The app adhering to Nielsen's Usability Heuristics.

1. Admin Access

Once logging in as an administrator, users will be redirected to the home page illustrated in the screenshot of Figure 1. The portal displays the name of the user (heuristic 1). The "Recognition Rather than Recall" heuristic was fulfilled by clearly labelled buttons to choose from (Figure 1 (1)) and the use of well-known icons. Furthermore, the "Edit profile details" modal (Figure 1 (2)), clearly mentions that if the user does not provide a new password, their old password will be used, and this aligns well with both heuristics "Error prevention" and "Help and documentation".

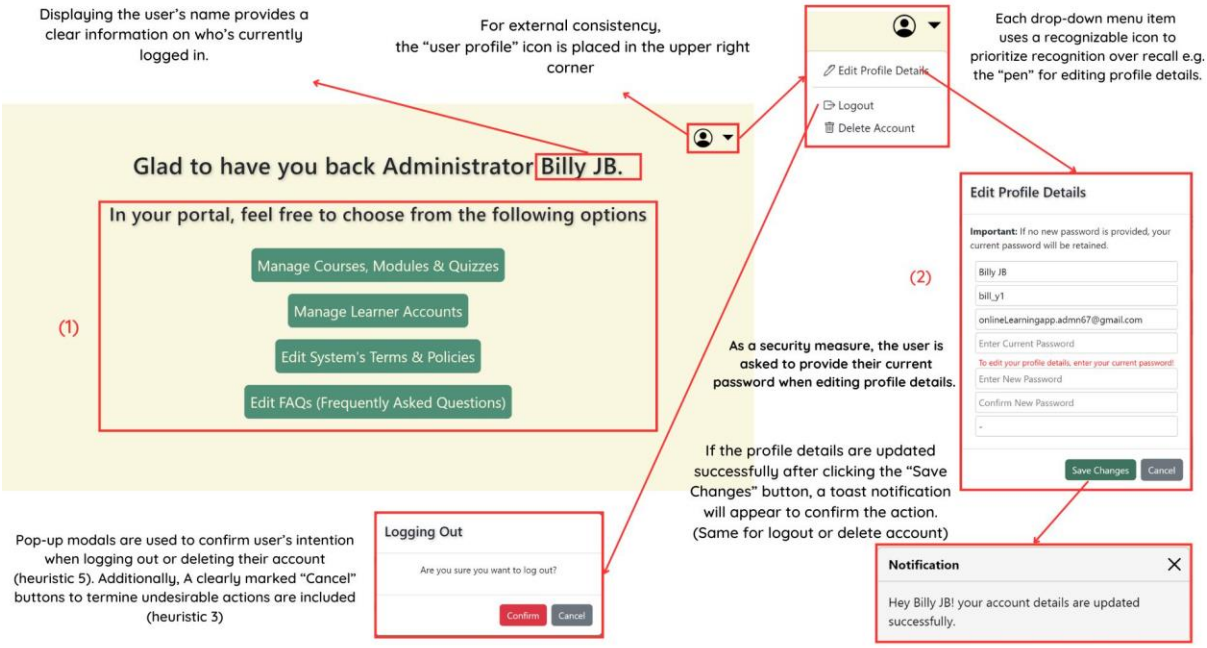

Figure 1. Annotated screenshot of the administrator portal in the advanced version of the application

2. Learner Access

After accessing the platform as a learner, the user will be taken to the main page where all the available courses are listed (Figure 2). For visibility of the system status, the learner is welcomed by their name, indicating the logged-in user. The portal is well-organized and focuses only on the essential elements, such as the list of courses. Additionally, it incorporates gentle colours (mainly pastel green and brown) to create a more appealing aesthetic and minimalist design (heuristic 8). To make the platform flexible for all users, a search bar with a comprehensive message on how to search for courses is provided for expert users, while inexperienced users can go through all the list, searching for a specific one. Also, to indicate that each course name is clickable and redirects the user to a new webpage, it is designed in different colour (blue) and will be underlined when hovering over it. In addition, a "Help" button that opens a pop-up modal with the administrators' email addresses to be contacted when needed, is incorporated. This fulfilled the heuristic 10. Users can easily close the modal using the "Close" button, and this gives them control over the platform (heuristic3).

