

Improving Community Administration Service and Population Reporting through SINANAS Development Using Participatory Method

Ni Made Ary Esta Dewi Wirastuti ^{1,*}, I Gusti Agung Komang Diafari Djuni Hartawan ¹, I Made Arsa Suyadnya ¹, Duman Care Khrisne ¹, Putu Arya Mertasana ⁵, Is-Haka Mkwawa ²

¹ Department of Electrical Engineering, Faculty of Engineering, Udayana University, Badung, Indonesia

² School of Engineering, Computing and Mathematics, University of Plymouth, Plymouth, United Kingdom

*Corresponding Author: dewi.wirastuti@unud.ac.id

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ABSTRACT

Background: Information technology in community administration service has been developed in helping to raise the efficiency and productivity of the leader of Banjar Dinas works, as well as organizing and utilizing information to support administration and management, policy development and decision-making.

Contribution: SINANAS (Administration Information System for Banjar Dinas) has proposed to support the works of “Kepala Lingkungan” in Sempidi for administration service and population reporting.

Method: Using interview and participatory approaches, the application was used by training and socialization. The application was developed using Visual Studio Code and Python language programming.

Results: The results of this community service are SINANAS reporting page for population data of education and livelihood, religion, ethnicity, race, number of population, family card, Temporary Resident Identity Card (KIPS), Temporary Resident Registration Certificate (STPPPTS), Reporting page for religion, ethnicity, race, and population, Reporting page for total population based on single age group and gender

Conclusion: Based on the post-questionnaire, “Kepala Lingkungan found that using the SINANAS application, producing annual and monthly administrative reports is easier and quicker than manually creating them in Microsoft Word and Microsoft Excel.

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INTRODUCTION

Banjar is a way of administratively dividing the territory, which can only be found in Bali, Indonesia [1]. Banjar is well-known as a legal entity with certain regional boundaries. The Balinese government has also set a clear position for the banjar [2]. There are two functions of the Banjar, which are regulated by Balinese government regulations. The two functions are: 1) The Banjar Dinas, or called Lingkungan, is a community tasked with carrying out administrative activities related to the government, such the process of making national Identity Card (KTP), Seasonal Resident Identity Card (KIPEM), Integrated Healthcare Center (POSYANDU), or voting activities for local elections or presidential elections in the Banjar Dinas; 2) Banjar Adat is a community that carries explicitly out its function of dealing with matters related to customary activities, for example: scheduling various traditional ceremonies such as wedding ceremonies, funerals, as well as arranging the procurement of various traditional ritual arts [3].

The Banjar Dinas is managed by a Kelihan Dinas (for village) or Kepala Lingkungan (for ward) responsible for administrative activities, such as the national identity card (KTP) process, integrated healthcare center (POSYANDU) activity, as well as various essential announcements of government activities, and administrative matters such as several permit administrators related to government. The bureaucratic function at the Banjar level also records immigrants in managing KIPEM (Kartu Identitas Penduduk Musiman), which also involves the Kelihan Dinas or Kepala Lingkungan who know more about the members or residents of the Banjar.

Based on the results of interviews with the Kepala Lingkungan in the ward of Sempidi, Mengwi District, Badung Regency, Bali Province, there are still many services carried out by Kelian Dinas in conventional ways, such as administrative papers, KTP archives, Banjar resident and community services, natives and newcomers data. All data were recorded in Microsoft Word and Microsoft Excel and collected in the folders, so they have not been integrated into an information system. Although there is a very rapid development of information and communication technology for villages to set up smart village programs [4], [5], those conditions still exist in the community administration service and population reporting.

