

# SQL Tutor for Novice Students

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**Abstract:** *These days, the utilization of innovation to improve educating and learning is expanding quickly. Intelligent Tutoring Systems (ITS) is one of method that uses artificial intelligence techniques to represent a form of computer-based training in which the system uses a knowledge base to provide guidance to the student as the student interacts with the system.*

*In this paper, we plan and create SQL (Structured Query Language) Intelligent Tutoring Systems for beginner understudies in programming SQL, which understudies need to specialize in information base track. The framework gives all themes of SQL and creates a few inquiries for every subject and the understudies should answer these inquiries accurately to move to the following level, the SQL coach concentrate on utilizing video, sound and pictures to make learning process simpler.*

**Keywords:** Intelligent Tutoring System, SQL, data Base, ITSB

## 1. INTRODUCTION

The advancement of Intelligent Tutoring System for showing SQL dialect for database subject. Database framework is one of the center subjects in software engineering, showing database picks up challenge when it achieves the part on the best way to educate the question dialect. Instructing and learning database start with the idea of experiencing the outlining of database graph keeping in mind the end goal to define the issue. From the diagram, SQL is needed to construct the database into physical implementation. Most of the students face difficulties when constructing database using SQL or querying database using SQL. Some of them get confused on the command used to manipulate and define the database while others get confused on when to use certain command for certain situation. For instance, A student might be confused when to use the clause SELECT, what is the purpose of WHERE clause and the usage of several aggregate functions such as AVG, COUNT, SUM and etc. Based on the problem regarding the understanding, we are developing Intelligent Tutoring System to handle this problem. ITS is chosen in order enable the system to repeat again consistently since humans are unable to do the same repetitive task consistently [7]. The main role of SQL tutor is to provide customized hints for each student and dynamically generated problems based on inferences about the student knowledge, processing from simple problems to complex problems, another role is to know individual student differences. These roles are considered very important to determine the performance of the tutor.

The SQL tutor designed and developed using Intelligent Tutoring System Builder (ITSB) [1]. The ITSB tool designed and developed to help teachers for building Intelligent Tutoring System in many fields.

## 2. LITERATURE REVIEW

ITS have been an important and expanding research area for several years. It has become a very popular and useful in our universities, schools, Factories. There are some of them,

such as An Intelligent Tutoring System Authoring Tool designed by Abu Naser teaches how to use java program [2], SQL-Tutor, ITS that teach students English dialogues through interaction with students and it takes into account the individual differences of students through levels [3]. ITS to examine errors in algebra [4]. A comparative study between Animated Intelligent Tutoring Systems (AITS) and Video-based Intelligent Tutoring Systems (VITS) [7], Affective Tutoring Systems (ATS) based on embedded devices is a system that relies on embedded devices for detecting the feelings, emotion, psychology student and also adapt to the student's mood such as angry, frustrated and fatigued etc. Based on the mood and feelings of the student, the student will learn [8, 9], teaching AI searching algorithms [10], teaching database to sophomore students in Gaza [11], Predicting learners performance using NT and ITS [12], learning to program in C++ [13], and security algorithms [37-47].

## 3. ITS ARCHITECTURE

Generally, ITS as illustrated in Fig. 1[7] consists of four main components namely, expert system, pedagogy module. Broadly defined, an intelligent tutoring system is educational software containing an artificial intelligence component. The software tracks students work tailoring feedback and hints along the way. By collecting information on a particular student's performance, the software can make inferences about strengths and weaknesses and can suggest additional work, student model and user interface. Expert System has the ability to guide the student in solving problems and measure students' performance. Pedagogy module is use to control the interaction between the student and the system. Student model is used to determine student level and their progress during the teaching and learning process. Communication between student and systems is through the user interface [7].

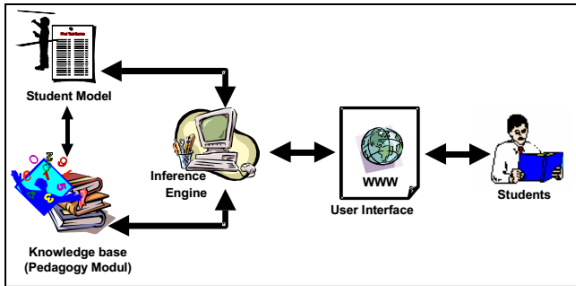


Fig. 1: SQL Intelligent Tutoring System Architecture

### 3.1 Student Module

The student model stores information that is specific to each individual learner. At a minimum, such a model tracks how well a student is performing on the material being taught. The model is necessary in order to tailor instructions to a student's privacy and learning needs. Without this knowledge, the pedagogical component of the tutor has no basis on which to make decisions and is forced to treat all students similarly.

