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Integrated Monitoring Platform for Collaborative Youth Communities in Indonesia: A Case of e-Government Implementation for the Rural Millennial

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Abstract. Electronic monitoring systems (e-Monitoring) is the term used for applying technology to a reporting system, used as a medium of supervising for various activities. One of the areas that are prone to chaotic problems thus needs monitoring, is the youth community. While youth empowerment promised high result for the society, it lacks control can also create all sorts of issues. Although there have been many studies dealing with the use of technology in youth communities, none have intensely discussed sharing information between each youth communities, especially those villages youth communities that connect through one sub-district youth community. We consider this as an essential issue since those youth communities are adjacent to one another; hence, a repetition of the program would be an ineffective use of budgets. Upon the implementation of the system, we conducted a user acceptance test. The test was made with 57 test scenarios for five types of users with an acceptance rate of 82,81%. Attaching this system into another e-Government system such as the municipal systems or the banking systems should be a promising future work to be done.

Keywords: integrated monitoring platform, youth communities, e-Government, technology in rural areas

1. Introduction

Electronic monitoring systems (e-Monitoring) is the term used for applying technology to a reporting system, used as a medium of supervising for various activities [1]. When a policy or specific plans are put in place, then that's where monitoring kicks in, and errors can be found. It can be done at the beginning as an evaluation to take correctives, to minimize the risk of having more significant problems at the end [2]. Studies have shown how monitoring systems can improve performances, and it has been widely used globally, including Indonesia. One study examined how monitoring systems can meet the importance of on-time criteria for one software project. With many parallel software projects to be done, monitoring systems have served to be a knowledge pool that provided information from previous projects. This can cut the requirements and analysis time of similar projects that they were doing at that time [3]. From a formal governmental perspective, a study has been done at the Public Works Office (P.U.) in Southeast Sulawesi Province, Indonesia. They created a workflow monitoring for the head of departments and their subordinates to communicate better on discussing their progress in a particular



project [4]. Others also suggest that it can be done in the textile industry [5], oil and gas [6], healthcare [7], agriculture[8], finance[9], and even natural science [10]. These studies prove that monitoring can work on many levels of working environments and have shown better results for each process being monitored.

One of the areas that are prone to chaotic problems thus needs monitoring, is the youth community. While youth empowerment promised high result for the society, it lacks control can also create all sorts of issues. In Ghana, one study has discovered that there was a power imbalance between youth program implementers and target beneficiaries. Monitoring can increase implementers' control of who participates in one particular program t what stage in the process [11]. Further study in Egypt also suggested that monitoring can create strong potential growth possibilities, a significant human resource base, and a substantial quantity of unrecycled wastes that could be directed toward sustainable development [12]. In Indonesia, youth communities are called KARANG TARUNA. We can find a lot of these types of communities, from villages to big cities across the country.

The ministry of social affairs regulates youth communities. They are commonly activated in every village and are monitored by their respective sub-districts. The young or the millennials are one of the highest potential resources of local movements that can carry out regional, provincial, or even national development [13] as it serves a great purpose of youth empowerment in many sectors [14][15]. With that kind of high expectations, monitoring and control should be treated as a priority; nevertheless, that is where the problem occurred. A sub-district youth community which have a responsibility to control lower youth communities in villages did not know which programs have or have not been done by them. Instead, the sub-district youth communities only relied on quarterly reports done by village youth communities. Technology should step in, involving activities and resource allocation monitoring to achieve better and improved resource management decision making and planning [16]. As a formal government entity and part of e-Government stakeholders, youth communities need to have a solid mechanism of sharing information within citizens (young people) and other government organizations, to acquire a high quality of good governance [17]. One solution to the problem is to construct a system that can monitor activities, provide reports on ongoing programs, and what most important is the integration of information of each village's youth communities. This integration can create transparency to the head of youth communities in sub-district areas to monitor their performances. Furthermore, the integration of information is more likely to create new ideas, images, and approaches that will lead to social innovations [18].