So the reason for the community service is to facilitate assistance to the community and to make it easier for Kepala Lingkungan in the Sempidi ward to carry out his duties; an information system application is needed. Currently, many researchers work on public administration systems [6]-[8]. With the rapid development of information technology [9]-[11], mainly distributed processing and network computing, the concept of Information Technology use in the public sector has changed dramatically to increase efficiency and productivity [12] - [15]. Information and communication technology (ICT) promises efficiency, speed of information delivery, global reach, and transparency [16]-[18]. Therefore, in this era of regional autonomy to realize good governance, one of the efforts is to use information and communication technology or what is popularly called e-Government [19]-[21].

In empowering the community and improving effective and transparent community services [9], [22], [23], were used the interview method to get the right solution to solve the problem. This research intends to design and develop an application for Banjar Dinas community service using the interview method. Kepala Lingkungan, Sempidi ward, was interviewed about the need for features in the application to facilitate their work and improve services to the banjar dinas community. Based on the interview results, an official Banjar Dinas information system called the Banjar Dinas Information System (SINANAS) was developed. With the existence of SINANAS, the administrative system and archives of the Banjar Dinas,

Sempidi ward, Bali, will be well organized so that public service satisfaction will increase. The contribution of the proposed application can be summarized as follows: 1) It designs based on the community and Kepala Lingkungan needed, which converts the conventional ways of processing the population data using an information technology application; 2) The collection of population data such as a) Education Data by Gender; b) Total Population by Single Age Group and Gender; c) Report on Total Religion, Ethnicity, Race, Population; d) Population Data by Education and Livelihood, Religion, Ethnicity, Race, Total Population, Household, KIPS, STPPTS; e) Upload K.K. Files; f) View and Print features, are filtered to create the population reporting monthly and yearly.

The rest of this paper is organized as follows. The next section describes related works. In the proposed scheme section, we suggest an intelligent irrigation system based on the Internet of Things (IoT) technology (SISIoT), considering the assumption conditions of field rice. The performance evaluation section includes performance evaluations and a discussion of the proposed scheme. Finally, we conclude this paper in the last quarter.

METHOD

1. Improving Community Administration Service and Population Reporting

Three phases were planned for the SINANAS application in Sempidi ward, Badung, Bali, for improving community administration service and population reporting. The first is the preparation phase, consisting of preliminary research of the administration tools of Kepala Lingkungan, finding suitable approaches and techniques for the SINANAS application. The second is to design and develop the application. The third is drafting socialization materials for the participants and implementation of the application; the fourth phase is the program evaluation. The workflow of the community service program can be seen in [Figure 1](#).

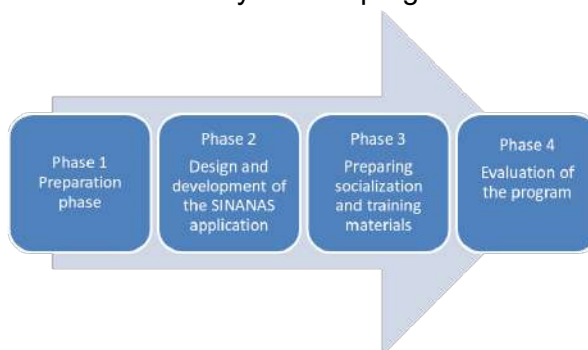


Figure 1. The workflow of the community service program

2. Application Development Methods

The SINANAS application development is based on the waterfall model. In the waterfall model, several main stages describe application development activities [24], [25]. Stages of application development on the waterfall model can be illustrated in [Figure 2](#).

