

Text-to-SQL

Ask about admission scores in plain Vietnamese —
the answer is **computed by SQL & rules**, not guessed.

Design and Evaluation of a Text-to-SQL-Based Admission Counseling Chatbot for Admission Score Query Processing

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The problem — “Will my scores get me in?”

Applicants don't ask for regulations — they ask whether their scores are enough. At NEU that means **3 admission pathways, 10 test & certificate scales**, exam combinations and yearly conversion rules — one wrong field becomes misleading advice.



Too many score systems

One question can mix **SAT + IELTS + subject scores** — with the admission method left unstated. The system must decompose and normalize them under official rules.

SAT ACT HSA V-ACT TSA IELTS TOEFL TOEIC A00
A01 D01 D07



Hallucination = bad advice

Eligibility, thresholds and conversions must be grounded in the **admission database** — a minor slip in field assignment misleads a real applicant.



Messy real questions

Real questions are short, incomplete and phrased 100 ways — yet the same intent must map to the **same structured query** every time.



Our answer: **LLM understands** → **SQL + rules compute**. Live in NEU's 2026 campaign. 🚀

CONTRIBUTION 1

A **controlled Text-to-SQL response architecture** — the LLM only interprets and extracts; score calculation, conversion and comparison are governed by SQL and explicit business rules → accurate, transparent, explainable.

CONTRIBUTION 2

An **application-oriented framework at a real university** — score lookup, conversion, eligibility assessment and major recommendation, running in NEU's live 2026 admission campaign.

How it works — the LLM understands, SQL decides

Language model — flexible



INPUT

Question in natural language

Free text or guided sample questions — scores, certificates, majors in any phrasing.



LLM

Extract intent, scores & major

Separates score type, value, certificates, method and target major into standard fields.



LLM

Text-to-SQL query mapping

Maps the request to structured queries — retrieval only, never the final answer.

Deterministic — SQL + rules



DATABASE

Cutoffs · conversions · programs

Historical cutoffs, conversion tables and program data — 3 allow-listed tables.



RULES

Official formulas compute score

Converted scores compared against criteria; unmet requirements identified.



OUTPUT

Score, gap & admission chances

Extracted fields → calculated score → gap → admission-likelihood table.



Guardrails



Read-only SELECT only



3-table allow-list



Missing info → “unknown”, never a guess



Every answer traceable to logged SQL

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Em có SAT 1450 và IELTS 7.0 thì có khả năng đỗ ngành Khoa học dữ liệu không? 🤔

Điểm quy đổi của bạn là **25.36 / 30** từ **SAT 1450**. 🎯
Các ngành phù hợp với khả năng trúng tuyển:

Kinh tế nông nghiệp	99%
Quản lý TN & MT	99%
Kinh tế tài nguyên TN	99%

Real exchange — captured live from production, 24 Aug 2026

One assistant, nine tools

Quy đổi điểm Dự đoán điểm chuẩn Kết quả xét tuyển Thông tin tuyển sinh
Chương trình đào tạo Tra cứu hồ sơ Khám phá tính cách Lọc ảo Tân sinh viên

Every scale → one score

10 scales + 5 subjects + priority points
SAT · ACT · HSA · V-ACT · TSA · IELTS · TOEFL iBT · TOEIC L&R/S/W · Toán · Văn · Lý · Hóa · Anh
(A00 · A01 · D01 · D07)

/30
one point space

Guided or free-form

First-time users pick **sample questions**; returning users type freely. Reference panels explain how each admission method computes their score — users see **why**, not just the number.

815
real questions
15-day pilot

97.4%
processed
without error

82.5%
correct answers
end-to-end

6,122
SQL statements
audited

100%
safe, read-only SQL
0 unsafe

Results — 815 real user questions

Answer quality

Processed without error

97.4%

Correct answers

82.5%

Incorrect answers

15.0%

System errors

2.6%

Independent SQL audit

100% 6,122 / 6,122 statements safe — read-only, allow-listed tables only

97.6% query coverage — expected score queries present (319 / 327)

97.0% consistent — same question, same SQL behavior (32 / 33 groups)

66.7% identical canonical SQL across repeats (22 / 33 groups) — wording varies, function does not

Audit covers structural safety & repeatability — not semantic execution accuracy. SQL traces available for 518 / 815 records (63.6%); 34 normalized statement forms in total.

Conclusions

Hybrid beats free generation for score-sensitive advice — accurate, explainable counseling at production scale.

Guardrails held — zero unsafe or out-of-allow-list SQL across 6,122 generated statements.

A helper, not an oracle — outputs support, never replace, official NEU admission information.

Next

Semantic SQL accuracy — log bind values & results with gold traces.

Cut the 15% error band — harden slot extraction on unusual score profiles.

Broaden user scenarios across the full admission cycle as rules evolve.