



IMPLEMENTATION OF SQL QUERY CONSTRUCTION TO IMPROVE DATABASE CONCEPT UNDERSTANDING WITH CLOSE-ENDED APPROACH

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01 INTRODUCTION



01 To make an effective query, **students need to understand how to extract them**, and **it becomes harder** as the database complexity grows.

(Phillip Garner, 2015).

02 The query complexity is **limited to the short-term memory of the code writer** when retrieving data.

(de Jong, 2010)

03 **SQL Query Formulation can be a challenging task** due to its declarative form of SQL syntax.

(Taipalus, 2019)

Problems



01 To increase understanding, the **practice should** not only be limited to code creation but also **reflects the student's thinking by case study descriptions and problem-solving.**

(Marion et al., 2007)

02 A close-ended approach that has **predefined answers allows students to think logically** about solving case studies within the appropriate context and scope of the problem.

(Lin & Lien, 2013).

03 A **drag-and-drop implementation reduces typing errors** and gives flexibility for the users to adjust code in order.

(Heift, 2003; Price & Barnes, 2015; C.Phewkum, 2019)





Research Problem

How is the effect of SQL Code construction with drag-and-drop and close-ended approach on students' understanding of SQL SELECT Statements concepts?

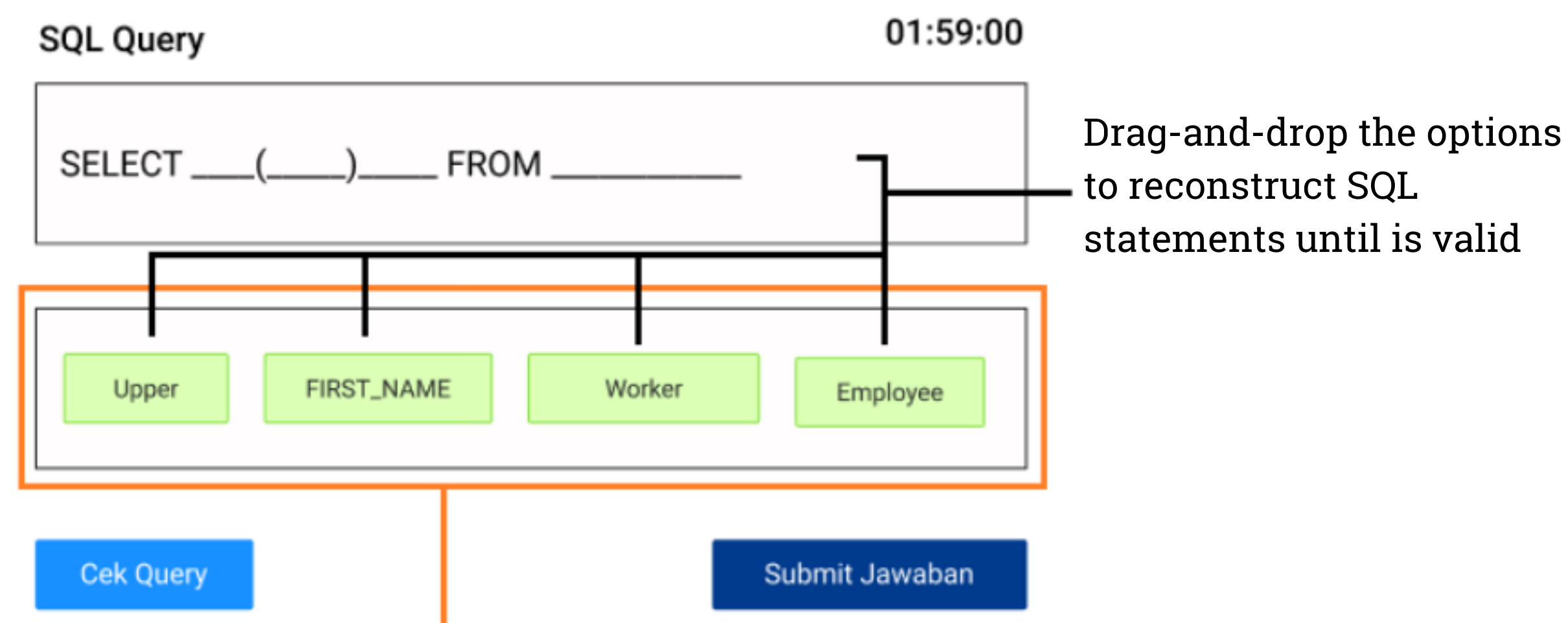


02

Application Concept SQLearn



Application Concept - Students



Predefined options
(Close-ended approach)



Application Concept - Lecturers

Create New Practice Set

Query

SELECT ×

COUNT ×

Nama ×

Mahasiswa ×

Murid ×

Answer

Correct SQL query . . .

