

User Flow Analysis of the Ruangguru App Using Heuristic Evaluation and Cognitive Walkthrough Methods

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Received: 08/06/2026, Revised: 09/10/2026, Accepted: 16/10/2026, Published: 18/10/2026

Abstract—This study evaluates the effectiveness of user flow in the Ruangguru application by integrating Heuristic Evaluation (HE) and Cognitive Walkthrough (CW). HE was conducted by two UI/UX experts, while CW involved 62 students from lower secondary, upper secondary, and higher education levels. The research stages comprised problem identification, literature review, HE/CW scenario development, data collection, analysis, and formulation of design recommendations. HE identified 23 violations of Nielsen's principles with an average severity rating of 2.74. The most critical issues occurred in System Status Visibility (SR = 3.2), Consistency and Standards (SR = 3.0), and Recognition rather than Recall (SR = 2.8), particularly during registration, content search, and payment transactions. CW produced an overall usability score of 4.08/5, with 63% of respondents willing to reuse the application. Interface Visibility achieved the highest score (4.10), whereas Action–Goal Association recorded the lowest score (3.81). HE exposed structural interface deficiencies, while CW revealed cognitive barriers during task execution. The combined analysis generated five recommendations: design-system standardisation, clearer status indicators, more intuitive labels, structured payment-method grouping, and contextual onboarding. This study contributes an integrated Heuristic Evaluation and Cognitive Walkthrough framework that links expert-identified interface problems with user-experienced cognitive barriers, providing a clear basis for prioritizing user-flow improvements in educational technology applications.

Keywords: Ruangguru; Usability Evaluation; User Flow; Heuristic Evaluation; Cognitive Walkthrough

1. INTRODUCTION

The rapid development of information technology has encouraged educational institutions to adopt digital learning environments, making e-learning an important component of modern education. As a form of digital transformation of conventional methodologies, e-learning utilizes internet infrastructure to facilitate a more flexible and integrated learning process [1]. As technology continues to evolve, educational institutions are increasingly required to integrate digital solutions to improve learning quality and broaden access to education [2]. This is reflected in the large number of educational institutions in Indonesia that have adopted digital media to support learning, such as Ruangguru, one of Indonesia's most prominent educational technology companies operating in the online learning sector [3]. As an entity that continuously improves by providing access to qualified teachers for students across Indonesia, Ruangguru has become an important contributor to the adoption of educational technology [4].

Despite its widespread use, the effectiveness of Ruangguru largely depends on how easily users can interact with the application and accomplish their learning objectives. However, Ruangguru's popularity does not always correlate directly with the stability of user satisfaction. User satisfaction [5], [6] reflects whether the experience provided by the application meets the expectations of its users, if the user experience fails to meet these expectations, the platform's effectiveness as a learning tool will decline significantly. To address these issues, usability testing serves as a strategic step to identify areas requiring optimization to better align with students' evolving expectations. Through this testing, developers can ensure the application remains relevant, drive innovation, and provide a more optimal learning experience, so that the platform is not only functionally adequate but also competitively superior in meeting the cognitive needs of its users [7].

One important aspect that influences the user experience in Ruangguru is user flow, which describes the sequence of actions users take while completing tasks within the application. An effective user flow guides users intuitively through the registration process, course selection, and access to learning materials without causing undue mental strain [8].

From the perspective of human-computer interaction, a well-structured and easily understandable path can reduce mental load and enhance user comfort when interacting with the system [9]. However, the complexity of features on e-learning platforms like Ruangguru can also create barriers if not supported by a simple and consistent navigation system. Therefore, analyzing user flows is crucial for identifying problem areas that may disrupt the user experience, thereby enabling the development of more effective solutions to enhance the effectiveness of digital learning [10].

A number of previous studies have explored the effectiveness of the Ruangguru app, focusing on usability as a key factor in determining the success of user interactions. To assess usability, the Heuristic Evaluation method introduced by Jakob Nielsen is often used to detect issues in the interface based on usability principles, such as

consistency, system visibility, and ease of navigation [11]. Additionally, the Cognitive Walkthrough approach is commonly applied to evaluate the extent to which the system is understood by new users as they complete tasks step by step [12]. Several studies indicate that combining these two methods can provide a more holistic assessment in identifying user flow challenges in digital applications, including in online learning platforms [13], [14].

