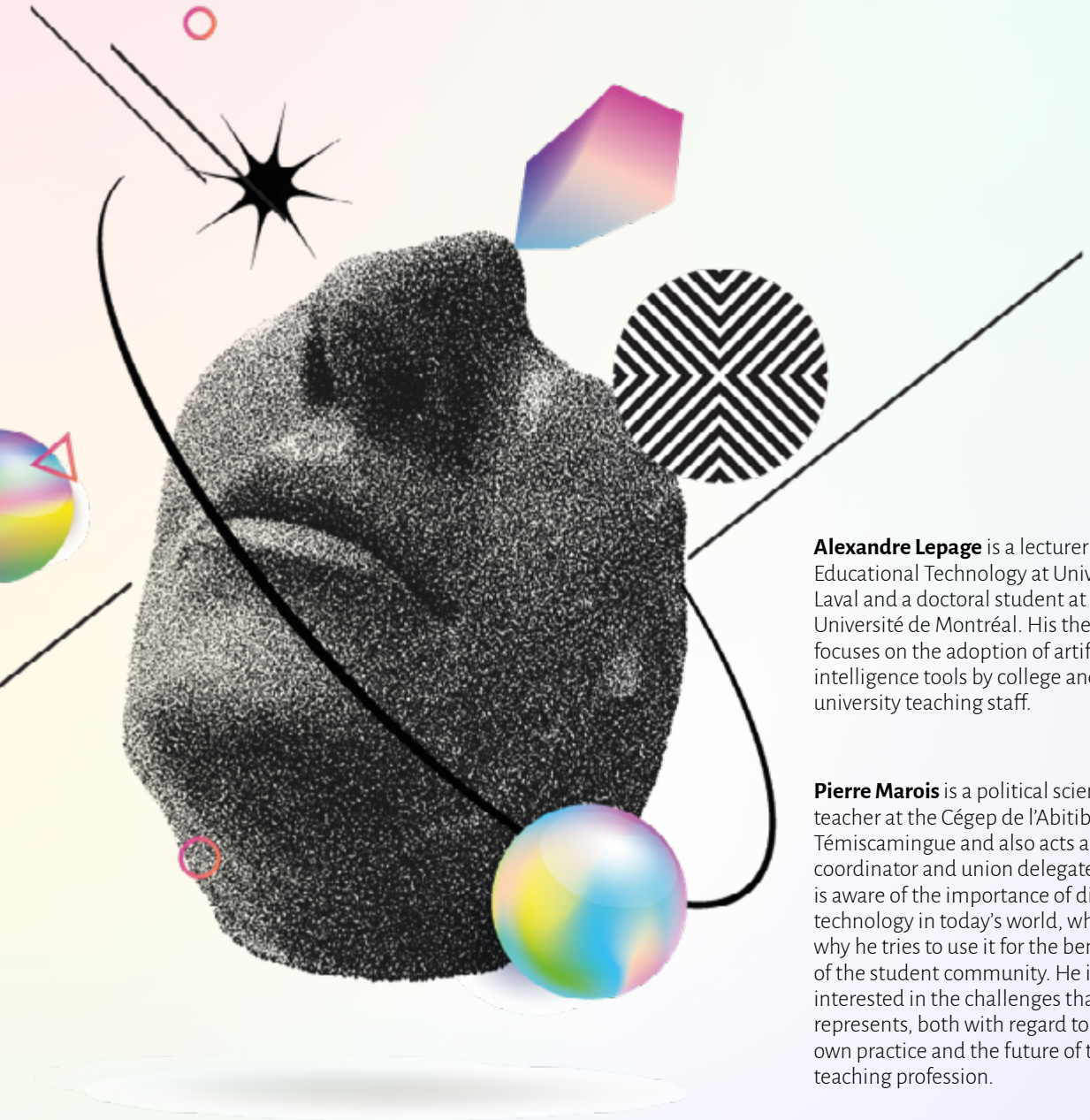
Perspectives on the Place of AI in College Education



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Pierre Marois is a political science teacher at the Cégep de l'Abitibi-Témiscamingue and also acts as coordinator and union delegate. He is aware of the importance of digital technology in today's world, which is why he tries to use it for the benefit of the student community. He is also interested in the challenges that it represents, both with regard to his own practice and the future of the teaching profession.

