Visualizations for Introducing Database Concepts in Forensic Science

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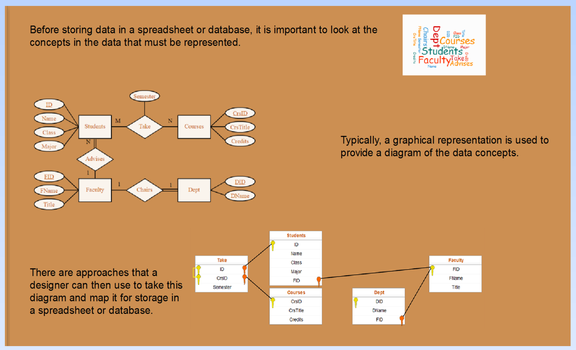
Purpose

Introducing database concepts and development through visualization has demonstrated to be a successful pedagogical method for understanding this concept.[1]

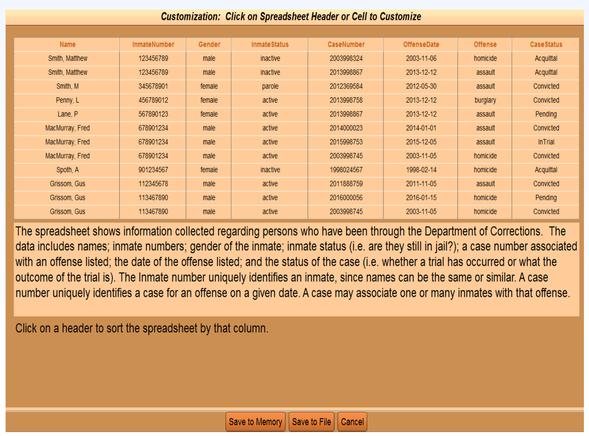
Using animations available at the project Web-site[2], volunteer faculty created animations that were customized to their particular discipline, including forensic science.

By understanding how a database operates, the user may be able to better utilize the power databases have. The advantage of the database is that, while one copy of the data exists, it also provides a powerful tool to ask different questions, or queries, of that data without changing the data.



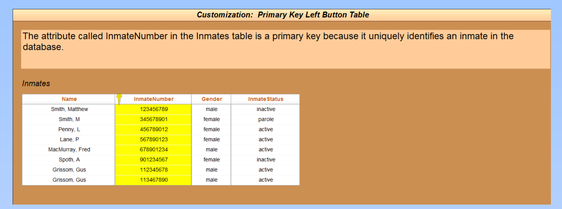
Customization

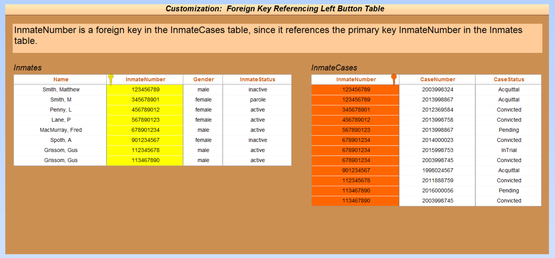
The forensic science faculty volunteer for this project created spreadsheet data that can be used in the database animation customization to demonstrate the many-to-many relationship example. A database breaks down a spreadsheet into separate, but related, tables.

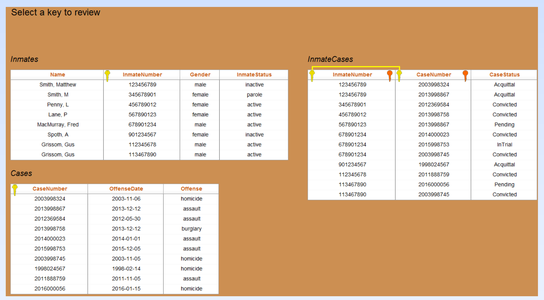


Introduction to Databases

The volunteer also needed to identify critical information that would play an important role in the customization and ultimate successful demonstration of the customized animations. These elements included the identification of the primary key in each table and the foreign key.

