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IMPLEMENTATION OF DESIGN THINKING FOR THE DIGITAL TRANSFORMATION OF DESA CANTIK MENTORSHIP AT BPS-STATISTICS TANGERANG REGENCY

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Abstract

Village for Statistical Excellence or Desa Cinta Statistik (Desa Cantik) program is a sectoral statistical development program implemented by the BPS-Statistics Indonesia to improve literacy, data management quality, and statistical utilization at the village level. However, the implementation of face-to-face statistical development still faces various obstacles, such as limited learning time, a work environment full of interruptions for village officials, difficulty repeating material, and limited access to flexible learning media. This study aims to design a digital transformation of Desa Cantik development program at the BPS Tangerang Regency using a design thinking approach. The study used a qualitative approach with the stages of understand, observe, define point of view, ideate, prototype, test, and reflect. Data collection was conducted through in-depth interviews, observation, documentation, and usability testing with village statistical agents assisted by BPS Tangerang Regency. The results showed that village statistical agents need statistical learning media that is simple, flexible, easily accessible, and can be re-learned independently. Based on the results of the ideation and testing process, a prototype of an Android-based e-learning application called StaT-Gem (Statistik Tangerang Gemilang) was developed, which features short learning videos, a structured material repository, an offline mode, and light quizzes with positive feedback. Usability testing results indicate that the application is easy to use, has intuitive navigation, and can help users access learning materials more flexibly according to the working conditions of village officials. This study concluded that the application of design thinking can produce digital transformation solutions that are more adaptive to user needs and support the sustainability of Desa Cantik's statistical development through an effective and user-centered e-learning approach.

Keywords: design thinking, digital transformation, e-learning, desa cantik, statistical development

INTRODUCTION

The BPS-Statistics Indonesia (BPS), as the country's official data provider, plays a strategic role in encouraging data utilization for national development planning down to the regional level. To strengthen this role, BPS has introduced the Integrated Statistics Service (PST) as a one-stop service. This service aims to provide data access, statistical consultations, data literacy assistance, and statistical education to the government, academics, business actors, and the general public. The Integrated Statistics Service not only facilitates data requests but also serves as a means of fostering and increasing the statistical capacity of data users. This aligns with BPS's goal of providing more collaborative, inclusive, and problem-solving statistical services, rather than simply providing numbers. The PST serves as a strategic instrument for strengthening public statistical literacy and ensuring data serves as the basis for evidence-based policymaking. As part of the integrated statistics service, BPS has been conducting statistical development activities under the "Desa Cinta Statistik" program since 2021. Desa Cantik program is a sectoral statistical development program at the village/sub-district level. This program is generally designed for several purposes, including: (1) increasing literacy, awareness and the active role of village/sub-district officials and the community in organizing statistical activities; (2) standardizing statistical data management to maintain the quality and comparability of statistical indicators; (3) optimizing the use and utilization of statistical data so that development programs in villages/sub-districts are on target; (4) forming statistical agents at the village/sub-district level. Thus, Desa Cantik Development is a form of integrated statistical service aimed at strengthening statistical development from the village/sub-district level.

Desa Cantik Program is considered effective in developing statistics at the village/sub-district level. Wiyanti et al. (2025) stated that there was a significant increase in digital literacy knowledge of statistical data processing and analysis among all training participants (Desa Cantik statistical agents) after receiving statistical training in Desa Cantik program. Kusuma and Khoiri (2023) explained that Desa Cantik Program has been instrumental in increasing village officials' understanding of the importance of data, while simultaneously encouraging better data governance to support village development planning. This program has been proven to increase the capacity of officials in managing village potential data. Meanwhile, Fisabilillah and Setiawan (2023) emphasized that the implementation of Desa Cantik Program has helped village officials in compiling village publications in figures and improving statistical data processing skills. This shows that Desa Cantik program focuses not only on training, but also on coaching, where mentoring activities and real data utilization are carried out. In 2024, Desa Cantik Development Activity will become one of the components of the Additional Performance Indicators (IKU Suplemen) of BPS work units throughout Indonesia. Starting in 2025, Desa Cantik Development Program has become a component of the Key Performance Indicators (KPI) and also supports the Public Service Index (IPP) assessment, which is another component of the KPI of BPS work units throughout Indonesia. BPS also consistently awards the best Villages/Sub-districts and Regency/City BPS Work Units in the Implementation of Desa Cantik Program every year. Thus, Desa Cantik Development Program has become a focus for BPS work units throughout Indonesia, including BPS Tangerang Regency. From 2021 to 2025, BPS Tangerang Regency has developed five villages in Tangerang Regency. The villages that have been developed by BPS Tangerang Regency are as follows.

Table 1. List of Villages that Have Been Assisted by BPS Tangerang Regency during 2021-2025

Year	Subdistrict	Village
(1)	(2)	(3)
2021-2022	Panongan	Serdang Kulon
2022-2023	Cikupa	Bojong
2024	Dragon Bay	Tanjung Pasir
2025	Pakuhaji	Surya Bahari and Sukawali

Desa Cantik Development materials cover the identification and preparation of statistical activities, data collection, data processing and analysis, data utilization for development, data quality management, and implementation of the One Data Indonesia (SDI) principle. This development material is delivered to all village statistics agents. Village statistics agents are appointed directly by the Village Head and are included in the Village Head's Decree concerning the Determination of Village Statistics Agents. Most village statistics agents are village officials. After receiving statistical development, statistics agents are expected to implement the knowledge gained for statistical development in the village. From 2021 to 2025, statistical development for the five villages supported by the BPS Tangerang Regency will be conducted face-to-face (offline) at the Village Government Office.

Five villages that have been fostered by the BPS Tangerang Regency received the title of Desa Cantik as stated in the Decree of the Head of the BPS-Statistics Indonesia concerning Desa Cantik. In general, villages/sub-districts with the title of Desa Cantik are determined by several criteria, including (1) having received statistical mentorship from Desa Cantik Supervisor (BPS Regency/City) and appointing a Statistics Agent in the Village/Sub-district, (2) producing output in the form of village/sub-district monographs/profiles, village/sub-district statistical publications, and websites with village/sub-district data/statistics. The five villages that have been fostered by the BPS Tangerang Regency meet these criteria and even received several awards from both the BPS-Statistics Indonesia (BPS RI) and the BPS Banten Province, namely as follows:

Table 2. List of Awards Received by Desa Cantik Fostered by BPS Tangerang Regency

Village	Award
(1)	(2)
Serdang Kulon	7 (Seven) Best Villages/Sub-districts at National Level in Desa Cantik Program in the Advanced Village Category in 2022
	3 (Three) Best Villages/Sub-districts at Provincial Level in the 2024 Desa Cantik Program
Bojong	3 (Three) Best Villages/Sub-districts at Provincial Level in the 2024 Desa Cantik Program
Tanjung Pasir	25 (Twenty Five) Best Villages/Sub-districts at the National Level in Desa Cantik Program in 2024

	Best Village/Sub-district in Banten Province in the 2024 Desa Cantik Program
Surya Bahari	4 (Four) Best Villages/Sub-districts at Provincial Level in the 2025 Desa Cantik Program
Sukawali	4 (Four) Best Villages/Sub-districts at Provincial Level in the 2025 Desa Cantik Program

In addition to the fostered villages, BPS Tangerang Regency as the Supervisor of Desa Cantik in Tangerang Regency also received several awards from the Desa Cantik Program, namely as follows.

