WHY THE LECTURES MIGHT BE INTERESTING ANYWAY pdf

1: Lecture Method: Pros, Cons, and Teaching Alternatives

Things a Computer Scientist Rarely Talks About Why I am unqualified to give these lectures. Why the lectures might be interesting anyway.

May 13, by C. The lecture method is convenient and usually makes the most sense, especially with larger classroom sizes. This is why lecturing is the standard for most college courses, when there can be several hundred students in the classroom at once; lecturing lets professors address the most people at once, in the most general manner, while still conveying the information that he or she feels is most important, according to the lesson plan. There are just as many disadvantages to the lecture method as there are advantages, though. Learn some of the best teaching methods for a younger audience in this guide. Or, learn how to become a better teacher by understanding the goals of learning with this course. As long as there is an authoritative figure in any given context at the front of a room, delivering a speech to a crowd of listeners, this is a lecture. Now, you might feel that this method sounds pretty one-sided. Advantages of the Lecture Method The lecture method has a few advantages that has kept it as the standard approach to teaching for so long. Below is a list, followed by some descriptions of each of these. Because the lecture is delivered by one authoritative figure â€" a teacher, professor, or instructor of some other kind â€" that person has full reign of the direction of the lesson and the tone of the classroom. Lectures are literally just long-winded explanations of information, deemed important by the lecturer. As such, students can absorb large quantities of new material. The lecture method makes the learning process mostly effortless on the part of the students, who need only pay attention during the lecture and take notes where they see fit. Students just need to know how to take good notes â€" check out this course on note taking skills for some tips. People who are against the lecture method see it as a one-way street. Professors dictate information to students, who have little to no opportunity to provide their own personal input, or protest the information being delivered. What if the professor is wrong, or what if the student disagrees with the professor on a fundamental ideology in their lecture? Well, the student just has to sit down and take it; sometimes, the student will even be forced to agree with the lecture if they want a passing grade. If the lecture is on a sensitive topic, over which there is much conflicting discourse, you can imagine the problems this might cause. Not only do people see the lecture method as a biased, one-way road, but they also see it as a wholly passive experience for students. Not being actively engaged in a discussion over certain material can make the material itself seem worthless to a student. Simply put, they might even be bored by the material because they will have no opportunity to learn how the subject applies to them on a personal level. The lecture method can be disadvantageous to the professor, as well. Not all academics can be expected to have the same level of public speaking skill. What if a teacher is a genius in his or her field, knows the material from every angle, and is enthusiastic about the subjectâ€¦ but has trouble speaking in front of large groups? Just as being lectured to might not be the learning method of choice for many students, being the one that is expected to do the lecturing might not be the best way for every instructor to present their course material. Check out this course on mastering public speaking for some tips on avoiding this pitfall. See the list below. Many colleges require students attend a supplementary discussion or lab section in addition to the mandatory lectures. This is a way for students to interact with other students from their class, on a much more personal level. Discussions are scaled down in size to aid this. For instance, a lecture might have students, but a discussion section will have just 10 or A seminar is a much smaller, more focused version of a lecture. They differ from lectures not only in size, but also because they are usually followed by a question and answer session at the end, allowing students to participate and engage with the course material so that the academic takeaway is more in their favor.

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2: CSC Winter lecture notes

By Aleszu Bajak May. 12, , PM Are your lectures droning on? Change it up every 10 minutes with more active teaching techniques and more students will succeed, researchers say.

The joke is that while this copying is going on, the information goes through the mind of neither. However there are a few reasons to explain this. So they try to present a coherent picture of a topic, rather than just answer questions helter-skelter. Many topics are actually insight-driven and it can be hard to capture that in print. A still more important reason, however, is that different people learn differently. The term of art is "learning modalities". Some people learn fine by reading, others by seeing, or hearing, or interacting, or practice, or So a good use of face to face time is to "ping" the students with preferred modalities other than book reading. But your bullet point description of a better way, is very good. You also need to get the students to practice the art, what ever it is. Sometimes this is done within a lecture period so that you can give immediate guidance or use pairing so the students can help each other. But usually you end by sending them off to some active task and more readings, of course. In fact your final 35 minutes might well be spent in having the students practice. This is called active learning and is an extremely important modality and generally a good use of at least part of "class time. For the last several years of my teaching retired now I never lectured in the sense of writing things on a board or showing slides that students were expected to copy. We did group work sometimes paired , active demonstrations sometimes with student "actors" , academic games think Jeopardy , etc. Students would have outside reading, but even then, most of their work was active practice of some skill. Charles University Prague was founded about a hundred years prior to the invention of the printing press. Books were very expensive if they even existed. Lectures then, were an efficient way to spread knowledge. But what was optimal then is past its "use by" date, perhaps.