SQL Parts that will be dragged and dropped by students

Define Correct SQL Query

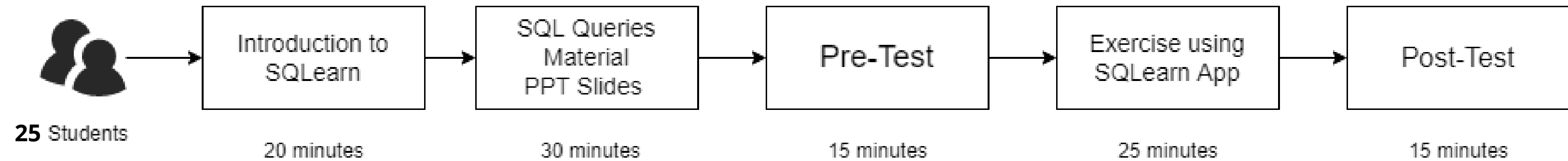


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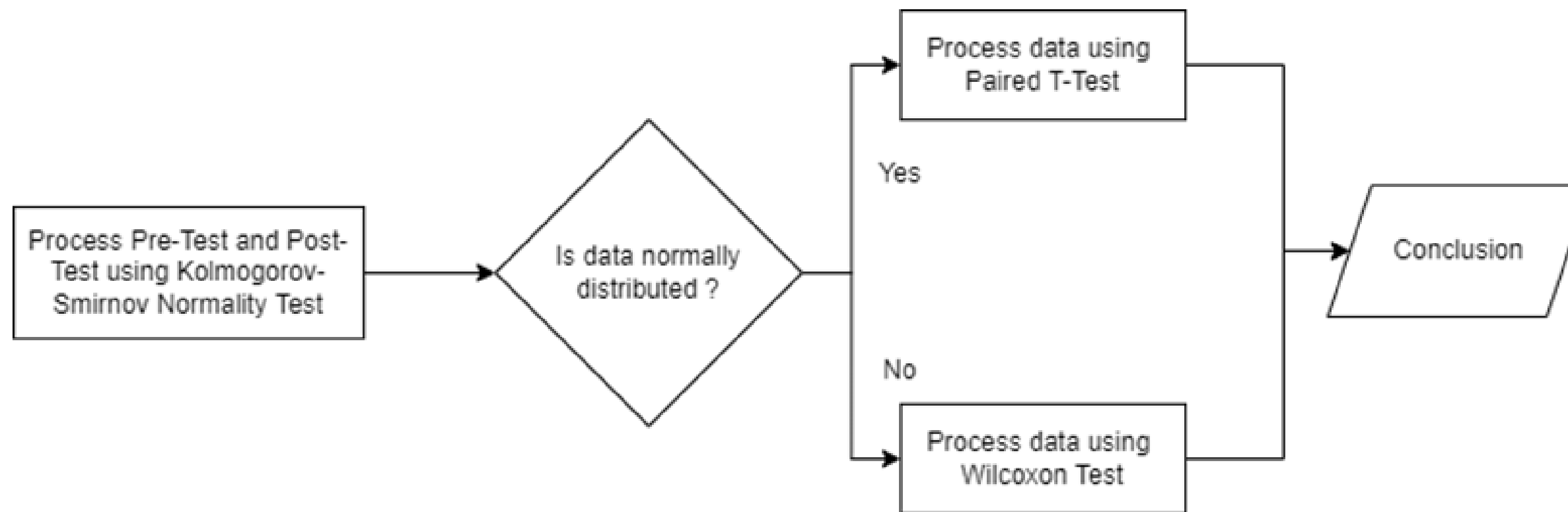
RESEARCH METHODOLOGY