Table 3. List of Desa Cantik Program Awards Received by BPS Tangerang Regency

Year	Award
(1)	(2)
2022	Best Work Unit at Regency/City Level in the 2022 Desa Cantik Program
2023	The First Best Work Unit in the Desa Cantik Program in Banten Province in 2023
2024	Best Work Unit at Regency/City Level in the 2024 Desa Cantik Program
2025	3 (Three) Best Work Units at the Provincial Level in the 2025 Desa Cantik Program

Starting in 2025, BPS Regency/City as Desa Cantik Supervisor faces challenges in implementing Desa Cantik development because BPS Regency/City must implement Desa Cantik Sustainability Program. This Desa Cantik Sustainability Program instructs all Desa Cantik Supervisors to re-develop villages that were previously developed in previous years. This is very different from previous years where BPS Regency/City was only required to develop 1 (one) village. Thus, it is necessary to determine the appropriate development method so that Desa Cantik Sustainability can be implemented properly at the Tangerang Regency BPS.

In facing these new challenges, the application of design thinking is necessary so that the BPS Tangerang Regency can design coaching methods that are more adaptive, efficient, and meet the needs of each assisted village. Tim Brown in Lewrick et al (2020) explains design thinking as a human-centered approach used to integrate user needs, technological possibilities, and business requirements to produce innovative solutions. This approach allows BPS Tangerang Regency as Desa Cantik Supervisor to re-understand the experiences, obstacles, and aspirations of village statistics agents through a process of in-depth empathy, especially after the statistics agents have participated in offline statistical coaching. The design thinking approach also allows BPS Tangerang Regency to redesign Desa Cantik coaching in a more innovative way through a sustainable, accessible, and efficient e-learning-based digital transformation that supports the sustainability of Desa Cantik program without burdening the supervisor's resources and while maintaining the quality of statistical coaching.

Digital transformation refers to a strategic process in which organizations integrate digital technologies into all aspects of their operations, fundamentally changing the way they work, innovate, and serve customers (Nadia & Nasution, 2025). Digital transformation in education through e-learning applications is the process of integrating digital technologies into traditional learning systems to create a more flexible, interactive, and affordable learning environment (Verawati et al., 2023). Verawati et al. (2023) show that e-learning as part of digital transformation can expand access to education, improve the quality of learning, and empower teachers to produce more engaging and relevant digital content.

Quiñones et al. (2024) used a design thinking approach to design a prototype of the EstApp mobile application. This application was designed to improve students' understanding of descriptive statistics in higher education. Test results showed that users found EstApp easy to use, useful, and potentially improved student engagement and understanding of statistics materials. There are six phases in the design thinking cycle: Understand, Observe, Define Point of View, Ideate, Prototype, and Test (Lewrick et al., 2020). In the British Design Council's double diamond model, the first three phases are in the problem space, and the next three are in the solution space. Finally, a reflect phase is added to learn from the actions taken. The best statistical coaching method for the next Desa Cantik program will be determined based on an analysis of these phases.

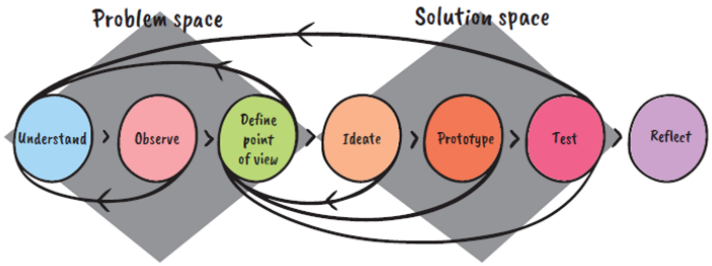


Figure 1. Phases in the Design Thinking Cycle

Based on the various problems and challenges in implementing the sustainability of Desa Cantik Program, particularly related to the limitations of offline statistical mentorship, an approach is needed that can produce innovative, adaptive, and user-oriented solutions. Digital transformation through the development of e-learning-based learning media is a strategic alternative to increase the effectiveness, flexibility, and sustainability of statistical mentorship at the village level. However, the development of digital solutions cannot be carried out solely based on technical assumptions, but it must be built on a deep understanding of the experiences, needs, and obstacles faced by village statistical agents as the primary users of mentorship services. Therefore, this research is necessary to design a digital transformation model for Desa Cantik Mentorship using a design thinking approach to produce statistical learning solutions that are more human-centered, easily accessible, effective, and appropriate to the real conditions of village officials. In addition, this research is expected to provide strategic recommendations for the Statistics Indonesia (BPS) of Tangerang Regency in supporting the sustainability of Desa Cantik Program and strengthening the quality of sectoral statistical development at the village level.

METHOD

This study uses a qualitative approach with the design thinking method as the main framework in the process of designing a digital transformation solution for the development of Desa Cantik at the Statistics Indonesia (BPS) of Tangerang Regency. The qualitative approach was chosen because the research focuses on an in-depth understanding of the experiences, needs, obstacles, and behaviors of users, particularly village statistics agents, in participating in statistical development. According to Creswell and Creswell (2018), a qualitative approach is used to explore and understand the meaning derived from social or humanitarian problems in depth. Meanwhile, the design thinking method is used because it is able to produce innovative solutions centered on users (human-centered approach) through the stages of problem exploration, idea development, prototyping, and iterative solution testing. This study adopts the design thinking stages according to Lewrick, Link, and Leifer (2020), namely understand, observe, define point of view, ideate, prototype, test, and reflect.

The research was conducted at the BPS Tangerang Regency and the Surya Bahari Village Government, Pakuhaji District, Tangerang Regency in November 2025. The location was selected purposively because Surya Bahari Village is one of the villages assisted by the 2025 Desa Cantik Program that has participated in statistical mentorship using the latest scheme from the BPS Tangerang Regency. The research subjects consisted of the Head of the BPS Tangerang Regency as the person in charge of Desa Cantik Program, Desa Cantik mentorship team of the BPS Tangerang Regency, and the statistical agents of Surya Bahari Village, most of whom are village officials. The selection of informants was carried out using a purposive sampling technique with the consideration that informants are directly involved in the statistical mentorship process and understand the actual conditions of program implementation. Sugiyono (2022) explains that purposive sampling is a sampling technique with certain considerations according to research needs.

