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DESIGN OF WEB-BASED LAND DEED REGISTRY WITH A GEOGRAPHICAL INFORMATION SYSTEM

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Abstract

The needs of the community in completing the administration, especially in the field of land and buildings are quite high. Especially in the land sector, which is never empty of buying and selling transactions. In the process, the community needs to take care of the administration from the village level to the sub-district level to get their land titles. At the sub-district level, which of course covers the area of several villages, it certainly requires a fast process to avoid queues and also tidy up the data as archives if one day it is needed. Cibiru District, which is located in the eastern part of Bandung City, includes 4 (four) urban villages, namely Pasirbiru Village, Cipadung Village, Palasari Village, and Cisurupan Village. With the coverage of the four sub-districts, of course, if there is a land administration process, it requires a system that can properly handle the interaction between sub-district officers and the community. The purpose of this study is to design a Land Deed Submission Information System with the intention of providing two-way services between the communities as users so that they can directly access and participate in the stages. The method used in this study uses qualitative methods by using interview and observation data collection techniques to the object of research, namely the Cibiru District Office. The system development method used is object-oriented with a prototype as a software development method. The results show that with the design of this information system, the problems that have been described previously can be resolved, so that the community can easily monitor the progress of the land deed. The process in the system includes an application for a Sale and Purchase Deed (AJB), site review, and AJB collection. All processes that are usually carried out by visiting the sub-district directly can be facilitated by the existence of this information system which can be accessed via the website by the user and can directly input data and file requirements.

Keywords: Information system, Land deed, Web-based.

1. Introduction

Cibiru District is a government agency tasked with carrying out the Bandung government's responsibilities in the population administration area. The service of land deeds is the one which requires the use of a system. There are basic obstacles encountered when carrying out administrative tasks, such as manual filing, the incoming data process takes a long time for one submission to be processed until the land deed is issued. Furthermore, the archiving process is carried out manually in the land data agenda book as a storage medium [1]. The estimated time for one submission is one day in the Standard Operational Procedure for submitting a land certificate, which refers to the Regional Government Regulation concerning Land Deed Issuance Services. As a result, in practice, submitting a land deed can take quite a long time because queues and data processing are still carried out by officers using this traditional method [2, 3].

In conducting this research, the author analyses previous research in order to generate innovation and improve needs from both the user and academic perspectives. As in Nugraha research which aimed to design and build a Web-based Land Deed Administration Information System [4]. This research is similar to the author's research in that they both build a system to facilitate data processing and data archives in digital media. However, there are significant differences in the results, specifically regarding the concept of the system being built. The author's system serves as an intermediary between sub-district officers and the community (multiuser), whereas the system built in this study is only used by officers. Further research conducted by Miscione et al. [5] with the aim of building a Notary & PPAT administrative information system based on web with laravel framework.

Following an examination of the benefits and drawbacks of previous research, the researchers attempted to explore and continue to seek in order to provide the best solution based on previous research. As a result, the researcher proposes a solution, namely the development of an information system that directly involves the community in the input of the required data into the submission form. The information system built also includes a monitoring feature for the public to see the extent of the submission, with the goal of directly reprimanding the community if the management process does not adhere to Standard Operating Procedures. The aim of the research is to create a Land Deed Submission Information System with the goal of providing two-way services to the community as users so that they can directly access and participate in the stages. The method used in this study employs qualitative data collection techniques, such as interviews and observations, to the object of research, namely the Cibiru District Office. The object-oriented system development method is used, with a prototype as a software development method. The results show that by designing this information system, the previously described problems can be resolved, allowing the community to easily monitor the land deed progress.

2. Related Work

A deed is a letter that is made with the intent of being used as evidence of an event that has occurred and is signed by the maker. A deed is defined as a letter with a signature containing events that form the basis of a thing or an agreement made from the beginning and deliberately as proof [6].

