AAP Bridge · African Futures Scholars article series

A Répétiteur for Every Student

Dr. El Hadji Bassirou Touré · Cheikh Anta Diop University (UCAD), Dakar, Senegal · AFRLP Cohort 6

Introducing my work

I am a computer scientist at Cheikh Anta Diop University in Dakar, Senegal. I teach software engineering and artificial intelligence, from first-year programming to master's courses in machine learning, and many of my course materials are freely available online. I also train university teachers to use AI in their own teaching. With my colleagues at DiCentre4AI, our university's centre for AI, I lead IA4Nieup, a learning platform designed, built and hosted in Dakar. "Nieup" means "everyone" in Wolof, and that word sums up the goal.

The issue

In a Senegalese public secondary school, a mathematics teacher often has sixty to eighty students in one class. In a single period, she cannot watch each student try an exercise, make a mistake and be corrected.

We know what works best: one-to-one tutoring. In French-speaking Africa it has a name, the *répétiteur*, who explains the lesson again after school. Some students take these lessons with their own class teacher, who explains her method again. Others have another tutor, who knows the mathematics but not the class, and explains it his own way: the child is shown two methods for the same task and, at the exam, is sure of neither. And many have no répétiteur at all. Because families pay for it, the children who need it most are the least likely to get it (Figure 1).

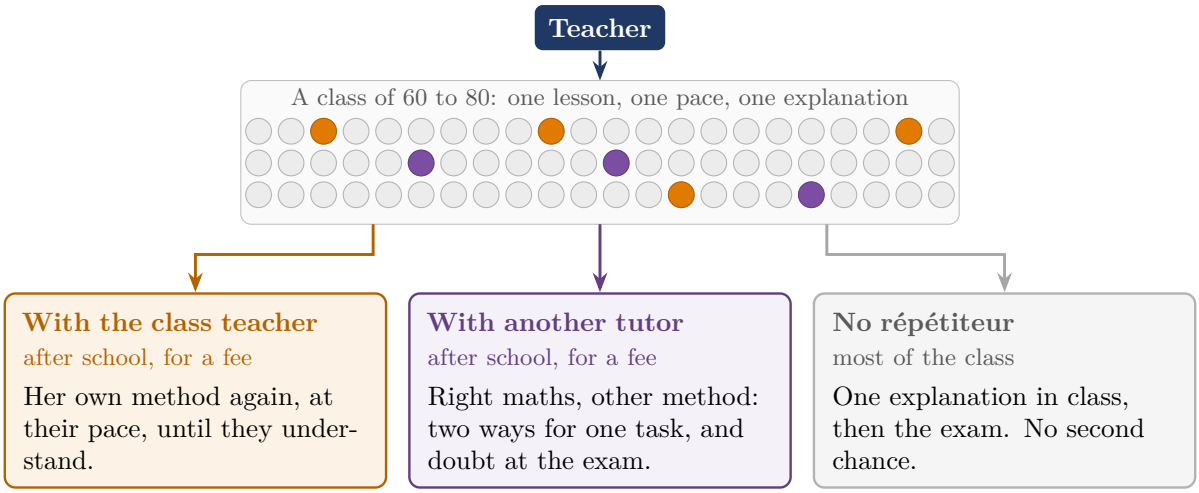


Figure 1. Today. In a class of eighty, a few students pay their own teacher for extra lessons, a few pay another tutor who teaches a different method, and most have no extra help at all.

Why does it matter?

Mathematics decides who can choose a scientific path, and in Senegal few students choose one. AI could offer a tutor to every child, but recent studies show a real risk: students who use a chatbot freely can score better on practice and worse on the exam, because the tool does the thinking for them. And a generic AI tutor behaves like the second kind of répétiteur: it explains mathematics its own way, for every child at once, while the exam rewards the method taught in class.

My perspective

In my own teaching, I have learned that a student who does not follow is rarely slower. She has been offered a door that does not open for her. Several doors are better than one, repeated louder.

With Aman Yadav at Michigan State University and Idrissa Sarr at UCAD, I am working on what we call a *piloted répétiteur*. The idea is simple: the teacher stays in charge. She tells the AI tutor how she teaches: her method, the explanations she accepts, and what it must never give away. Within those limits, the tutor adapts to each student. It goes at her pace, tries another door when the first one stays closed, comes back to old lessons before they fade, and tells the teacher where her students are stuck (Figure 2).

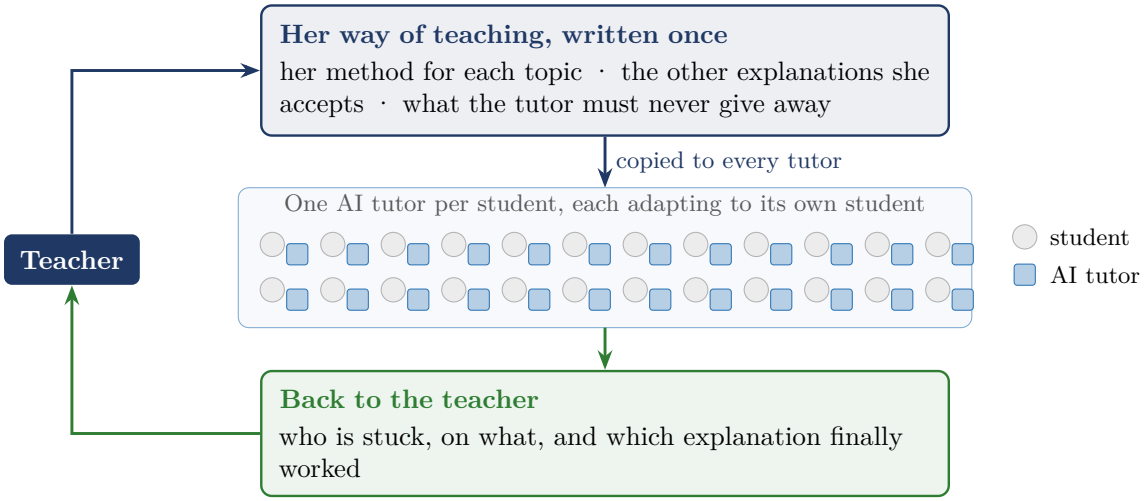


Figure 2. The piloted répétiteur. The teacher writes her way of teaching once; every student gets a tutor that follows it and adapts to them; the tutors tell her where her students are stuck.

In other words, the AI does not bring its own way of teaching mathematics. It carries the teacher's way to every student at once. Our first checks are encouraging: once the teacher has described her method, the tutor keeps to it, and it does not hand out the answers to graded work.

Looking ahead

Next, we will bring the répétiteur into classrooms in Dakar, alongside the teachers who shaped it, and learn from them. The questions that matter most are human ones. Does it reach the students who never had a répétiteur? Does it give teachers more insight into their class rather than more work?

In the longer run, I hope this helps more Senegalese students choose science, and shows that AI in African classrooms does not have to replace the teacher. It can extend her reach, so that every student, not only those whose families can pay, has a répétiteur who explains things the way the class does.

To learn more. My page: https://ebtoure.sn/ · My courses, freely available (in French): https://ebtoure.sn/enseignement/ · How I build a course, "several doors" (in French): https://ebtoure.sn/blog/