In recent years, the uses of artificial intelligence (AI) have transcended the context of research in educational sciences and have been implemented in CEGEPs. For example, we can cite the conversational robot ALI from the Cégep de Chicoutimi and the Collège de Rimouski, aimed at providing psychosocial support to students, or Cégep à distance's Tableau de bord [Dashboard, Ed.] which guides students in their success. More recently, ChatGPT has demonstrated the possibilities of AI to automatically generate new text with a level of complexity approaching what humans are capable of doing. This is a breakthrough that provides a glimpse of a wide range of uses at the college level, touching all disciplines, for better or for worse.

We have chosen to exchange on the topic in order to identify more precisely the potential and the challenges of AI in the college system, by confronting our perspectives—one from the world of research, rooted in scientific literature, and the other from the field, oriented toward practice.

The uses of AI in education

The first references to the field of AI applied to education date back to the 1970s (e.g., Carbonell, 1970). At that time, the main focus was on the design of intelligent tutorial systems, i.e., systems that allowed the learner to acquire certain knowledge autonomously, using a computer. These systems worked with a database of organized knowledge on a given topic and could question the student and eventually provide feedback and further explanations in case of wrong answers.

Today, the uses of AI in education are diversified and are aimed at: analyzing learners and their digital traces, taking attendance or detecting emotions when solving a problem, grading written productions or objective evaluations automatically, providing automated feedback, detecting plagiarism, recommending personalized content, as well as predicting success or failure in order to deploy early interventions (Lameras & Arnab, 2022; Zawacki-Richter *et al.*, 2019). It is worth briefly recalling that not all of these uses employ the same AI technology; some of them are symbolic in nature (a system operating with pre-set rules) and others are probabilistic, i.e., they rely on predictive models trained on massive data.

While these uses can be inspiring, they can also be frightening. What about classification errors related to sensitive decisions, such as admission or certification evaluations? How will students' learning and personal data be stored, as they are essential to the proper functioning of probabilistic AI? What if predictions of failure generate anxiety in students rather than encouraging them to increase their efforts? We do not have the answers to all these questions, but they will need to be discussed extensively in the coming years. Far from wanting to paint a bleak picture of AI in the college system, we hope that it will develop in a forethoughtful way, and that the automation of human tasks that it enables will be consciously chosen by the main stakeholders at the forefront, including teaching staff and the student community. We therefore propose to reflect on the transformation that AI can bring about in the roles and responsibilities of these individuals.

Pierre Marois - Like many fellow teachers, I was interested in the arrival of ChatGPT and I am now wondering about the place that AI can occupy in college education. I wonder about the changes that AI will bring to our teaching environments. Because there will be disruption, won't there?

Alexandre Lepage - Certainly, AI will bring about major upheavals. It has already started, and it was relatively predictable insofar as education is one of the few sectors where AI is slow to develop massively. There are several reasons for this, including the fact that education is not an industry with consensual ends. The *why* and *how* debate needs to happen; education is constantly brought to the forefront. With the accelerating development of AI uses, we are even forced to ask questions we haven't asked ourselves in millennia, namely: Why learn to read and write? Can we learn without a teacher? In my research, I am interested in the potential of AI to accomplish certain tasks traditionally executed by students or teachers. In fact, I'm interested in their opinions on the matter: Are they aware of the potential applications of AI at the college level for predicting student success, creating digital educational resources and automated assessments, or detecting plagiarism? Do they think these applications have a future?

PM - At this point, some students obviously know about ChatGPT. However, for uses other than text composition, they are less familiar with it. Therefore, the challenge of integrating AI into our practice is twofold: finding pedagogical ways to use it and getting students to engage with it for reasons other than those negatively exposed in the media. As far as teachers' use of AI is concerned, I think it depends on the level of adaptation that an AI will be able to demonstrate. I can see AI being very useful for detecting plagiarism in course assignments, for example. It can already be used to identify the probability that a text has been written by an AI. However, to correct an essay or even essay questions instead of teachers would require a very advanced level of AI. Could an AI really replace a teacher for grading?