Many people complain when they want to take care of a land certificate in the form of a land certificate at the Wagir sub-district office because the process takes a long time to process the land certificate, so they have to wait for months. Furthermore, interested individuals from both outside and within the city must commute. This is due to the fact that land deeds in Wagir sub-district are still managed manually. As a result, the community suffers as a result of the longer time it takes to issue land deeds. As a result, it is necessary to design and build a web-based land certificate administration information system application to assist officers in managing land deeds so that the public can also view detailed and periodic information that can be viewed via the web [6, 7].

Furthermore, research conducted by Pande Wayan Ego Nugraha entitled 'Sistem Informasi Administrasi Akta Notaris & PPAT Berbasis Web Dengan Framework Laravel (Studi Kasus Notaris & PPAT Hartono, S.H.)' with the aim of building a web-based Notary & PPAT administrative information system with the framework laravel and assisting Notary & PPAT Hartono, SH in managing personal data, collecting land with digital maps, and accelerating the creation of deeds of sale and purchase, grant, sharing of joint rights, binding sale and purchase not paid off, binding sale and purchase in full, power of sale, deed of cancellation, and lease. At the Notary & PPAT Hartono, S.H., there is no system in place to monitor the process of making deeds, managing personal data, and collecting land certificates. For example, in making deeds and data processing, Microsoft Word and Microsoft Excel are still used, so the data is not neatly arranged, which can cause delays in making the deed due to the difficulty of getting information in a short time. Based on the problem's context, a Sistem Informasi Administrasi Akta Notaris & PPAT Berbasis Web Dengan Framework Laravel was developed [3].

Moreover, the research conducted by Dedi and Hardi Yusmanto entitled 'Rancang Bangun Sistem Informasi Administrasi Akta Jual Beli Berbasis Web (Studi Kasus Di Notaris dan PPAT Andriyani Mirawati, SH. M.KN.)' with the aim of analysing the current system and designing the administrative information system of the Akta Jual Beli pada Kantor Notaris dan PPAT Andriyani Mirawati, SH. M.KN transaction processes such as calculating the costs of NOTARIS/PPAT staff Andriyani Mirawati, SH. M.kn. is still necessary to receive data before performing calculations, and after processing, the results of the cost calculation detail will be sent back to the client, implying that there is a process of waiting for each other for data. Besides, there are still problems when delivering information because the processing time for the completion of the Sale and Purchase Deed (AJB) which takes about 3 to 6 months, when you want to provide information the staff must find and match the archives in the ledger, so providing information takes time and cannot be obtained directly. As a result, we require an integrated system to ensure that the process of storing data and delivering information is as quick as possible [8].

Following an examination of the benefits and drawbacks of previous research, it is necessary to develop an information system that directly involves the community in the input of the required data into the submission form. The information system built also includes a monitoring feature for the public to see the extent of the submission, with the goal of directly reprimanding the community if the management process does not adhere to Standard Operating Procedures.

3. Method

The descriptive analysis method was used to achieve the objectives of this study by explaining in detail the research conducted and then analysing qualitatively according to the method of development [9]. In this study, the system approach method is an object-oriented approach, with the method of analysing requirements based on classes and objects that exist in the system development process itself [10]. In this study, the development of information systems focuses on resolving a problem from the existing system in order to provide certainty between the two users, both from the community as external parties and PPAT officers as internal.

The prototype method was used in this study to develop the system [11]. This prototyping development method emphasizes the contribution of users and application developers, so in practice, communication between the two can be intense in order to achieve the best results [12, 13]. Generally, the developer will gather information about their needs and then create an early stage design that will later be used for discussion and evaluation of the development carried out.

The stages in the prototype model include [14], refer to Fig. 1:

- Identify User Needs
- At this stage, the process of gathering data regarding the needs of information system users is carried out, generally through direct observation and interviews.
- Prototype Making
- Following the analysis of the needs, a prototype is created directly on the basis of the results of data collection on previous needs. At this stage, it is still in the form of an initial prototype of the information system to be used as material for further discussion with users.
- Prototype Testing
  - After the prototype is completed, the developer will consult with users as well as test the results of the early stages of making whether it is appropriate or still needs to be added or there are subtractions.
- Prototype Fixing
  - When there is an evaluation or input from the user side, the developer needs to improve according to user requirements.
- Prototype Implementation
- If the prototype has been completed and is in accordance with user requirements, the final step is to implement the system that has been designed to be used in accordance with user requirements.