Data collection techniques were conducted through in-depth interviews, observation, documentation, and usability testing. In-depth interviews were conducted with the Head of BPS Tangerang Regency and village statistics agents using the interview for empathy approach, 5W + 1H questions, and ask 5x why to explore experiences, needs, and root causes in the development of statistics in Desa Cantik. According to Moleong (2018), in-depth interviews aim to obtain detailed information about the experiences and views of informants on a phenomenon. Observations were conducted directly in the work environment of village officials using the AEIOU (Activities, Environment, Interaction, Objects, Users) approach to understand user behavior, work environment conditions, interactions, and technical obstacles in the statistics learning process. Documentation was carried out by collecting supporting documents in the form of guidelines for Desa Cantik Program, observation results, screenshots of application

prototypes, and documentation of research activities. In addition, usability testing was conducted with five statistics agents in Surya Bahari Village using a task-based testing approach to evaluate the ease of use of the developed e-learning application prototype. According to Rubin and Chisnell (2008), usability testing is used to measure the effectiveness, efficiency, and user satisfaction with a system or application. Data analysis was conducted using descriptive qualitative methods following the design thinking stages. The understand stage was conducted to understand user needs and problems through empathetic interviews and identification of root causes. The observe stage was conducted using AEIOU, empathy maps, and profit personas to map user behavior, needs, and conditions in more depth. The define point of view stage was conducted using context mapping to formulate the primary user needs in the form of point of view statements as the basis for solution development.

Next, the ideate stage was conducted through brainstorming and dot voting to generate and determine the priority solutions most relevant to the needs of village statistics agents. The prototype stage was carried out by developing an initial design for an Android-based e-learning application called StaT-Gem, which included short learning videos, a material repository, an offline mode, and a light quiz. After that, the test stage was conducted through usability testing to evaluate the effectiveness and ease of use of the application by village statistics agents. The final stage, reflect, was conducted using a retrospective sailboat to evaluate supporting factors, obstacles, risks, and the objectives of developing a digital solution for fostering Desa Cantik.

The validity of the data in this study was tested using source triangulation and method triangulation. Source triangulation was conducted by comparing information from the Head of BPS Tangerang Regency, the development team, and the village statistics agent. Meanwhile, method triangulation was conducted through a combination of interviews, observation, documentation, and usability testing so that the research results have a stronger level of validity and are able to describe the actual conditions of the implementation of statistical development in Desa Cantik. According to Patton (1999), triangulation is used to increase the credibility of the research through the use of various data sources and data collection methods.

RESULTS AND DISCUSSION

This research resulted in a digital transformation design for the development of Desa Cantik at the BPS Tangerang Regency through a design thinking approach consisting of the stages of understand, observe, define point of view, ideate, prototype, test, and reflect. Each stage was used to explore the needs of village statistics agents, identify problems in offline statistical development, and design digital-based learning solutions that are more flexible, easily accessible, and appropriate to the working conditions of village officials. The results of each stage were then analyzed to explain the effectiveness of implementing a human-centered approach in supporting the sustainability of Desa Cantik Program.

UNDERSTAND

Understand is the first stage in the design thinking cycle, aiming to understand potential users, the needs to be met, and the tasks to be completed (Lewrick et al., 2020). At this stage, a more precise creative framework is established to determine the desired solution. In this case, several design thinking tools are used, including empathy interviews, asking 5x why, 5W + 1 H questions, and jobs to be done. At this stage, the analysis begins by building a big picture of the user situation before diving deeper into the details of needs and root causes. The first tool used is the 5W + 1H questions which help map the initial context broadly so that an initial understanding of the user ecosystem is obtained. This first tool was applied in an interview with the Head of the Tangerang Regency BPS (Mr. Husin Maulana, S.Si., M.SE.) as the person in charge of implementing Desa Cantik Development in Tangerang Regency and also supervising the implementation of the development carried out offline.

Figure 2. Interview Activities with the Head of BPS Tangerang Regency

The interview was conducted on Wednesday, November 19, 2025, from 8:00 AM to 8:30 AM WIB in the Head of BPS Tangerang Regency's office. The results of the interview with the Head of BPS Tangerang Regency using the design thinking tool 5W + 1H questions are as follows.

Table 4. Application of Design Thinking Tools 5W + 1H Questions

Element	Question	Answer
(1)	(2)	(3)
What	What is needed?	Practical, clear, and easy-to-repeat statistics learning media.
Who	Who needs it?	- Desa Cantik Development Team of the BPS Tangerang Regency for the efficient implementation of Statistics Development - Desa Cantik Statistics Agent (including village officials) for statistics learning media
Why	Why is it needed?	- Desa Cantik Sustainability Program must be implemented but the budget and human resources (supervisory team members) are still limited. - Desa Cantik Statistics Agents do not have a background in statistics, most of them are high school graduates or below.
When	When is it needed?	During Statistics Coaching and After Statistics Coaching, especially when you forget the material
Where	Where is it used?	Anywhere
How	What is the solution?	Create a Desa Cantik e-learning containing videos, short modules, practical examples, and interactive exercises.

After understanding the big picture through the 5W+1H, the next step is to explore real-life user experiences through empathy interviews. At this stage, the analysis goes beyond simply gathering facts, but also seeks to delve into the feelings, motivations, and subjective experiences of village statistics agents (including village officials) as potential users of the e-learning application. Empathy interviews, in this case, aim to uncover emotional insights, understand unspoken behaviors and motivations, and hear authentic stories, not assumptions.

The empathy interview was conducted through an interview with 1 (one) representative of Desa Cantik statistics agent fostered by BPS Tangerang Regency, namely the Head of the Surya Bahari Village Government Section and also the coordinator of the Surya Bahari Village statistics agent (Mr. Kalidin). Surya Bahari Village is a Main Desa Cantik fostered in 2025 so it has received coaching with the latest coaching materials and schemes even though coaching is still being carried out offline. Since the location of the Surya Bahari Village government office is quite far, the interview activity was conducted online on Wednesday, November 19, 2025, at 10:00 to 11:00 WIB.