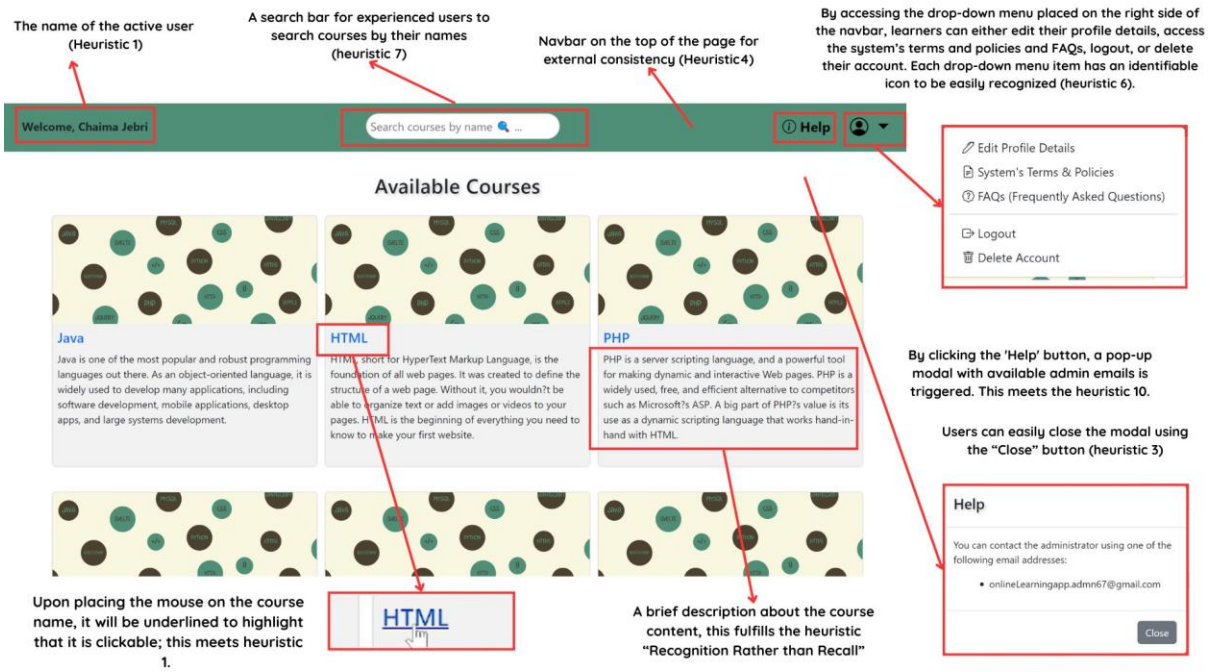

Figure 2. Annotated screenshot of the learner portal in the advanced version of the application

When the user clicks on a course name (for example Java), they are redirected to the modules and quizzes page for that course, as presented in Figure 3. To make it easier for learners to understand what they're browsing, the upper header incorporates the related course's name. In addition, if no modules or quizzes have been added to the platform yet, an appropriate message will be displayed. Those two features fulfil Nielsen's first heuristic, Visibility of System Status. Each module or quiz has an overview, for example, the "Java Fundamentals" quiz mentions that it has 20 questions and there's no time limit to take it. For user control and freedom, a "Back" button to return to the list of courses directly is placed on the left side of the navigation bar.