In the field of e-learning, the application of Heuristic Evaluation and Cognitive Walkthrough techniques has proven highly effective in identifying issues related to user experience, particularly regarding navigation and task completion. Research indicates that unidentified usability issues can directly impact satisfaction and effectiveness in digital learning [15].

Additionally, evaluations based on cognitive walkthroughs can reveal gaps between system design and how users think, particularly regarding their understanding of the steps involved in using application features. Other studies also confirm that improvements based on usability evaluation findings can significantly enhance efficiency, effectiveness, and user satisfaction when using e-learning systems [16]. Therefore, the application of these two methods in this study is expected to provide improvement recommendations that are more focused on the user flow of the Ruangguru application, thereby enhancing the overall quality of the user experience [17].

Previous studies evaluated usability in e-learning systems using different methods. Imana and Nugroho [7] used Heuristic Evaluation and usability testing, while Alqurni [13] examined usability approaches. Ofosu-Asare [14] focused on improving online learning interfaces. Kusuma et al. [18] evaluated Ruangguru using Heuristic Evaluation only. However, these studies did not combine expert findings with users' cognitive difficulties in the same task flow. This study fills that gap by integrating Heuristic Evaluation and Cognitive Walkthrough.

The main contribution of this study is the integration of expert-based Heuristic Evaluation and user-based Cognitive Walkthrough in the same Ruangguru user flow. This approach connects interface problems with actual user difficulties and supports more focused design improvement priorities. By using both Heuristic Evaluation and Cognitive Walkthrough, this study examines usability problems in the Ruangguru application from two complementary viewpoints. Expert evaluation identifies weaknesses in interface design, while user-based evaluation reveals difficulties that occur during task completion. The findings are used to determine priority areas for improvement and to propose practical changes that can make the Ruangguru user flow clearer, easier to follow, and more effective.

2. RESEARCH METHODOLOGY

2.1 Research Stages

This research methodology was designed to analyze the effectiveness of the user flow in the Ruangguru app by combining two primary evaluation methods. This approach uses Heuristic Evaluation (HE) [18], [19] as an initial step to quickly and systematically identify usability issues in the user interface by referring to Nielsen's ten usability heuristics, such as system status visibility, interface consistency, and minimalist visual design principles. The use of HE has proven effective in analyzing and improving the user experience due to its ability to deeply detect barriers in interface elements [20].

To complement this analysis, this study also applied the Cognitive Walkthrough method, which serves to predict the ease with which users can understand specific tasks within the system. Through the evaluator's observation of the given task scenarios, this method can identify cognitive barriers users face while navigating the application workflow [21]. The integration of these two methods is expected to provide a comprehensive evaluation in identifying usability issues and improving the effectiveness of the user flow on the Ruangguru application. The objective of this study is to analyze interface barriers and cognitive constraints in the Ruangguru app's user flow to improve the effectiveness and user experience in completing tasks within the app.

The research process comprises several stages, as illustrated in Figure 1: problem identification, literature review, development of test scenarios for Cognitive Walkthrough (CW) and Heuristic Evaluation (HE), data collection, formulation of design improvement recommendations, and drawing conclusions. Evaluation using these methods is essential to objectively identify interface barriers and user cognitive constraints. The aim of this study is to provide the most appropriate design improvement recommendations to help improve the overall effectiveness of the user journey in the Ruangguru app, as similar approaches have been successfully applied in the evaluation of other digital education platforms [22].

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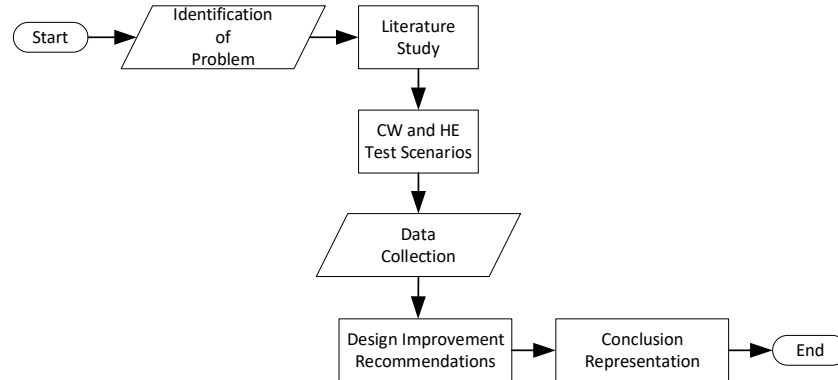


Figure 1. Diagram of the User Flow Analysis Stages for the Ruangguru App

2.2 Literacy Study

This literature review begins by compiling the main theories relevant to the topic of User Flow Analysis in the Ruangguru app, using a Cognitive Walkthrough approach combined with Heuristic Evaluation. Sources of understanding were drawn not only from nationally recognized local journals such as those listed in Sinta, but also from print publications on Human-Computer Interaction as well as detailed articles on usability testing parameters for online learning systems. These materials then served as references when formulating evaluation criteria to ensure that the criteria remained justifiable.

