

Project Monitoring and Evaluation System for SETUP

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Abstract— The Web-based Project Monitoring and Evaluation System for the Small Enterprise Technology Upgrading Program (SETUP) Beneficiaries of the Department of Science and Technology Regional Office No. VII (DOST VII) is an Information Technology (IT)-based application project that places a major part of the agency's continuous improvement strategy. The system is employed for the monitoring and evaluation activities of the entire SETUP projects DOST VII carries out in Central Visayas region along with managing the information of the projects and the system as a whole (data access, storage and retrieval). The system likewise automates certain decision processes and provides mechanism improving decision making and planning capacity of the agency in a dynamic and knowledge-driven approach. It has a dashboard or visualization of data (key performance indicators), mini messaging or notifications, maps and reports. Specifically, the system was created to stimulate communication and collaboration within the organization, facilitate organizational transformation to the overall operation of DOST VII in the implementation of SETUP, and increase organizational efficiency and competitiveness.

Keywords— Dashboard, Information System, IT-based application, Project Monitoring and Evaluation System.

I. INTRODUCTION

Small Enterprise Technology Upgrading Program (SETUP) is a banner program of the Department of Science and Technology (DOST) that significantly upholds the DOST commitment to its function and outcomes. The bulk of SETUP implementation transpires in the regional offices. As the agency's frontier, the crucial operation of SETUP places a big demand on the limited workforce of DOST regional offices like DOST VII.

However, the current monitoring and implementation processes of the DOST VII Regional Project Management Office (RPMO) lack a good system other than using spreadsheet application to support its function as an implementing agency of SETUP. Consequently, the office encounters difficulties dealing with the current predominantly manual monitoring processes. Moreover, synchronizing of records using spreadsheet application for the three provinces of Central Visayas is generally tedious and cumbersome.

Over the years, there is an increasing trend of SETUP projects in the region and it is but imperative to come up with a system to monitor each project efficiently. A system with analytical tool and feedback mechanism will not only boost efficiency but responds the need to support and improve the

decision making and planning capacity of DOST VII.

The objective is to develop a web-based system that will strengthen the project monitoring and evaluation of DOST VII SETUP projects in Central Visayas and provide mechanism to improve decision making and planning capacity of the agency in a dynamic and knowledge-driven approach.

II. REVIEW OF RELATED LITERATURE

According to SETUP Guidelines [1], recognizing the role of micro, small and medium enterprises (MSMEs) in national growth, economic policies have been refocused and strengthened to develop the MSMEs. The Department of Science and Technology (DOST) launched and sustained the Small Enterprise Technology Upgrading Program (SETUP) as a nationwide strategy to encourage MSMEs to adopt technological competitiveness, and develop new products. Included among the MSMEs are communities/cooperatives/associations with businesses, and local government units with entrepreneurial activities/business.

The program enables MSMEs to address their technological requirements and improve productivity and efficiency through: infusion of appropriate technologies to improve/develop products, services and/or operations; human resource training, technical assistance and consultancy services; design and execution of functional packages and labels; assistance for compliance with regulatory and market standards including testing; and provision of assistance for technology acquisition.

SETUP focuses assistance on the following priority sectors: Food Processing; Furniture; Gifts, House wares, Decors; Marine and Aquatic Resources; Horticulture and Agriculture; Metals and Engineering; Health Products and Services/Pharmaceuticals; and ICT/Electronics.

Additionally, DOST provides assistance to participating MSMEs in the form of technology and/or S&T intervention-related equipment to improve their production efficiency and/or product quality and make them more competitive. The nature of technology transfer and technological interventions is to conduct Technology Needs Assessment (TNA) and provide suitable equipment to address these needs and therefore improve productivity of the SETUP client. The DOST grants funding for the acquisition of the equipment and other related interventions and the SETUP beneficiaries returned the investment in a programmed payment scheme.