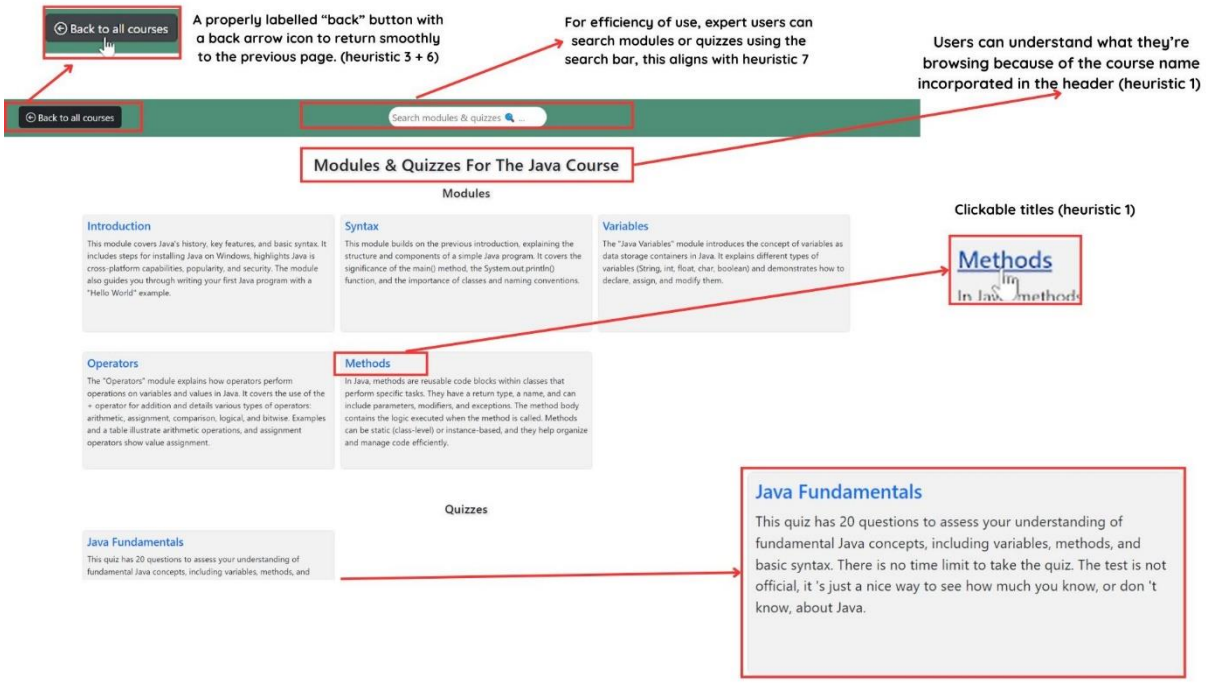

Figure 3. Annotated screenshot of the modules and quizzes page in the advanced version of the application

If the learner wishes to take the quiz and clicks on its name, they will be taken to a new webpage where the list of questions and their associated answer options is displayed (Figure 4). Each quiz contains two types of questions: multi-choice questions and true/false questions. To ensure that learners are aware that each question has only one correct answer, that any unanswered question will be considered incorrect, and that the passing criteria is 50%, a guideline is placed at the top of the question list. At the end of the webpage, a "Submit Answers" button is presented to send the learner answers for processing. The label of the button is a common terminology and covers what users would expect at the end of a quiz, thus, it aligns with the second heuristic, "Match Between the System and the Real World"