Although there have been many studies dealing with the use of technology in youth communities [16] [19] [20], none have intensely discussed sharing information between each youth communities, especially those villages youth communities, which are connected through one sub-district youth community. We consider this as an essential issue since those youth communities are located adjacent to one another; hence, a repetition of the program would be an ineffective use of budgets. Independence Day festivals, vaccine campaigns, music, and art programs, are amongst those that can be done collectively. Furthermore, past programs can be stored in the systems and available online so that youth communities can learn how other communities have done a similar program [21]. We combine those 2 solutions in this study and create an open platform to monitor each youth communities' program. This study was performed in the area of sub-district Padalarang, West Java, Indonesia, in which there are 16 village youth communities and 1 sub-district youth communities as the entity who is in charge of the monitoring activities.

2. Research Method

We conduct this study by doing data collection before moving on to the design, development, and implementation stages. Data collection has been touted as one of the critical elements of software engineering, and it consists of interviews and observations [22]. The interview process took place at the Padalarang Sub-District Office, West Java, Indonesia, and conducted on January 11 until 13, 2019; next on February 6 and 17, 2019; and lastly, on March 10, 2019. Each interview took an average of 2 hours. Interviews were conducted with the heads of sub-district youth communities and representatives from

villages youth communities. At each meeting, we highlighted topics such as the business process, organizational profile, vision and mission, problems or needs within the processes that need to be addressed, and actors (their role) and specifically defined the information flow between each actor across the operations. Other than interviews, we also conduct observations on the 13th until March 19, 2019. We observed the activity closely and witnessed the problems of the youth communities firsthand. Inspections were carried out by visiting Padalarang Subdistrict and coming to the village and sub-district youth communities' activities, especially the process of monitoring from the sub-district youth communities to the ones at the villages. This event highlighted more findings that were not mentioned by the interviewees earlier. We recorded and summarized our findings and validated them to the interviewees before we decide to put them all as facts of research.

2.1 Business Process Identification and System Objective

Identifying a business process is the first step towards business process improvements [23]. As we would like to improve the current business process using a new monitoring system, then we need to conduct this stage before moving on to the other. The business process in youth communities started when the coordinator of the village youth community created a series of programs that refer to the sub-district youth communities' program. Those programs must be communicated to the chair and members of the sub-district youth communities so that the monitoring process can be carried out. Upon approval, the members of the village youth community can directly carry out or implement the activity with the direction of their coordinator. The events will be monitored directly by the sub-district youth group leader. Monitoring is done by coming directly or witnessing the ongoing events without any formal documentation. Then later, when the activity has been completed, the village youth community reported a series of events to the sub-district youth leader and the headman. The activity report prepared includes the activity accountability report document (if the activity uses funds from the village) or attach a Minutes (if the event does not use funds from the village). Reports that have been made are sent to the chairman and members of the sub-district youth community. The report is submitted as proof that that activity has been completed. Reports received are kept as archival reports on youth organization activities.

We identify the gap or problems that occur within the business process identification, as depicted in Table 1.

Table 1. Problems Found during Business Process Identification

No	Problems Found	Description
1	Ad-hoc notification	The coordinating office of the youth community at the sub-district often get a last-minute notification of one particular youth events happening in a specific village.
2	Minimum monitoring documentations	There were none, or very minimum documentation was done during the event. Documentation was mostly done with regards to the pictures, not a day-by-day report of the event.
3	Overlapping schedules	Several events were identified to be overlapping to one another in terms of schedules, thus making it hard to monitor them one-by-one.
4	Lack of coordination and supervision	Events are done locally, resulting in a lack of coordination between village and sub-districts, or sometimes even amongst the committee of one event.
5	Repetition of Events	The same event was conducted two or even three times in almost the same period, without each of them realizing that they can make it into one big event instead of making 2 or 3 small events
6	Unstandardized report	Reports that have been done were known to have no standards. Furthermore, the content was very superficial with little information about the evaluation of the event, while reports should be able to serve as a learning document for the next activities to come

From this problem found during business process identification, we set up objectives using the S.M.A.R.T approach [24]. A S.M.A.R.T goal incorporates all these criteria to help focus the efforts of making a sound system and increase the chances of achieving that goal. SMART objectives are well known in the education sector [25] [26], although we also can find the framework being implemented in health [27] and even national defense [28]. Our interpretation of objectives based on the S.M.A.R.T. approach can be seen in Table 2 below.

