# Implementation of Digital Invitations Using Web Technology for Invitation Design and QR-Based Attendance Tracking System

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**Abstract.** This research aims to help people manage and organize event invitations by using digital invitations. Many digital invitation platforms still need to improve, especially in design customization and guest attendance recording. Based on interviews with 17 respondents aged 20-30, 70% have used digital invitations before. Still, they feel the existing system could be more optimal in processing attendance and customizing designs according to preferences. Meanwhile, 30% of respondents who have never used digital invitations stated that they are still more comfortable with printed invitations due to their lack of understanding of digital invitation technology and the features it offers. To overcome this problem, this research proposes the development of a digital invitation application that not only supports the creation and distribution of invitations but also features online payment through Midtrans and QR scanners to record attendance more efficiently and use the application. The test results show that 95% of respondents feel that the application speeds up the creation and distribution of invitations, 87% find it helpful with the design customization feature, 96% strongly agree that the attendance confirmation feature makes it easier to manage guests, and 97% state that the payment process through the application is easy to do. This research contributes to the adoption of sustainable digital solutions, reducing paper waste, and establishing a new standard for efficient invitation systems that can be scaled and adapted for various types of events and cultural contexts in the future.

## INTRODUCTION

The development of digital technology has had a significant impact on various aspects of life, including the way people manage event invitations. In this digital era, electronic-based or digital invitations are increasingly in demand, mainly due to the ease of distribution and reduced printing costs they offer [1]. In addition, digital invitations can be accessed easily through mobile devices, making them more flexible than conventional invitations that require physical distribution [2]. However, despite offering various advantages, implementing digital invitations in society still faces several obstacles that affect the widespread adoption of this technology [3].

Based on interviews with 17 respondents aged 20 to 30, it was found that 70% of those who have used digital invitations admit that the current platform needs to be more fully adequate. Some respondents stated that the limitation regarding invitation design customization was the main obstacle faced. They feel that existing digital invitation platforms need to be more flexible to provide design options that can be customized to suit their event theme or preferences. This limitation makes users feel dissatisfied because their invitation designs tend to be uniform and need to reflect the uniqueness of the event being held.

In addition to customization issues, respondents also complained about efficiency in guest management, especially regarding recording attendance. Recording guest attendance is often still done manually despite using digital invitations, resulting in long queues at significant events. This certainly reduces the efficiency that should be the main advantage of digital invitations over conventional invitations. The current digital invitation system is considered not fully optimal in automatically processing guest attendance, so event managers still face challenges in real-time monitoring guest attendance [4].

On the other hand, 30% of respondents who have never used digital invitations prefer to continue using printed invitations. They argued that printed invitations are easier to understand and use [5]. Some respondents stated they were unfamiliar with digital invitation technology, so they hesitated to try. Lack of understanding of the features available in digital invitations, such as integration with attendance systems or

design customization capabilities, is the main factor that causes this group to prefer printed invitation methods [6].

In addition, for new users, digital invitations are often perceived as complicated due to the many poorly explained features. Existing digital invitation platforms generally need to provide clear guidance on how to use their features, such as invitation settings, attendance recording, or payment integration. This lack of clarity confuses and discourages potential users from switching to digital technology. Therefore, it is necessary to develop a digital invitation system that is more flexible in terms of design and easy to access and use by new users [7].

To overcome these problems, this research proposes the development of a more functional and user-friendly digital invitation application. This application is designed to cover the entire process of managing event invitations, from creation and distribution to recording guest attendance automatically. The research specifically aims to address three key challenges identified in the literature: first, implementing flexible design customization through Grapes.js technology to overcome the limitations in existing platforms; second, integrating automated attendance recording using QR scanner technology to eliminate manual processes and reduce queuing issues; and third, incorporating seamless online payment integration through platforms such as Midtrans to simplify transaction processes for users. One proposed feature is using QR scanners to record guest attendance more quickly and accurately. With this technology, guests only need to scan the QR code on their digital invitation when arriving at the event to do the attendance process more efficiently without long queues. This is expected to increase convenience for both event organizers and guests. In addition, the app will also be equipped with an online payment system integration using platforms such as Midtrans. This feature lets guests pay for events directly through the digital invitation application [8].

This research is expected to positively impact the development of a more effective and efficient digital invitation system. By presenting features such as QR scanners for attendance recording and online payment integration, this system is expected to overcome various obstacles that digital invitation users have faced. These solutions directly respond to the problems identified in the literature review: design customization limitations, attendance management inefficiency, and payment process complexity. In addition, the development of easier-to-use applications is also likely to increase the use of digital invitations among people unfamiliar with this technology so that digital invitation technology can be more widely accessed and provide greater benefits for event organizers and guests [9].