2.3 HE and CW Test Scenarios

The evaluation scenarios were developed to represent common activities performed by users in the Ruangguru application. This testing suite is designed to guide participants through a series of scenario-based activities [24], [25]. The tasks were arranged sequentially, beginning with simple interactions and progressing to more complex activities to observe user behavior and identify potential usability issues.

Nielsen's 10 Heuristic Principles [26] provide a systematic basis for identifying interface weaknesses and interaction issues that can reduce application usability. These principles evaluate important aspects such as navigation clarity, consistency, user control, error prevention, understandable information, and system feedback. In this study, the principles are used to examine different parts of the Ruangguru application and identify problems that may affect users during task completion. The evaluation also supports the classification of usability issues according to their impact on the user experience. Applying these principles allows the interface to be assessed in a structured and consistent way. The definitions and application of Nielsen's 10 Heuristic Principles in this study are presented in Table 1.

Table 1. Nielsen's 10 Heuristic Principles

Code	Heuristic Principles	Operational Definition
H1	Visibility of System Status	Does the app provide clear information about what's happening? (Example: loading bar, registration success notification).
H2	Match between System & Real World	Are the terms, icons, and language used by Ruangguru easy for students to understand?
H3	User Control and Freedom	Is there a "Cancel" or "Back" button in case a user clicks the wrong option when selecting a learning package?
H4	Interface Consistency and Standardization	Is a consistent arrangement of buttons and visual color elements maintained across all application pages?
H5	Error Prevention	Does the design prevent users from making mistakes (e.g., confirmation before payment)?
H6	Recognition rather than Recall	Are the instructions clear enough so that users don't have to memorize previous steps?
H7	User Flexibility and Operational Efficiency	Does the application provide shortcut functionalities, such as a "Recently Viewed" feature, to facilitate quicker access to learning materials?
H8	Aesthetic and Minimalist Design	Does the interface present a simple and uncluttered design without elements that may divert users' attention from the learning process?
H9	Error Recognition and Recovery	When an error occurs, such as an invalid promo code entry, does the system provide clear instructions to help users resolve the issue?
H10	Help and Documentation	Is the "Help" or "Customer Service" feature easy to find if a user is confused?

The Cognitive Walkthrough [27] was applied to novice users to assess how easily they could learn and use the Ruangguru application. Participants performed several common tasks arranged from basic to more complex activities. This process helped observe how users understood the interface, followed navigation steps, and completed each task. The method was also used to identify interaction difficulties that could affect task completion. The task scenarios used for this evaluation are summarized in Table 2.

Table 2. Cognitive Walkthrough Task Scenario Matrix

Task ID	Activity Description	Success Indicators
Q1	Initial orientation and understanding of app navigation.	Users understand the interface's main functions without external assistance.
Q2	Searching for and identifying specific learning materials.	Effectiveness of the search feature and menu hierarchy.
Q3	Accessibility of content (videos/modules) and interaction flow.	Clarity of the process flow from selection to consumption of materials.
Q4	Evaluation of system responsiveness and feedback.	User perception of system responsiveness during the process.
Q5	Assessment of satisfaction and usage retention.	Level of user willingness to adopt the system on an ongoing basis.

2.4 Data Collection

Data was collected through observation and by having evaluators complete evaluation forms based on a predefined scenario. The outcome of this phase is a list of identified issues along with a severity rating for each issue.