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3: Knuth: MIT Lectures

The lectures and the panel discussion will be webcasted - thanks to Dr. Dobb's Journal! The website will be announced shortly before the first lecture. Don Knuth's presentations will also be distributed on MIT cable and to the Draper Lab. Professional videos of the series may be purchased after the lecture series is over.

Tom Clay and Lori Breslow Are you dissatisfied with the attendance at your lectures? Do you wonder what your students are thinking when they skip your lectures? Click here to learn about the survey. Most students reported they try to attend lectures, and usually do, missing them from time to time as the result of academic, extracurricular, or personal conflicts. In creating the list of factors we asked students to rate, we tried to adopt their viewpoint, but we discovered from their write-in comments that we had not anticipated the following: Whether the students expect to learn from the lecture â€" If students do not expect to learn from lectures, they are less likely to attend. How the lectures relate to psets and tests â€" Students felt that the lectures should be aligned with what appears in the homework and on tests. Because that way, what is said in class can be processed in doing the problem sets and I can see that they are both useful and applicable. Sometimes a class is good because it is simply an interesting topic. However, an otherwise boring subject can become an interesting class if the lecturer is able to present the course material in such a clear and cogent manner that students cannot help finding it interesting. To the contrary, the write-in comments make it clear that students typically use a very practical decision-making process that considers a range of factors in combination, comparing the advantages and disadvantages of lecture attendance, calculating the impact on their workload, and attempting to optimize their use of time. While students may or may not be deliberate or systematic in making their decisions, they do explain them this way in retrospect. Some of those methods â€" pop quizzes, taking attendance, and giving away test questions in class â€" force students to attend. Other methods, they said, make the students want to attend. How can a professor do this? The easy answer is to say that he or she should lecture well and clearly, use relevant examples, engage the students, schedule classes in the afternoon, use a lot of demos, and align the lectures with the psets and tests. This is sound advice as far as it goes, but is of only limited usefulness, since it does not suggest how these things can be done. Fortunately, some of the same students who provided the other insights in this article also offered specific advice on how to give great lectures. Then the students could leave, confidently knowing that what seemed so new and overwhelming just a few [minutes] ago could be explained very simply. This can simply be done by verbally giving the equivalent of directions after every new small concept is â€¦ introduced.

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4: Free Lectures Online

3. "Lectures are the best way to get facts across." 4. "Lectures are the best way to get students to think." 5.

Share via Email One of the main contributors to student boredom is the use of PowerPoint. Corbis I study boredom in a range of professions - from heavy goods vehicle drivers to teachers - and have found that one group for whom boredom appears to be a familiar bedfellow is the student. Although a range of factors may contribute to these findings, they do prompt the question of what it is about the learning experience that might be deemed "boring". The traditional lecture is still one of the most common teaching methods, since it has the advantage of being able to reach many students in one economical time slot. This approach, of course, rarely allows for the sort of interaction and active learning that more hands-on, practical sessions such as lab work or tutorials can facilitate. One of the main contributors to student boredom is the use of PowerPoint. And that is the problem - lecturers tend to prepare too many slides, pack them with too much information, and whizz through them in a manner that obliges students to spend most of the session attempting to copy copious amounts of text from the screen, while bypassing active processing of the material. We might expect more hands-on practical sessions to be more engaging but, surprisingly, lab work and computer sessions achieved the highest boredom ratings in our study. One of the problems with lab studies is that the experiments the students conduct are often just controlled exercises where the results are already known. Computer sessions, too, have the potential to be stimulating or tedious; this study suggests too many fall into the latter category. This could be due to the manner in which sessions are conducted are the tasks relevant and interesting? Does any of this really matter? Might students just accept that the world of learning, like the workplace, is always going to include some elements of boredom? To answer this question, we need to look at what the consequences of being bored are for the student. We found that students adopt a variety of strategies to cope with boring lectures. Over a quarter of students leave the lecture at the mid-session break. This "class cutting" is potentially the most serious consequence, since previous research has shown a link between attendance and grades. So, what can an academic do to ensure the most engaging teaching possible? First, we should look carefully at our use of PowerPoint presentations and limit the number of slides and the quantity of information on them. Colour, animation and sound should be utilised to vary the pace - and an accompanying handout should always be provided. Where more interactive, hands-on teaching methods are used, we must not make the mistake of assuming that simply "doing" is enough to engage; the "doing" must also be relevant, non-prescriptive, and should benefit from appropriate resources and utilise animated teaching styles. Finally, a "buddy" teacher observation system, like the one we operate at the University of Central Lancashire, can help ensure that teaching stays fresh and engaging. Reducing student boredom does not require elaborate attempts to entertain.