**METHODS**
The descriptive research method is research that describes objects according to facts and what they are. By using descriptive analysis, researchers can analyze and identify problems and trends that exist in society [10]. The descriptive method provides a clear and in-depth description of the user experience and the challenges or difficulties that may be encountered using digital invitations.

The research process in developing this digital invitation system follows a systematic approach consisting of several interconnected stages. The process begins with problem identification through literature review and preliminary surveys with 17 respondents aged 20-30 years to understand current challenges in existing digital invitation platforms. Data collection is conducted through structured interviews, questionnaires, and platform analysis to gather information on user preferences regarding invitation design, attendance recording methods, payment systems, and user experience expectations.

Following data collection, technology analysis and selection are performed to determine the most suitable tools for system development. This evaluation considers factors including ease of implementation, compatibility, development costs, and scalability. Key technologies selected include Midtrans as the payment gateway platform, Vue QR Code Reader for QR code scanning in attendance recording, and Grapes.js as a website builder supporting responsive design and flexible customization.

The system design stage involves developing system architecture, database structure, workflows, use case diagrams, and user interface designs that prioritize usability. The design undergoes iterative refinement based on user feedback to ensure it meets requirements. Implementation follows using Nuxt3 framework with Vue.js for the frontend and Laravel framework with PHP for the backend.

Comprehensive testing is conducted using Black Box testing approach to verify all features function correctly. Test scenarios include invitation creation, design customization, QR code attendance recording, payment processing, and system integration. The final stage involves user acceptance testing where the

system is evaluated by actual end users during real wedding events through structured questionnaires. Respondents assess ease of invitation creation and distribution, design flexibility, attendance confirmation effectiveness, and payment convenience to measure research success and identify improvement areas.

**System Analysis and Design**

System architecture is an important component in software development. This architecture defines how the various elements of the system are interrelated and interact to form a unified whole. System Architecture Analysis is carried out to ensure that the designed architecture can meet all existing functional, non-functional, and technical constraints. The results of the system architecture analysis in this study can be seen in figure 1.
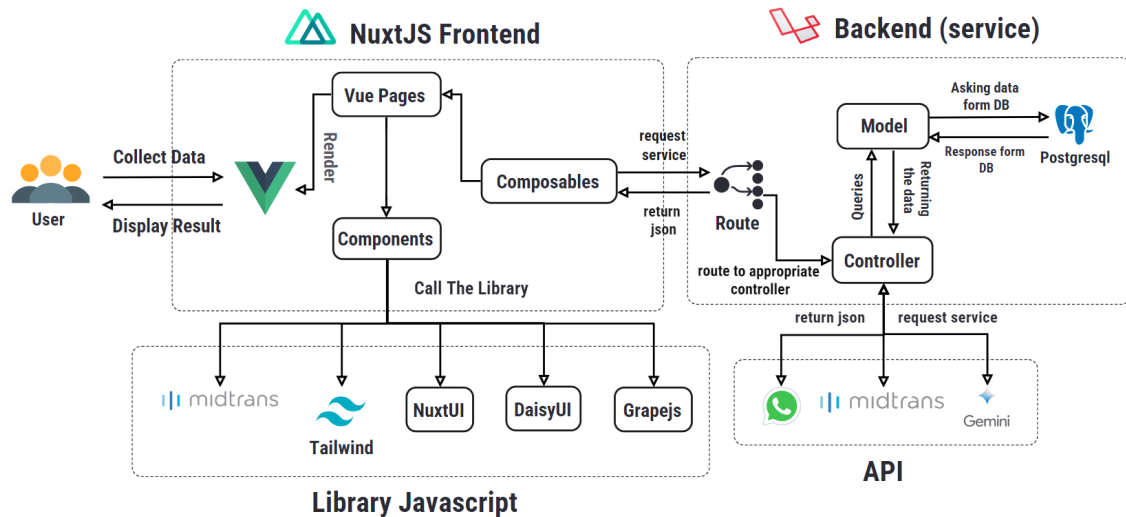


Figure 1. Digital invitation system architecture

Judging from the flow above, there are two separate project modules, namely the front end and the back end. The frontend uses the Nuxt3 framework from the vue library which uses the javascript programming language [11]. The Nuxt3 framework was chosen because it is considered the most suitable when compared to other similar framework, besides that nuxt3 is also the latest framework from the Nuxt series that has been issued by Vue. There are already many large companies and agencies that use nuxt3 to be implemented on their website applications.

While the Backend uses the php programming language by utilizing the laravel framework. Laravel was chosen because its application is considered easy and the documentation is complete enough for novice developers who just want to learn [12]. Until now, Laravel is still actively providing module updates even though this framework is quite old [13]. Many companies are still using this Laravel to be implemented on their website applications.