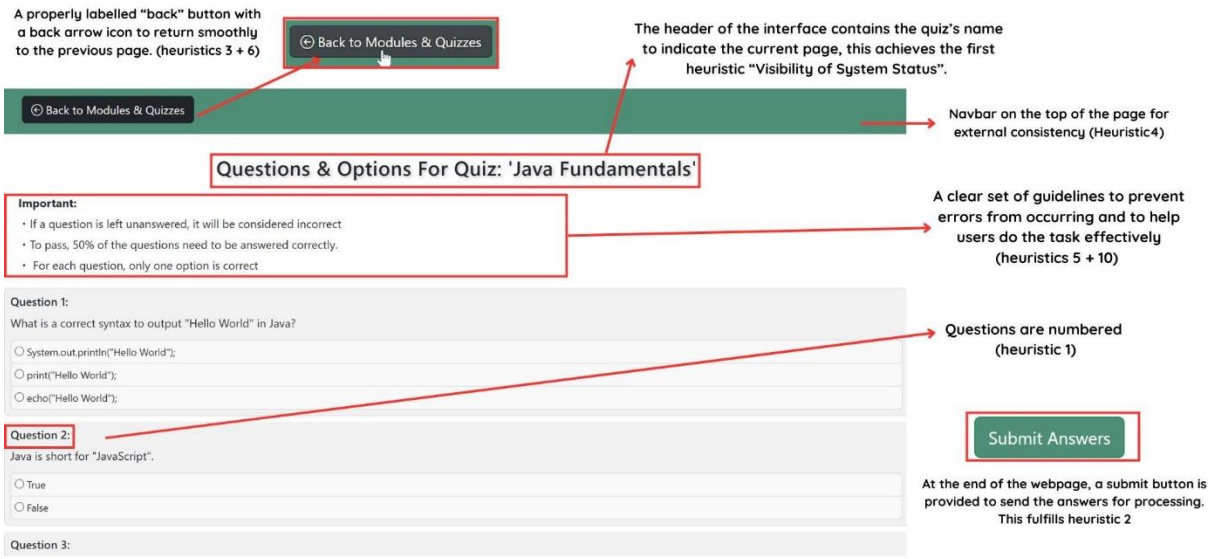

Figure 4. Annotated screenshot of the quiz page in the advanced version of the application

After submitting the quiz answers, there are two possible results: pass or fail. In both cases, users are provided with the total number of questions and the number of the ones answered correctly, along with two buttons: to retake the quiz or to check the correct answers (Figure 5). However, if learners pass the quiz, they will get an additional button labelled "Laugh it Up", which provides a set of random coding jokes.

Figure 5. Annotated screenshot of the quiz result page in the advanced version of the application

The navigation map for the learner (Figure 6) in the more usable application, which is easy and straightforward.

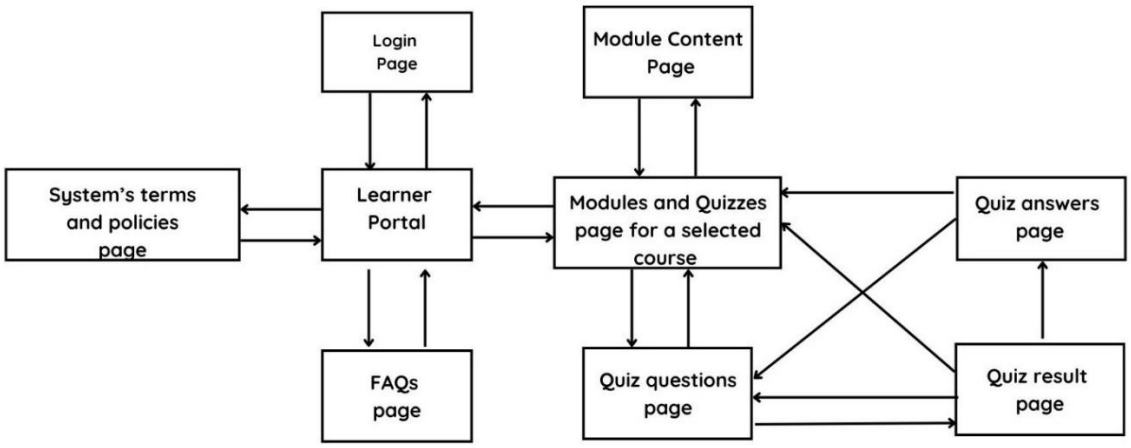

Figure 6. The learner navigation map in the advanced version of the application

The app that does not adhere to Nielsen's Usability Heuristics.