### 3.2 Pedagogical Module

This module utilizes data from student model to figure out what parts of the space information ought to be displayed to the student and recognize the requirements for every understudy. This segment gives a model of the instructing procedure. For instance, data about when to survey, when to display another point, and which subject to exhibit is controlled by the academic module [7,8].

### 3.3 Domain Knowledge

This component contains information the tutor is teaching, and is the most important since without it, there would be nothing to teach the student. Generally, it requires significant

knowledge on engineering to represent a domain so that other parts of the tutor can access it.

The domain model covers the following topics:

- Lesson 1: Introduction to SQL
- Lesson 2: Retrieving Data
- Lesson 3: Updating Data
- Lesson 4: Inserting Data
- Lesson 5: Deleting Data
- Lesson 6: Sorting and Filtering Data
- Lesson 7: Advanced Filtering
- Lesson 8: Summarizing Data
- Lesson 9: Grouping Data
- Lesson 10: Using Subqueries
- Lesson 11: Joining Tables
- Lesson 12: Managing Tables
- Lesson 13: Using Views
- Lesson 14: Stored Procedures
- Lesson 15: Using Cursors
- Lesson 16: Using Transactions

### 3.4 Communications Module

Interactions with the learner, including the dialogue and the screen layouts, are controlled by this component. It handles the question on how should the material be presented to the student in the most effective way.

A screenshots of the tutor interface are shown in Fig 2, Fig 3, Fig 4, Fig 5 , Fig 6 and Fig 7 .