The primary purpose of building a digital invitation application is to provide a platform that allows users to create, manage, and share digital invitations easily, efficiently, and environmentally friendly. This application is expected to be a practical solution for people who want to adopt a more modern digital invitation method.

An overview of the process of making digital invitations is made based on the results of analyzing similar applications that are running and the results of interviews with respondents. With the results of this analysis, the development of digital invitation applications can be a solution to overcome existing problems. The following is a complete explanation of the digital invitation flow, as follows:

1. New users who want to create digital invitations must register an account and log in to the application. Users do not need to register an account if they only want to browse invitations or become invited guests.
2. Users can select several subscription package options. Users can choose according to the price and benefits offered according to their respective needs.
3. Users can create digital invitations from scratch or blank pages or choose templates that have been provided.

4.  Fill in the invitation data such as the name of the event, family data, invitation event time and several other components completely.
5.  Share invitations to guests who will be invited via WhatsApp or other social media.
6.  Guests who are invited can see the invitation that is shared without having to register or log in.

**Website Builder with Grapes.js**

Grapes.js is one of the java script libraries that supports the Website editor [14]. In this research, grapes are used to support the process of making digital invitations. This technology can make it easier for users to design websites with drag and drop [15]. Grapes.js was chosen because it was easy to implement the code, besides that from the user side the appearance of Grapes.js is also very simple and makes it easy for new users.

Before understanding the working mechanism of Component Type Stack, it is important to know how the initial process occurs when an HTML element is added to the Grapes.js editor. When this HTML element is inserted, the editor does not yet recognize it as a specific component. Instead, the element goes through a processing process where a new property called type is added. This process involves iterating through a series of predefined component types in the system, following a specific sequence, to determine the most appropriate component type. This sequence, known as the Component Type Stack, ensures that each HTML element is converted into the appropriate component type in the context of the built design [16].

This order is very important because whenever a new component type is added, it is placed at the top of the stack [17]. When an HTML element is processed, the editor will check the elements in order from top to bottom, where the last element is usually the default. The checking will stop when one of the components in that order is declared as appropriate by the is Component method. This process ensures the inserted HTML element is correctly mapped to the right component type. To illustrate, in the sequence of components, the new type is placed on top, followed by image, text, and default. When a new HTML element is processed, this order will guide the editor in determining the most appropriate component type based on the order of the stack. Here is the flow of how Grapes.js is used in this research, which can be seen in figure 2.
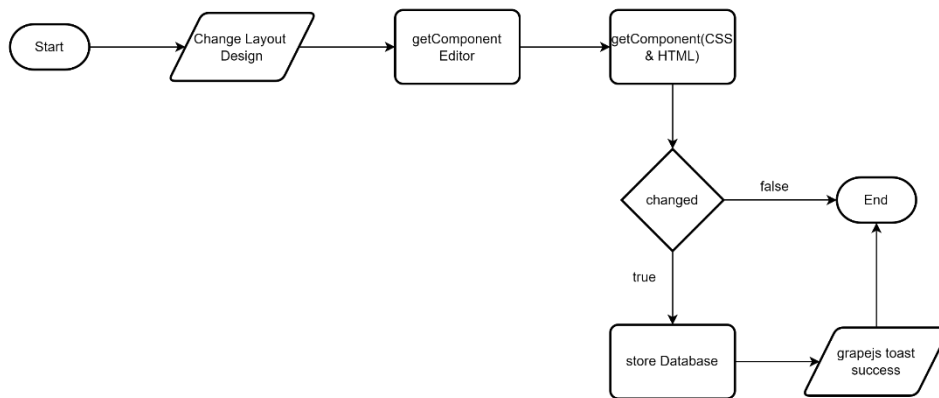


Figure 2. Flowchart of website builder with Grapes.js

The following is a list of plugins used in Grapes.js to support the creation of digital invitations. These plugins play a role in improving the functionality of the application, allowing users to easily customize the invitation design according to their needs [18]. Full details of the plugins used can be seen in table 1.

