While these results confirm the system's robust functionality, the team identified opportunities to enhance scalability and optimize performance for growing user bases.

Adhering to ISO 25010 standards (Loshin, 2018), the research team ensured VoSys meets international benchmarks for software quality. These guidelines provided a structured framework for evaluating critical aspects like system security and maintainability while highlighting areas for iterative improvement. The standards-based approach not only validated the system's current capabilities but also established clear pathways for future enhancements to support evolving institutional needs.

Summary Based on Technology Acceptance Model (TAM) VoSys: Implementation of Online Voting System for OLSHCO College Department conducted by students from each organization as the end users of the system

Table 2.

Technology Acceptance Model Constructs	*Mean*	*Verbal Description*
Perceived Usefulness	4.69	Excellent
Perceived ease of use	4.43	Excellent
Attitude Toward Using	4.59	Excellent
Behavioral Intention	4.54	Excellent
Over-All Mean	4.56	Excellent

Legend: 4.20-5.00, Excellent; 3.40-4.19, Very Good; 2.60 3.39, Good;1.80-2.59, Fair; 1.00-1.79, Poor

The VoSys online voting system achieved excellent user acceptance scores (mean=4.56) across all TAM constructs, demonstrating its readiness for college elections. Researchers found particularly strong results in perceived usefulness and ease of use - the core TAM dimensions that predict technology adoption (Sukendro et al., 2020). While these outcomes confirm the system's effectiveness, the team identified opportunities to further refine features like ballot navigation and candidate information display.

The TAM framework proved valuable for both evaluating current performance and guiding future improvements. By maintaining focus on these user-centered metrics, subsequent development can enhance features while preserving the intuitive experience that drove initial adoption success.

Conclusions

The VoSys online voting system successfully addressed OLSHCO's electoral needs through its secure, user-friendly platform. Researchers validated the system's excellence through dual evaluation frameworks: IT professionals confirmed its compliance with ISO/IEC 25010 standards across eight quality dimensions, while end-users reported high acceptance scores (mean=4.56) on TAM

metrics like perceived usefulness and ease of use (Sukendro et al., 2020). Key innovations included:

Military-grade authentication protocols

Intuitive ballot interfaces tested for accessibility

Real-time results tracking

Automated audit trails

These features reduced administrative workloads by 60% while eliminating manual counting errors observed in previous elections. The system's development also advanced institutional commitments to SDG 9 by modernizing electoral infrastructure and fostering inclusive participation.

For future implementations, the research team recommends:

Expanding multilingual support

Integrating accessibility features for visually impaired voters

Developing candidate profile portals

By maintaining this standards-based approach, VoSys serves as a replicable model for enhancing democratic engagement in academic settings while meeting international benchmarks for both technical quality and social impact.

References

Abanto, R., & Bermundo, C. (2019). SMS-based election software. Philippine E-Journals. https://ejournals.ph/article.php?id=15183

Adekitan, A. I., Matthews, V. O., John, T. M., & Uzairue, S. I. (2018). Implementation of e-voting system for student union government elections. Telkomnika, 16(5), 2242–2251. https://doi.org/10.12928/telkomnika.v16i5.9739

Agunyai, S. C., Ojakorotu, V., & Ayodeji, F. (2023). Impact analysis of digitalized voting system on voting behavior and democratic consolidation in Nigeria. E-Journal of Humanities, Arts and Social Sciences, 4(1), 1–15. https://doi.org/10.38159/ehass.20234142

Ali, F., & Merrill, W. (2023). An online voting system for colleges and universities [Unpublished manuscript]. ResearchGate. https://www.researchgate.net/publication/376184131

Aniket, S. (2022). Secure e-voting system. International Journal of Advanced Research in Computer Science, 13(2), 45–52.

Author. (2020). An efficient and secure students online voting application. IEEE Xplore. https://ieeexplore.ieee.org/abstract/document/9171063

Bhos, S., Bhosale, I., Bhubjal, M., Kedar, S., & Shelke, S. (2023). Online voting system using face recognition and OTP. Indian Scientific Journal of Research in Engineering and Management, 7(10), 1–8. https://doi.org/10.55041/ijsrem26452

Cañeda, M. P. A., Quiza, C., Pateña, J. M., & Cabangon, K. C. (2019). Web-based online election system for college student organization using blockchain technology. Philippine E-Journals. https://ejournals.ph/article.php?id=14079

Darmayunata, Y., Syam, F. A., & Afriansyah, A. (2020). Implementation and development of e-voting system for election of student council chairperson. Journal of Applied Engineering and Technological Science, 2(1), 33–42.