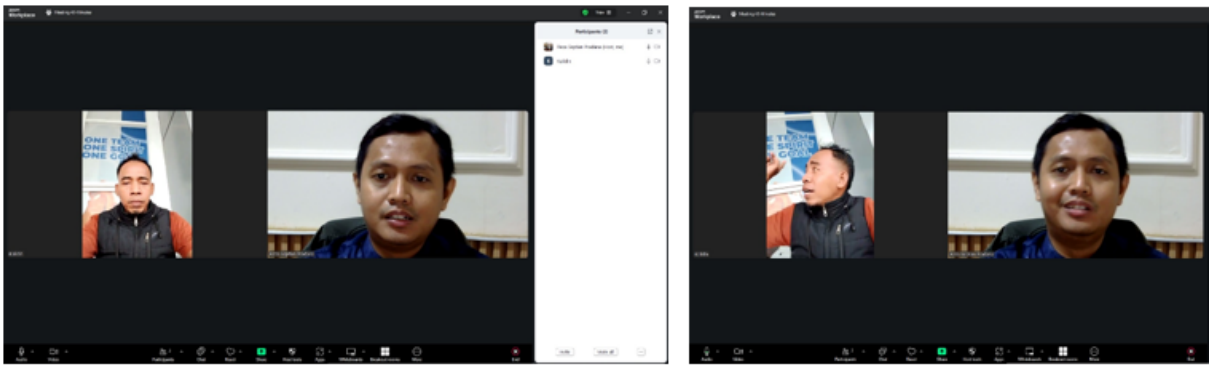


Figure 3. Interview Activities with Statistics Agents of Surya Bahari Village

In the interview for empathy activity, the statistics agent of Desa Cantik was given 3 (questions), including: (1) How was the experience when participating in offline statistics training?, (2) "What obstacles did you experience when participating in offline statistics training?", (3) "If you have to learn through a digital application, what is the most helpful thing?". These questions aim to dig up information on the pains and gains of the statistics agent of Desa

Cantik as a potential user of the digital application. The results of the interview with the statistics agent of Desa Cantik using the design thinking interview for empathy tool are as follows.

Table 5. Pain and Gains Findings from the Results of the Implementation of the Interview for Empathy

Pains (Obstacles)			Gains (Profits) (what is being sought)
Offline Training	*e-learning*	Emotional	
(1)	(2)	(3)	(4)
- The material goes by fast, can't repeat - Focus is divided because office work is still piling up - It takes a while to understand statistical concepts, but training time is limited.	- Fear of complicated login and navigation - *HP memory*small, afraid of heavy applications - Village internet connection is unstable - Long videos make you tired quickly - Quizzes are too difficult to make you feel inferior	- Afraid of being wrong - Afraid the material is difficult - Frustrated at having to leave village work to attend a full day of training	- Can learn slowly without fear of being judged - Material in the form of short videos is easier to follow. - There are real examples that are relevant to the village situation. - There is a simple guide for each feature - Can repeat the material at any time when needed for work - The presence of light quizzes makes users feel capable

After key pain points and gain points emerged from empathy interviews, the design thinking tool Ask 5x Why was used to identify the root cause. When users reported that offline training felt ineffective, the question "why" was asked repeatedly until the most fundamental reason emerged. This helped avoid superficial solutions by shifting the focus from symptoms to the underlying cause.

The Ask 5x Why questionnaire was conducted concurrently with an interview with Desa Cantik Statistics Agent for empathy. According to Mr. Kalidin, Head of the Surya Bahari Village Government Section and coordinator of the Surya Bahari Village Statistics Agent, offline statistical coaching during Desa Cantik program was deemed ineffective. The initial statement was that offline coaching was ineffective. In this case, the Ask 5x Why questionnaire was conducted to explore the root cause of this initial statement. Its implementation is as follows.

Table 6. Application of the Design Thinking Tool Ask 5x Why

Ask the-	Question	Answer
(1)	(2)	(3)
1	Why is it less effective?	Because many participants did not attend in full
2	Why not attend in full?	Due to schedule clashes with village activities
3	Why can schedules clash?	Because the training lasts all day and requires special time.
4	Why is the format all day?	Because the material is dense and must be delivered directly
5	Why can't it be learned flexibly?	Because there is no digital media yet

The application of Ask 5 Why revealed that the problem was not only caused by the face-to-face (offline) coaching method, but also by the inflexibility of time and limited access to materials as well as dependence on coaches, making it difficult for village officials to learn independently. Once the context is clear, the user experience has been mapped, and the root cause has been identified, an understanding is formulated in the form of Jobs To Be Done (JTBD). JTBD describes the main "jobs" that users (Desa Cantik statistics agents) want to complete. It's not just about what they do, but also what they want to achieve. In the context of Desa Cantik Program's statistical development, Desa Cantik statistics agents, including village officials, actually want to learn statistical materials in a way that is easy to understand, flexible, and doesn't disrupt their routines at the village government office so they

can prepare data accurately and on time. Therefore, Desa Cantik development application needs to be designed based on user goals.

OBSERVE

The observation phase is conducted through direct observation of potential users in a real-world environment to understand how potential users behave, what they do, what they need, and what problems they face, without relying solely on assumptions or what is said (Lewrick et al., 2020). In the observation phase of the design thinking process for developing Desa Cantik e-learning development application, data collection is carried out sequentially using the AEIOU approach, followed by the preparation of an Empathy Map, and ending with the creation of a Profit Persona as a representation of the main user. This flow is used to understand the real conditions of Desa Cantik statistical agents (including village officials) in participating in statistical training that was previously carried out offline and was considered ineffective. The first stage is AEIOU, which is an observation framework that maps Activities, Environments, Interactions, Objects, and Users. The AEIOU design thinking tool was applied through field observations and structured interviews with the Head of the Surya Bahari Village Government Section and the coordinator of the Surya Bahari Village statistics agent (Mr. Kalidin) at the Surya Bahari Village Government Office on Thursday, November 20, 2025.

Figure 4. Observation and Interview Activities of Surya Bahari Village Statistics Agents

The results of field observations and structured interviews are as follows:

Table 7. Implementation of AEIOU Design Thinking Tools

Activities	- Attend offline village statistics training (when invited) - Compiling basic village data, both monographs and village profiles - Serving the community while handling daily administration - Self-study using old materials or previous training notes
Environments	- Working in the village office with standard facilities (computer, internet is not always stable) - A work environment full of interruptions: guests arriving, signings, impromptu meetings - The offline learning atmosphere is often rushed and cannot repeat the material. - There is no organized and easily accessible repository of materials.
Interactions	- Interaction with BPS instructors during training or when requesting assistance - Interaction with other village officials with varying levels of literacy - Interaction with the community when asked for village data or information - Interactions with digital devices can sometimes be confusing or slow
Objects	- Village office laptop or computer - Training modules (hardcopy or PDF) - Simple spreadsheet application (Excel) - Offline training materials (slides, notes) - Going forward: e-learning applications as the primary learning platform
Users	- Village officials, who are multitasking, want to learn but have limited time - Have a strong motivation to improve the quality of village data reports - Feeling anxious when training material is too fast and difficult to repeat - Need a learning solution that is flexible, simple, and immediately applicable

The AEIOU's findings were then further developed through an Empathy Map, which describes what village officials said, thought, did, and felt during the development process. The following is the result of the Empathy Map for the Digital Transformation of Desa Cantik Development.