Table 1. List of plugin Grapes.js description

| Component | Description |
|---|---|
| Grapes.js-preset-webpage | Preset plugins to build complete web pages. |
| Grapes.js-plugin-forms | Plugin to add form support to the page. |
| Grapes.js-blocks-basic | Plugins that provide basic blocks such as text, images, and more. |
| Grapes.js-component-countdown | Plugin to add a countdown timer component. |

| | |
|---|---|
| Grapes.js-plugin-export | Plugin for exporting projects into various formats such as HTML, CSS, and ZIP. |
| Grapes.js-custom-code | Plugin for adding custom code to projects. |
| Grapes.js-touch | Plugin to support touch interaction on mobile devices. |
| Grapes.js-tooltip | Plugin to display tooltip text on certain elements. |
| Grapes.js-parser-postcss | Plugin to use PostCSS parser to handle CSS. |
| Grapes.js-tui-image-editor | Plugin for editing images using the TUI image editor. |
| Grapes.js-typed | Plugin for adding typing effects to text. |
| Grapes.js-tabs | Plugin to add a tab component to the page. |
| Grapes.js-style-bg | Plugin for managing background styles on elements. |
| Grapes.js-tailwind | Plugin to integrate the Tailwind CSS framework into GrapesJS. |
| Grapes.js-uppy | Plugin to upload files using Uppy. |

**Vue QR code reader**

Vue QR code reader is a component or library in Vue.js that functions to read and scan QR codes using cameras on devices such as computers, smartphones, or tablets [19]. This component allows users to easily integrate QR code scanning features into web applications built with Vue.js. The following is the flow of how Vue QR code reader is used in this research can be seen in figure 3.
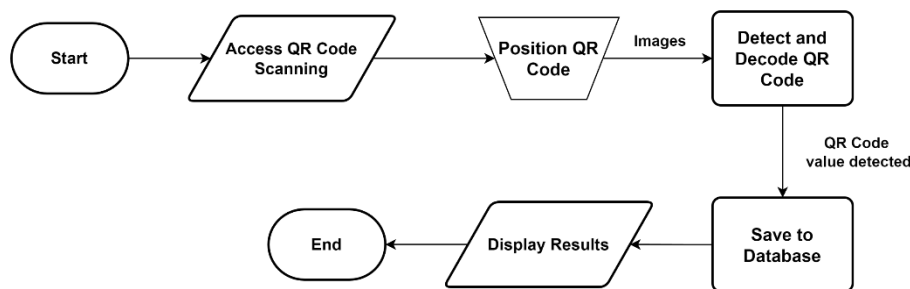


Figure 3. Vue QR code reader

The following is a detailed explanation of the flow of implementing the vue QR code reader scanner in nuxt.js as follows:

1. Nuxt.js application integrates the Vue QR code reader component.
2. The Vue QR code reader component displays the camera scanner display on the user interface.
3. The user points the camera at the QR code that he wants to scan.
4. The Vue QR code reader component reads the data encoded in the QR code.
5. After successfully reading the QR code, the Vue QR code reader component displays the QR code reading results.

Encoding modes can be used to more efficiently encode strings in QR codes. Each encoding mode is suitable for a specific type of string content [20]. There are four main modes supported which can be seen in table 2.

Tabel 2. Encoding modes QR code

| Mode | Characters | Compression |
|---|---|---|
| **Numeric** | 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 | 3 characters are represented by 10 bits |
| **Alphanumeric** | 0–9, A–Z (upper-case only), space, $, %, *, +, -, ., /, : | 2 characters are represented by 11 bits |
| **Kanji** | Characters from the Shift JIS system based on JIS X 0208 | 2 kanji are represented by 13 bits |
| **Byte** | Characters from the ISO/IEC 8859-1 character set | Each characters are represented by 8 bits |

Table 2 above describes the four modes used to encode QR code strings: numeric, alphanumeric, Kanji, and byte. Each mode has different characteristics and compression levels [21]. Numeric mode is used for numbers (0-9) and allows three characters to be represented in 10 bits. The alphanumeric mode includes numbers and uppercase letters (A-Z) as well as some special symbols, with two characters represented in 11 bits. Kanji mode is specialized for Kanji characters from the JIS X 0208 system, where two characters are represented in 13 bits. Finally, byte mode supports characters from the ISO/IEC 8859-1 character set, representing each character in 8 bits. This mode selection is important for the efficiency of storing and processing data in QR codes
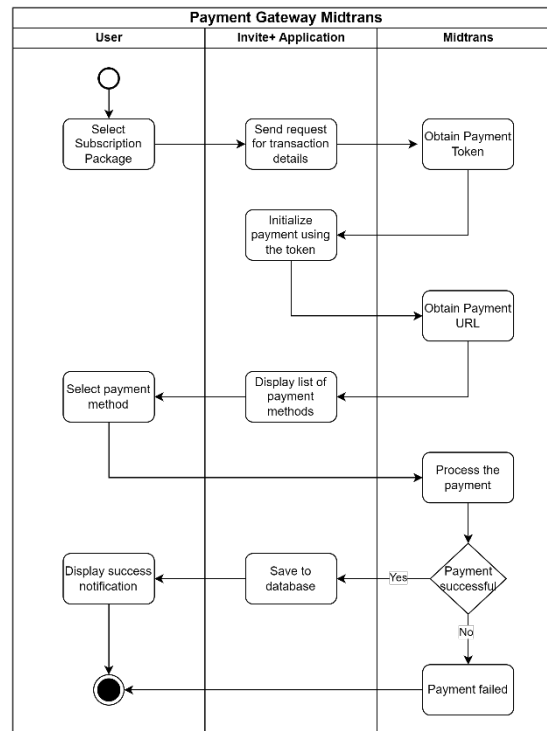
**Midtrans Payment Gateway**