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5: NPR Choice page

I understand that some students may not understand the book, and a spoken lecture makes it possible to answer questions and provide clarifications on unclear statements from the book, or just to add more detail/intuition to a certain topic.

The first generation of neural networks Keep in mind the analogy with neurons and synapses. Try to fully understand why the bias can be implemented as a special input unit. After you understand this video, the other two will be easier than this one. A few basic facts about those: It can be called a location or a vector. A hyperplane is the high-dimensional equivalent of a plane in 3-D. The same ideas apply in high-D. The "scalar product" between two vectors is what you get when you multiply them element-wise and then add up those products. The scalar product between two vectors that have an angle of less than 90 degrees between them is positive. Understanding it is a prerequisite for the next video. Why the learning works Here, using the geometrical interpretation, a proof is presented of why the perceptron learning algorithm works. The details are not all spelled out. After watching the video, try to tell the story to someone else or to a wall in your own words, if possible with more details. This story motivates the need for more powerful networks. January 21 This video introduces lots of new ideas, and is a big prerequisite for understanding the other two videos and in fact the rest of the course. This video introduces a different type of output neuron. A very central concept is introduced without being made very explicit: Try to understand why those concepts are indeed very related. The error surface for a linear neuron A lot of geometry again, much like in video 2c about perceptrons. These types of analysis are the best tool that we have for understanding what a learning rule is doing. This is not easy. In the image, we use two weights, and two training cases. This one is easier than the other two: January 23 Lecture 3d: The backpropagation algorithm Here, we start using hidden layers. To train them, we need the backpropragation algorithm. Hidden layers, and this algorithm, are very important in this course. The story of training by perturbations serves mostly as motivation for using backprop, and is not as central as the rest of the video. This computation, just like the forward propagation, can be vectorized across mulitple units in every layer, and multiple training cases. Here, two topics optimization and regularization are introduced, to be further explored later on in the course. January 28 Lecture 4a: We start to ask how the network learns to use its hidden units, with a toy application to family trees and a real application to language modeling. This material forms the basis of assignment 1. This video introduces distributed representations. It does a great job of looking inside the brain of a neural network. This video is part of the course, i. This video contrasts two types of inference: Conscious inference, based on relational knowledge. Unconscious inference, based on distributed representations. The softmax output function This is not really a diversion: This video presents a third type. This one only makes sense if we have multiple output neurons. The logistic has small gradients, if the input is very positive or very negative. The math of softmax units This goes over softmax units in more detail, including derivatives and detailed derivations. All of these describe the learned collection of numbers that is used to represent a word. January 30 Way 1: This means fewer parameters, but still a lot of work. Displaying learned feature vectors. February 4 Lecture 5a: This video explains why it is difficult for a computer to go from an image i. Some of this discussion is about images of 2-dimensional objects writing on paper , but most of it is about photographs of 3-D real-world scenes. Make sure that you understand the last slide: It explains how switching age and weight is like an object moving over to a different part of the image to different pixels. These two might sound like very different situations, but the analogy is in fact quite good: Understanding this is prerequisite for especially the next video. Its activity is invariant under viewpoint changes. Like many of the stories which we tell with the application of recognizing handwritten digits, this one, too, is applicable to a great variety of vision tasks. Convolutional nets are still very much used. The slide "Backpropagation with weight constraints" can be confusing. Here are some clarifications. What does care about weight constraints is the optimizer: The optimizer can keep the "tied" weights the same in at least two ways. One way is to use the sum of the gradients of the various "instances" of the tied weights as if it were the gradient for each of the instances. Another way is to use the mean instead of the sum. Both methods have their advantages. This