The basic version of the application on the other hand, deliberately violates Nielsen's 10 usability heuristics in multiple ways. Upon accessing the application as an administrator (Figure 7) or a learner (Figures 8, 9, 10, and 11), users will quickly find out that the platform is not well-designed in terms of usability, especially due to the lack of internal and external consistency and the use of irrelevant information, which distracts them from their primary goals.

1. Admin Access

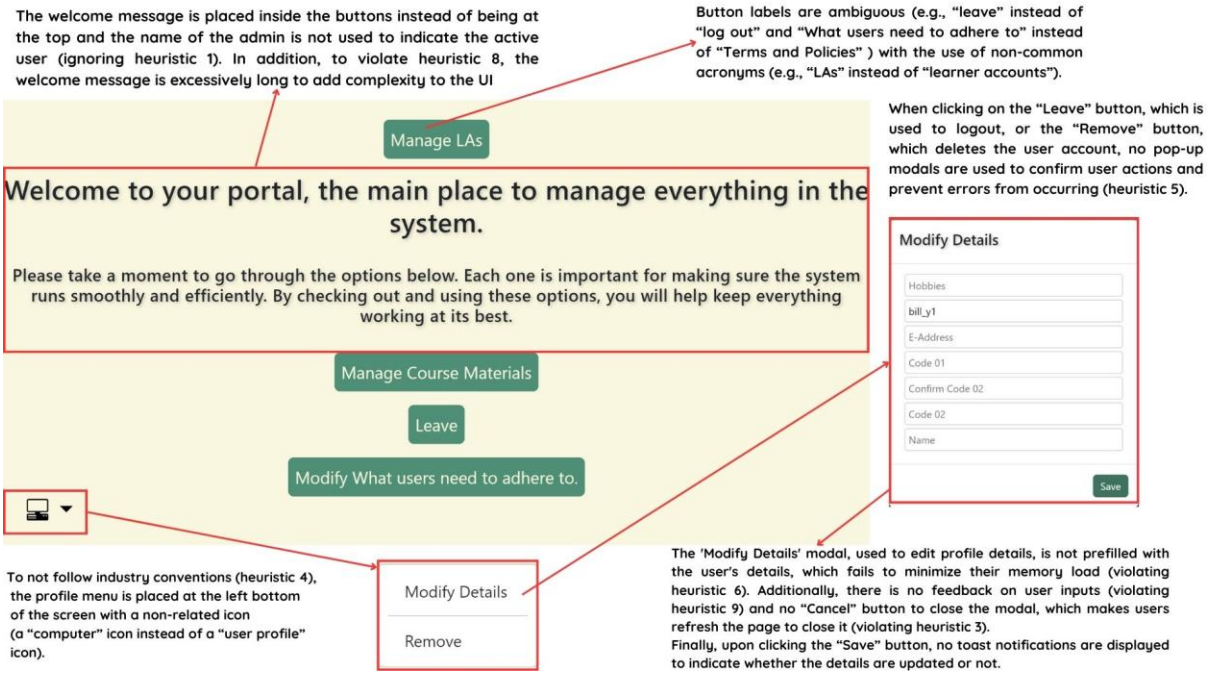

Figure 7. Annotated screenshot of the administrator portal in the basic version of the application