Figure 4. Flow midtrans payment gateway

Midtrans payment gateway is used to make online payments and provides various payment methods such as bank transfers, digital wallets (e-wallets), and other payment methods [22]. By integrating Midtrans into a Website or application, developers can easily add payment features safely and reliably. The following is a flow of Midtrans payment gateway implementation in this research can be seen in figure 4.

Before using Midtrans, it is important to consider several factors that can affect costs, as each method has different transaction costs, as well as the need for additional features such as integration with specialized payment systems that may result in additional costs. The following are the transaction fees for each payment method on midtrans, as shown in table 3.

Table 3. Midtrans transaction fee

| Payment Method | Type | Transaction Fees | Description |
|---|---|---|---|
| **Bank Transfer** | BCA | IDR 4,000 per each transaction | - |
| | BRIVA (BRI Virtual Account) | | - |
| | BNI | | - |
| | Mandiri | | - |
| | Permata Bank | | - |
| | ATM Bersama | | - |

| Payment Method | Type | Transaction Fees | Description |
|---|---|---|---|
| **E-Wallets** | Prima | | - |
| | CIMB Virtual Account | | - |
| | GoPay | 2% per each transaction | IDR 2,500/ transaction. Different fees for gaming companies and digital products. |
| | QRIS | 0.7% per each transaction | Different fees for gaming companies and digital products. |
| | ShopeePay | 2% per each transaction | Different fees for gaming companies and digital products. |

There are two environments in Midtrans, namely sandbox and production environments. The sandbox environment is used for application development, such as testing new features or debugging. In this environment, the application usually runs locally, which allows developers to test and view error messages and other information that is useful in the development process. On the other hand, the production environment is used when the application is ready for use by end users. The application runs in a more optimized and secure production mode in this environment. Debug features are usually turned off to prevent leakage of sensitive information and improve application performance.

**Use Case Diagram**
Use case diagram is a UML diagram used to describe the interaction between actors and the system. Use case diagrams are also used to describe what access each actor can do with the system, and describe how the system responds to actions taken by actors [23]. The following is a Use case diagram that describes the interaction of actors with the system can be seen in figure 5.
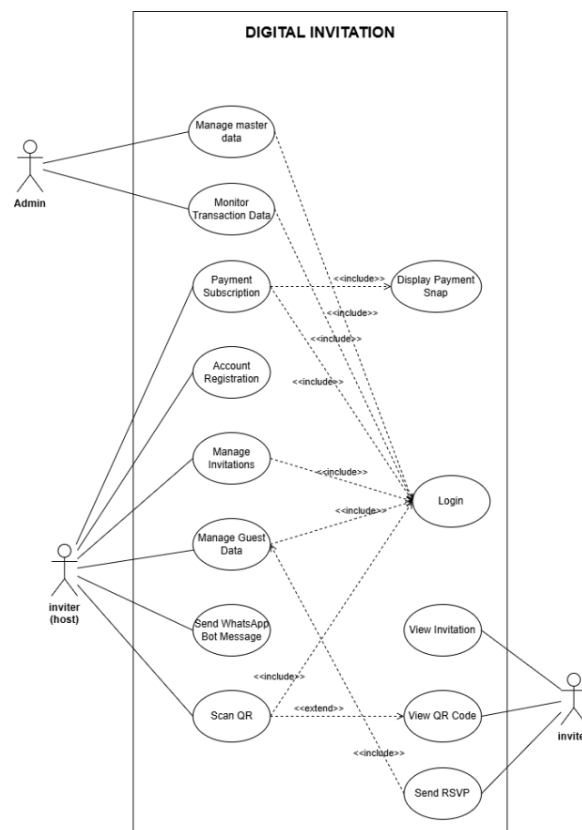


Figure 5. Use case diagram

Based on the use case picture that can be seen in figure 5. It has five actors: admin, Midtrans, Invitation client, invitation web service, and guests. The following is a brief explanation of all the actors involved in the digital invitation application:

1. Invitation client this actor has access to create and manage invitations.
2. Admin is an actor with access to monitor incoming transactions and manage master data.
3. Invitation guest is an actor who has access to view invitations and send RSVP.