4. Results and Discussion

4.1. Use case diagram design

This use case designed is a mapping description of what processes are provided in the system built, including who can be involved in this system. Figure 2 shows a proposed use case diagram for the development of an information system for submitting land deeds in the Cibiru district.

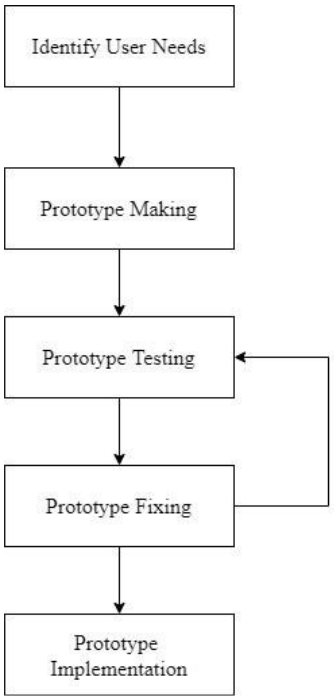

Fig. 1. Stages of the prototype model.

Fig. 2. Use case diagram design.

The researcher's information system will be the Land Deed Submission Information System, with a focus on submitting a web-based Land Sale and Purchase Deed to meet user needs while also keeping up with developments in information technology in the field of government services. This information system can serve as a monitoring medium for the community during the land deed submission process, assisting PPAT officers in validating their submission requirements files, and streamlining documentation of evidence of requirements both physically and digitally in order to anticipate user error (human error). People who submit a deed of sale and purchase are usually land sellers who can directly access the website to submit a deed of sale and then upload all of the required documents in the form of an image as proof of fulfilment of the first stage of the file. The officer will verify the first stage by reviewing all of the files submitted by the applicant; if the files are complete, the officer will give a verification mark. If it is not suitable, the officer will reject the submission as well as any officer comments that are missing from the requirements file. The PPAT officer schedules site inspections, verifies proof of sales and purchases tax payment, and issues an invoice proving that all stages have been completed. It also specifies when the Land Deed can be obtained from the Cibiru District Office.

4.2. Interface design

The interface's function is to provide an overview of the application's design. Tables 1 and 2 show an implementation of the interface that is being built, as well as what its function is and a description of its appearance.

Table 1. User menu structure.

Menu	Description	Filename
Home	Displaying the Main Page	Index.php
Survey schedule	Displays the Survey Schedule Page that will be carried out	Peninjauan.php
Tax payment	Displaying the schedule to retrieve the Land Deed	Bayarpajak.php
Retrieving Schedule	Displaying the schedule to retrieve the Land Deed	Pengambilan.php

Table 2. Admin menu structure.

Menu	Description	Filename
Home	Displays the Main Page which displays submissions notification that must be processed in a day	Index.php
Submission	Displaying the Land Deed Registration Data Page submitted by the user	Datapendaftaran.php
Survey schedule	Displays the Survey Schedule Data Page	Datapeninjauan.php
Tax payment	Displaying Land Deed Tax Payment Data For Verification	Datapajak.php
Retrieving land deed	Displaying the schedule to retrieve the Land Deed	Datapengambilan.php
Officer data	Displaying Reviewer's Data	Datapetugas.php
Officer account data	Displaying the reviewer's account data	Dataakun.php
Land deed submission data	Displaying A Page To Print A Sale And Purchase Deed Submission Report	Ajb.php

4.2.1. PANAH Web App Main page and user

People who want to submit their land deeds on this page must create an account first. After the account has been made, you can login to enter the system as a user and begin submitting the land deed before proceeding to the final stage, namely taking the land deed, after going through several processes such as validation from the PPAT officer, site review, tax payments, and others. Figure 3 depicts the main page of the PANAH Web App.