2. Learner Access

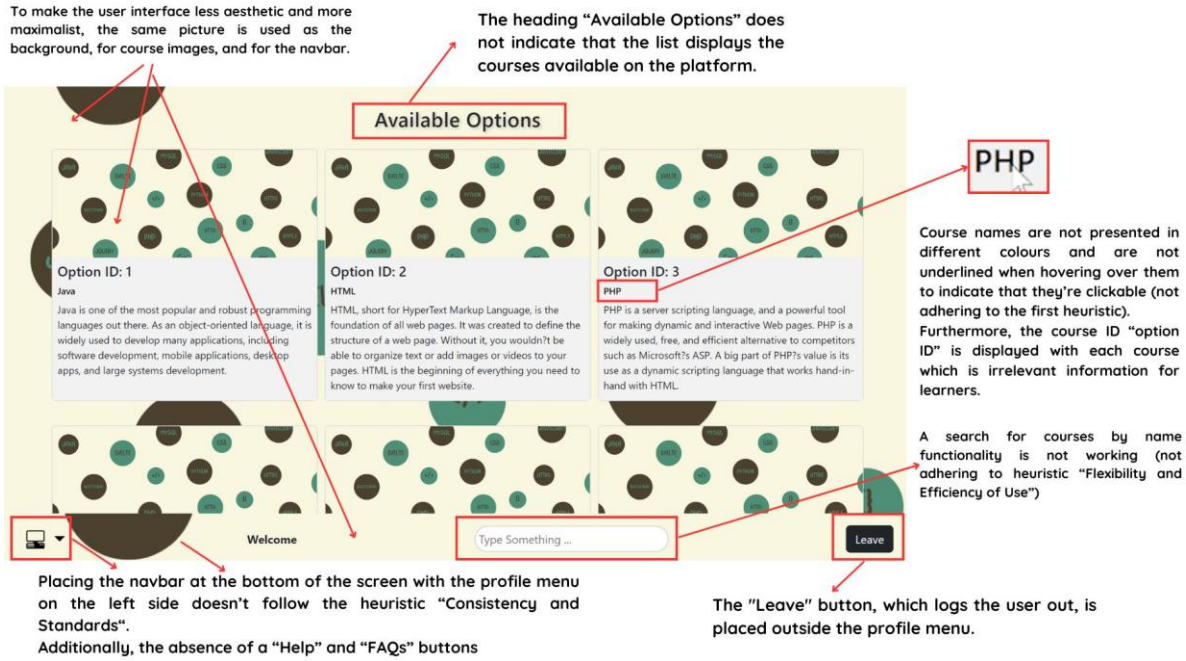

Figure 8. Annotated screenshot of learner portal in the basic version of the application

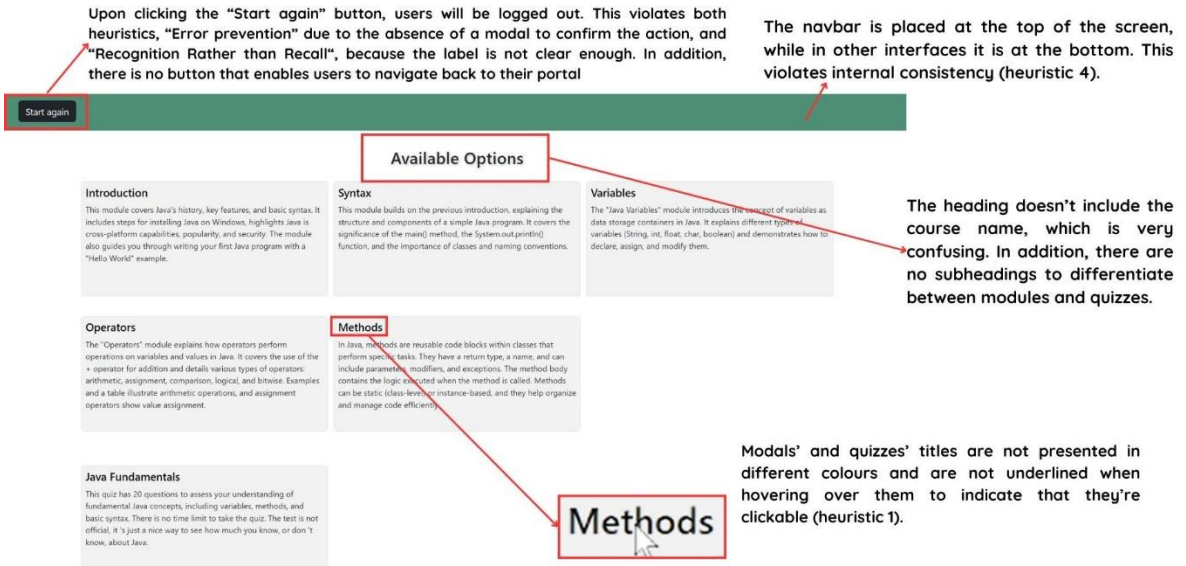

Figure 9. Annotated screenshot of the modules and quizzes page in the basic version of the application