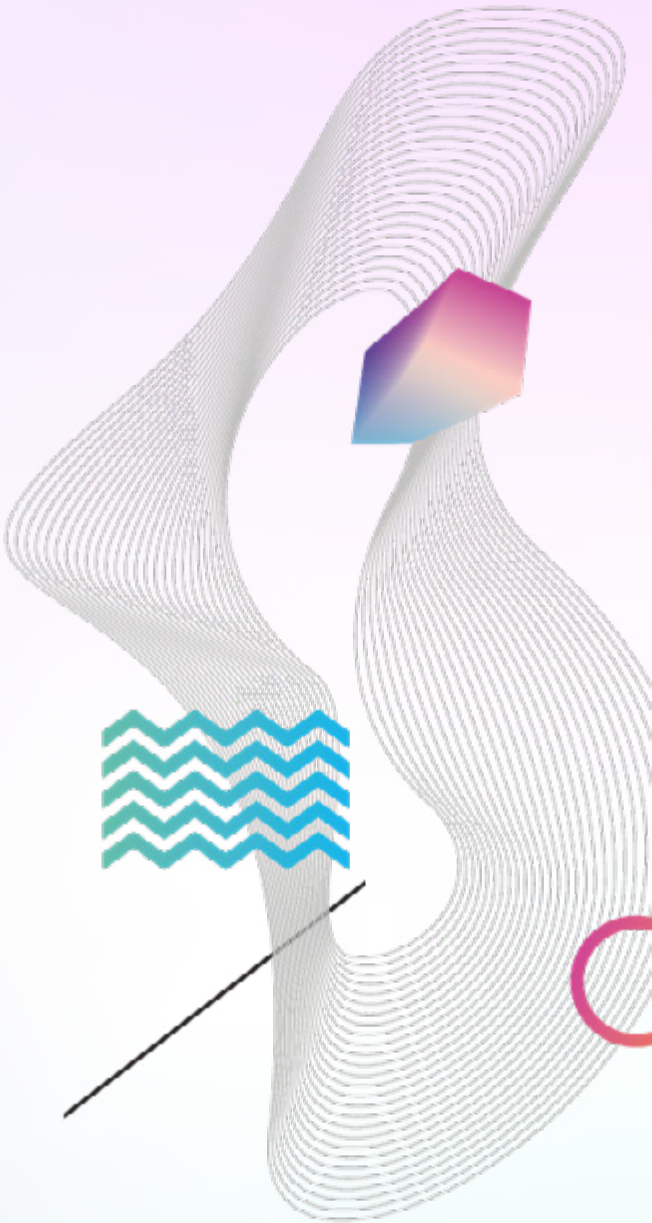
AL - At the moment, experiments with automatic essay grading still have significant limitations. Since writing tasks are often confined to the context of a class group, it is difficult to gather enough data to train a system that would be able to apply the evaluation criteria as well as the teacher does. However, this is likely to change rapidly in the next few years and we may be surprised at the ability of AI systems to reproduce the grades given by teachers. We must not forget that the act of grading goes beyond giving a grade. Teachers explain the grade to allow their students to improve and provide feedback and even encouragement.

PM - To tell you the truth, I'm not sure I would use an AI even if it were able to reproduce my grades accurately. If an AI were to become so efficient that it consistently graded like a professional, it could be a tool, but a human would still need to proceed with a verification. In my opinion, teachers should always cross-check corrections to ensure that small subtleties have been taken into account and also to protect themselves in case of a grade review request. It should be possible to demonstrate that it was not just the machine making the decision, but rather the teacher, to ensure a transparent grade review process. The objective part of evaluations is relatively easy, but the more complex a field of study becomes, the more room there may be for interpretation. In college, we want to develop independent thinking and the ability to solve problems in different ways. This means there are often several right answers. Moreover, the teacher is accountable for the grade given to the student and must be able to explain it to the student. It is important to avoid teachers blindly trusting an AI.