Table 8. Empathy Map of Digital Transformation of Desa Cantik Development

Think & Feel	*Hear*	*See*	*Say & Do*
(1)	(2)	(3)	(4)
- Want to learn but feel time is very limited - Felt the offline training was too fast and difficult to follow. - It's a relief to have a learning method that can be repeated at any time.	- If you don't take part in offline coaching, you won't understand later.	- The coaching material is scattered and unstructured. - Offline coaching is intense and time-packed	- Expressed a desire to learn in a more flexible way - Looking for old notes to understand a concept - Rely on colleagues or BPS when confused
Pain		*Gain*	
(5)		(6)	

- Study time is limited in class if done offline - Material is difficult to re-access after coaching if it is done offline.	- Learn at any time according to your own rhythm if e-learning is available - Access structured and repeatable material where e-learning is available

These findings were then formulated into a Profit Persona, a comprehensive overview of the primary users of Desa Cantik e-learning development application. The following is a summary of the Profit Persona compiled by one of the statistical agents interviewed.

Table 9. Profit Persona of Desa Cantik Development E-Learning Application Users

Name: Desa Cantik Statistics Agent (including Village Officials)		
Description of Persona: - Desa Cantik Statistics Agent (including Village Officials) with the task of compiling routine reports - Managing monographic data, population data, and activity data - Intermediate technological capabilities, more comfortable with visuals - Have a multitasking job at the village office every day - Have participated in statistics training before, felt it was too fast	**Mood Board or Sketch:** - A person who wants to learn but is burdened by multitasking - The village office atmosphere is busy but needs data improvement	**Job to be done/ customer task:** - Learn to understand the concept of village statistics in stages - Input village data accurately and according to BPS standards - Participate in coaching without disrupting other work - Access training materials independently and flexibly - Check understanding through exercises/quizzes
Influencer: - The village head demanded timely reports - BPS instructor who provides a lot of material in a short time - More experienced colleagues - The trend of digitalization of village services from local governments		**Problem/Frustration/Pains:** - Face to face training is too fast paced and difficult to follow. - Study time is very limited in the office - Internet access is not always stable - The old module was too bulky and lacked visuals

Trends:	**Use Cases:**	**Gains:**
- Digital transformation of village government (Siskeudes, SIAK) - Preference for self-paced training through e-learning - Increase in the use of mobile devices in villages - Demands for increasingly accurate village data for regional planning	- Open e-learning after service hours are over - Replay the video 2–3 times to understand the diagram. - Take the quiz to make sure you don't get the concept wrong. - Looking for case examples that are similar to the village where you work - Save PDF modules to read when internet signal is poor	- Can learn independently at your own pace - Videos and animations make concepts easier to understand. - The material can be repeated at any time - *Feedback*automatically increases self-confidence - Real case examples make it easier to understand the assignment.

Define Point of View

A Point of View (POV) is a synthesis or summary of findings obtained during the observation and analysis process, providing an in-depth understanding of user needs, problems, and perspectives. The POV is formulated clearly so it can serve as a basis for designing solutions, typically in the form of reflective statements such as "How might we...". The define point of view phase focuses on the evaluation, interpretation, and assessment of the collected findings (Lewrick et al., 2020).

In this case, the design thinking tool used for the define point of view phase is context mapping. Context Mapping is a technique for formulating a Point of View by combining the user's actual context, environment, obstacles, and aspirations into a single, focused understanding. The result is a point of view statement (POV statement) that serves as the basis for the subsequent ideation and solution design process. The Context Mapping format contains eight categories (Lewrick et al., 2020). The results of defining a point of view using Context Mapping are as follows.

Table 10. Context Mapping of Digital Transformation for Desa Cantik Development

Environment	*Economy & Efficiency*
(1)	(2)
The environmental context in which users work & learn - High-interruption village office: guests arriving, impromptu meetings, daily services - Limited facilities: computers are shared, printers often break down - Internet is unstable, especially during peak hours - The coaching materials are not centralized and are spread across PDFs/slides. - Minimal space to study with full focus	**The context of time, cost and resource efficiency** - BPS's development budget is limited so training is only held a few times. - Village Statistics Agents find it difficult to leave their jobs due to the potential loss of public service time. - Full day training is considered inefficient because it hinders village tasks. - There is no repeated learning media so that instructors have to explain the same material every year. - *E-learning*can increase the efficiency of instructors and participants
Politics & System	*Needs & Desires*
(3)	(4)

Bureaucratic context, regulations, and system structure - Desa Cantik Development is part of BPS's Integrated Statistics Service - Village data is the basis for sub-district/district planning, so accuracy must be high. - Village officials are bound by national system standards (SIAK, Siskeudes, village profiles) - The village head's instructions often encourage quick reporting so that users are under pressure. - BPS has an annual coaching output target so the process must be efficient.	**Explicit needs and desires of users** - Need flexible learning, does not interfere with service hours - Want simple material, not too theoretical - Want a short, step-by-step video that can be repeated at any time? - Want an example of a case similar to the village where you work? - Want an application that is not heavy, mobile friendly? - Want a light quiz that boosts your confidence?
Uncertainties	*Challenges*
(5)	(6)
The uncertainty felt by users - Fear of complicated and confusing applications - Worried about not having enough phone memory? - Afraid of entering data incorrectly because you don't understand statistical concepts - Not sure if e-learning can work with weak village internet - Worried that system changes will burden daily work	**The most significant obstacle** - Offline training is too fast, can't repeat - Study time is very limited due to multitasking - Unstable internet hampers access to digital materials - The old training modules were thick and not visual. - The capacity of human resources for mentoring is limited so they cannot mentor many villages at once. - There is no structured material repository for participants who forget material.
Demography & Ethnology	*Other Categories*
(7)	(8)
User characteristics related to social identity and behavioral patterns - Generally aged 25–50 years (village officials) - Education levels vary with many being high school graduates. - Lower middle digital literacy - Playing a dual role as public service, administration, and data compilation - Prioritize social relationships and direct communication	**Filled in based on field findings** - The learning culture in villages is more comfortable with verbal explanations and real examples, rather than abstract statistical theories. - Some village officials are more competent in practical work than theory. - Users need visual guidelines or short videos

Based on the Context Mapping above, the Point of View Statement can be drawn as follows:

Desa Cantik Statistics Agents who work multitasking in an office environment full of interruptions need statistical learning media that is flexible, lightweight, easy to repeat, and simple, because offline training is not suitable for work conditions, is time-consuming, and difficult to understand without a digital repository that can be accessed anytime.

