











[13]. Based on the UEQ results, we need to improve the attractiveness, dependability, and stimulation of the product. The attractiveness can be enhanced by modification of the user-interface and user-experience of the tool. This should facilitate student enjoyment in using it. In addition, we consider enhancing the tool's security, consistency, and navigation in order to improve the dependability [15]. We also recommend that the tool should motivate and become more inventive so it can stimulate students to follow the self-monitoring intervention [15].

### E. Improvement Strategy

With regards to future work, and based on the usability and user experience evaluation, the research team has determined to re-engineer the interface design of the self-monitoring tool. The newer version of the self-monitoring tool was developed based on the previous self-monitoring tool features that will be enhanced with the recommendations from the students. Finally, the improvement strategy for the self-monitoring tool was conducted by following these steps:

- 1) Analyze the result of the usability and use-experience evaluation of the self-monitoring tool.
- 2) Evaluate the recommendations that were provided by the students.
- 3) Analyze and design the newest version of self-monitoring tool.

Based on the strategy above, the new self-monitoring tool was developed in the server environment. The use case and basic flow of the newer version of the self-monitoring tool followed the previous version. However, some features, such as security, prompt, and answer interface design, were improved and enhanced. This strategy is enhancing students' experiences with the tool. It is also expected that they are more motivated to conduct self-monitoring process.

Work has also focused on redesigning the interactivity of the self-monitoring tool. This work implemented the Shneiderman's Eight Golden Rules as interface design principles. Table 3 shows the realization of Eight Golden Rules Principle that was applied in designing self-monitoring interaction.

TABLE III  
EIGHT GOLDEN RULES REALIZATION

Principle	Realization
Strive for consistency	<ul style="list-style-type: none"> <li>• The same of navigation and theme for entire the tool</li> <li>• The same of language use</li> </ul>
Enable frequent users to use shortcuts	Minimize the number of user interaction by simplifying the tool
Offer informative feedback	Intuitive error alert and success notification
Design dialog to yield closure	Create an intuitive feedback for each user's action
Offer simple error handling	Simplify the error handling mechanism by giving certain command
Permit easy reversal of actions	Using reverse function (such as undo) for data entry
Support internal locus of control	Using non-command sentence/word for action
Reduce short-term memory load	Simplify the information presentation so the user can easily understand

The results of the re-engineering process are shown in Fig.7. The figure shows the sequence of prompts in the new version of self-monitoring tool. When compared with the Fig. 1, the newer version is seen to provide a clearer presentation of prompts. In addition, the newer version of the self-monitoring tool also creates a newer presentation of the prompt and their feedback. Fig. 8 shows the user interface of a prompt with a detailed answer. The prompt question delivered by the lecturer is followed by the student's answer. If the lecturer wishes to give feedback related to the student's answer, he/she can choose the blue-button. We expected that students would gain better experience in self-monitoring activities due to this enhanced version of self-monitoring tool.

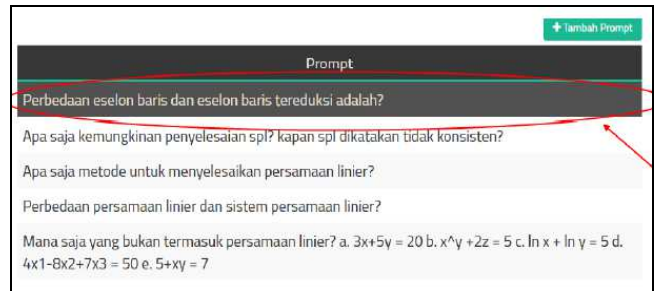


Fig. 7 The sample of sequence of prompt shown on the lecturer's dashboard

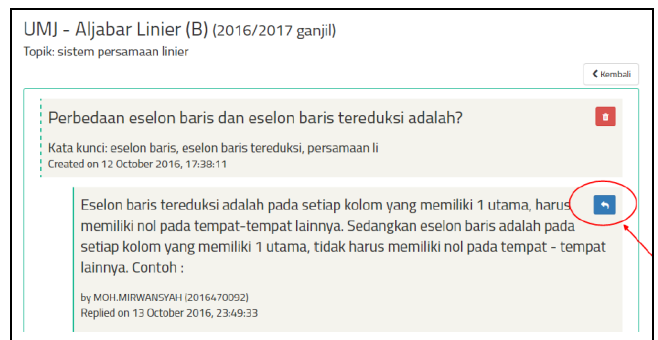


Fig. 8 A sample of a detailed prompt

## IV. CONCLUSIONS

The result from both SUS and UEQ surveys rate the tool as average regarding usability but also indicate some areas for improvement. Specifically, based on a user experience evaluation, the results of the UEQ survey places this tool a little above average. With reflection upon these results, it is seen that the tool needs to be enhanced and improved from both a usability and user-experience perspective prior to its wider adoption. We consider re-engineering the tool from both a usability and user-experience perspective in order to deliver a higher quality self-monitoring tool and experience.

Based on the usability and user-experience evaluation, the team will redesign the self-monitoring tool. We intend to apply the same features as the previous self-monitoring tool, but additionally, we will also enhance features based on the students' recommendations. We expected that the new version of this self-monitoring tool would provide better experiences to the students.

There is much future work still need to be conducted related to self-monitoring research. This study is recognized as still being somewhat limited, and the research team intends to continue its research by implementing the new version of self-monitoring tool within a self-monitoring intervention strategy for several courses.

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