Table 2. S.M.A.R.T Objectives of the Integrated Monitoring System for Youth Communities

No	Objective Type	Objective Description	Solving Problem No-
1	Specific	The goal of the system is to create clear and transparent information with regards to events that are happening	1, 2, 4
2	Measurable	To eliminate overlapping schedules, repetition of the same events, and ad-hoc notifications	1, 3, 5
3	Achievable	To manage and monitor youth communities' activities within one sub-district region	1, 4, 5, 6
4	Realistic	Web-based systems accessible to all stakeholder of youth communities in one district for monitoring purposes	1, 2, 3, 4, 5, 6
5	Time-Bound	To be used in 2nd semester of 2019 and measured after 60-days of use	-

2.2. System Design

System design deals with planning the development of information systems through understanding and specifying in detail what a system should do and how the components of the system should be implemented and work together [29]. System analysts solve business problems by analyzing the requirements of information systems and designing such systems by applying analysis and design techniques. The design emphasizes a *conceptual solution* that fulfills the requirements, rather than its implementation [30]. For example, a description of a table structure of events and logbook (2 of our most crucial table) is presented in table 3 and 4.

Table 3. Table of tb_events

No	Field Name	Type Field	Size Field	Key	Ref Table	Remarks
1.	id_event	Number	-	Primary Key	-	Not Null Integer [0-9]
2.	id_KTDesa	Number	-	Foreign Key	tb_KTDesa	Not Null Integer [0-9]
3.	id_KTUnit	Number	-	Foreign Key	tb_KTUnit	Not Null Integer [0-9]
4.	name_event	String	20	-	-	Not Null Varchar [Xx]
5.	type_event	String	10	-	-	Not Null Char [X]
6.	date_st	Date	-	-	-	Not Null Date [ddmm-yyyy]
7.	date_ed	Date	-	-	-	Not Null Date [ddmm-yyyy]
8.	prop_fund	Number	-	-	-	Not Null Integer [0-9]
9.	actual_fund	Number	-	-	-	Not Null Integer [0-9]
10.	auth_name	String	10	-	-	Not Null String [Xx]
11.	fund_src	String	10	-	-	Not Null String [Xx]
12.	status	String	9	-	-	Not Null String [Xx]
13.	progress	Number	-	-	-	Not Null Integer [0-9]

tb_logbook is used to store logbook data and tasks that must be carried out in the process of carrying out events created by the village youth community, and later on from the activity plan, data will be monitored by each head of the village youth community.

Table 4. tb_logbook

No	Field Name	Field Type	Size	Key	Ref Table	Remarks
1.	id_log	Number	-	Primary Key	-	Not Null Integer [0-9]
2.	id_event	Number	-	Foreign Key	tb_events	Not Null Integer [0-9]
3.	date_actual	Date	-	-	-	Not Null Integer [0-9]
4.	event	String	20	-	-	Not Null Varchar[Xx]
5.	achievements	Number	-	-	-	Not Null Integer [0-9]
6.	cost	Number	-	-	-	Null Integer [0-9]
7.	attachment	String	100	-	-	Null Varchar[Xx]
8.	status	String	10	-	-	Null Varchar[Xx]
9.	Desc_event	Text	-	-	-	Null Varchar[Xx]

2.2.1 Actor's Identification. Identifying actors is one of the first steps in use case analysis [31]. An actor represents each type of external entities with which the system must interact. We define actors within our systems and can be seen in table 5.