IDEATE

Once the point of view is established, the ideate or "Ideation" phase begins. Ideation is the step of discovering various possible solutions to the problem at hand (Lewrick et al., 2020). In this case, two design thinking tools were used: brainstorming and dot voting. To ensure the ideation process is consistent, linear, and accountable, the solution brainstorming process focuses on eight categories of context mapping.

Table 11. Brainstorming Solution Ideas in 8 Context Mapping Categories

Environment –Solution Ideas	*Economy & Efficiency* –Solution Ideas
(1)	(2)
- Short videos (3–5 minutes) to overcome interruption-filled work environments - Offline download mode so you can learn even if the village internet is weak. - Light application size, compatible for low-end cellphones - Structured material library	- Micro-learning modules for efficient use of time - "Continue where you left off" feature (resume learning) - Ready-to-use village data entry template for efficient work of village officials - Automatic progress system so that BPS supervisors do not have to monitor manually
Politics & System –Solution Ideas	*Needs & Desires* –Solution Ideas
(3)	(4)
- BPS statistical standard integration features (definitions, formulas, examples) - Notification reminders for coaching according to the village schedule - Simple compliance checker mode to check data compliance with BPS standards	- Step by step video with village examples - A light and beginner friendly quiz. - "Learning Path" based on user ability level - Visual guide (simple icons and illustrations)
Uncertainties –Solution Ideas	*Challenges* –Solution Ideas
(5)	(6)
- Onboarding tutorial mode for new users - Village data input simulation feature (safe without risk of incorrect input) - 1 quick help button "Ask BPS"	- A repository of materials that can be repeated at any time - Hybrid learning format (can be online and offline) - Real case studies from previous villages
Demography & Ethnology –Solution Ideas	*Other Categories* –Solution Ideas
(7)	(8)
- Simple language, not technical - Local context based examples - Minimalist navigation (only 3 main buttons)	- PDF of condensed modules from the videos (1–2 pages per topic) - "Glossary of statistical terms for village officials" feature

The brainstorming resulted in 26 solution ideas. From these 26 ideas, a dot voting was conducted by the advisory team and 10 statistics agents of Desa Cantik at a meeting to identify the needs of Desa Cantik for its sustainability on Friday, November 22, 2025, at the Surya Bahari Village Government Office. According to Lewrick et al (2020), dot voting is a visual and collaborative method of selecting ideas, where each person is given a number of "dots" (stickers/dots) to choose the idea that is considered the most valuable, important, or a priority.

Figure 5. Dot Voting Activity with the Advisory Team and Statistics Agents of Desa Cantik

There are several criteria for selecting priority ideas using dot voting, including: impact on village statistics agents, ease of implementation, relevance to the context of implementation in the field during Desa Cantik Program, and addressing the biggest pain points in context mapping. The following are the dot voting results for selecting priority ideas for digital transformation in the development of Desa Cantik.

Table 12. Results of the Most Votes by Desa Cantik Advisory Team and Statistics Agents

Idea	*Voting*	Reason
(1)	(2)	(3)
Short videos (3–5 minutes)	★★★★(4)	The village environment is full of distractions so it requires short learning
The material repository can be repeated at any time	★★★(3)	Core problem: material cannot be repeated
Offline download mode	★★(2)	Responding to internet instability
A light and beginner friendly quiz	★(1)	Overcoming users' feelings of inferiority and fear

The first idea that received the most votes was the development of short, three- to five-minute learning videos for each village statistics topic. This idea emerged because voters observed that village statistics agents work in environments with many interruptions and lack sufficient learning time. Quickly delivered learning materials in offline training often fall short of comprehension, leading users to feel anxious and afraid of falling behind. With short, focused videos, the learning pace becomes more human, less intimidating, and manageable even while users are busy completing multiple tasks at the village office. This solution was deemed to most directly address the core issues: limited time, the need to repeat material, and users' fear of lengthy and theoretical statistical explanations.

The second idea arose: creating a repository of learning materials that could be accessed and repeated at any time. This idea addressed the issue of training materials not being stored in a single, organized, and easily accessible location. Many previous training participants relied on manual notes or scattered slides, making the relearning process inefficient and causing participants to lose track of concepts. With a repository, whether in the form of visual modules, videos, or case studies, Statistics Agents can relearn at their own pace without having to wait for the next training session or contact a BPS instructor. This idea is considered to transform the concept of learning into a more sustainable one, less dependent on the physical presence of an instructor.

The third idea selected through dot voting was the addition of an offline mode, allowing users to download materials or videos for study without an internet connection. Voters recognized that network limitations in many villages were a major obstacle to implementing digital applications. Even when applications were available, users often struggled to follow the material due to unstable signal. By providing a download feature, users could study after hours or in quieter areas without the hassle of network issues. This solution was deemed to address fundamental infrastructure issues and increase the inclusiveness of learning across the village.

Finally, the idea of a light-hearted quiz with positive feedback emerged as the fourth top idea. In empathy interviews, many village statisticians expressed a fear of giving incorrect answers and a feeling of inferiority when faced with statistical material. Therefore, a light, non-stressful quiz that provides supportive feedback can help boost their confidence. This feature not only helps users check their understanding but also creates a warmer, more welcoming, and more motivating learning experience. This simple form of assessment can reduce anxiety and make users feel more capable of gradually mastering the statistical material.

Based on brainstorming focused on context mapping results and selection using the dot voting method, four main ideas were obtained that were deemed most relevant, most likely to be implemented, and have the potential for high impact for village statistics agents participating in Desa Cantik development program. These four main ideas include the development of short learning videos (3–5 minutes), a material repository that can be accessed and repeated at any time, an offline learning mode to overcome village internet limitations, and a light quiz with positive feedback to increase self-confidence. These four ideas will then be used as the basis for the Prototype process in the next stage.

PROTOTYPE

Prototyping is done to test ideas or solutions quickly and without risk with potential users (Lewrick et al, 2020). This phase is in the solution space. Types of prototypes include experience prototypes, function prototypes, vision prototypes, X is finished prototypes, to final prototypes. In this case, the type of prototype created is X is finished prototypes. X is finished prototypes are a type of prototype in Design Thinking that shows that the main parts of a system have been completed and are functioning, although not yet a perfect final version (Lewrick et al, 2020). Since all Desa Cantik statistics agents (including village officials) use Android phones, the e-learning application created as a form of digital transformation for Desa Cantik development is an application that supports Android phones and can be downloaded from the Play Store. Digital media in the form of websites is not recommended because not all Desa Cantik statistics agents (including village officials) have or are able to use laptops/PC computers. The following is the front view of Desa Cantik development e-learning application named StaT-Gem (Statistik Tangerang Gemilang).