Data Collection | Design Experiment



Data Processing | Flow

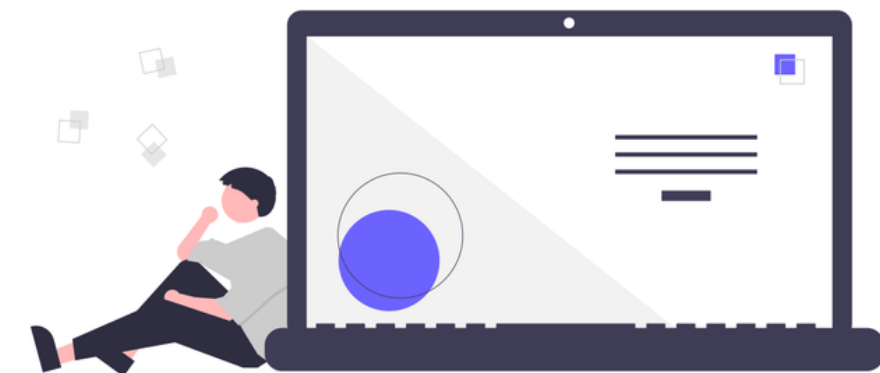
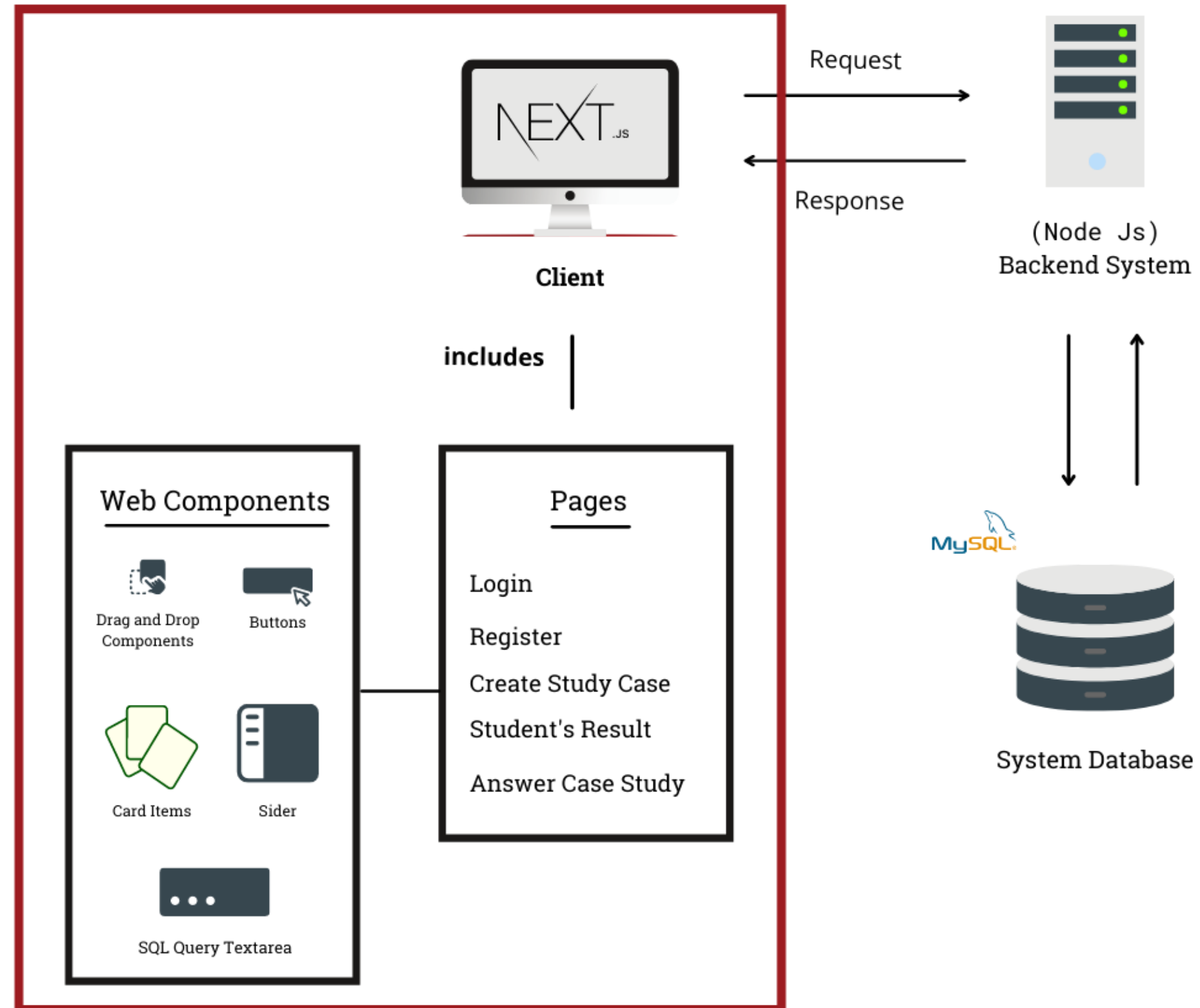