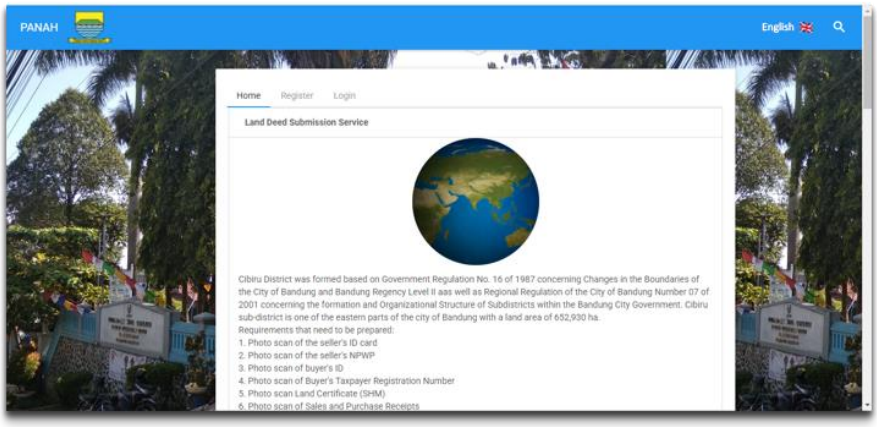

Fig. 3. PANAH Web App main page.

Users can submit land deeds by entering information such as the Owner party data, the Receiving party data, the Land deed data, and the Purchase data. On that page, there are also several files that must be uploaded in order for digital files to be complete. File scan ID Card, Taxpayer Card, Initial Land Deed, and Sales and Purchase Receipt, for example. Figure 4 depicts the display of the land deed submission form.

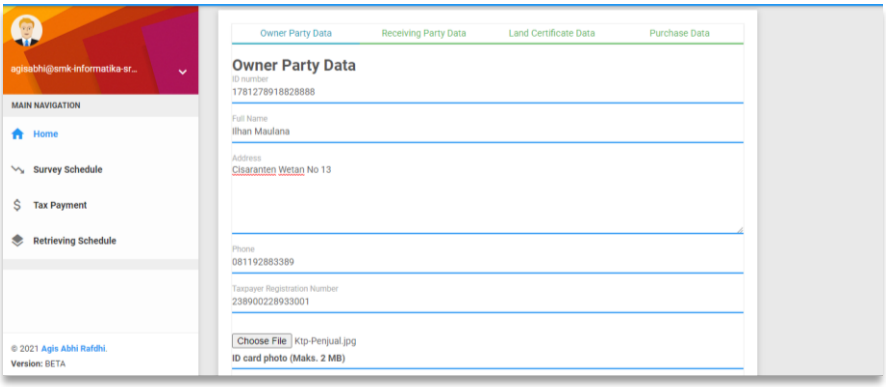

Fig. 4. Land deed submission form page.

4.2.2. PANAH Officer's page

After the user's submission is added, the PPAT officer, as the admin, must validate the requirements file that was previously uploaded, determining whether it is

appropriate or if something needs to be changed by the user; if it is suitable, it must be verified and accepted before proceeding to the next stage. The admin can manage almost all administrative processes, such as submitting verification, scheduling site visits, verifying tax payments, and taking land deeds. Figure 5 shows the admin page.

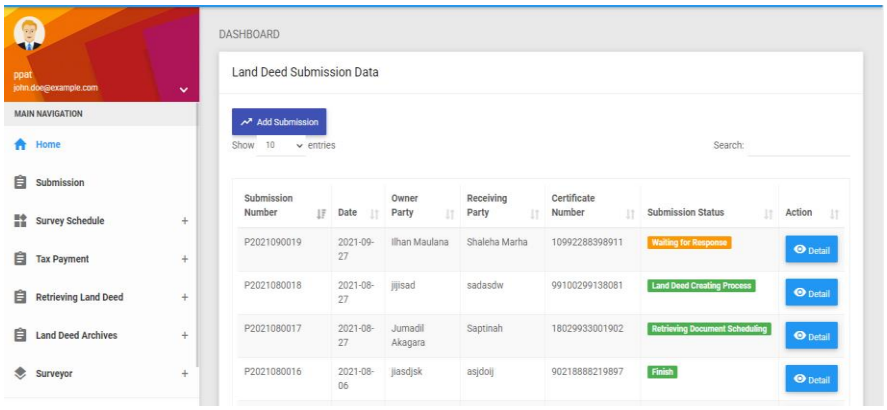

Fig. 5. Officer page.