AL - I can see the catastrophic consequences that an evaluation administered exclusively by an AI can have. In terms of ethical issues, the question of imputability fuels many debates when it comes to AI. The same is true for the question of explicability: unfortunately, many AI technologies would not allow users to fully understand what led to one grade rather than another. Here, I stress the importance of teachers developing sound AI literacy and an understanding of how it works, in order not to be surprised by systems that seem reliable, but that can introduce bias or classification errors, nonetheless. As we are currently seeing with ChatGPT, just because it seems true does not mean it is. Even in the case of a powerful system that appears to be able to reproduce a teacher's correction, biases are possible, and these could be harmful to students. As you point out, it would be a trap to put unbounded trust in it because it *seems* to do the job well; this is called automation bias. Using students' work, without their consent, to train AI systems is also a risk to avoid. As teachers and students learn about these uses of AI, they must learn to manage and minimize their risks.

PM - I would also add that the main issue for many college students is language proficiency. I'm not just talking about grammar and spelling. Many find it difficult to communicate an idea. When evaluating, we must take this into account. This does not mean lowering our standards, as there are penalties for poor French. It simply means that we must sometimes correct with a slight level of interpretation to make relevant comments that will help the student. Thus, to correct evaluations fairly, an AI would need to have an interpretive ability to go beyond what is textually written. Can AI really take context into account?

AL - The use of more refined data that would allow for a real adaptation to students represents certain difficulties because of the important issues of privacy rights and the commodification of personal data. In addition, some data that would allow for learning context remain inaccessible for the time being, as they are intangible (for example, how to access the logical inference errors that the learner may make, in real time?). The challenge is to model the contextual elements to be considered adequately and with sufficient precision. Of course, this is a daunting task, as it is difficult to model everything, including the physical spaces of learning, prior knowledge, and the events that occur in the classroom. On the other hand, this is likely to change rapidly with the multiplication of data sources and the appearance of increasingly sophisticated devices. Think of devices like smart watches that collect biometric data. For the moment, the teacher is better than any AI at knowing individual students, especially as far as the emotional aspect is concerned, because they are in close contact with them and thus dispose of a considerable amount of intangible information.



PM - I would add that the teacher is able to intervene from the beginning to the end of the learning process, from planning and designing learning activities to teaching and evaluating. Since AI does not have access to all of this contextual information, I think there would be some distrust in using AI for complex evaluations. On the other hand, I see the potential of AI to predict student success or failure, insofar as it remains a tool to detect difficulties more easily. At the same time, it shouldn't become a kind of fatalistic prediction that would stop us helping one person over another to unethically favour the success rates of our classes. Is that a documented risk?

AL - Yes, it's a risk that has been discussed. Several authors have raised the point that predictions of success could have the opposite effect: rather than encouraging students to be more engaged, they could cause them to panic and feel that it is impossible to succeed. Predictions could also be simply wrong and thus generate misunderstanding among students (Romero, 2019). There may also be outright unscrupulous uses. For example, a case occurred in 2016 at Mount St. Mary's University in the United States. The university president had to resign after orchestrating the administration of a survey to students at the beginning of the semester to detect those at risk of failure (Svrluga, 2016). So far, so good. However, the more or less implicit goal was to gently show the door to these students in order to increase the graduation rate and thus enhance the university's image. According to some authors such as Prinsloo and Slade (2017), seeking to predict success or failure would *de facto* lead to the responsibility to act in case of detection of risk of failure, i.e. to help students. In short, before deploying this kind of technology, it is necessary to ensure that both human and technological resources are substantial in order to do something useful with these predictions. Another consideration is how the predictions are presented to students. They too should be educated to interpret them and understand how they are made.

PM - Again, as with automated evaluation, there is no doubt that the ethical aspect is important. But beyond assessment or prediction of student success, how far do you think AI could develop? Do you think it could one day replace teaching professionals in some of their tasks? Would human teachers become technicians who would supervise these robots?