04

SYSTEM DESIGN AND ANALYSIS



System Architecture



05

SYSTEM IMPLEMENTATION AND TESTING




Close-Ended SQL Hints (Lecturer)

SQL Parts

SQL Hints



* Teks Soal

 Dosen ingin menampilkan daftar kode jadwal menurut berdasarkan jam

* Kategori


Close-Ended

Komponen SQL ?

SELECT jp_mulai jp_mulai jp kode_jp, X

+ Tambah komponen SQL

Petunjuk Jawaban ?

 Untuk bagian komponen yang kosong dapat diisi dengan '___' (double-underscore)

___ FROM ___ ORDER BY ___ X

+ Tambah komponen petunjuk SQL

* Jawaban Benar


 SELECT kode_jp, jp_mulai FROM jp ORDER BY jp_mulai

Preview Hasil



Click or drag file to this area to upload

Hanya bisa upload gambar

 exp_sql_1_3.png

* Gunakan Tabel dari

jadwal X

* Studi Kasus

jadwal_kuliah

Cancel

Submit

Drag-and-Drop Implementation (Students)

The screenshot shows a web application interface for building SQL queries. The browser address bar displays `deploy-fe-sqllearn.vercel.app/mahasiswa/soal/84/pertanyaan/42?session_id=409`. The application has a dark blue sidebar on the left with links for [Beranda](#) and [Ubah Profile](#). The main content area is divided into two columns.