**RESULT AND DISCUSSION**

The results of the implementation that has been carried out include the extent to which the system can meet the predetermined objectives, as well as challenges or obstacles that arise during the implementation process. At this stage, the specifications of the software used are very important to ensure the system runs well. Based on testing, the mobile software used is Android 11 as the operating system and Google Chrome as the main browser. As for desktop devices, the specifications used are Microsoft Windows 10 as the operating system and Google Chrome as the browser.

**Application Implementation**

Several interface pages are discussed in this section, including the landing page, which functions as the main page and introduces the digital invitation platform with a simple and informative design. This page makes it easy for users to immediately understand the main features offered, such as invitation customization, theme options, RSVP for attendance confirmation, gift delivery, and QR scanning for guest registration. With the gallery section, users can view and select invitation themes as needed. In addition, this landing page also features flexible pricing plans, ranging from free to paid versions, with premium features such as guest management and higher-quality invitations. The following landing page implementation results can be seen in figure 6.
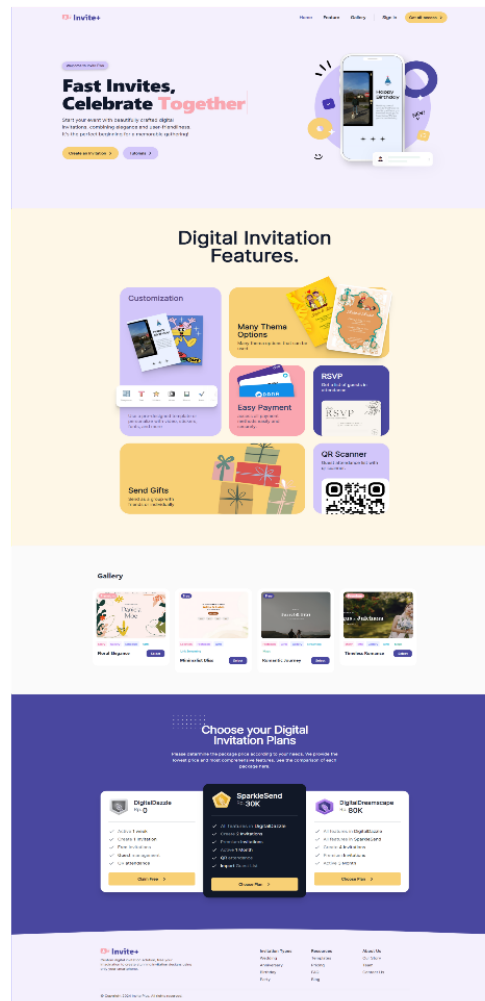


Figure 6. Landing page

The payment process through Midtrans offers a variety of easy and flexible payment methods, with billing amounts and unique order IDs for transaction identification. Users can choose the appropriate payment method, such as QRIS, which supports popular apps like LinkAja, OVO, DANA, and ShopeePay, or the

GoPay option that allows direct payment. In addition, there is also a virtual account method for bank transfers through central Indonesian banks such as Mandiri, BNI, BRI, and Permata. The remaining payment time is clearly displayed, ensuring users can complete the transaction before the time limit expires. With these various payment options, Midtrans ensures that transactions take place safely, quickly, and according to user preferences. The following implementation results of the payment page using midtrans can be seen in figure 7.
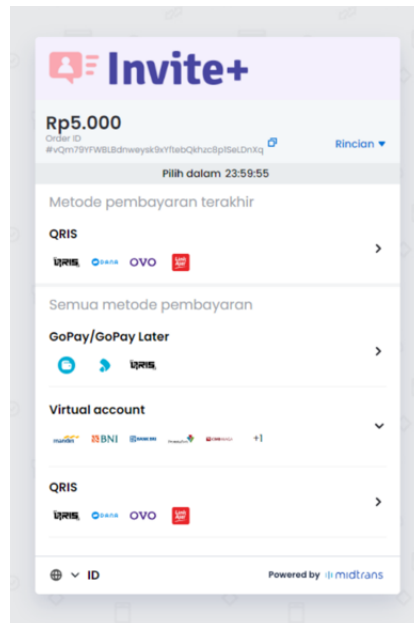