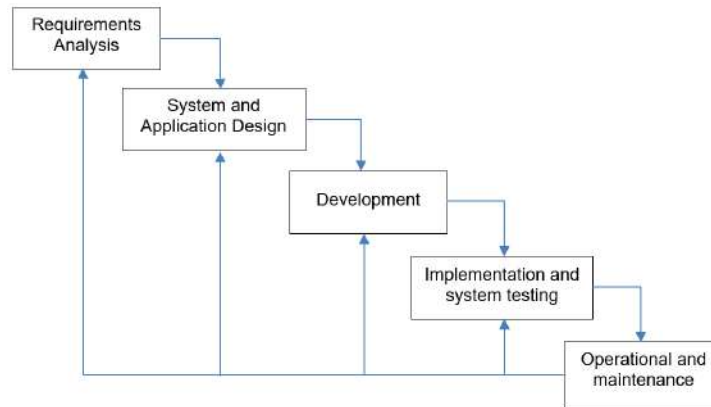


Figure 2. Waterfall model

Requirements analysis using interview and observation methods. Identifying problems related to the activities and tasks being carried out by Kelihan Dinas or Kepala Lingkungan that can be assisted by using advances in ICT (Information and Communication Technology). Collect data regarding functions that must be completed related to Family Card (K.K.) data. This step was carried out by interviewing Kepala Lingkungan and the community at Sempidi ward, Bali. At this stage, a complete collection of needs is analyzed to satisfy the development of the application.

Furthermore, system and application design can be carried out in steps: plans related to SINANAS information systems, analyze the information system workflow, and identifying whether the workflow is efficient and according to specific standards, application design where there are two types of structures made in this step, namely business process designs and programming designs includes: database design, user interface design, and report layout design.

SINANAS application develops using Visual Studio Code and Python language programming [26]-[28]. After implementation, the features of the application are tested using the black box method [29]-[32], testing whether the parts are running according to the design. A guide for using the application in completing office oversight tasks is created for operational and maintenance purposes. Finally, socialization and evaluation of using the application to the Kepala Lingkungan of Sempidi ward, Bali, is conducted.

3. Banjar Dinas and Regency District Population and Civil Registration Office

Integration Service

The SINANAS application will be equipped with the following features: 1) Banjar Dinas community data with the keyword family card number (K.K.), all family members will appear on the K.K. (Full Name, NIK, Gender, Place of Birth, Date of Birth, Religion, Education, Type of Work, Marital Status, Status of Family Relations, Nationality, Names of Parents (Father and Mother), annual reporting features with filters: a) Education Data by Gender; b) Total Population by Single Age Group and Gender; c) Report on Total Religion, Ethnicity, Race, Population; d) Population Data by Education and Livelihood, Religion, Ethnicity, Race, Total Population, Household, KIPS, STPPTS; e) Upload K.K. Files; f) View and Print features.

Based on this data, the Regional Office will register interested citizens with administrative documents, such as birth certificates, death certificates, marriage certificates, poor residents, business licenses, and other documents, through <https://akudicari.badungkab.go.id/>. [Figure 2](#)

shows the features of the Badung Regency, Department of Population, and Civil Registration that the Kelihan Dinas or Kepala Lingkungan must complete regarding services to the banjar dinas community.

4. Data Provisions

According to the data availability and the required design features, the following data provisions are obtained: The folder structure for the running program can be seen in Figure 3. The source data used in the program is the sheet "Data for Single Age 2022" in Excel "Data.xls" in the "Data" folder.

The data is in the columns N A M A, J.K., DATE. BIRTH, EDUCATION, WORK, AGE, and G.B. When adding new data, please fill in all these fields. Structure data in Excel format can be seen in Figure 4. There must be columns N A M A, J.K., and DATE. BIRTH, EDUCATION, WORK, and AGE on the 8th line. In the G.B. column is the active status of the population data. If the resident is involved, it can be filled with '1'. If it is not happening, it can be filled with '-.' In the AGE column, the data used by the program is the population's birth year. Structure data in excel shown in Figure 5.