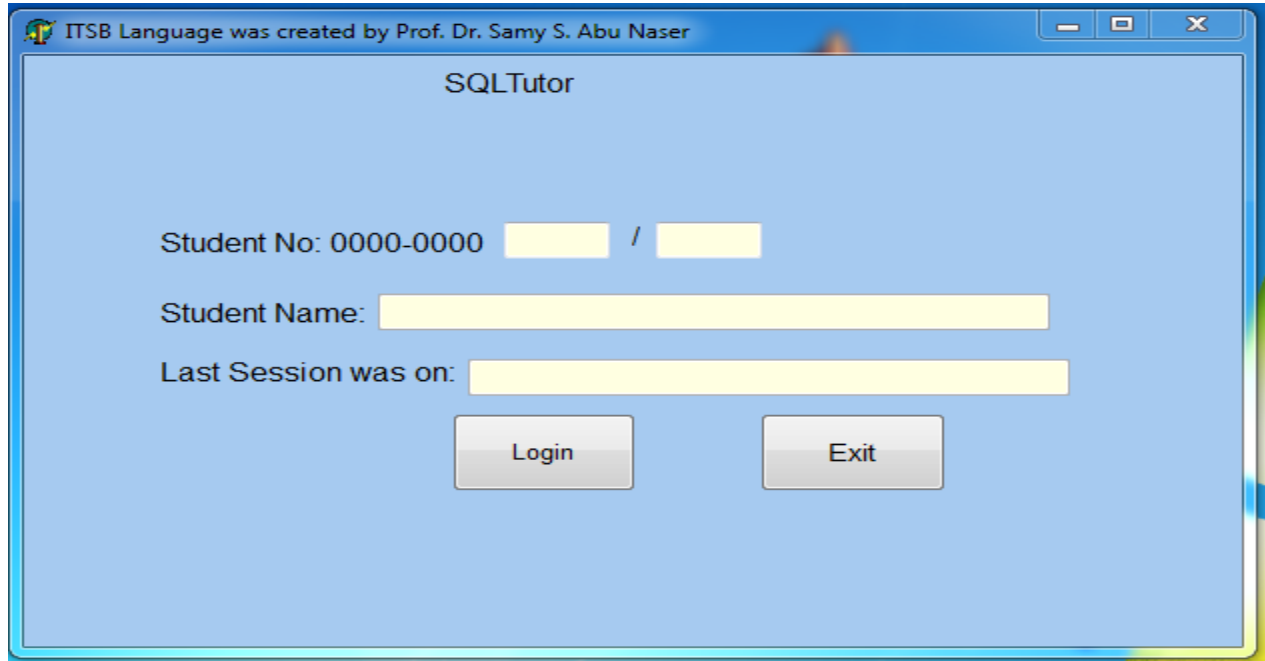
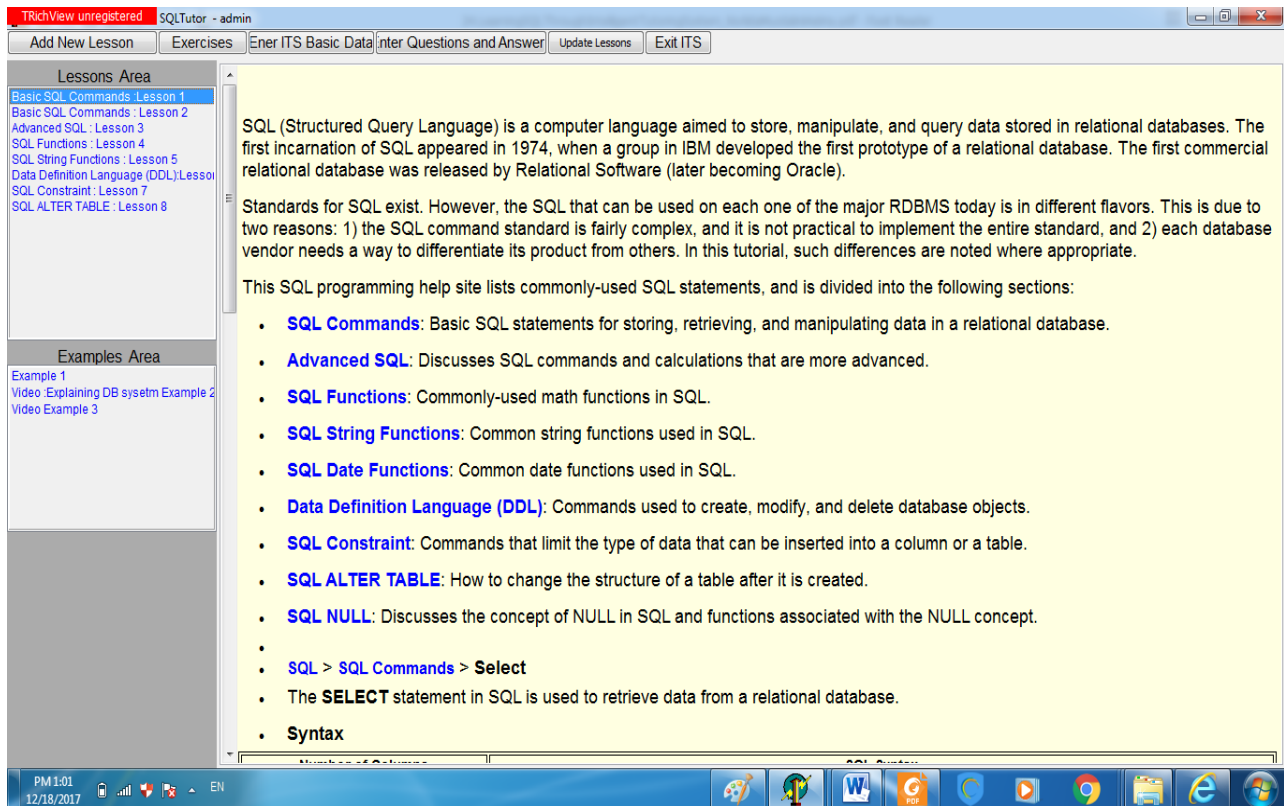


Fig. 2: Login screen



Teaching screen

Fig. 3:

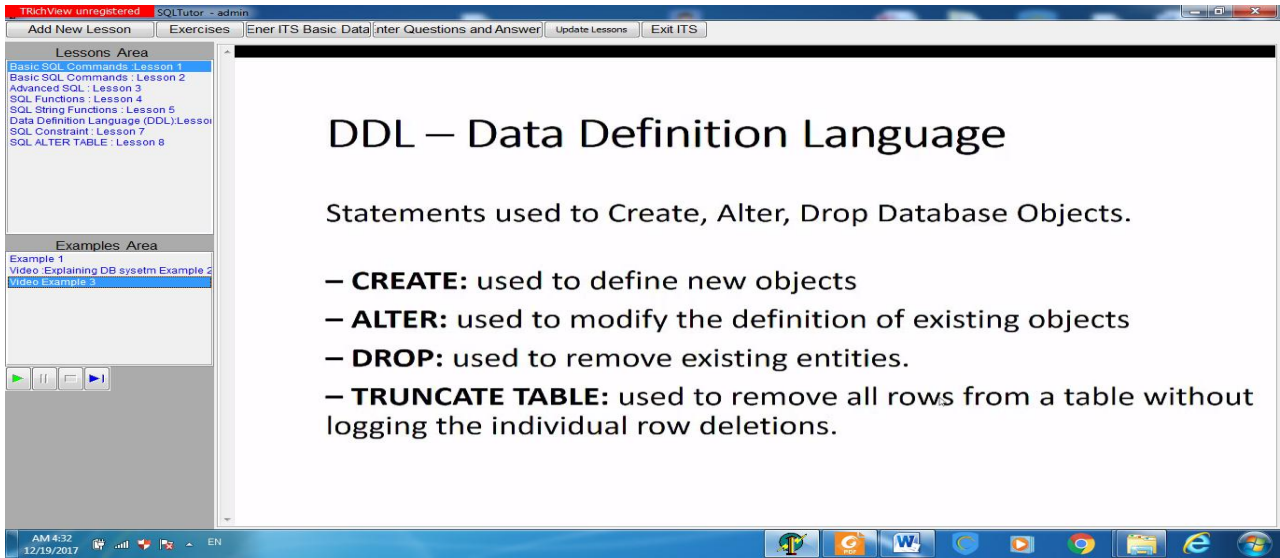


Fig. 4: Examples screen (video example)