Figure 7. Midtrans payment page

The digital invitation creation process has basic features such as text settings, layout, and graphic elements that can be changed directly using the drag-and-drop method. Users can add visual elements such as images and icons and customize the design according to the event's theme, as seen in the example invitation that uses floral motifs and pastel colours. In addition, the app provides a navigation menu to add additional information, such as the couple's story, photo gallery, event schedule, and gift list. Once completed, the invitation can be instantly shared digitally via email or social media, making it a practical and efficient solution for disseminating event information to guests. The following implementation results of the editor invitation page can be seen in figure 8.
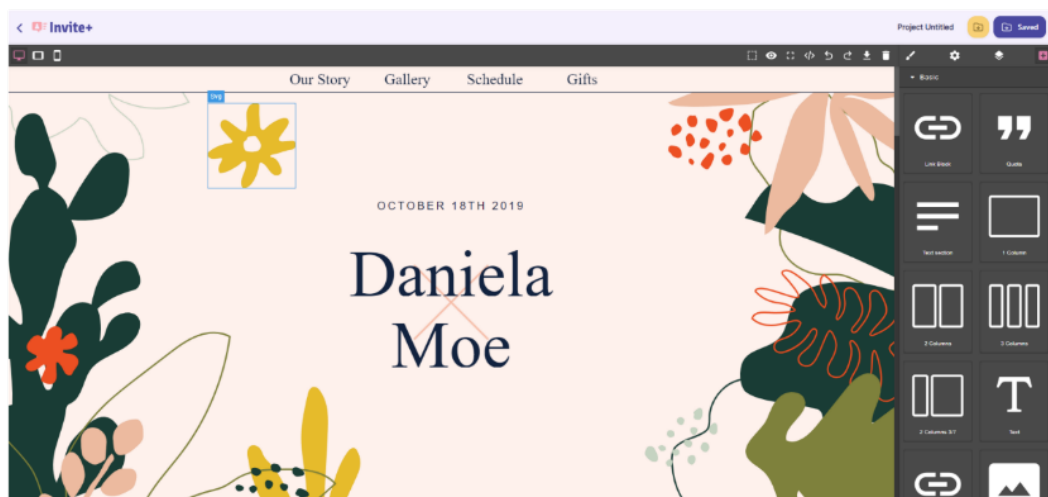


Figure 8. Editor's invitation

In recording guest attendance using a QR scanner, each guest will receive a digital invitation with a unique QR code directly linked to the event system. When guests arrive at the event location, they show the QR

code, which will be scanned by the event staff using a smartphone. Once scanned, guest attendance information is immediately recorded in the system in real time, making it easier for event owners to monitor the number of guests attending without the need to record manually. This method speeds up the guest registration process and minimizes errors.

**User Application Testing**

Testing is carried out to ensure that the system can run properly and efficiently when recording guests' attendance. In this test, each guest who comes is directed to check in by scanning the QR code printed on their digital invitation. figure 9 below shows the process where the attendant uses a smartphone device to scan the guest's QR code. The scan result is immediately recorded in the system automatically, ensuring that guest attendance is documented in real-time without the need for manual recording. The following is a test conducted at a wedding event, as seen in figure 9.



Figure 9. User application testing

Testing of the digital invitation system was conducted in two main stages to ensure its quality and effectiveness. The first stage is software functionality testing using a testing method with a Blackbox Testing approach. Blackbox testing is a method in which the tester does not need to know or understand the internal structure of the application being tested [24]. The main focus of this test is to observe the system output based on the input given, so it only looks at the functionality aspects of the application. In other words, the tester will only check whether the existing features work as they should in accordance with predetermined specifications [25]. Examples of Blackbox testing in the context of digital invitations include testing invitation creation, invitation distribution, and guest attendance functions using QR codes. Through this test, it is expected that the system can run well without any disturbing errors.

The second stage of testing involves end users, in this case, brides-to-be and guests, to assess their experience in using digital invitations. At this stage, researchers will use the questionnaire method to collect user data [26]. The questionnaire will contain questions related to various aspects, such as ease of use, interface clarity, design flexibility, and comparison between digital invitations and paper invitations. Users will be asked to rate the ease of accessing invitations, comfort in using the available features, and the aesthetics and design offered by the digital invitation system.