Table 5. Actor Identification of Integrated Monitoring System for Youth Communities

No.	Actors	Descriptions
1.	Head of sub-district youth community	access rights to view the dashboard of village youth communities, the dashboard of funds for village youth community activities, the dashboard of members of village youth communities, and send suggestions and input in the monitoring processes.
2.	Member of sub-district youth community	access rights to manage youth community information, send suggestions and input, and manage users.
3.	Head of village Youth community	access rights to manage village activities and send suggestions and input in the event monitoring processes.
4.	Member of village Youth community	access rights to manage the event of village activities, make a final report, and send suggestions and input for the event.
5.	Head of the sub-district region	access rights to view the dashboard of village youth communities, the dashboard of funds for village youth community activities, the dashboard of members of village youth communities.

2.2.2 Functional Analysis. Modules, functions, and features of a system are derived from the interpretation of objectives. Depicted in Table 6, the analysis, and its correlation to the system's objectives.

Table 6. Functional Analysis of the Integrated Monitoring System for Youth Communities

No.	Module(s)	Description of Functionalities	Objective No-
1.	Manage events	view, create, update, and delete events.	1, 2, 4, 5
2.	Monitoring module	This module consists of monitoring activities, uploading event progress, and updating event status and progress. This function is used to see the extent of the achievements of the ongoing events.	1, 3, 4, 5
3.	Feedbacks and suggestions module	all existing actors can see and send suggestions and input on each ongoing activity/event.	3, 4, 5
4.	Manage reports	manage the final report (uploading and update) of the Official Report and the Accountability Report.	1, 3, 4, 5
5.	Dashboard	summary of the activities that are ongoing and have been carried out. The percentage of event progress, the rate of activity funds usage, the percentage of youth community members participated. This function is used to monitor every youth community.	1, 3, 4, 5

2.3. System Development

In this study, we implemented the web-based software based on the PHP programming language with the editor in Visual Studio. It uses the MySQL database and Apache Web Server that is in the X.A.M.P.P. application, Google Chrome / Mozilla Firefox as a Web Browser media, Codeigniter Framework for PHP, and Admin LTE template as admin template management.

3. Results and Discussions

We have managed to make the base software in 40 days and did several tests and measurements. Two significant evaluations were conducted. The first one was internal to compare the objectives set at the beginning with the implementation result. The second test was using the actors, to measure their acceptance towards the systems.

3.1. The Monitoring System

Implementation of the software interface is the result of the design concept or design that was created in the previous stage [32]. Interface design or mockup helps developers to make good designs in building monitoring systems for the management of youth activities. To enter the system based on the user level, namely the head of the unit youth group, the member of the youth group, the leader of the village youth group, the member of the village youth group, the leader of the youth group and the member of the youth group. Each user must first fill in their username and password, as depicted in Figure 1.

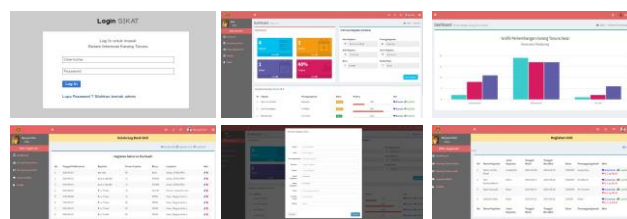
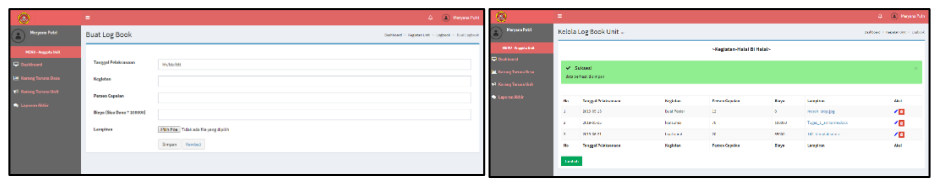


