Development and Trial Use of a Web-based Database Learning System

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Summary: Database is an important part in a system, and it can be accessed by SQL (Structured Query Language). To help beginners to learn SQL practically, SQLzone provides learning objects that can assist them. SQL zone is an online system that helps users to learn SQL. SQLzone is built as an online learning system that helps users to learn SQL. It provides tasks that should be solved by SQL syntax. SQLzone also provides a syntax compiler that shows the message about syntax error, logic error and instruction that should users do. This system prototype is evaluated by using LORI (Learning Object Review Instrument).

Key words: SQL, database, logic error, string matching algorithm, Start End Mid Algorithm, prototype, LORI.

1. Introduction

Every system needs a storage media as a data base. Data base is contained of data which if the data is processed will give valuable information (1). The data processing involves a language called SQL. There are two categories of errors that can occur in SQL statement, they are syntax error and logic error (2). Different with a syntax error, logic error cannot be detected by SQL compiler. So, it is needed for further processing to user SQL statement to know about the logic error. One of the concepts that can be used to know the logic error is compare between the user answer with the related answer key (3).

To help beginners to learn SQL, this system was built as an online learning and it can be accessed at http://sqlzone.net. This system’s name is SQLzone as the Figure 1. The lessons in this system is about Selection concept in SQL as shown as Figure 2.

![Figure 1. SQLzone](image1)

![Figure 2. Lessons in SQLZone](image2)

The first prototype was evaluated by using LORI (Learning Object Review Instrument) and the result will be discussed in this article. LORI is a tool for eliciting ratings and comments from learning resource evaluators and its purpose is to support evaluation of multimedia learning objects (4).

2. System Overview

To help users for understanding SQL practically, SQLzone provides cases which has to be solved using SQL syntax. Information about the result that was submitted by users is also displayed to guide users about what should they do to solve the case. That information is about syntax error and logic error that occurred in user’s SQL syntax. By informing those errors, users are expected to know the mistakes that they did and make corrections to solve the related case. The system overview is shown as the Figure 3.

![Figure 3. The system overview](image3)

To give an information to user about corrections that should they do, system does these process:

1. Syntax error checking

After user tried to solve the case with the SQL, in the first phase, the user SQL statement will be checked by SQL compiler (5). In this phase, the compiler will inform the syntax error until the SQL statement is true. Then the table result will be shown.

2. Logic error checking

In this phase, SQLzone uses Start End Mid algorithm to check the similarity between user’s result table with key answer’s table (6). In this case, if those data are different, it means that the user’s SQL has logical error to solve the case.

3. Suggestion making

The last one is about giving a feedback to users about the location of keyword that makes logic error in their SQL statement. This process compares the user’s SQL with the key answer’s SQL. By giving the different result table, both of those syntax must be different. Then the system searches the differences and gives a suggestion about the user mistakes.
In the implementation, each scoring aspect was developed in to two related questions. Table 2 shows the result of this evaluation.

Table 2. Questionnaire result

<table>
<thead>
<tr>
<th>No</th>
<th>Scoring Aspect</th>
<th>Average Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Content quality</td>
<td>4.3</td>
</tr>
<tr>
<td>2</td>
<td>Learning goal alignment</td>
<td>4.4</td>
</tr>
<tr>
<td>3</td>
<td>Feedback and adaptation</td>
<td>4.1</td>
</tr>
<tr>
<td>4</td>
<td>Motivation</td>
<td>4.7</td>
</tr>
<tr>
<td>5</td>
<td>Presentation design</td>
<td>4.3</td>
</tr>
<tr>
<td>6</td>
<td>Interaction usability</td>
<td>4.1</td>
</tr>
<tr>
<td>7</td>
<td>Accessibility</td>
<td>3.7</td>
</tr>
<tr>
<td>8</td>
<td>Reusability</td>
<td>4.6</td>
</tr>
<tr>
<td>9</td>
<td>Standard compliance</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>4.2</td>
</tr>
</tbody>
</table>

4. Conclusion

Based on the evaluation, SQLzone still has no bug in suggestion making. But based on questionnaire, the lowest score is on the accessibility (3.7) because the display of compiler page cannot fit in the tablet or phone access. Based on hint buttons that user used, all of hints are needed to help user to answer the case if they have no idea. This evaluation was conducted not for all lessons. Based on that matter, to know about the greater accuracy of system, it is needed to complete the all of the lessons and let users do all of them.

References