UNIVERSITI TEKNOLOGI MARA

BULETIN APB

EDUCATION FOR BETTER FUTURE



EDISI 17

OKTOBER 2026

AKADEMI PENGAJIAN BAHASA
UNIVERSITI TEKNOLOGI MARA
CAWANGAN NEGERI SEMBILAN
KAMPUS SEREMBAN

e-ISSN : 2682-7948

The First Error Message: Why Students Should Not Be Afraid to Make Mistakes

ABD MALIK MOHD RICK
UiTM CAWANGAN NEGERI SEMBILAN KAMPUS SEREMBAN

It is a familiar scene in a university computer laboratory. A lecturer demonstrates a short program, the class follows along, and everyone clicks 'Run'. A few seconds later, a student raises a hand and asks, “Sir, why is mine showing red?” The message may look alarming, especially when everyone else seems to be moving ahead. Yet that first error message is not proof of failure. It is often where real learning begins.

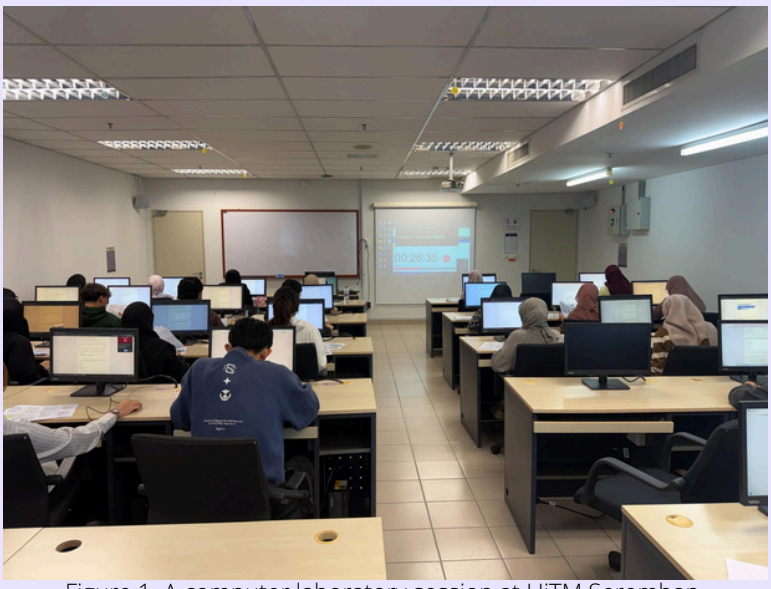

Figure 1. A computer laboratory session at UiTM Seremban, where problem-solving often begins with a first attempt.

Learning from an Error

In computer science, mistakes are part of the work. A missing semicolon, an incorrect condition or a variable with the wrong value can stop a program from running. The screen points to the problem, and the student reads the message, checks the code, tests an idea and tries again. We call this debugging, but it teaches more than programming. It builds patience, attention to detail, and a willingness to revise our thinking. Research on learning from errors similarly finds that an incorrect attempt can help when it is followed by corrective feedback (Metcalfe, 2017).

The same lesson applies across university life. Students write a first draft, receive feedback and improve it. They solve a calculation, discover an assumption was wrong, and start again. They rehearse a presentation, forget a point and become better prepared for the next attempt. Education has never been a straight journey from question to perfect answer. It grows through attempts that gradually become clearer and stronger.

Why Students Hold Back

Still, many students fear being wrong. In a lecture hall, they may stay quiet because they do not want to give the wrong answer. During a tutorial, they may wait for a confident friend to speak first. A student may hesitate to post a basic question in the class WhatsApp group or upload an unfinished draft to Google Drive. Someone new to coding may copy a friend’s working program instead of asking why their own version failed. The immediate problem disappears, but so does an important learning opportunity.

A better learning culture does not celebrate careless work or pretend every answer is correct. It treats a reasonable mistake as useful information. What did we misunderstand? Which assumption failed? What can we change before the next attempt? These questions move students from embarrassment to curiosity. They also help lecturers identify where an explanation, example or exercise needs improvement. Feedback is most useful when it helps learners see what to improve and how to move forward (Hattie & Timperley, 2007).

Using AI to Think More Clearly

This matters even more now that generative artificial intelligence can produce polished answers within seconds. AI can explain a concept, suggest code, organise notes and improve a paragraph. Used thoughtfully, it can be a valuable learning companion. Used carelessly, it can remove the struggle that helps understanding grow. A student may submit an impressive answer without knowing why it works. UNESCO guidance likewise calls for educational uses of AI that protect human agency (Miao & Holmes, 2023).

The difference often lies in the question. Instead of asking AI to write the solution, a student can ask, "What does this error mean?" "Give me a hint without revealing the full answer" or "Can you check my reasoning and show me where it goes wrong?" These prompts keep the student involved. AI becomes part of the debugging process rather than a substitute for thinking.



Figure 2. Debugging turns mistakes into a continuous cycle of checking, improving and trying again.

Making Room to Try Again

Students will only take these risks when the classroom feels safe enough. A lecturer's response can make a lasting difference. "Let's look at why that happened" opens a door; "You should already know this" closes it. Peer behaviour matters too. When classmates listen respectfully and share their own difficulties, mistakes become less isolating. The classroom becomes a place where people learn with one another, not a stage where everyone must appear perfect.

This does not mean lowering standards. Constructive feedback often raises them. Students who understand what went wrong can correct it, explain it and avoid repeating it. They become less dependent on memorised answers and better able to handle unfamiliar problems. That ability is especially important in computing, where technology changes quickly and yesterday's solution may not fit tomorrow's challenge. Research on feedback supports this emphasis on information students can use to improve their work (Hattie & Timperley, 2007).

Skills That Last Beyond University

Future workplaces will not be error-free. Systems will fail, data will be incomplete, user requirements will change, and project plans will need revision. Employers will value graduates who can respond calmly, ask useful questions and improve a weak first attempt. Technical knowledge matters, but so do resilience, judgement and the courage to admit, "This did not work. Let me find out why."

That is part of education for a better future. We are not preparing students for a world in which they will always know the answer. We are preparing them to meet uncertainty without giving up. A student who sees a red error message may feel frustrated, especially when an assignment is due at 11.58 p.m. But if that student learns to pause, read, test and try again, the lesson will last much longer than the program itself.

A mistake is not a label. It is feedback. The first error message does not tell students that they do not belong in computer science. It invites them to look more closely, think more carefully, and take the next step. Sometimes, that is exactly where confidence begins.

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