2.4.1 Data Processing and Analysis of Results

After data collection, the findings were analyzed to determine the priority level of each identified usability issue. To assign weight to the issues identified during the heuristic evaluation process, this study employs severity ratings. This scale helps researchers prioritize fixes based on the impact of the issues on users. The severity level is determined based on the average rating from experts using the Equation (1).

$$SR = \frac{\sum_{i=1}^n S_i}{n} \quad (1)$$

In Equation (1), SR represents the Mean Severity Rating, or the average severity of the problem, while S_i is the rating score assigned by the i evaluator, and n is the total number of evaluators involved in the inspection. The interpretation of severity scores refers to the standard classification developed by Nielsen (1994). A score of 0 represents a condition where the finding is not a usability issue. A score of 1 is categorized as a cosmetic problem, i.e., an aesthetic issue that is not urgent to fix. A score of 2 is classified as a minor usability problem, where the identified issue has a low priority for correction. A score of 3 refers to a major usability problem, a significant issue that hinders functionality and requires high priority for correction. Finally, a score of 4 is defined as a usability catastrophe, indicating a critical system failure that must be fundamentally addressed before the application is further implemented.

The data obtained through the Cognitive Walkthrough method was analyzed using descriptive statistical techniques to determine the users' success rate in interacting with the system. Measurements were taken by calculating the mean score for each indicator on the post-task questionnaire to obtain an objective picture of user perceptions using Equation (2).

$$\bar{X} = \frac{\sum_{i=1}^n X_i}{n} \quad (2)$$

In Equation (2), $\bar{X}$ is defined as the mean of the users' perception scores, while X_i is the Likert score given by the i respondent, and n is the total number of respondents in the beginner group. This assessment instrument uses a 5-point Likert scale to convert subjective perceptions into measurable quantitative data.

The questionnaire data were evaluated by calculating the mean scores to assess the overall usability level of the interface. In Section A, respondents evaluated statements concerning interaction quality by selecting responses on a five-point Likert scale, ranging from Strongly Disagree (1) to Strongly Agree (5). Section C assessed users' perceptions of application usability, with scores ranging from 1 (Very Difficult) to 5 (Very Easy). Higher average score indicated better user satisfaction and interaction quality, while lower scores pointed to possible usability and cognitive challenges requiring additional analysis based on participants' qualitative responses.

2.5 Design Improvement Recommendation

Based on the results of the analysis of the collected data, the researchers formulated recommendations for improvements to the interface design and workflow. These recommendations may include changes to the layout

of navigation buttons, simplification of the registration process, and improvements to the information hierarchy to enable users to complete tasks more efficiently and with minimal cognitive errors.

2.6 Drawing Conclusions

The final stage involves drawing conclusions once the entire series of testing and analysis has been completed. This stage summarises the key findings regarding usability issues in the Ruangguru app and provides suggestions for the app developers to enhance the user experience in the future based on the results of the CW and HE evaluations.

3. RESULT AND DISCUSSION

3.1 Ruangguru Interface Overview

Prior to presenting the evaluation results, the Ruangguru interface structure should be examined to establish the interaction context of the study. The selected interfaces represent key stages of the user journey, including registration, class selection, content exploration, search functionality, and subscription access. These screens provide the empirical basis for subsequent usability assessment using Heuristic Evaluation and Cognitive Walkthrough.

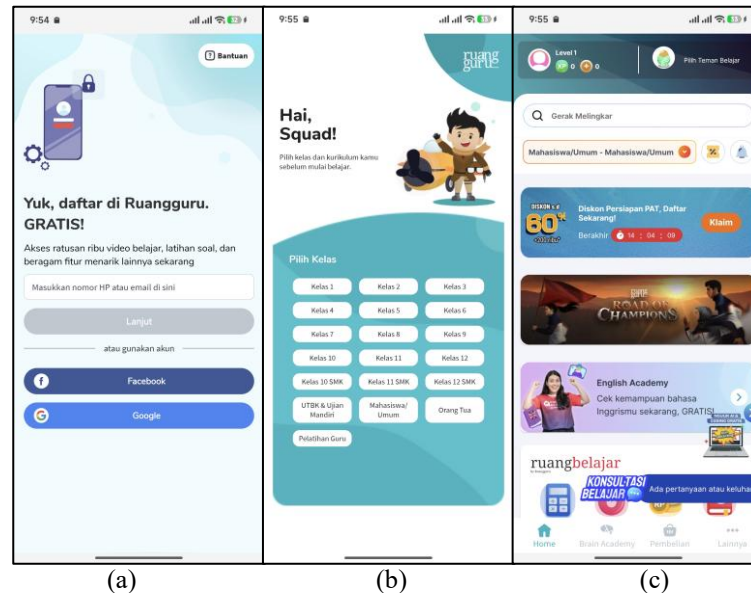


Figure 2. Ruangguru Application Interface Display: (a) Registration Page, (b) Class Selection, (c) Home Page

Figure 2(a), (b), and (c) show the main Ruangguru interfaces for user registration, class selection, and home-page navigation. These interfaces represent the early stages of user interaction with the application. Figure 2(a) shows the Ruangguru registration page, which is the first access point for new users. The page provides a simple form for creating an account by entering basic information and choosing a registration method. Users can also select alternative sign-in options using external accounts. The layout is clear and places the main registration functions in visible positions, helping users complete the account creation process easily.