In addition, the questionnaire will also include an assessment of the effectiveness of digital invitations in managing guest lists, primarily through the QR code attendance feature. Guests will be asked to provide feedback on whether this attendance system makes it easier compared to printed methods, such as manual signatures at the venue. All questionnaire results will be analyzed to measure the level of user satisfaction and evaluate the extent to which this application can meet the needs and expectations of prospective brides and invited guests [27]. The following is a graph of the test results with the questionnaire method conducted on several respondents at the wedding event, which can be seen in figure 10.
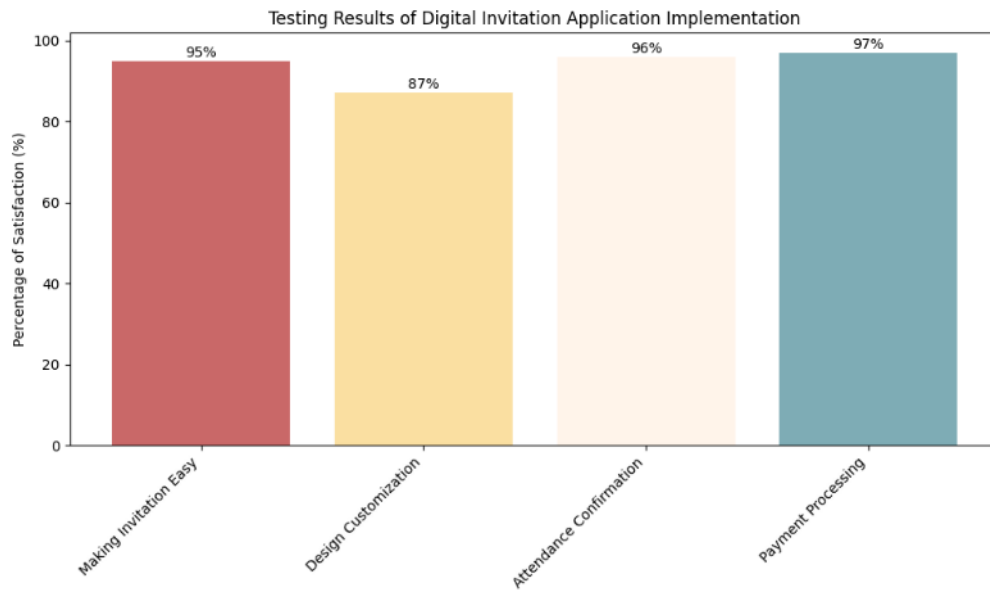
Figure 10. Result of user application testing

Accelerating the creation and distribution of invitations is the first test to determine the extent to which digital invitation applications can speed up the process of making and distributing invitations. The results of the questionnaire showed that as many as 95% of respondents strongly agreed that this application helped speed up the process. With a total score of 129 out of a maximum score of 135, the majority of users stated that this application made it easier for them to manage invitations efficiently. This shows that the main feature of the app, the creation and distribution of digital invitations, is highly valued by users.

The second test was conducted to find out how easy it is to customize the invitation design. From the questionnaire results, 87% of respondents felt very helped by this feature. The score obtained was 118 out of a maximum score of 135, indicating that users felt that this application made it easier for them to customize invitations according to their respective preferences. However, 13% of respondents were unsure or dissatisfied with the flexibility of design customization, indicating that improvements in this aspect are still needed to meet the needs of more varied users.

The Third Test was conducted to find out how easy it is to confirm guest attendance. The test results show that 96% of respondents strongly agree that this feature makes it easier to know the number of guests who will attend. With a total score of 130 out of 135, this feature is considered very helpful for event owners in managing guest lists. This high percentage shows that the QR code-based attendance confirmation feature provides an efficient solution compared to the manual method.

The last test was conducted to find out how easy the payment process was, the online payment feature on the application also received a positive response from users. A total of 97% of respondents agreed that the payment process was easy to do, with a total score of 132 out of 135. Respondents felt that the payment system through platforms such as Midtrans integrated in the application was very helpful, especially in terms of convenience and speed.

Thus, this test not only measures the initial success of the application, but also becomes the basis for further development that can improve the quality of digital invitation services in the future. From the results of the tests that have been carried out, it can be concluded that the results of the tests are as follows.
1. his digital invitation application can 95% make it easier for users or invitation event owners to create and distribute invitations.
2. This digital invitation application, 87%, can make it easier for users or owners of invitation events to make invitations according to the user's own wishes.
3. This digital invitation application 96% can make it easier for users or owners of invitation events to manage and know the number of guests who will attend.
4. This digital invitation application 97% of users feel that the subscription payment process in this application is easy for users to do.

**CONCLUSION**

Based on the results of the implementation design and testing that has been carried out on the invite+ digital invitation application, it can be concluded that the development of digital invitation applications that utilize web technologies such as Grapes.js, Vue QR code reader, and Midtrans has succeeded in providing a better solution in managing event invitations and directly addressing the main research objectives. These findings demonstrate that the system can run efficiently and is accessible even for users who are unfamiliar with digital invitations. The research contributes to sustainable event management practices by promoting digital solutions that reduce paper waste and environmental impact compared to printed invitations. With a more flexible and user-friendly system, this technology helps more people transition to digital invitations while establishing a scalable framework that can be adapted for various types of events and cultural contexts in the future, thereby bridging the digital divide in event management and paving the way for wider adoption of efficient, environmentally conscious invitation systems.

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