AL - In fact, we need to rethink the role of the teacher in this hyperconnected, hyperperforming environment. Yes, I think the teacher will increasingly be required to mine and interpret learning data, as Kay and colleagues (2022) suggest. In a course I taught in the fall of 2022, a student—Charles Désy, to whom I give full credit for the idea—suggested that the teacher's role with regard to their students should be viewed much like that of a doctor with regard to their patients. Doctors in hospitals are not constantly with patients; they spend time looking at data or reports to develop treatment plans. In a similar fashion, teachers might be required to do more of this—to establish comprehensive pedagogical strategies and then adjust them based on data, and for atypical cases, based on the specifics of each student. In-class time, in my opinion, is also going to be invested differently. This has already begun, but teachers could adopt flipped teaching approaches even more massively, so that in-class time is devoted to collaborative integrative and co-regulatory activities. Perhaps the teacher can opt for self-directed learning strategies among students whose learning data show good autonomy and increase in-class time for students who seem less motivated when learning alone. Perhaps they will plan interventions around the development of learning strategies at certain times rather than around the transmission of content. This transformation has already been underway for a few decades, and I think AI will be able to help relieve teachers of repetitive tasks. We need to think about the teacher – student – AI triad.

PM - When you think about it, as a teacher, you were sometimes one of the few vectors of knowledge in an environment. Now, with the proliferation of information sources, knowledge is readily available at one's fingertips. Teachers increasingly act as facilitators of the learning process and transmit learning and working methods to students rather than knowledge. It is important to avoid that the deployment of AI at the college level takes us backwards and that this branch of computer science only concerns knowledge transmission. Teaching dynamic

courses, popularizing, and choosing pedagogical methods are tasks that require a great capacity of adaptation and reflection. Could an AI do as well as a teacher in this respect? For certain more clerical tasks, it could indeed be an asset.

AL - AI can do better than teaching staff with regard to some specific aspects, including speed of feedback and, sometimes, accuracy of feedback on tasks that have been well modeled. And, indeed, on more clerical tasks, it can do better as well. Of course, in terms of fine pedagogical expertise and awareness, teachers need not worry about losing their place. We've talked about teaching staff, but what about the students? Do you think they can benefit from the use of AI?