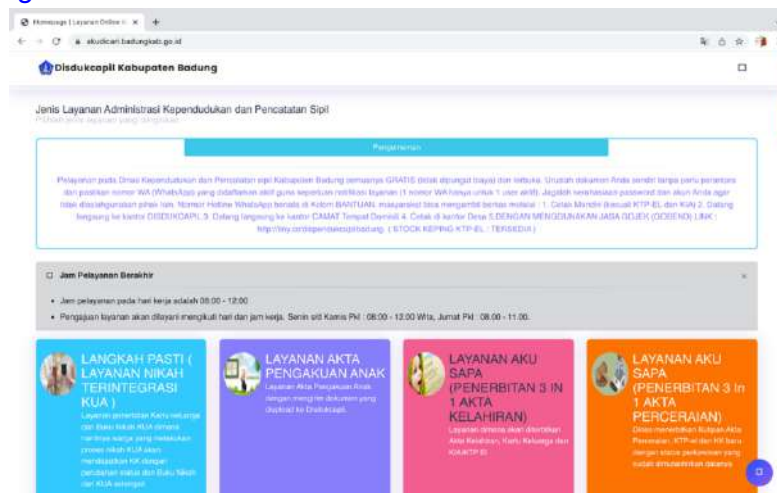


Figure 3. Badung regency disdukcapil (district population and civil registration office) service [30]

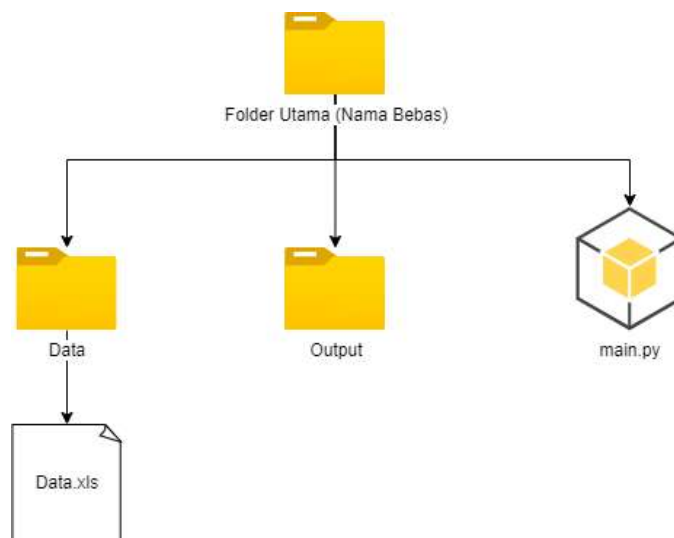


Figure 4. Folder structure

K.K. NO.	NAMA	JK	TGL LAHIR	PENDIDIKAN	PEKERJAAN	UMUR
1	Penduduk 1	L	16-12-1972	SLTA	Karyawan swasta	1972 50
2	Penduduk 2	P	12-06-1977	SLTA	Mengurus rm tg	1977 45
3	Penduduk 3	L	11-01-2000	SLTA	Pelajar	2000 22
4	Penduduk 4	L	21-01-2002	Masih SLTA	Pelajar	2002 20
5	Penduduk 5	L	31-12-1942	Tamat SD	Tukang Batu	1942 80
6	Penduduk 6	P	31-12-1943	Tamat SD	Wiraswasta	1943 79
7	Penduduk 7	L	30-07-1970	SLTA	Karyawan swasta	1970 52
8	Penduduk 8	P	17-02-1975	SLTA	Karyawan swasta	1975 47
9	Penduduk 9	L	23-10-2001	SLTA	Pelajar	2001 21
10	Penduduk 10	L	08-08-2005	Bim.Tmt. SD	Pelajar	2005 17
11	Penduduk 11	L	15-01-1987	SLTA	Karyawan swasta	1987 35
12	Penduduk 12	P	07-02-1993	SLTA	Karyawan swasta	1993 29
13	Penduduk 13	L	13-06-2016	Bim sekolah	Bim bekerja	2016 6
14	Penduduk 14	P	15-05-2019	Bim sekolah	Bim bekerja	2019 3

Figure 5. Structure data in excel

RESULTS AND DISCUSSION

1. Designing Population Data Recapitulation Appearances

1.1. Homepage of Population Data Recapitulation Application

The initial page of the population data recapitulation application is the first page that will appear when the main.exe file is opened. The initial page for the population data recapitulation application can be seen in Figure 6.