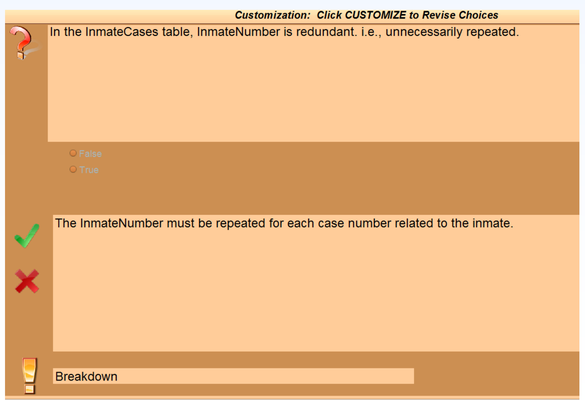






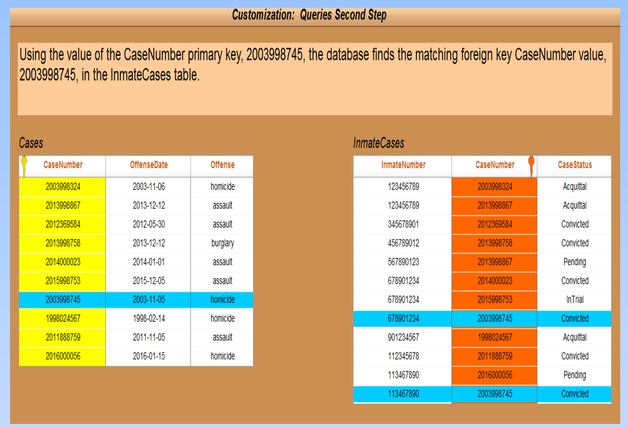
Self-Assessment Checkpoints

Self-assessment checkpoint questions are also customizable for students to check for understanding.



Introduction to Querying

Customizable animations for the Introduction to Querying were also produced based on the completed Intro to DB animations.

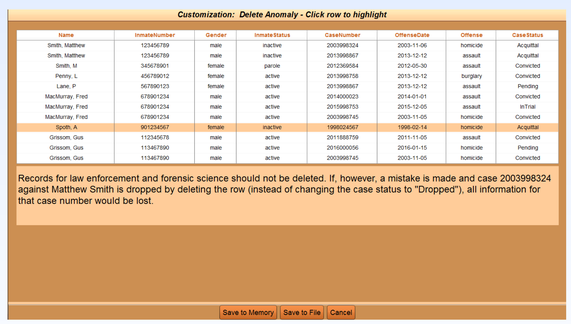


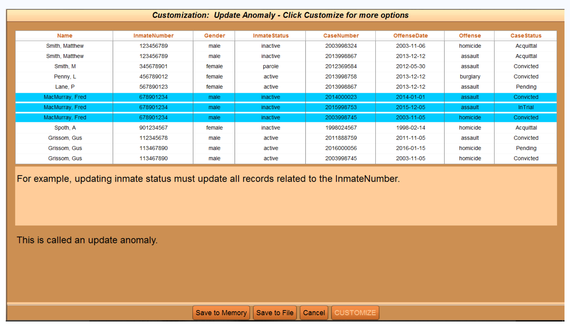
Challenges

The key in understanding how to successfully complete the customized animations is understanding how relational databases work.

Issues related to animation customization include:

- User understanding of basic database terms
- Demonstration of database anomalies
- Character size and limits placed in animations

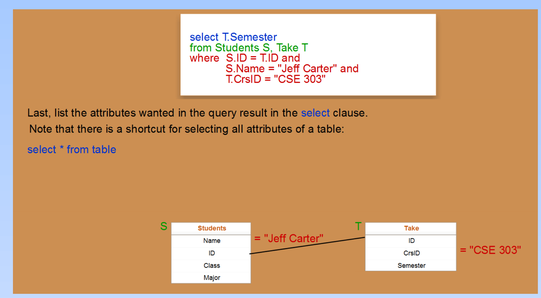




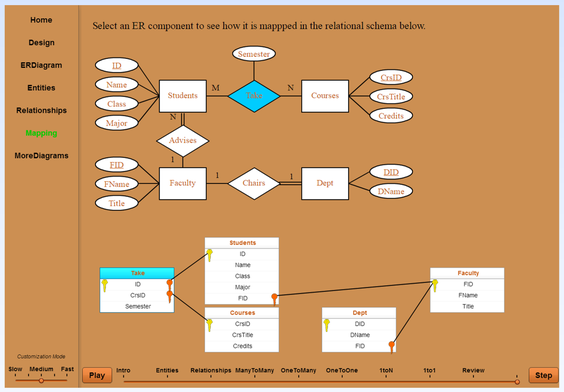
Future Plans

View the forensic science customized animation for an Introduction to Databases at the project Web site:
http://databasesmanymajors.faculty.asu.edu/

The customization of the Query DB animations for the forensic science discipline will begin in mid-February, 2017. The customization of Query DB will include animations which show the query graphically, as well as the SQL Standard as shown below.



A customizable animation that students can use to understand the design of a database, Design DB, is also underway. The image below depicts an Entity-Relationship (ER) diagram which assists the database designer in asking and answering questions about the concepts and associations represented on the ER diagram.



Acknowledgements

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References

1. Dietrich, S. and Goelman, D. Project Summary: NSF DUE-1431848/DUE-1431661, September 2014 - August 2017. Databases for Many Majors: Customizable Visualizations to Improve STEM Learning

2. http://databasesmanymajors.faculty.asu.edu/