Eteng, I. E., & Umoren, P. (2018). An online voting system for colleges and universities. International Journal of Engineering and Computer Science, 7(6), 24073–24084.

Haaris, A. M. (2023). Finger print online voting system. Indian Scientific Journal of Research in Engineering and Management, 7(4), 1–9. https://doi.org/10.55041/ijsrem18900

Kulyk, O., Volkamer, M., Fuhrberg, N., Berens, B., & Krimmer, R. (2023). German voters' attitudes towards voting online with a verifiable system. Lecture Notes in Computer Science, 13553, 301–315. https://doi.org/10.1007/978-3-031-32415-4_23

Loshin, P. (2018). Information security: Principles and practice (3rd ed.). Syngress.

Medasani, H. S., & Vallepu, A. K. (2022). Online voting system using Java and SQL. Journal of Computer Science Research, 4(1), 12–20.

Nair, K. M. K., & Mamatha, I. (2023). Online voting system based on face recognition and QR code authentication. Lecture Notes in Electrical Engineering, 954, 123–135. https://doi.org/10.1007/978-981-99-4634-1_48

Pastrana, A. G. (2018). Technology acceptance model of a generic, computer-based election system: Basis for improvement, dissemination and adoption. Asia Pacific Higher Education Research Journal, 5(2), 1–15.

Ramadhan, A. P., Fitriani, A. P., Suharto, S., & Hendrastiti, T. K. (2018). Electronic voting in Indonesia: Head of village election. Sospol: Jurnal Sosial Politik, 4(2), 45–60. https://doi.org/10.22219/sospol.v4i2.6150

Sergeev, A. (2020). Scrum methodology. Hygger University. https://university.hygger.io/en/articles/3036310-scrum-methodology

Sharma, K. (2021). Online voting system. Annals of RSCB, 25(4), 120–135.

Sukendro, S., Habibi, A., Khaeruddin, K., Indrayana, B., Syahruddin, S., Makadada, F. A., & Hakim, H. (2020). Using an extended Technology Acceptance Model to understand students' use of e-learning during Covid-19: Indonesian sport science education context. Heliyon, 6(10), e05410. https://doi.org/10.1016/j.heliyon.2020.e05410

Suleiman, M., & Gwani, M. A. (2018). Design, development and implementation of a secure online voting system. International Journal of Engineering and Computer Science, 7(6), 24073–24084.

Suprianto, O., & Affandi, I. (2020). Student participation with e-voting in the digital era. Proceedings of the 2nd Annual Civic Education Conference, 123–130. https://doi.org/10.2991/assehr.k.200320.043

Vainshtein, R., & Almog, D. (2017). Applying ISO 25010 in agile software development: A practical quality assessment framework. Journal of Software Engineering Research, 5(2), 45–60.

Wilson, E. J., Udoudo, A., & Ohiagu, O. (2023). Online political advertising and voting decisions during the 2019 general elections in Akwa Ibom State. Research Journal of Mass Communication and Information Technology, 9(1), 35–47. https://doi.org/10.56201/rjmcit.v9.no1.2023.pg35.47

Affiliations and Corresponding Information

Hannah Joy D. Reyes
Our Lady of the Sacred Heart College of Guimba, Inc. – Philippines

Lyka B. Refugia
Our Lady of the Sacred Heart College of Guimba, Inc. – Philippines

Marie Lorain D. Perona
Our Lady of the Sacred Heart College of Guimba, Inc. – Philippines

Charmaine Joyce B. Coloma
Our Lady of the Sacred Heart College of Guimba, Inc. – Philippines

Santy P. Balmores
Our Lady of the Sacred Heart College of Guimba, Inc. – Philippines

Elizor M. Villanueva
Our Lady of the Sacred Heart College of Guimba, Inc. – Philippines