Figure 6. Page of population data recapitulation application

1.2. Select the Type of Population Data Recapitulation Page

The select type of population data recapitulation page is a data page for selecting the data recapitulation to be made. Four types of population data recapitulation can be seen in Figure 7.



Figure 7. Selecting type of population data recapitulation page

1.3. Population Form Pages by Single Age Group and Gender

The page of the population number form by single age group and sex is the page to fill in the total number of family cards that will be recapitulated. The page form for the number of residents according to a single age group and sex can be seen in [Figure 8](#).

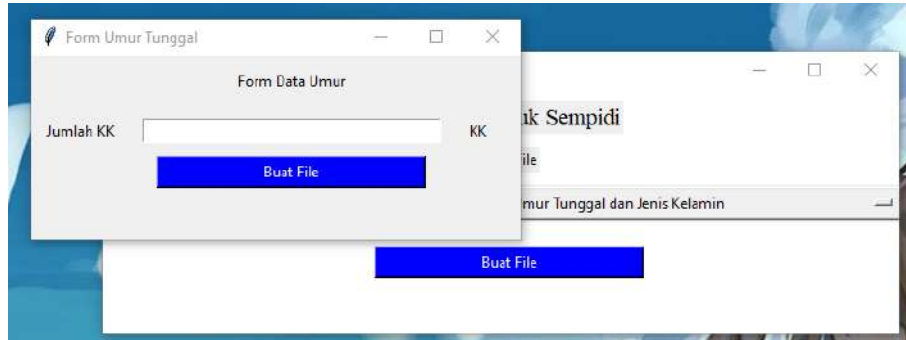


Figure 8. Pages of population data form by single age group and gender

1.4. Pages of the Population Data Form by Education and Livelihood, Religion, Ethnicity, Race, Total Population, K.K., KIPS, STPPTS

Population data from pages according to education and occupation, religion, ethnicity, race, population, family card, KIPS, and STPPS are form pages for filling in additional data that are filled in manually, which can be seen in [Figure 9](#).

1.5. Pages of Religion, Ethnicity, Race, and Population Report Data Form

The religion, ethnicity, race, and population report data form page is a population data recapitulation page according to belief, where the total amount of data for each religion is entered manually into the application on the form provided. Religious, ethnic, racial, and population report data from pages can be seen in [Figure 10](#).

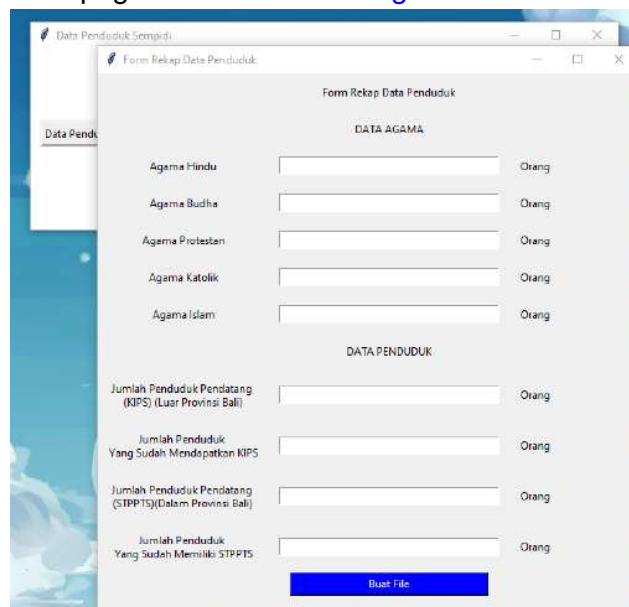


Figure 9. Population data form pages by education and livelihood, religion, ethnicity, race, total population, household, KIPS, STPPTS