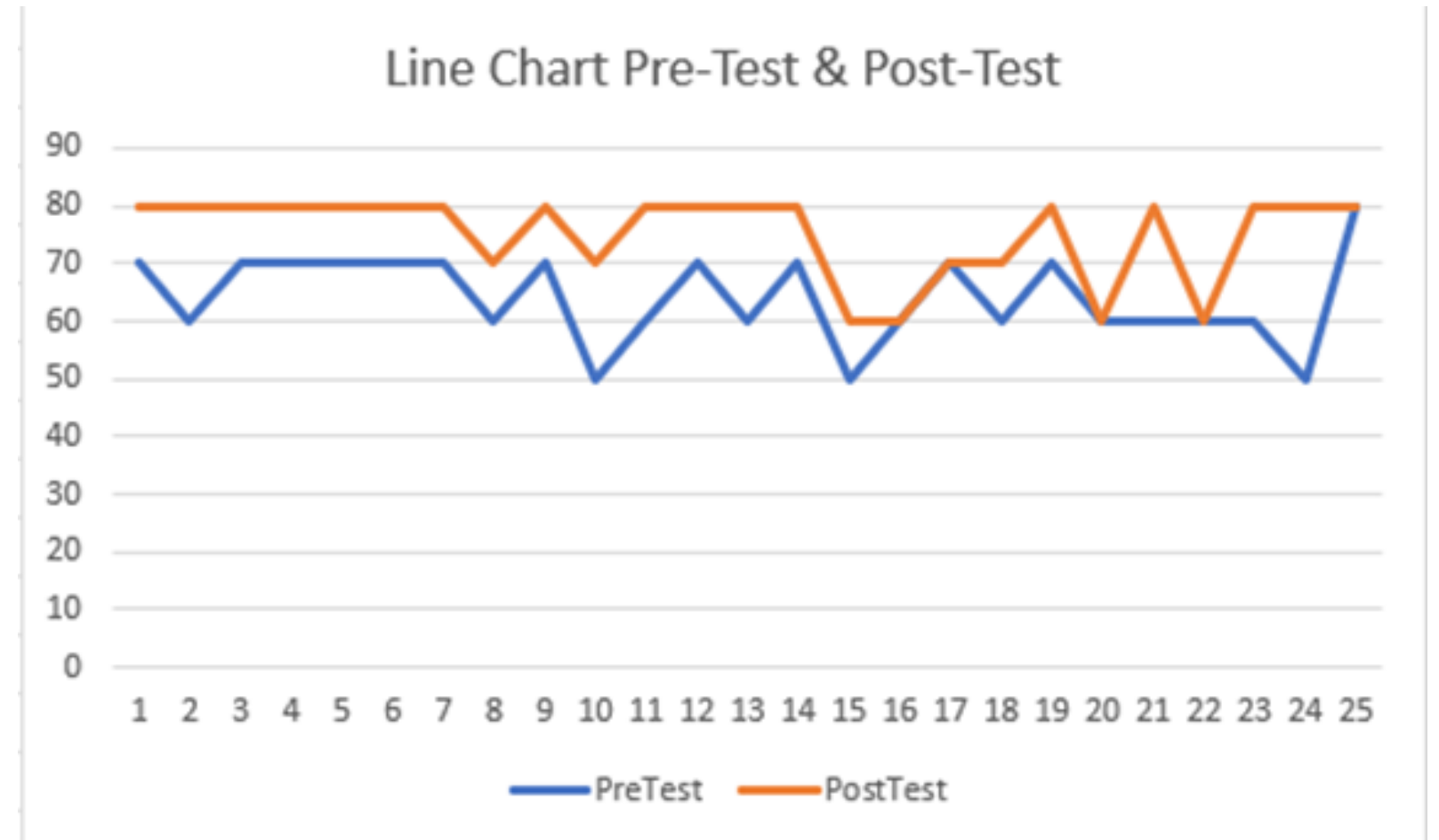
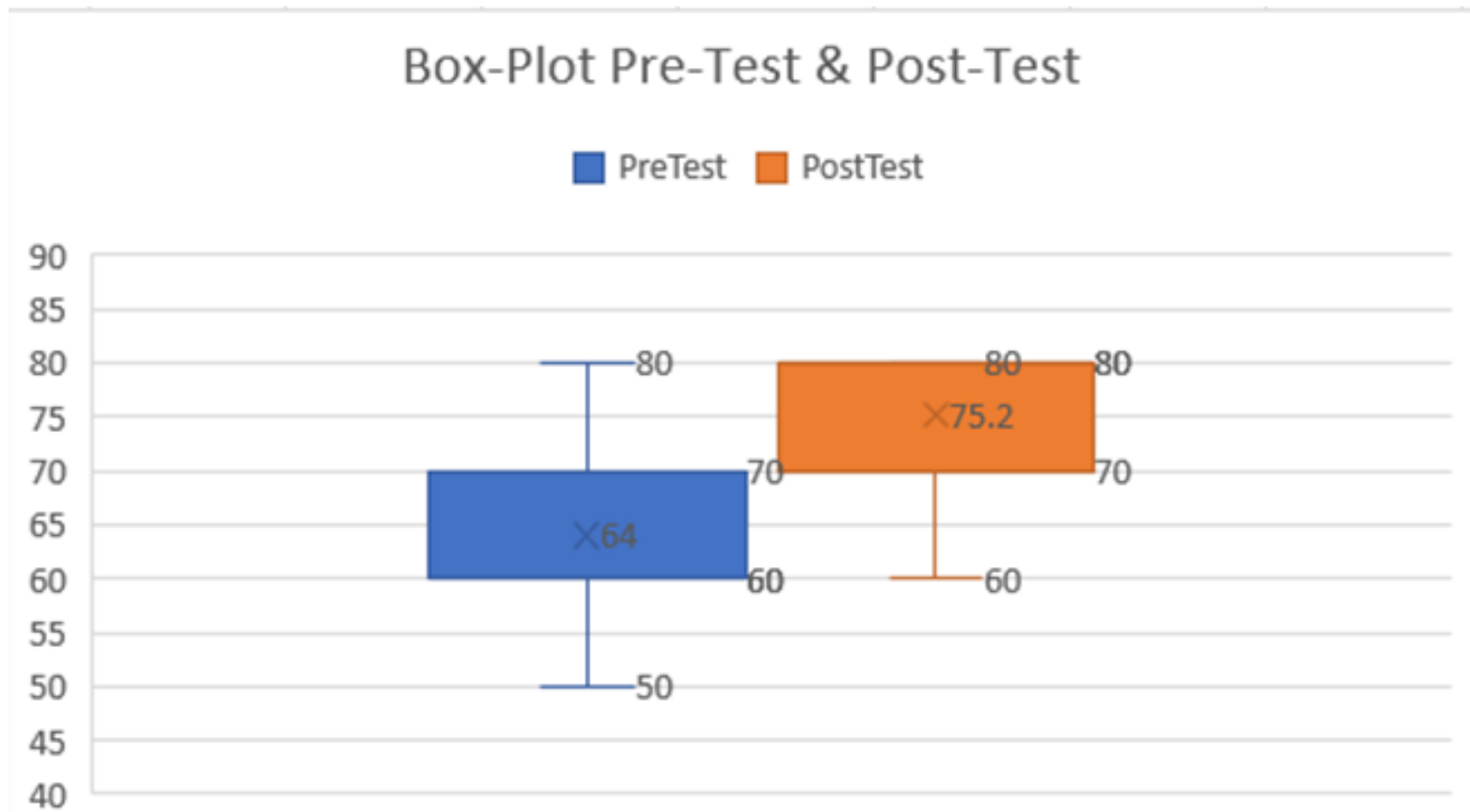
Left Column:

- Pertanyaan:** Dosen ingin menampilkan daftar kode jadwal menurut berdasarkan jam mulai belajar
- Daftar Tabel:** A dropdown menu shows "Tabel jadwal". Below it, a list of columns is provided:
 - Daftar Kolom :
 - id-int(11)
 - kode_jadwal-varchar(255)
 - kode_kelas-varchar(255)
 - kode_dosen-varchar(255)
 - kode_mk-varchar(255)
 - kode_ruang-varchar(255)
 - kode_hari-varchar(255)
 - jp_mulai-varchar(255)
 - jp_selesai-varchar(255)
- Buttons:** "Preview Hasil Query" and "Soal Selanjutnya" (disabled).

Right Column:

- SQL Query:** A timer shows 18:23:17. Below it, the "Constructed SQL" template is shown: `___ FROM __ ORDER BY __`.
- Komponen SQL:** A row of draggable components: `SELECT`, `jp_mulai`, `jp_mulai`, `jp`, and `kode_jp,`.
- Jawaban SQL:** A row of slots for the query. The `FROM` and `ORDER BY` keywords are already placed in their respective slots.
- Buttons:** "Test Query", "Reset", and "Simpan Jawaban".

Data Collected



06

RESULT AND DISCUSSION



Result | Normality Test

One-Sample Kolmogorov-Smirnov Test			
		Pre-Test	Post-Test
N		25	25
Normal Parameters	Mean	64.0000	75.2000
	Std. Deviation	7.6376	7.7028
Most Extreme Differences	Absolute	0.264	0.413
	Positive	0.220	0.267
	Negative	-0.264	-0.413
Test Statistic		0.264	0.413
Asymp. Sig. (2-tailed)		0.000	0.000

Decision-Making Basis

- a. If the value of Asymp. Sig. (2-tailed) $> 0,05$. Data is normally distributed.
- b. If the value of Asymp. Sig. (2-tailed) $< 0,05$. Data is **not** normally distributed.

Result | Wilcoxon Test

Ranks				
		N	Mean Rank	Sum of Ranks
Pre-Test & Post-Test	Negative Ranks	0	0.00	0.00
	Positive Ranks	20	10.50	210.00
	Ties	5		
	Total	25		

Wilcoxon Signed Ranks Test

Test Statistics	
	PostTest - PreTest
Z	-4.064
Asymp. Sig. (2-tailed)	0.000

Wilcoxon Signed Ranks Test Statistics

Decision-Making Basis

- a. If the value of Asymp. Sig. (2-tailed) < 0,05. There is significance average difference between pre-test scores and post-test scores.
- b. If the value of Asymp. Sig. (2-tailed) > 0,05. There is **no** significance average difference between pre-test scores and post-test scores.

Discussion

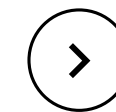
- 01 Drag-and-drop method and SQL Query construction in **SQLearn can be used as SQL query exercise** in database subject
- 02 Drag-and-drop method and SQL Query Construction with close-ended approach in **SQLearn has significant positive impact towards students understanding in SQL Query topic** in database subject

Conclusion

Based on this research result of SQL Query Construction practice with a close-ended approach and drag-and-drop implementation, it is concluded that this method has a significant positive impact on students' post-test scores in SQL Queries topic in database subject.

Suggestion

- 01 Logs recorded in the database can be optimized and being used for mapping students understanding in more detail.
- 02 Broaden drag-and-drop implementation so that it is not limited to SELECT statements.



Thank you