Figure 1. The implementation of the Integrated Monitoring System for Youth Communities

Members of the youth community use the village activity management page. The page to manage the activities has the function of comments, logbooks, and the contents of the logbook. The comment function is used to add comments or suggestions and suggestions from every activity/event. The logbook function is used as a diary containing milestones that have been carried out, while the logbook content function is to add logbook data to the system. The event progress management page has a logbook table that provides information about what has been done by the village youths to achieve an activity that will be carried out. The module of the progress of events can also be used as a benchmark. It provides the

percentage of how far the activities have been carried out. Logbook data can be deleted when there is more data or incorrect logbook data entry. Below we can see in Table 7, a test case of filling out the logbook form.

Table 7. Use Case Test of Filling out Logbook form Scenario

Use Case ID	UC-4
Use Case Name	Manage Logbook
Test Scenario	Filling out Logbook
Test Case	Filling outfield of the start date, activities name, progress percentage, cost, attachments
Pre-Condition	Logbook = empty
Test Steps	<ol style="list-style-type: none"> 1. Click “fill out logbook” in one of the events 2. Start filling out the data in all fields 3. Click “save.”
Test Data	<ol style="list-style-type: none"> 1. Fill out start date <11/06/2019> 2. Fill out activities name <Printing a poster> 3. Fill out progress percentage <50%> 4. Fill out the cost <Rp. 50000> 5. Fill out attachment <poster_receipt.jpg>
Expected Result	Filling out logbook succeeded without fail and show a message “Data has been successfully saved.”
Post Condition	“Data has been successfully saved”
Status (Pass/Fail)	PASS
Actual Result	

Furthermore, the head and members of the village youth group can also add logbook data. Activity data can be added to the system via the page for activities. The function of this activity is carried out by the head of the village youth group. The Youth Activity Monitoring page contains a percentage showing the value of the work or progress to be carried out, and that has been completed along with the costs incurred to complete the activity. If the expenses incurred are more than the maximum price that has been determined, the system can detect and give a red mark. This function helps to control the cost of activities so that there is no difference between actual costs with the draft budget that has been made previously. The head of the village youth group can also add new activity data.

3.2. The Acceptance Test

To find out that the needs of users have been fulfilled, we conducted a user acceptance test. The test was made with 57 test scenarios for five types of users: (1) Head of sub-district youth community; (2) Member of sub-district youth community; (3) Head of village Youth community; (4) Member of the village Youth community, and (5) Head of the sub-district region. UAT results can be seen in Table 7.

Table 7. Users' Acceptance Test of Integrated Monitoring System for Youth Communities

No	User/Tester	Acceptance Rate	Notable comments
1.	Head of sub-district youth community	(50 out of 57) 87,72%	“good system. Apparent and transparent progress.”
2.	Member of sub-district youth community	(44 out of 57) 77,19%	“I still am not familiar with all the buttons and stuff.”

No	User/Tester	Acceptance Rate	Notable comments
3.	Head of village Youth community	(52 out of 57) 91,23%	"adding a planning module should be a very nice thing to have."
4.	Member of village Youth community	(46 out of 57) 80,70%	"problems within the area of no internet."
5.	Head of the sub-district region	(44 out of 57) 77.19%	"great visualization of data."
Average Acceptance		82,81%	

4. Conclusions

This study can be concluded to a great extent that the system helps in the process of monitoring every process of implementing youth activities. This system helps provide information about the activities and development of which youth communities contribute more to their respective villages. It can also be used as a means of communication for a unit, village, and sub-district youth so that every input and suggestion from the village and sub-district cadets can be conveyed. And finally, this system produces a percentage of the development of each village community by displaying data on each event, cost, and members contained in the youth community.

This study can be a stepping stone towards a sounder application soon. Attaching this system into another e-Government system such as the municipal systems or the banking systems should be a promising future work to be done.

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