Figure 2(b) presents the class selection page, where users choose their educational level before accessing learning materials. The available classes are displayed as separate buttons, making the options easy to identify and select. This process supports content personalization because the selected class affects the learning materials, subjects, and recommendations shown later. The organized layout also helps reduce user effort during the selection process.

Figure 2(c) shows the Ruangguru home page, which acts as the main navigation area of the application. It contains several important features, such as a search bar, learning recommendations, promotional information, subject services, and access to other educational functions. These elements give users several ways to find learning materials and continue their study activities. This page is important for usability because it supports content exploration, service selection, and navigation to other parts of the application.

Beyond the initial navigation screens, two additional interface displays (Figure 3) were also included in the evaluation scope: the content search feature (d) and the subscription package page (e). These screens are of particular relevance to the usability findings of this study, as they are directly associated with the most frequently identified heuristic violations, specifically those concerning information retrieval complexity and payment processing flow illustrated below in Figure 3.

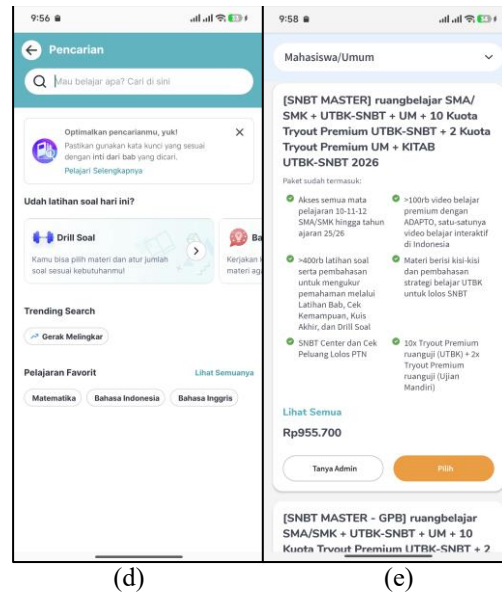


Figure 3. (d) Content Search Feature, (e) Subscription Package Page

3.2 Heuristic Evaluation (HE) Results

The evaluation was conducted independently by two UI/UX experts, each with over two years of experience in digital product design. Expert 1 and Expert 2 reviewed the application separately to prevent bias, then met to consolidate findings and agree on severity ratings, following established dual-expert protocols. Issues were rated on a scale of 0 to 4, where 0 indicated no problem, 1 a cosmetic issue, 2 a minor usability issue, 3 a major issue, and 4 a catastrophic failure. The evaluation covered three key task flows: account registration, searching and accessing learning videos, and completing the subscription payment process.

Two reviewers spotted 23 broken rules during the check, consistent with the typical range of issues found in expert-based usability inspections. Notably, searching content brought up ten problems, more than any other area. Payment steps came next, showing eight flaws. Account sign-up had five. On average, severity ranked at 2.74, meaning most glitches fell into the minor-to-major range. Worst single issue scored 3.2 under rule H1: users couldn't tell what the system was doing. Rule H4 broke down most often five times total with mismatched designs and formats. Every problem, its related guideline, and typical seriousness appears in Table 1. Table 3 shows the results of the analysis. The heuristic evaluation identified several usability issues in the Ruangguru application. A summary of the findings is presented in Table 3.