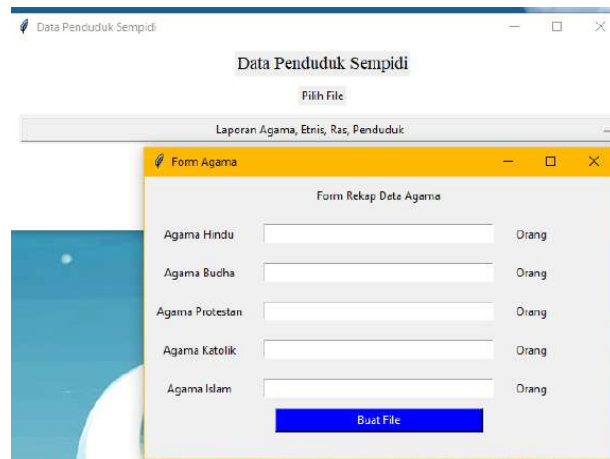


Figure 10. Pages of religion, ethnicity, race, and population report data form

2. Application Testing

2.1. Testing of Education Recapitulation Page Based on Gender

Creating a recapitulation of education data based on gender is done by opening the main.exe application and selecting the type of recapitulation of education data based on gender, and also pressing the "Create File" button, which will produce a file "Recap_Education.xlsx" which has the format Excel data, which is stored in the output folder in the main.exe application storage location.

Data from the education data recapitulation based page on gender can be seen in Figure 11, and the results of application testing on the education data recapitulation based on gender can be seen in Figure 12. From the test results, it can be seen that the education data recapitulation page based on gender has worked well.



Figure 11. Pages of education data recapitulation by gender

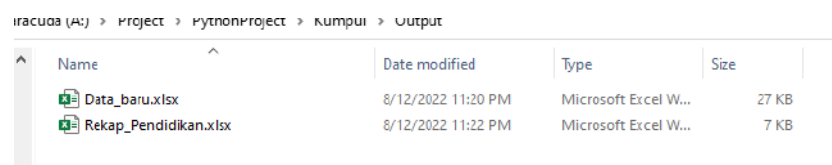


Figure 12. Results of making education recap files in excel format

2.2. Testing of Total Population Page based on Single Age Group and Gender

Creating a population data recapitulation file according to a single age group and sex is done by opening the main.exe application and selecting the population according to a single age group and sex, and also pressing the "Create File" button, which will later be directed to

fill out the form for the number of family cards. And last, produce a file, "Population Recap by Single Age Group and Gender.xlsx," which is stored in the output folder in the main.exe application storage location.

Data from the recapitulation page of population data by single age group and sex can be seen in Figure 13, and the results of application testing on the population data recapitulation page by single age group and sex can be seen in Figure 14. The results show that the application can create an Excel file of population data recapitulation by single age group and sex.



Figure 13. Pages of population data recapitulation by single age group and gender

Name	Date modified	Type	Size
Data_baru.xlsx	8/12/2022 11:20 PM	Microsoft Excel W...	27 KB
Rekap Penduduk Menurut Kelompok Umur Tunggal dan Jenis Kelamin.xlsx	8/12/2022 11:40 PM	Microsoft Excel W...	10 KB
Rekap_Pendidikan.xlsx	8/12/2022 11:22 PM	Microsoft Excel W...	7 KB

Figure 14. Results of data recapitulation test on total population based on single age group and gender

2.3. Testing of Population Data Form Page based on Education and Livelihood, Religion, Ethnicity, Race, Family Card, KIPS and STPPTS

Population data page based on education and livelihood, religion, ethnicity, race, population total, family card (K.K.), Temporary Resident Identity Card (KIPS), and Temporary Resident Registration Certificate (STPPTS) is an input form for entering religion and population data which cannot be processed directly by using a filter. Pages of population data form shown in Figure 15.

The test result of the application of the population data form page by education and livelihood, religion, ethnicity, race, population, households, KIPS, and STPPTS produces a data file named "Rekap_all.xlsx," which is stored in the output folder. The results of testing the population data form page by education and livelihood, religion, ethnicity, race, population, households, KIPS, and STPPTS can be seen in Figure 16. Based on the results, the application tests have gone well, and we have created files in Excel format.