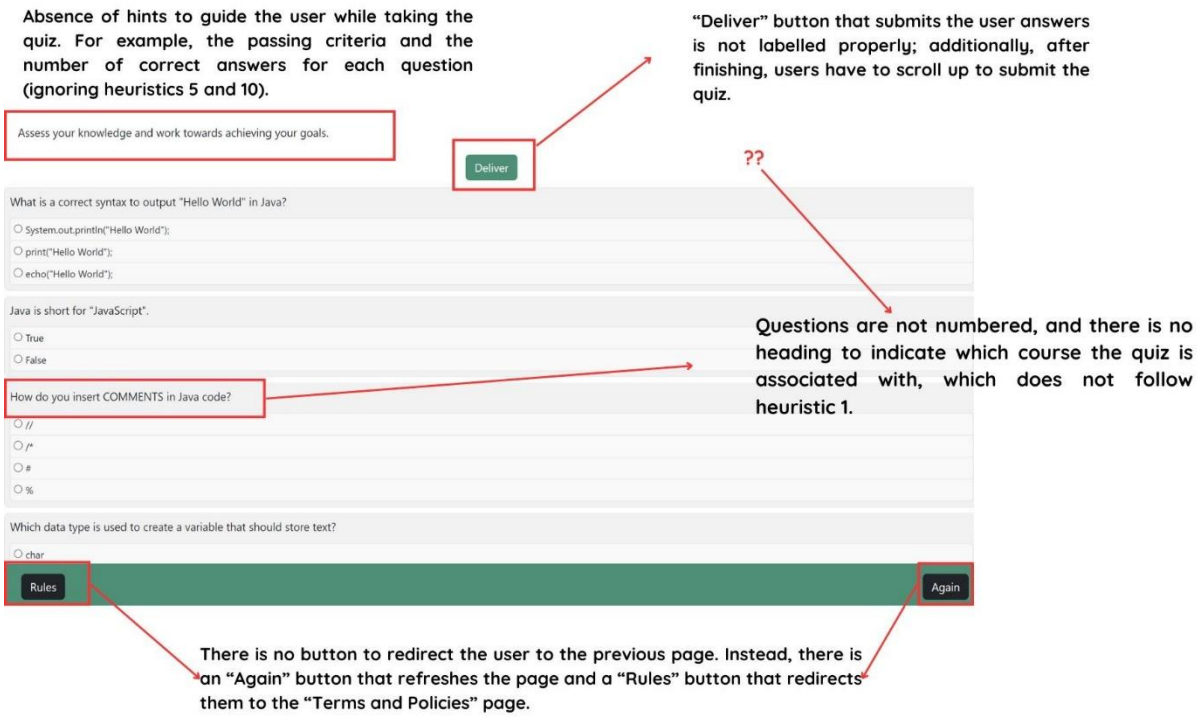

Figure 10. Annotated screenshot of the quiz page in the basic version of the application