Figure 6. Front View of Desa Cantik Development Application (StaT-Gem)

The prototype phase aims to produce an initial version of the solution selected during the ideate phase. Priority solutions from the dot voting process included short learning videos, a structured material repository, an offline mode, and a light quiz with positive feedback. In this phase, all these ideas began to be translated into concrete descriptions of the appearance, flow, and user experience of the e-learning application. The prototype began by designing a simple user flow. When a Desa Cantik statistics agent opened the application, they were immediately presented with a concise homepage containing a list of learning topics. Each topic was displayed as a visual card with a short title for easy identification by the often-rushed agents. This layout allowed them to quickly select relevant material without having to navigate complex menus. Each learning topic was then presented in the form of a short three- to five-minute video. The video prototype was designed with a simple visual style, real-life examples close to the village context, and a narrative that was not overly technical. At this stage, the video content was not yet perfect, but sufficient to illustrate the structure of the material in a concise, focused, and easily repeatable manner.

In addition to videos, the prototype also includes a repository of materials that can be accessed anytime. This repository is organized as a short list of modules in a lightweight PDF format. The goal is to keep the materials

accessible even when the internet connection is unstable. In the prototype, the repository is placed on a dedicated page so users can review lessons without having to follow the training flow linearly. An offline mode is also introduced through a download feature. In the prototype, a simple download button allows users to save videos or modules for study after office hours at the village government office. The button's layout is designed to be minimalist so village officials don't worry about pressing the wrong button or being overwhelmed by the many options.

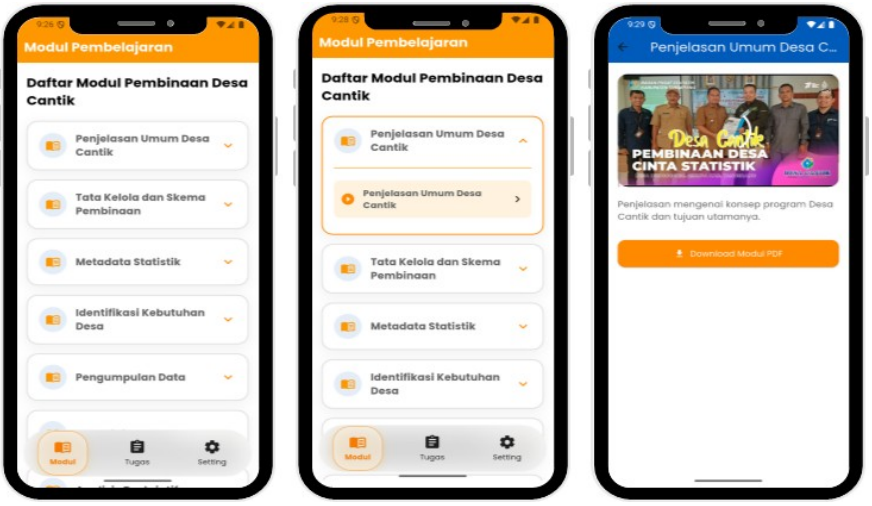


Figure 7. Display of the Learning Module Access Menu in the StaT-Gem Application

The final part of the prototype is a light quiz/assignment with positive feedback. The quiz is structured as short questions with simple choices. After answering, the user receives a reassuring message such as "Congratulations." At this stage, the quiz is simply an initial example to demonstrate the desired communication tone within the app.

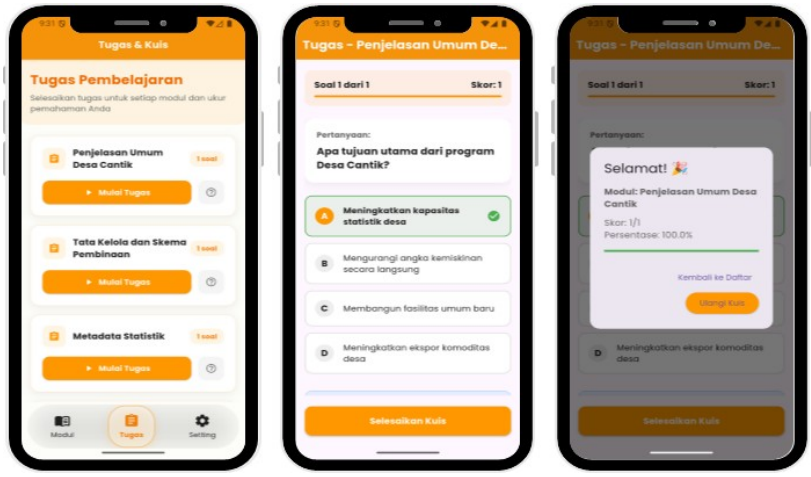


Figure 8. Display of the Quiz/Learning Assignment Access Menu in the StaT-Gem Application

Through all these elements, the prototype provides an initial glimpse into how an e-learning application can help village statistics agents learn flexibly, incrementally, and without pressure. This prototype isn't yet a final product, but it's sufficient for user testing to gather relevant feedback for the next phase, testing.

TEST

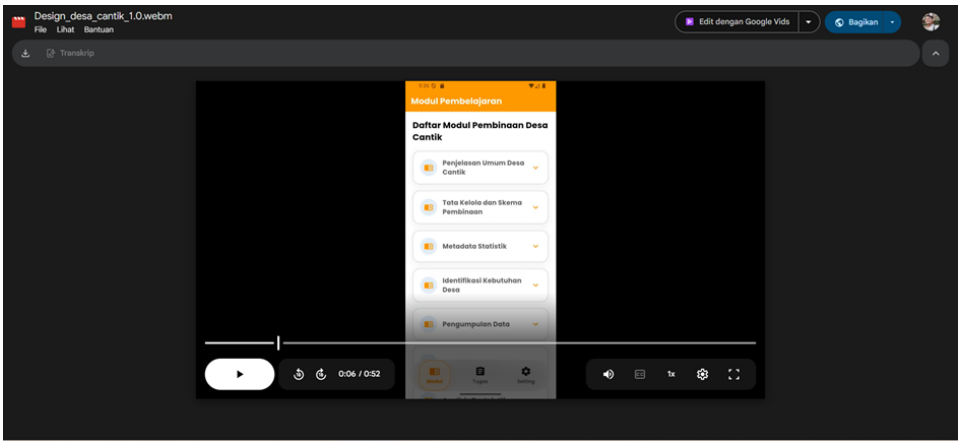
Testing should be conducted after each prototype is completed, even if only a specific function, experience, or form is developed (Lewrick et al., 2020). The most important thing in the testing process is direct interaction with potential users and documentation of the results. Test results provide useful feedback for improving the prototype. After the initial prototype of Desa Cantik Development e-learning application was completed in the form of a functional wireframe (X is finished prototypes), usability testing was conducted to understand how potential users interact with the design. This testing aims to ensure that the application design truly fits the work context of village officials, especially Desa Cantik statistics agents (including village officials) who daily face an environment full of interruptions, limited learning time, and technical limitations such as unstable internet connections.