2.4. Testing of Form Pages for Religion, Ethnic, Race, and Population

The testing of the report form page for religion, ethnicity, race, and population by inserting data of each religion's total number, which can be seen in Figure 17. The page testing produces

data called "Recap_Religion.xlsx," stored in the output folder, as seen in Figure 18. The result showed that the report form page for religion, ethnicity, race, and population has been successfully carried out and is running well.

Figure 15. Pages of population data form based on education and livelihood, religion, ethnicity, race, population total, household, KIPS, and STPPTS

Data_baru.xlsx	8/12/2022 11:20 PM	Microsoft Excel W...	27 KB
Rekap Penduduk Menurut Kelompok Umur Tunggal dan Jenis Kelamin.xlsx	8/12/2022 11:40 PM	Microsoft Excel W...	10 KB
Rekap_Pendidikan.xlsx	8/12/2022 11:22 PM	Microsoft Excel W...	7 KB
Rekap_Semua.xlsx	8/12/2022 11:49 PM	Microsoft Excel W...	7 KB

Figure 16. Test Results of population data form pages by education and livelihood, religion, ethnicity, race, total population, household, KIPS, STPPTS

Figure 17. Pages of religion, ethnicity, race, and population report form

Data_baru.xlsx	8/12/2022 11:20 PM	Microsoft Excel W...	27 KB
Rekap Penduduk Menurut Kelompok Umur Tunggal dan Jenis Kelamin.xlsx	8/12/2022 11:40 PM	Microsoft Excel W...	10 KB
Rekap_Agama.xlsx	8/12/2022 11:55 PM	Microsoft Excel W...	6 KB
Rekap_Pendidikan.xlsx	8/12/2022 11:22 PM	Microsoft Excel W...	7 KB
Rekap_Semua.xlsx	8/12/2022 11:49 PM	Microsoft Excel W...	7 KB

Figure 18. Pages of religion, ethnicity, race, and population report form

3. Socialization and Training Session

To complete this community engagement program, the training on using the SINANAS application for Kepala Lingkungan of the Sempidi ward was held in the Sempidi ward head office. Sempidi ward has 9 (nine) Kepala Lingkungan that serves 9 (nine) Banjar Dinas. The aim is to socialize and develop Kepala Lingkungan's skill of utilizing the SINANAS application as well as to improve the application's features according to advice and the needs of the Kepala Lingkungan and community. Results of the training activity show that Kepala Lingkungan initially knew how to use the application as well as how to install the application installation. Some participants have problems with their Microsoft Excel installation, and we have fixed their situation and can continue the training.

After the training, the participants showed great enthusiasm for the material presented, the presenter delivery, and the facility prepared, as demonstrated by both post-training questionnaire results. The participants have expanded their knowledge of using ICT technology from this activity, especially the SINANAS application. These activities are beneficial to facilitate the work of the Kepala Lingkungan in serving the Banjar Dinas Sempidi ward community relating to administrative documents. Based on the final questionnaire, Kepala Lingkungan found that using the SINANAS application, creating annual and monthly administrative reports is easier and quicker than manually creating in Microsoft Word and Microsoft Excel.

Table 1 and Figure 19 show the result of the pre-questionnaire tools for administrative work. In Table 1, it can be seen that the Kepala Lingkungan in Sempidi ward disagree and strongly disagree that their administrative work is well-organized, understandable, effective, and efficient. On the other hand, they strongly agreed that the administrative work was time-consuming. The pre-questionnaire was converted in the graph for administration software applications and can be seen in Figure 19. As seen in Figure 19, participants used Microsoft Word and Microsoft Excel to simplify their work. They always use their applications.