III. METHODOLOGY

A. Data Gathering

Apart from obtaining copies of sample forms, substantive and relevant data were gathered through leveraging subjective methods such as conducting interviews to SETUP

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implementers in DOST VII and actual observation and assessment of the current processes. Copies of the existing spreadsheet files were also obtained and studied. The agency also furnished a copy of SETUP Guidelines [1] to arrive a deeper understanding of SETUP implementation.

Sample forms obtained during data gathering were SETUP Pre-implementation Project Information Sheet (PIS) and Project Information Sheet (PIS) for On-Going Projects.

B. Preparation of Resources

XAMPP, a reliable and quick way to set up PHP programming environment was installed and configured for the project development of the *Web-based Project Monitoring and Evaluation System for the SETUP beneficiaries of DOST VII*. Besides being a free and open source cross-platform stack package, XAMPP is an efficient alternative of individually installing and configuring essential components like a web server, a PHP engine, a database server and a debug engine. It bundles the most common and necessary web development technologies like Apache web server, MySQL database and scripts interpreters written in PHP that allows creating and mimicking an environment suited to run, test and troubleshoot web-based project locally. XAMPP also includes phpMyadmin web application, a database administration tool which allows developers to administer and maintain MySQL databases. In addition, an administrator site served as home page of the server and XAMPP control panel where the mentioned services can be configured and manipulated were also part of the installed package. And for the editing and manipulating of codes and queries, the Sublime Text, a cross-platform source code editor was installed and used.

C. Implementation

The agile software development cycle was the methodology of choice in the development of the *Web-based Project Monitoring and Evaluation System for the SETUP Beneficiaries of DOST VII*. According to [6], agile software development fundamentally incorporates iteration and the continuous feedback that it provides to successively refine and deliver a software system. It involves continuous planning, continuous testing, continuous integration, and other forms of continuous evolution of both the project and the software. More importantly, agile software development focuses on empowering people to collaborate and make decisions together quickly and effectively. It encourages client participation in fine-tuning goals and expectations on a continuing basis and shorter feedback loop all throughout the development phases and integrates the client's feedbacks making the end result favorable.

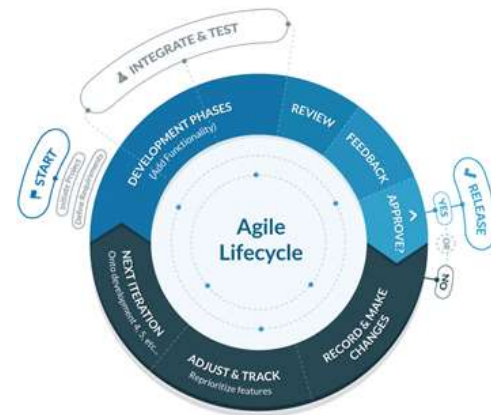


Fig. 1. Agile Software Development Life Cycle [7]

During the development of the system, modules were identified and created and some external libraries were incorporated to provide the necessary features of the system like the dashboard or visualization of data and map viewing functionality. Certain guidelines based on [2] were used during the development of the system ensuring quality end result. Two separate checklists were defined, one for the whole site and another for the page components.

IV. RESULTS

A. Software

The initial version of the system basically constitutes of five modules namely *Dashboard, Notifications, Monitoring, Maps and Reports*. It has a home page that functions as a login screen of the system as well (Fig.2).



Fig. 2. Home Page/Login Page.

- *Dashboard*

The dashboard or a progress report of key performance indicators of the DOST VII SETUP implementation in graphical representations is displayed once a user logs in. It is a real-time user interface linked to the database of the system wherein the current status and historical trends of the agency's SETUP projects constantly updated. The visualization module is a mechanism integrated in the system to support instantaneous and informed decisions.

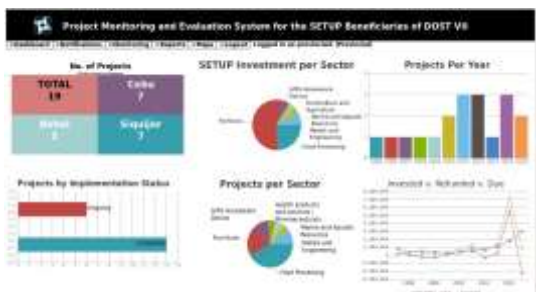


Fig. 3. Dashboard.