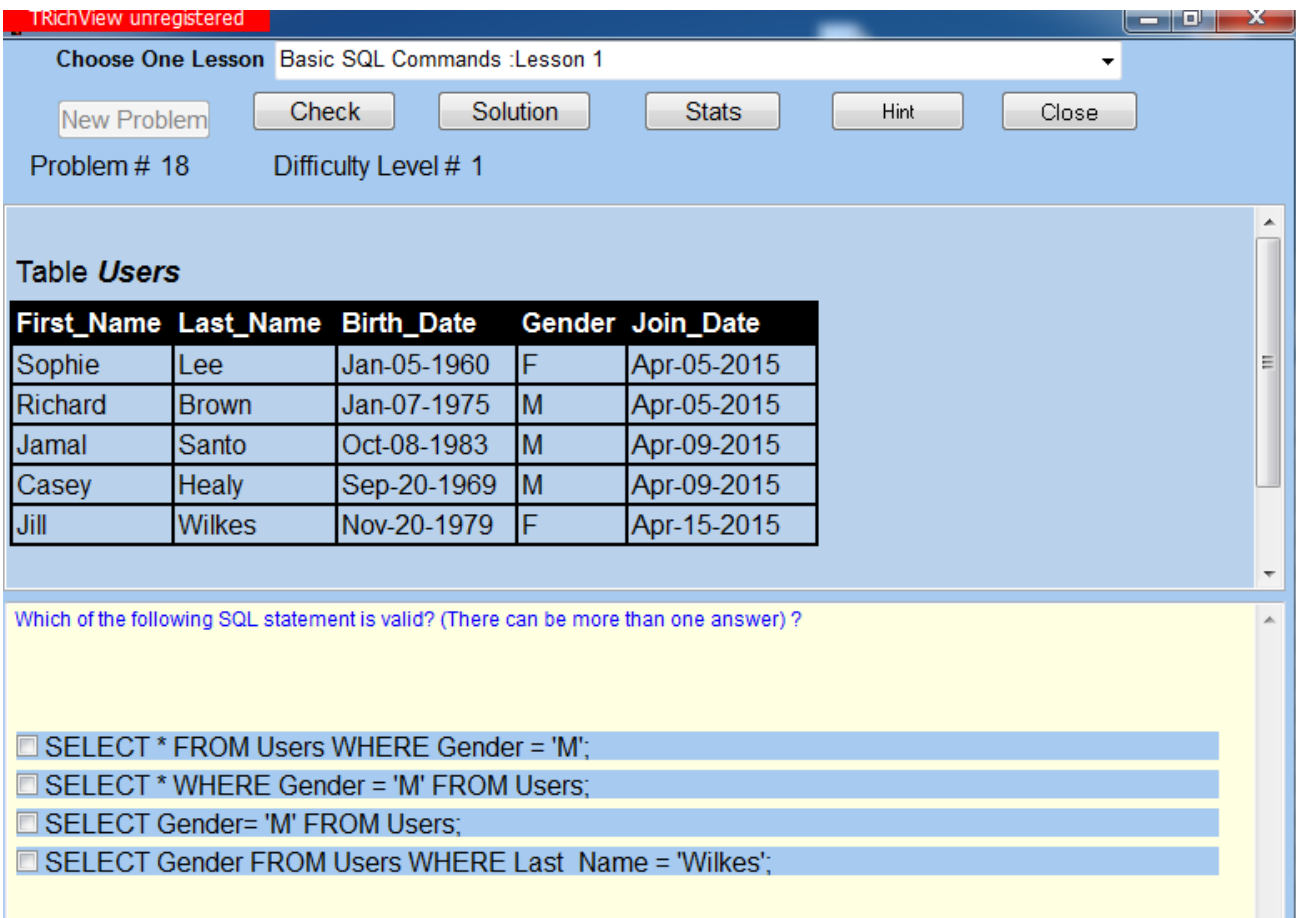


Fig. 5: Student Exercises form

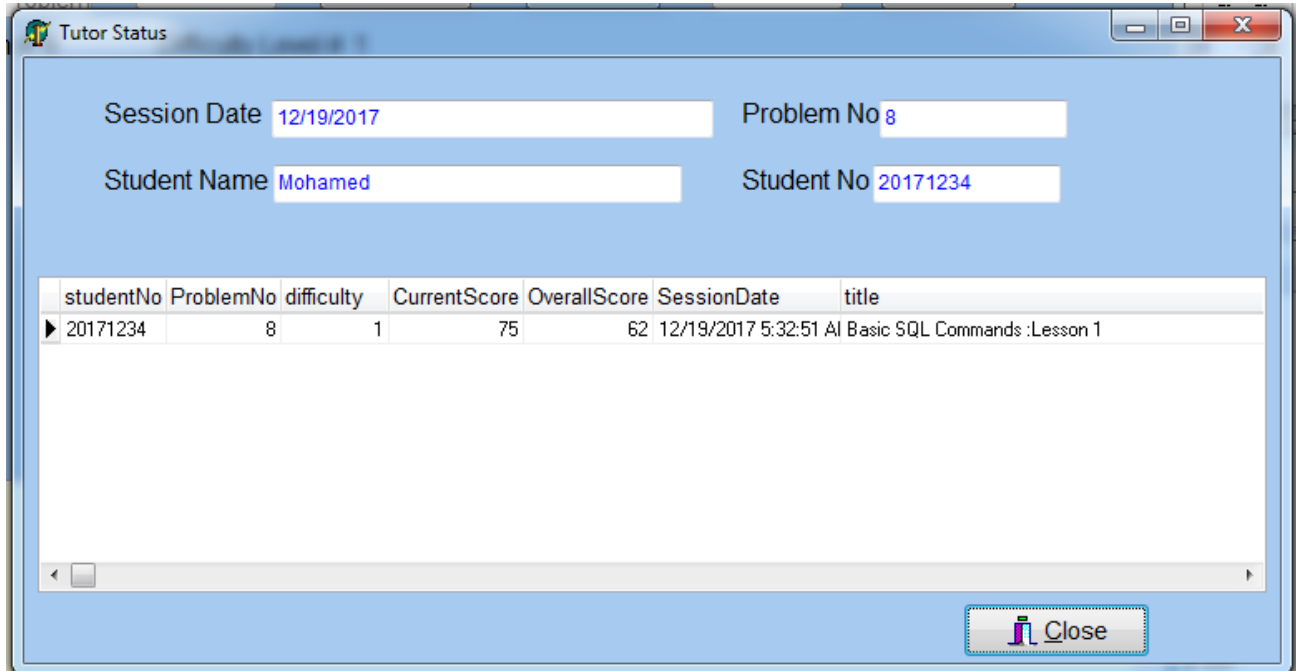


Fig. 6: Shows current assessment of the student performance

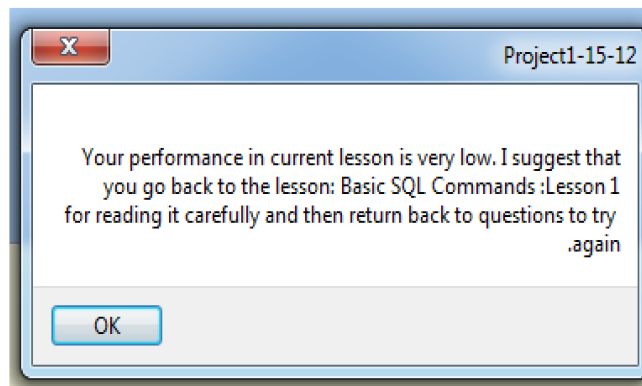


Fig. 7: Shows a notification of the performance of the student in a specific lesson

#### 4. CONCLUSION

This research paper presents recent developments related to the SQL Intelligent tutoring systems , SQL tutor was designed developed using ITSB authoring tool for teaching SQL , this tutor designed for novice students which they wishing to navigate the world of programming specially data base track , In designing process we focus on displaying material as video ,sound, picture files to facilitate teaching process , In an initial evaluation of the system, the students and teachers were satisfied with it. Our future work is

coordinated to the utilization of Distributed AI techniques to accomplish correspondence of the ITS with other clever instructive frameworks educating the same or related subject

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