4.2.3. Surveyor's page

The surveyor is responsible for conducting a direct review of the land deed transaction's object in order to upload the results of the location review as well as a sketch of the land map that is used as the transaction's object. When the previous Officer has completed the land location review schedule, the reviewing officer will conduct a site review with the owner. The physical files that were uploaded in the previous stage will be verified during the location review process. As a result, the reviewing officer will also provide stage 2 file validation on the provided form, making the verification stage more valid between the digital one as system documentation and the original file (Fig. 6). Furthermore, a review of the land's location is carried out by taking into account the actual land area, then filling out the report form for the review, and finally uploading a rough map of the transaction's object (Fig. 7).

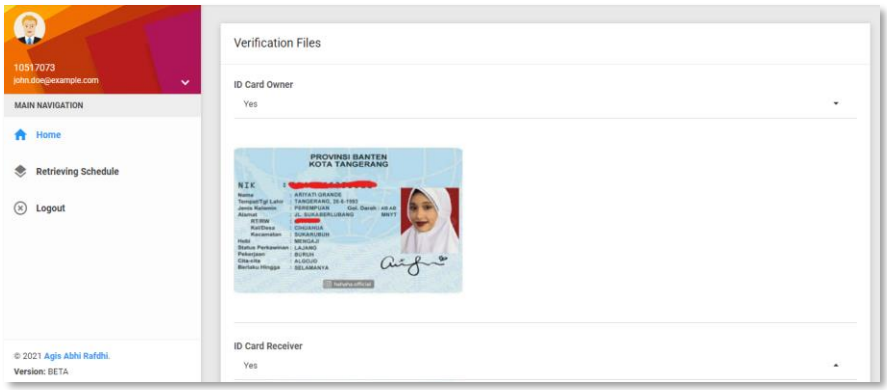

Fig. 6. Surveyor file verification page.

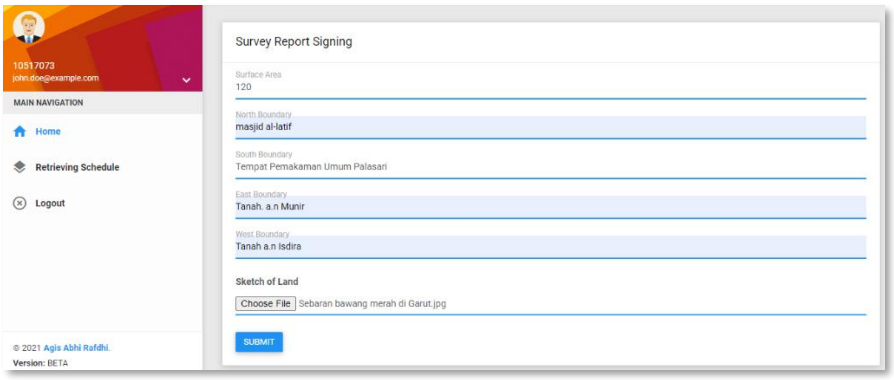

Fig. 7. Surveyor Review results page.