Table 3. Summary of Heuristic Evaluation Findings for the Ruangguru App

Code	Heuristic Principles	Issue Findings	Average SR (1-5)
H1	Visibility of System Status	After the payment confirm button is clicked, no feedback or loading indicator appears, which may confuse users and cause repeated clicks.	3.2
H2	Match between System & Real World	The terms sound too technical and formal, and don't reflect how students naturally talk when studying or practicing lessons.	2.0
H3	User Control and Freedom	Users who enter the payment process by mistake may struggle to find a clear way back, making navigation feel confusing and unnatural.	2.5
H4	Consistency and Standards	Buttons on the home and category pages look identical despite having different functions, which can confuse users in multiple areas of the app.	3.0
H5	Error Prevention	Error messages appear only after pressing Register, as the form lacks real-time validation while users are typing.	2.0
H6	Recognition rather than Recall	The interface lacks clear navigation indicators, making users rely on memory to move through long and complex sections.	2.8
H7	Flexibility and Efficiency of Use	The system does not save search history or provide shortcuts for returning users, forcing them to start from scratch each time.	1.5
H8	Aesthetic and Minimalist Design	The interface feels cluttered with excessive banners, recommendations, notifications, and menus, making the	2.5

Code	Heuristic Principles	Issue Findings	Average SR (1-5)
H9	Help users recognize, diagnose, and recover from errors	layout appear disorganized and overwhelming. A vague notice shows up if payment does not go through, just saying "Transaction failed, please try again", leaving users in the dark about why it happened or what to do next.	2.0
H10	Help and Documentation	Accessing support or FAQs requires users to leave their current task, making help difficult to reach during navigation.	1.5

From Table 1, H1 appears first with a value of 3.2, just above H4's 3.0, which edges past H6 at 2.8, while H3 settles precisely at 2.5, all tagged as Major concerns. Movement across tasks within the app links directly to each of these points. Meanwhile, values for H2, H5, H7, H8, H9, and H10 range from 1.5 up to 2.5, showing lower priority but eventual need for correction. The absence of any score reaching 4.0 or dropping to zero implies underlying stability in the Ruangguru system. Still, repeated irregularities across multiple heuristic categories signal spots where structured improvements may be due.

3.3 Cognitive Walkthrough (CW) Results

A Cognitive Walkthrough was conducted with 62 participants, 40 university students, 18 high school students, and four middle school students. Forty-nine participants (79%) had previously used the Ruangguru app. A Likert scale from 1 to 5 was used to measure usability aspects across four core CW dimensions: action knowledge (Q1 & Q2), interface visibility (Q3), action-goal association (Q4 & Q5), and system feedback (Q6). The expanded sample provides greater statistical representativeness across educational backgrounds, reflecting the broad demographic reach of the Ruangguru platform and aligning with best practices in HCI research that recommend diverse user groups to achieve reliable usability score distributions.

3.3.1 Action Knowledge (Q1 & Q2)

In Q1 & Q2 (Action Knowledge), the statement "I can quickly understand how to use the Ruangguru app" averaged 4.05, while "The flow is clear and not confusing" scored 4.13. Both items had a minimum score of 2 and a maximum of 5, indicating that most participants found the onboarding experience acceptable, though a portion of users still encountered comprehension difficulties. High school and middle school students tended to give lower scores, suggesting that younger or less digitally experienced users require clearer onboarding guidance. This finding is consistent with research demonstrating that user familiarity with digital interfaces significantly mediates perceived ease of use, and that structured onboarding sequences can meaningfully reduce initial cognitive load among novice users of mobile learning applications [21].

3.3.2 Interface Visibility (Q3)

In the interface visibility section, menus and buttons received an average score of 4.10 with a minimum of 2 and a maximum of 5, indicating that the majority of users could navigate the app without significant difficulty. This dimension recorded the highest average across all CW categories in the expanded dataset.

3.3.3 Action-Goal Association (Q4 & Q5)

Q4 & Q5 (action-goal association) showed the lowest average scores: the item "I did not experience confusion when using the app" averaged 3.81, with a minimum of 1, indicating that at least one participant felt completely disoriented. The item "I could find materials easily" averaged 4.16. Together, the combined average was 3.99, revealing that while most users could locate content, a subset struggled to align interface options with their learning intentions. One participant specifically noted that the Brain Academy Online feature was unintuitive, and that frequent app updates disrupted access to lesson materials. These findings are consistent with research showing that information architecture mismatches between user mental models and application structure are a primary driver of navigation failure in mobile e-learning systems, and that taxonomic clarity in menu labelling significantly reduces task completion errors in educational platforms.