- **Notifications**

The notifications module or the system’s mini messaging is created to allow the stakeholders or the DOST VII SETUP implementers to communicate and collaborate within the organization. It has three functionalities namely *Pending*, *Viewed* and *Send Message*. *Pending* functions as the inbox of the notifications module. *Viewed* basically archives all the communications the user received. *Send Message* is where the user notifies other system users. Unlike any full scale email system, this functionality limit to two receivers at the same time. All communications has timestamp to indicate and keep track when a particular message is sent or received.



Fig. 4. Notifications - *Send Message*.

- **Monitoring**

The core feature and the heart of the system is the Monitoring module. It constitutes two components, *Firms* and *Projects*. In essence, only users with provincial accounts have the privilege to manipulate the records like refunds, statuses and accomplishments of a certain firm or project. The rest of the users are limited to viewing and printing of records in the system. All transactions have timestamp to indicate and keep track when a particular transaction took place. Timestamp is commonly visible in the viewing functionalities and printing of records.

The *Firms* component is the preset setting of the Monitoring module and an “Add New Firm” panel tab initially displays on the screen. Under the *Firms* component, the users can add and edit firm; add and view quarterly and midyear accomplishments; and print all firm information. Colored buttons are used to provide distinction of functionalities under this component.

Similarly, in the *Projects* component an “Add New Project” panel tab initially displays on the screen. Under the *Projects* component, the users can add and edit project along with individual project milestone, refund and other project related tasks; view milestones, refunds and other transaction histories; and print all project information. Colored buttons are likewise

used to provide distinction of functionalities under *Projects* component.

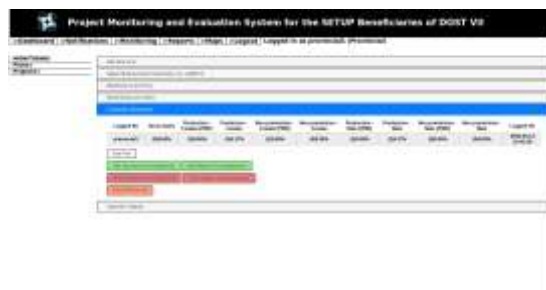


Fig. 5. Monitoring – view *Quarterly Accomplishment*.

- **Maps**

The system uses Google Maps Application Program Interface (API), a powerful and one of the most popular JavaScript libraries to run the map viewing functionality of the system [5][8]. Under certain conditions, this web mapping API is free and allows maps to be embedded on any third-party applications [5][8]. It also brings the familiar look and feel of Google Maps to an application thus making the system user-friendly.

The Maps module displays separate provincial maps of the Central Visayas region with place marks indicating precise locations of the SETUP projects. There are two selection boxes, one for the provinces and the other for the corresponding districts as shown in Fig. 6. To obtain an expanded and full view of projects, users can select the desired province in the first selection box. To narrow the viewing of projects by district, users can select the desired district in the second selection box.

The customized maps showing place marks is done by adding the individual coordinates of the SETUP projects in each province. This map viewing functionality of the system is not only a useful tool for conducting project visits but in engaging potential beneficiaries and external clients.



Fig. 6. Maps.

- **Reports**

The Reports module is basically a frontend interface presenting three tabs of formatted results that runs backend database queries using Structured Query Language (SQL). The formatted results contain useful data for decision-making. The options include *List of All SETUP Projects*, *List of SETUP Projects by Sector* and *List of SETUP Projects by Province*. These explicit subsets of information extracted from the system’s database also spare the users from viewing extraneous data.

The *Print This Table* button allows the user to print the selected report. The printed copy bears a timestamp indicating the time and date the printing is done.



Fig. 7. Reports.