4.3. Software implementation

The implementation phase can begin once the system has been built and adjusted to meet the needs of the test results. Several factors must be considered during the implementation stage of this software in order to achieve maximum implementation in its use. One of them is about the specifications for this land deed information system, which are listed below. These specifications are extremely useful in completing program by program in the development of this system, which includes the following applications:

- Microsoft Windows 10.
- XAMPP v3.3.0.
- Google Chrome Browser

4.4. Minimum requirements

The implementation of this system also requires adequate hardware specifications to support optimal service, these specifications include:

1. Server Computer Specifications
   a. Single core processor Inten or AMD minimuml of 2.1 Ghz
   b. Hard disk with capacity of minimum 320 GB or more
   c. Minimum RAM memori of 4GB or more
   d. Minimum APU (Accelerated Processing Unit) Graphics Card
   e. Keyboard, Monitor, Mouse, and Printer.
2. Client Computer Specifications
   a. Single core Intel atau AMD processor minimum of 2,00 GHz or equivalent
   b. Requires a minimum of 2 GB RAM
   c. Hard disk capacity of minimum 120 GB
   d. Minimum APU (Accelerated Processing Unit) Graphics Card
   e. Keyboard, Monitor, Mouse, and Printer

Finally, this system was designed to make it easier for people to obtain legal status for their property. It is because the obtained legality will provide administrative security and legal recognition by the state. Of course, in the future, it will not only be in the form of data exchange services but can also be

implemented in the form of a Geospatial Information System (GIS) to provide a clear picture of the location of the land where the transaction is being carried out [15, 16]. In the future, GIS can provide information to people looking for land in the Cibiru sub-district, such as the status of the land and the available price based on the area's Tax Object Sales Value (NJOP) [17, 18]. In addition, the use of GIS will be linked to a website with a dynamic display to provide a detailed description of land ownership within the Cibiru sub-district [19, 20] (see Fig. 8).

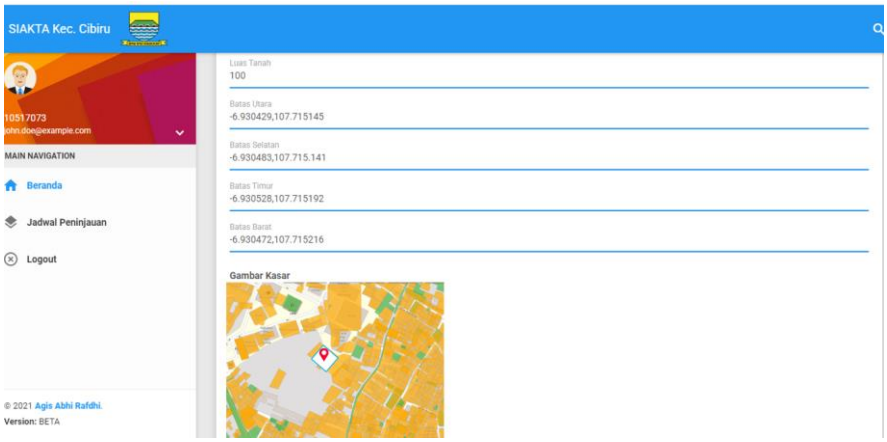

Fig. 8. Digitizing map location coordinates by surveyor.

5. Conclusion

Based on the results and discussion of the research that the researchers describe in the development of the information system for submitting land deeds, it can be concluded that the construction of this system is in accordance with its objectives to overcome existing problems, beginning with the efficiency of filing time. Therefore, with this system, the public can apply at any time and from any location without having to go to the Cibiru district office. Furthermore, when it comes to data archiving, it can be done digitally and accessed by the administrator at any time. Moreover, from the community's perspective, they can see the status of the submission and at what stage they submitted it from the beginning. All of the features provided can assist with existing problems with simple solutions and can be run with minimal effort while providing maximum service to the community.

References

1. Ramadhani, R.; and Abduh, R. (2021). Legal assurance of the land registration process in the pandemic time of Covid-19. *Budapest International Research and Critics Institute-Journal*, 4(1), 348-358.
2. Babalola, S.O.; Fadola, H.A.; and Ayo, B. (2020). Development of a web-based cadastral system for verification and mortgage lands registration in Akure metropolis. *Journal of Geomatics and Environmental Research*, 3(1), 97-114.