Table 1. Pre-questionnaire results

No.	Statements	5	4	3	2	1	Total
Administration works							
1	Well-organized				3	6	9
2	Effective and Efficient				5	5	9
3	Time-consuming	9					9
Administration software applications							
4	Microsoft Word				9	0	9
5	Microsoft Excel				0	9	9
6	Other applications				0	0	0

Note: 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, and 5 = strongly disagree

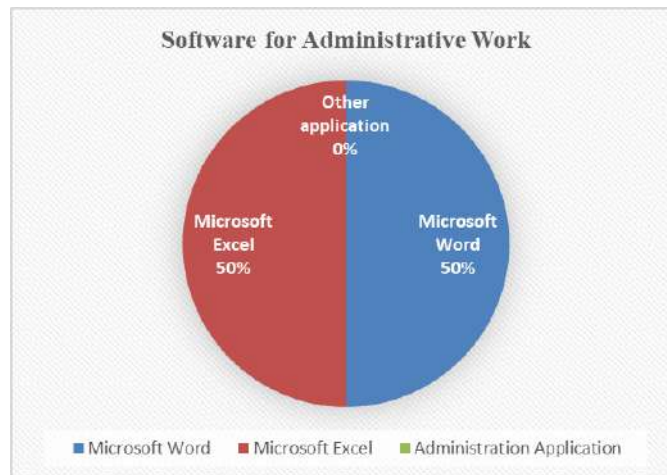


Figure 19. The diagram result of the pre-questionnaire tools of administrative work

Based on the pre-questionnaire results of administrative work, the SINANAS application was developed. After we had finished the socialization and training session, the post-questionnaire training was conducted to determine the application's success rate and the success of the implementation of community service activities. Table 2 shows the detailed result of the post-questionnaire training. The columns show the ratings from 9 participants.

Table 2. Post-questionnaire results

No.	Statements	5	4	3	2	1	Total
Material							
1	Well-organized and understandable	5	4				9
2	Effective and applicable	6	3				9
3	Support and development skill	8	1				9
4	Corresponds to the time provided	4	5				9
Presenter							
5	Mastery of the material	8	1				9
6	Clear and understandable	7	2				9
7	Good interaction with the participants	9	0				9
8	Helpful and answer the need of participants	9	0				9
Organization of the training							
9	Time management	4	5				9
10	Room, consumption, and facility	3	6				9
11	Presenter expertise and communication	8	1				9
12	Sustainability	8	1				9

Note: 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, and 5 = strongly disagree

The result shows that all participants give 5 or 4 ratings. In the material section, the highest impact is on the support and development skills of the participants. In addition, the response to the training also shows a well-interaction between the presenter and participants to understand the material deeper. The presenters can answer the needs of the participants so that all participants are satisfied. Overall, before we did this study and after we developed the application, Kepala Lingkungan could use it very well to improve their administration service to the community and produce monthly and yearly reports easier.

CONCLUSION

Findings advised involving stakeholders, Kepala Lingkungan, and the Sempidi ward community early in the SINANAS application design process. Designs should build on existing population data and ensure flexibility in the design to incorporate adaptations and evolving stakeholder needs.

SINANAS application has succeeded developed based on the Kepala Lingkungan and Sempidi ward community needs for facilitating Kepala Lingkungan's work in serving the community's administration. There were four features of the SINANAS application successfully created using Visual Studio Code and Python language programming, which are 1) reporting page for population data of education and livelihood, religion, ethnicity, race, number of population, family card, Temporary Resident Identity Card (KIPS), Temporary Resident Registration Certificate (STPPTS); 2) Reporting page for religion, ethnicity, race, and population; 3) Reporting page for total population based on single age group and gender, finally, 4) Report for education recapitulation based on gender.

Kepala Lingkungan was very impressed with the material in the socialization and training session. The highest impact of the trainer was support and development skills. In addition, the response to the training also shows a well-interaction between the presenter and participants to understand the material deeper. The presenters can answer the needs of the participants so that all participants are satisfied.

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