3.3.4 System Feedback (Q6)

In Q6 (System Feedback), the statement "The system provides clear feedback when used" averaged 4.02 with a minimum score of 2, indicating residual dissatisfaction with system responses among a segment of users. The overall ease-of-use score was 4.08, and 39 participants (63%) expressed willingness to use the app again. Open-ended responses from the full dataset highlighted recurring requests: more free video content, improved app performance on lower-end devices, periodic design refreshes to prevent monotony, and a less repetitive login process. One respondent specifically noted that the app felt slow when accessing the online class feature on certain devices. Research on mobile learning satisfaction consistently identifies system responsiveness and feedback quality as critical determinants of user retention, continued engagement, and willingness to reuse a platform. The results of the Cognitive Walkthrough questionnaire are presented in Table 4.

Table 4. Summary of Cognitive Walkthrough Results Based on Questionnaires

Code	Questionnaire Items	Key Findings	Average (1-5)
Q1	I found it easy to use the Ruangguru app	Most respondents rated the ease of understanding as fairly good. The item “easy to understand” averaged 4.05.	4.05
Q2	The app’s user flow is clear and straightforward	Many respondents feels that the app’s user flow is already clear and straightforward, with an average of 4.13.	4.13
Q3	The menus and buttons in the app are easy to understand	Most users rated the visual navigation elements as sufficiently clear. But a small number of users still encountered interface clarity issues, particularly among first-time users.	4.1
Q4	I did not have any trouble of using the app	Weakest dimension. The questionnaire averaged 3.81. Despite the average score, there are some users that felt disoriented when using the app.	3.81
Q5	I was able to find the material easily	The questionnaire averaged 4.16. Certain features (Brain Academy Online) were reported unintuitive. Frequent app updates were cited as an additional navigation barrier.	4.16
Q6	The system provides clear feedback when used	System feedback averaged 4.02. Despite the relatively higher average compared to Q3, recurring complaints about inefficient re-login processes and slow response on certain devices indicate that the feedback experience is still inconsistent across users and device types.	4.02
Q7	How much do you want to use this app again	Overall averaged 4.08; 63% of respondents (39 out of 62) expressed willingness to use the app again.	4.08

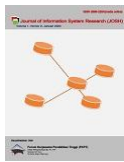
Table 4 shows that most questionnaire items received relatively high average scores, indicating that users generally found the Ruangguru app easy to understand and use. The highest score was obtained by Q5 (4.16), suggesting that most users were able to find learning materials easily, although some features were still considered unintuitive. Q2 also received a high score (4.13), indicating that the app’s user flow was generally viewed as clear and straightforward. In contrast, Q4 received the lowest score (3.81), showing that some users still experienced difficulties or confusion while using the app. Overall, the questionnaire results indicate that the app has good usability, although several navigation and interface clarity issues still need improvement, particularly for first-time users.

3.4 Discussion

The differing results of Heuristic Evaluation and Cognitive Walkthrough actually complement each other. On the one hand, HE is more effective at identifying fundamental design flaws, such as inconsistent visuals or chaotic information flow, because it follows fixed rules. Meanwhile, CW reveals how ordinary users actually get stuck during real-world activities, not just in theory. When combined, these two approaches cover a broader scope than when used individually. Previous studies have noted that approximately forty to fifty percent of their findings overlap; however, each method still uncovers issues that the other fails to detect.

The combined method was applied in two connected stages. First, Heuristic Evaluation examined the Ruangguru interface using Nielsen’s usability principles. Evaluators reviewed registration, content search, content access, and payment flows, then linked each problem to a heuristic and severity score. The highest scores were Visibility of System Status (H1 = 3.2) and Consistency and Standards (H4 = 3.0), showing that feedback and interface consistency were key improvement priorities. Second, Cognitive Walkthrough examined user experience during task completion. Participants assessed action knowledge, interface visibility, action–goal association, system feedback, and reuse intention. Scores ranged from 3.81 to 4.16. The lowest score, Q4 = 3.81, showed that some users still experienced confusion, while Q5 = 4.16 indicated that learning materials were generally easy to find. Together, both methods provided complementary evidence by linking expert-identified interface problems with user-reported difficulties during actual interaction and helped prioritize practical design improvements across important Ruangguru application user flows.

These results show a similar pattern to the study by Kusuma et al. [18], which evaluated the Ruangguru application using Heuristic Evaluation and identified usability problems related to user control, recognition, and interface design. The present study also found problems in Recognition Rather than Recall (H6 = 2.8) and Aesthetic and Minimalist Design (H8 = 2.5). However, Visibility of System Status (H1 = 3.2) and Consistency and Standards (H4 = 3.0) were the most critical issues. This difference shows that combining Heuristic Evaluation with Cognitive Walkthrough can identify both interface problems and user difficulties during actual tasks.