B. Evaluation Result

Using the System Usability Scale (SUS) by Brooke [3], the result showed that the system was acceptable to the users. Additionally, the result of the usability evaluation resonates good level of consistency among respondents (system users) with an average score of 75 (Table I). Based on research [4], a SUS score above 68 would be considered above average and anything below 68 is below average.

The System Usability Scale
Standard Version

10-Item System Usability Scale (SUS) for the Small Enterprise Technology Upgrading Program (SETUP) Beneficiaries of the Department of Science and Technology Regional Office No. VII (DOST VII)

Please imagine that you have just completed using the system. On a scale from 1 (strongly disagree) to 5 (strongly agree), indicate your level of agreement with the following statements:

Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
1. I think that I would like to use this system frequently.	1	2	3	4	5
2. I think that I would need to learn a lot of things before I could get going with this system.	1	2	3	4	5
3. I think that I would like to use this system.	1	2	3	4	5
4. I think that I would need the support of a technical person to be able to use this system.	1	2	3	4	5
5. I think that I would like to use this system.	1	2	3	4	5
6. I think that I would like to use this system.	1	2	3	4	5
7. I think that I would like to use this system.	1	2	3	4	5
8. I think that I would like to use this system.	1	2	3	4	5
9. I think that I would like to use this system.	1	2	3	4	5
10. I think that I would like to use this system.	1	2	3	4	5

Total: _____

Fig. 8. Adopted SUS Form for the system.

TABLE I: EVALUATION RESULT

System Users	SUS Score
User 1	77.5
User 2	75
User 3	67.5
User 4	77.5
User 5	82.5
User 6	62.5
User 7	82.5
SUS Score Average	75

V. CONCLUSION AND RECOMMENDATION

A. Conclusion

Web-based Project Monitoring and Evaluation System for the Small Enterprise Technology Upgrading Program (SETUP) Beneficiaries of the Department of Science and Technology Regional Office No. VII (DOST VII) was developed to automate certain decisions and predominantly manual processes. The system was created to stimulate communication and collaboration within the organization, facilitate organizational transformation to the overall operation of DOST VII in the implementation of SETUP and increase organizational efficiency and competitiveness.

Based on the evaluation result, the system earned positive feedback from the SETUP implementers of DOST VII. The agency was committed to adopt the introduced technology. The intention to use the system was highly influenced and associated on the system’s facilitating conditions and effort expectancy like providing Dashboard – a mechanism that support the decision making and planning capacity of the agency in a dynamic and knowledge-driven approach, and the ease in monitoring and evaluating individual SETUP project efficiently among others. DOST VII top management users openly influenced the agency supporting the suitability and use of the web-based system.

B. Recommendation

The present project focused on the internal processes of the agency and on the users’ intention to use the system and its introduced technologies. Further studies, however, can immerse more on assimilating the public computing side. As a government entity, the system can later offer and extend a module as a point of access displaying processed and filtered data appropriate for public use. The enhancement will deliberately support towards the ICT-based transformation of governance extending access to government services. Likewise, it will bring support to the open data initiative of the national government and readiness for the practice of Freedom of Information (FOI) in the country.

The initial version of the system was designed to satisfy the need of the agency to come up with a system that harness the knowledge within the organization. As future direction of the project, there should be more modules and functionalities added to cater the needs of other stakeholders, such as incorporating the project collection performance rate report of the accountant and other SETUP related reports not included in the current version.

Another point of interest is refining the map viewing functionality and attaining a full responsive web design (RWD) of the system. The prevalent trend at the present time is the thriving capabilities and power of mobile devices such as smart phones and tablets where RWD becomes important and places high demand on applications based on maps. The system should transcend into a mobile friendly site and benefit on the advances of mapping APIs.

Other players like the DOST VII constituents or the MSMEs should also be considered in the later versions of the system to ingrain substantial contribution to value chain. Lastly, the system can be replicated to the rest of DOST regional offices where the bulk of SETUP implementation transpires.

ACKNOWLEDGMENT

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