3. Santyaningtyas, A.C.; and Zubaidi, R. (2020). Role of land deed officials in legal satisfaction guarantee for complete systematic land registration. *Jurnal Notariil*, 5(1), 49-57.
4. Nugraha, V.M. (2022). Implementation of first time electronic land registration by notary as officer of land deed management at the office of the national land agency. *Sultan Agung Notary Law Review*, 4(2), 690-696.
5. Miscione, G.; Richter, C.; and Ziolkowski, R. (2020). Authenticating deeds/organizing society considerations for blockchain-based land registries. *Responsible and Smart Land Management Interventions*. CRC Press, 133-150.
6. Polat, Z.A.; and Alkan, M. (2018). Design and implementation of a LADM-based external archive data model for land registry and cadastre transactions in Turkey: A case study of municipality. *Land Use Policy*, 77, 249-266.
7. Rupasinghe, K.A.B.S. (2016). A pragmatic approach to establishing the cadastral parcel fabric for sustainable land management in Sri Lanka. *Journal of the Urban & Regional Information Systems Association*, 27(2), 65-73.
8. Dedi, D.; and Yusmanto, H. (2013). Rancang bangun sistem informasi administrasi akta jual beli berbasis web (studi kasus di notaris dan ppat andriyani mirawati, sh. m. kn.). *Jurnal Sisfotek Global*, 3(2).
9. Narimawati, U.; Pertiwi, P.; and Sulaeman, S. (2022). Penggunaan aplikasi padlet untuk meningkatkan hasil belajar menulis mahasiswa pada materi teks prosedur pada mahasiswa unikom. *JIIP-Jurnal Ilmiah Ilmu Pendidikan*, 5(11), 4714-4719.
10. Kanaki, K.; and Kalogiannakis, M. (2018). Introducing fundamental object-oriented programming concepts in preschool education within the context of physical science courses. *Education and Information Technologies*, 23(6), 2673-2698.
11. Oluyomi, A.O.; Olorunshola, O.E.; and Irhebhude, M.E. (2020). Comparative analysis of structured system development life cycle methodologies: rapid application development, prototyping, and scrum. *i-Manager's Journal on Software Engineering*, 15(1), 1-11.
12. Sudarmilah, E.; Susanto, A.; Ferdiana, R.; and Ramdhani, N. (2017, May). Preschoolers' cognitive game prototype. *Proceedings of the 2017 International Conference on Applied System Innovation (ICASI), Sapporo, Japan*, 1875-1878.
13. Lebens, M.C. (2021). Using prototyping to teach the design thinking process in an asynchronous online course. *Journal of the Midwest Association for Information Systems*, Vol, 2021(2), Article 3, 21-38.
14. Agarwal, P.; Singhal, A.; and Garg, A. (2017). SDLC model selection tool and risk incorporation. *International Journal of Computer Applications*, 172(10), 6-10.
15. Maharjan, H.G. (2015). Land records information management system. *Nepalese Journal of Geoinformatics*, 14, 26-31.
16. Tagoe, N.D.; and Mantey, S. (2011). Web-based land records system-the case of Ghana. *International Journal of Scientific & Engineering Research*, 2(11), 1-9.
17. Pangaribuan, I.; Rahman, A.; and Mauluddin, S. (2020). Computer & network equipment management system (CNEMAS) application measurement.

International Journal of Informatics, Information System and Computer Engineering (*INJIISCOM*), 1, 23-34.

18. Ginting, S.L.B.; Maulana, H.; Priatna, R.A.; Fauzzan, D.D.; and Setiawan, D. (2021). Crowd detection using yolov3-tiny method and viola-jones algorithm at mall. *International Journal of Informatics, Information System and Computer Engineering* (*INJIISCOM*), 2(2), 13-22.
19. Budiarti, I.; Andrian, R.; and Falah, A.W.N. (2021). Application of web communication relationship management in small and medium enterprises. *International Journal of Research and Applied Technology* (*INJURATECH*), 1(1), 49-54.
20. Soegoto, E.S.; Rizqi, N.A.; Purwani, I.S.; and Zulkarnain, Z. (2022). ZionimeArt app: designing mobile application as a medium for selling anime t-shirts. *International Journal of Research and Applied Technology* (*INJURATECH*), 2(1), 61-70.