The results are also similar to those reported by Imana et al. [7] because both studies show that a good overall usability score does not eliminate problems related to navigation, interface consistency, system feedback, and task completion. In the Ruangguru application, the overall Cognitive Walkthrough score was 4.08/5, but Action–Goal Association had the lowest score of 3.81. This indicates that good overall usability does not mean that all task flows are easy for users. The result also supports Ofosu-Asare [14], as the study showed that combining different usability evaluation methods can provide more comprehensive usability results. In addition, Alqurni [13] emphasized the importance of clear navigation, interface quality, ease of use, and system feedback in e-learning systems.

The CW results confirmed that the inconsistencies in the user interface previously identified through HE based on H4 were indeed experienced by new users; they were confused when switching from the home page to the course page. This finding suggests that design differences are not merely a matter of aesthetics but also disrupt how users understand the overall flow of the application. When evaluating online tutoring apps in Indonesia, [13] reached a similar conclusion: inconsistent navigation patterns have a significant impact on satisfaction and the decision to continue using the service on mobile devices.

The lack of clear system feedback during registration directly links to the H1 finding in HE. Without visible responses to user actions, participants became hesitant and uncertain whether their previous step had succeeded. Research consistently demonstrates that humans require immediate feedback to maintain focus during task execution. When a system remains unresponsive, even a simple process can generate cognitive anxiety, creating a gap between user intent and perceived outcome.

The cluttered payment methods page, as identified by CW, directly points to Issue H8 (Aesthetic and Minimalist Design) in the HE. Twelve payment methods are displayed haphazardly without being grouped, this violates Miller’s Law: The human brain is capable of handling only a limited amount of information at one time, typically around seven items, with a variation of two items more or less. This showed that an overload of information on the transaction screen makes it difficult for people to complete the payment process on their own, especially under time pressure or limited user attention spans.

Combining the results of these two approaches yields five concrete suggestions for improving the product’s interface, all ready for immediate implementation. Starting with design system standardization: icons, color schemes, fonts, and button labels must be consistent across every screen, complete with a standardized style guide that serves as a reference for all developers. Furthermore, during critical processes like registration or payment, clearer system status indicators are needed, for example, through labeled progress bars, loading animations with explanatory text, and unambiguous success or failure messages.

The main menu structure also warrants improvement. Labels such as “Tryout” or “Question Bank” should be replaced with more intuitive phrases like “Learning Videos,” “Daily Exercises,” or “Online Quizzes,” supported by brief descriptions. The payment page should group methods clearly, Bank Transfer, E-Wallet, Credit Card, displaying only three or four popular options by default. Additionally, contextual help such as onboarding walkthroughs and hover tooltips should remain accessible during key tasks, reducing cognitive load and making the overall learning experience on Ruangguru more efficient and intuitive for users of all backgrounds.

4. CONCLUSION

This study concludes that the Ruangguru application has generally good usability, but several user-flow problems still need improvement. The Heuristic Evaluation identified 23 usability issues with an average severity rating of 2.74. The main problems were found in Visibility of System Status (H1 = 3.2), Consistency and Standards (H4 = 3.0), and Recognition rather than Recall (H6 = 2.8). These results show that unclear system feedback, inconsistent interface design, and weak navigation can make task completion more difficult, especially during registration, content search, and payment. The Cognitive Walkthrough also supports these findings, with an overall usability score of 4.08 out of 5. However, Action–Goal Association received the lowest score of 3.81, showing that some users still had difficulty matching interface options with their intended learning goals. In contrast, material discovery achieved the highest score of 4.16, which indicates that users could generally find learning content easily. These findings show that the Ruangguru user flow is usable for completing key learning-related tasks, but several interface and navigation problems still reduce interaction clarity and efficiency. The combined HE and CW methods also provide a clear basis for improving interface consistency, system feedback, terminology, information structure, payment options, and onboarding guidance. Moreover, this research confirms that the integration of HE and CW provides an evaluation approach that examines user-flow problems from multiple perspectives through clear and structured procedures, supporting the continuous improvement of educational technology platforms within the Indonesian digital landscape. Overall, this study contributes by combining Heuristic Evaluation and Cognitive Walkthrough to connect expert-identified interface problems with actual user difficulties in the same user flow.

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