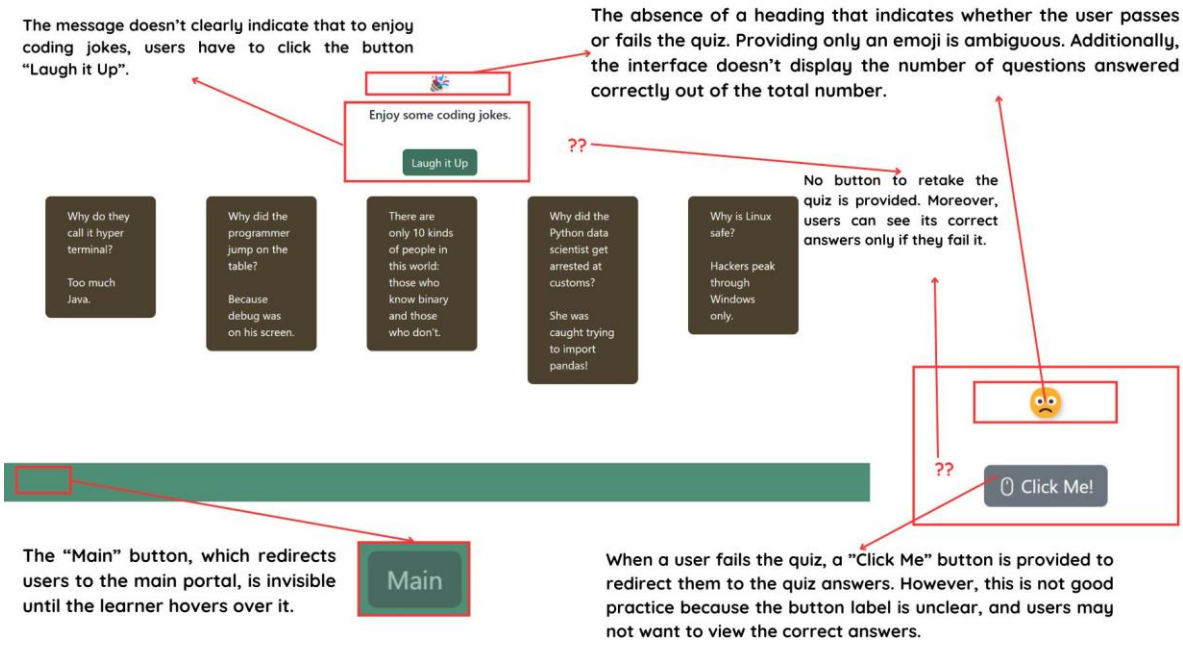

Figure 11. Annotated screenshot of the quiz result page in the basic version of the application

Compared to the learner's navigation map in the more usable application, the navigation in the basic application is confusing and not straightforward. In some cases, users must log in again to return to a specific page within the application, which is inconvenient and negatively impacts the UX.

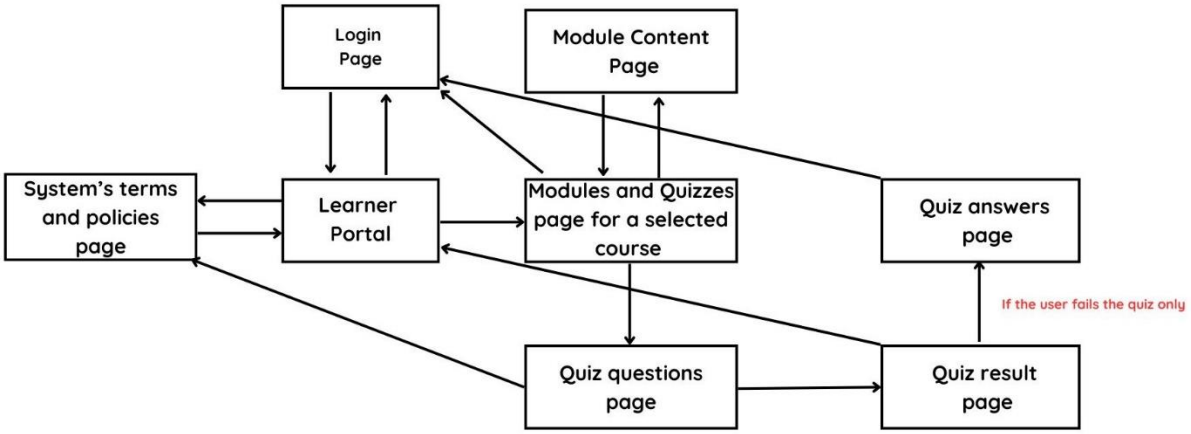

Figure 12. The learner navigation map in the basic version of the application