Usability testing was conducted using a task-based testing approach, where participants were asked to perform a series of tasks that were most relevant to the use of the application, such as opening learning videos, browsing the material repository, accessing offline mode, and trying short quizzes. Testing was conducted directly with 5 (five) Desa Cantik Statistics Agents of Surya Bahari Village during the offline Statistics Development activity for the sustainability of Desa Cantik on Monday, November 24, 2025. The session was conducted individually so that spontaneous responses could be observed without pressure from other participants. Each participant was asked to explain their thoughts verbally (think aloud) while accessing the prototype. The tasks tested focused on four main features resulting from the ideate stage, including: (1) navigation to 3–5 minute learning videos, (2) access to the material repository, (3) downloading materials for offline mode, (4) Working on light quizzes and reading feedback. The entire session was recorded for re-analysis, then recorded obstacles, emotional reactions, and participant comments.

Figure 9. Testing Activity for the Use of Desa Cantik E-Learning Application

Test results of the video playback feature in the "Desa Cantik General Explanation" module showed that users could easily access the video display after selecting a topic in the module list. The transition process from the module list to the video page was smooth and intuitive, while the visual display of large thumbnails and explanatory text below helped users understand the context of the material before watching, and the overall layout was considered clear, not confusing, and suited to the needs of field users who wanted quick access without complex navigation. In testing the Material Repository feature, test participants tried to open the list of coaching modules on the main page and found the repository structure displayed through module cards easy to understand because each material title was neatly arranged, had supporting icons, and could be expanded to view sub-materials, making it easier for users who are used to working quickly in the interruption-filled village office environment. Most users were able to find the material they were looking for in less than five seconds, indicating that the repository navigation was effective, while verbal feedback indicated that the presentation of the material in a structured list was very helpful for them to review topics that were previously explained too quickly in offline training. There were no significant obstacles in opening the module details, and users felt that the repository structure was quite intuitive, easy to repeat, and suited their needs for independent learning after service hours.

The test results for offline mode access show that users can access downloaded materials without any significant obstacles, and this feature is considered very helpful, especially when the internet signal is weak or unavailable; users feel more at ease because they can continue studying after service hours without depending on the network, so that offline mode is considered to increase learning flexibility and support the needs of village officials who work in environments with unstable connectivity. The following video shows a cellphone screen display of a statistics agent who is conducting a trial of the BPS Tangerang Regency Desa Cantik e-learning application (StaT-Gem).



Video access:
https://drive.google.com/file/d/1OcjtPqz2Wwn9tuYc-1nBVsSx11sYkfBH/view

Figure 10. Video Display of the Mobile Phone Screen of the StaT-Gem Application User

REFLECT

Reflection is a crucial step that accompanies the entire design thinking process (Lewrick et al., 2020). Through reflection, one can understand what has been done, what worked, what didn't, and what can be improved. In other words, reflection is a key learning tool that helps deepen understanding, improve solution quality, and strengthen empathy and innovation skills. The Retrospective Sailboat is a reflection tool in the Design Thinking methodology that functions to evaluate the process, identify driving factors, obstacles, risks, and objectives to be achieved in solution development projects. In this case, the Retrospective Sailboat tool was used to reflect on the development process of Desa Cantik Development e-learning application prototype as an effort to support the transformation of statistical mentorship services at BPS Tangerang Regency. The sailboat model was adapted into four areas of analysis: Wind (drivers), Anchors (obstacles), Rocks (risks), and Island (goals).

The driving factor (Wind) is an element that accelerates the prototype development process and positively contributes to achieving results. In the case of Desa Cantik (Desa Cantik), the primary driver came from the real needs of users, namely village statistics agents (including village officials), who needed flexible, repeatable, and easy-to-understand statistical learning media. Furthermore, institutional support from BPS Tangerang Regency and the trend of digitalizing village services were important catalysts that reinforced the urgency of application development. User enthusiasm in trying the prototype, coupled with the clarity of design direction derived from context mapping and ideation, contributed to the effective completion of the prototype phase. The sailboat model also encompasses factors that hinder or slow the ship's journey towards its destination (Anchors). The main obstacle in implementing Desa Cantik (Desa Cantik) e-learning application was limited digital infrastructure in the village, such as unstable internet connections and varying device capacities. Furthermore, limited user time due to multitasking public services also reduced the intensity of prototype testing. Variations in the digital literacy of village officials also posed a challenge, requiring the prototype to be designed with a very simple interface. These obstacles did not halt the process but required design adjustments to ensure the solution remained relevant and usable.

Risks (Rocks) represent potential disruptions that could disrupt the process and outcomes if not anticipated. In this case, the primary risk is the potential mismatch between the initial design and the technical capabilities of users due to heterogeneous digital literacy. Furthermore, there is a risk that the application cannot be fully implemented if the village network does not support video playback or material downloads. Another risk is the dependence on the internal resources of BPS Tangerang Regency supervisors to provide quality content on an ongoing basis. If not managed, these risks have the potential to reduce the application's adoption rate. The symbolic island in the Sailboat represents the ideal goal that guides the overall project. In the case of Desa Cantik Development, the primary goal is to provide an e-learning platform capable of supporting flexible, independent, and adaptive statistical development to village conditions. The application is expected to provide short videos, a material repository, an offline mode, and light quizzes that increase the understanding and confidence of village statistics agents. In the long term, this application is expected to improve the quality of village data, accelerate the development process, and reduce dependence on face-to-face development.

CONCLUSION AND RECOMMENDATIONS

The application of design thinking to the digital transformation of Desa Cantik Development Program demonstrated that the statistics learning process in villages faces significant challenges, particularly related to time constraints, a work environment full of interruptions, and the lack of repetitive learning media. Through the stages of understand, observe, define, ideate, prototype, and test, it was discovered that the primary need of Desa Cantik Statistics Agents is a learning medium that is flexible, simple, and accessible at any time. The results of the prototype development, including short learning videos, a material repository, an offline mode, and light assignments/quizzes, demonstrated a high level of acceptance and usability in initial trials. These findings confirm that digitalization through e-learning not only simplifies the development process but also improves understanding, independence, and efficiency of statistics learning at the village level.

Based on the prototype testing results, it is recommended that the development of Desa Cantik e-learning application be continued to the implementation stage by strengthening the platform's stability, particularly to support offline mode. Video content should be refined to be more concise and contextual to village needs. BPS Tangerang Regency should continuously manage the material repository, including updating modules in line with developments in statistical methodology. Furthermore, regular user evaluations should be implemented to ensure the learning experience remains adaptive to the dynamic tasks of statistical agents (including village officials). Collaboration between BPS Tangerang Regency and village governments is also recommended to expand application adoption and ensure the sustainability of the statistical development program through a digital approach.

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