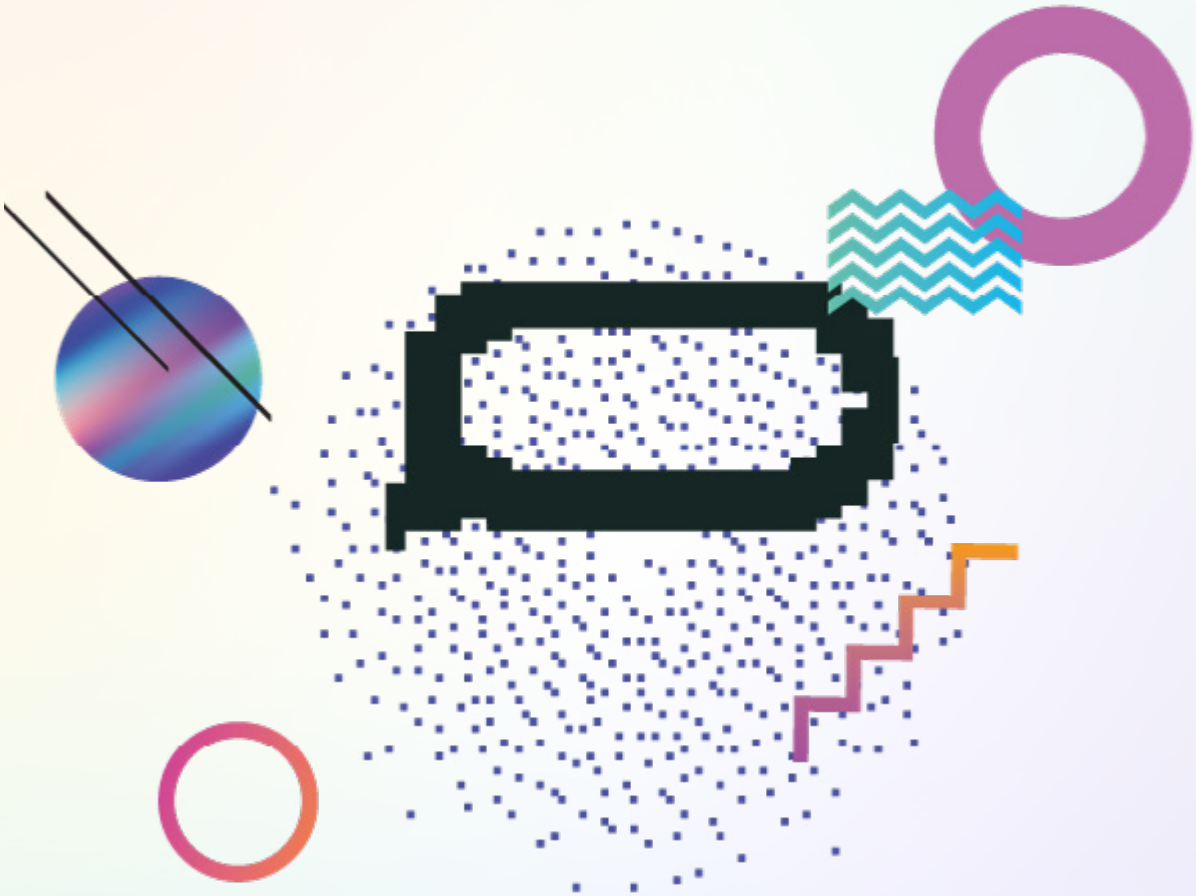
PM - Based on the students in my classes, I would say that the use of AI tools could be more or less effective depending on the level of autonomy of the students. They have autonomy, they are able to learn on their own and complete learning activities on their own. However, they have difficulty developing higher-level intellectual skills. In the first session, for example, most have difficulty with abstract learning. They are often very anxious when asked to understand theories through reasoning and logic. They seem to have a rather mechanical approach to tasks and look for simple procedures with specific examples. This skill development could be compared to the skill development required to create a painting of a house. They know how to handle brushes, they know what a house is, but when comes the time to make their painting, they want a numbered model; they don't seem to trust themselves to draw from scratch. When told that the house may differ from student to student, they have a hard time conceiving that this is possible. They seem to be used to rigid, integrated models, so when there is talk about honing their independent thinking skills and blending different types of learning to analyze a situation, they block. But besides that, I can imagine AI providing feedback to reassure them in real time when their teacher is not present.

AL - A powerful AI could certainly give faster and perhaps even more accurate feedback than the teacher is able to when called upon from all over the classroom. From the outset, we need to anticipate the interactions that are expected of the student with the AI. How much control does the student have over the learning environment? What can they do or not do? What is their task? Above all, we should constantly check whether using an AI to replace certain teaching tasks has a negative effect, not only on the students' grades, but also on their motivation to learn or simply on their enjoyment of college life. For AI to continue to develop in a useful way, it is essential to include students in this reflection. Similarly, it is necessary to clarify with them what the role of AI is and what the role of the teacher is, so that they develop realistic and coherent expectations of these actors.

The changing role of teachers

It is clear from our discussion that while it is unrealistic to think that AI will replace teachers, the role of the latter will be refocused on tasks that cannot be automated or for which there is an advantage in preserving the presence of a human. At the college level, teachers are involved in all stages of a course and have the professional autonomy to choose the content to be taught and the pedagogical methods to be used. In an environment where AI is increasingly used for instructional design, content delivery, learning assessment, and even student support, it is important to consider how this professional autonomy could continue to be exercised without missing out on AI innovations. Since teachers are experts in pedagogy and not just in their discipline, they should also logically be involved in some of the choices concerning the learning process, such as the frequency, nature, and precision of feedback. In this regard, teaching staff will increasingly be required to work with AI systems and consult learning data to better support learners.

The role of teaching staff in developing students' capacity to learn should not be neglected and could even be emphasized. Some methodological learning takes place over a long period of time. Once again, the teacher is essential, particularly for supporting motivation and developing students' confidence in their ability to succeed. In this regard, all teachers have anecdotes of how they were able to identify a student struggling academically and provide the encouragement and feedback necessary to restore that student's desire to learn. The teachers' approach is more subjective when compared to AI, and perhaps that is for the best. At the very least, it is more sensitive. ▬



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