interpretation is also closer to what typically happens in the computer program that runs the convolutional neural net. This video is more a collection of interesting success stories than a thorough introduction to new concepts. Sit back and enjoy. Most researchers, including Geoffrey, usually mean this combination, when they say "backpropagation". February 6 Lecture 6a: A bag of tricks for mini-batch gradient descent Part 1 is about transforming the data to make learning easier. The "it" in that comment is the average size of the input to the unit. This comment is not essential in this course: Part 2 is about changing the stochastic gradient descent algorithm in sophisticated ways. However, this algorithm typically does not involve randomness. However, it would be truly stochastic if we would randomly pick training cases from the entire training set, every time we need the next mini-batch. We call traditional "stochastic gradient descent" stochastic because it is, in effect, very similar to that truly stochastic version. February 11 Lecture 6c: The biggest challenge in this video is to think of the error surface as a mountain landscape. If you can do that, and you understand the analogy well, this video will be easy. You may have to go back to video 3b, which introduces the error surface. Important concepts in this analogy: All of those have meaning on the "mountain landscape" side of the analogy, as well as on the "neural network learning" side of the analogy. The meaning of "velocity" in the "neural network learning" side of the analogy is the main idea of the momentum method. It can mean the momentum method for neural network learning, i. This is the most appropriate meaning of the word. It can mean the viscosity constant typically 0. It can mean the velocity. This is not a common meaning of the word. Note that one may equivalently choose to include the learning rate in the calculation of the update from the velocity, instead of in the calculation of the velocity. This is really "for each parameter", i. This video introduces a basic idea see the video title , with a simple implementation. You might get the impression from this video that the details of how best to use such methods are not universally agreed on. Divide the gradient by a running average of its recent magnitude This is another method that treats every weight separately. Make sure to understand how momentum is like using a weighted average of past gradients. All of these describe the same method of getting a weighted average of past observations, where recent observations are weighted more heavily than older ones. That method is shown in video 6e at 5: February 13 Lecture 7a: A brief overview This video talks about some advanced material that will make a lot more sense after you complete the course:

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6: A Learning Secret: Donâ€™t Take Notes with a Laptop - Scientific American

Why learning from PowerPoint lectures is frustrating Posted on November 7, by Carolyn I'm in my third year of college now, and by this point I have the hang of determining what constitutes a good class and a bad class.

In classes with Powerpoint presentations, I find myself frantically copying down all the points from the slides before they evaporate from the screen even though I know full well that I can view them later on the course website. Agent Plus Environment http: The problem is that PowerPoint bullets mask over the ambiguities in the way that is impossible in well written prose. So, the thinking in many PowerPoint presentations has holes built right into it. I graduated from university in the 70s. Back then, lectures needed to stand fully on what the professor could convey with her spoken words and what the student pulled from the readings. In my business, I suggest to everyone that they read Presentation Zen by Garr Reynolds and develop PowerPoint slides that are bullet-free and present images that embody the point the speaker is making. We then produce well-written leave behinds for those that want to read more later. Eric G I have been a Computer Engineering student for 3 years at 2 universities and in every engineering class I have ever taken the primary form of instruction was power point. I agree that power point is a good tool for instructors to use, but when power point presentations replace the professor, there is a problem. Several of the professors that I have had speak very poor English, and use power point as a crutch. I would be so relieved to take a class where the instructor actually instructed the class, instead of just narrating the power point presentations. Dude Thanks for the insight. I am starting as an Adjunct Professor in Jan teaching network security in the evening. I am glad that I read your blog as I am presently developing my coursework and will keep in mind all the comments presented â€" BTW â€" I too hate powerpoint centered classes. Thanks for the comments! I was a dual CS-Math major as an undergraduate and there was a remarkable difference in the quality of lectures given by math profs who use the old chalktalk method, and CS profs. I hope some professors out there will take note. Good supporting article I remember reading a couple of years back: To complicate this, I also found these classes to be taught by foreign professors that struggled to explain things to us due to their various accents and difficulties speaking English This happened to the worst extent with my Chemistry courses. Fortunately, my geology professors were of the old-school variety and wrote out everything on the board and were born and raised in the US. In short, professors should teach from their knowledge, not second-hand via a power point presentation. My very worst classes were with professors who could barely speak English, which is inexcusable for someone whose job hinges on being able to communicate complex topics. Taking these out of the equation, the quality of lectures for me ultimately correlated with the enthusiasm of the professor. If a lecturer was able to convey their love of the subject, it was far easier to pay attention to what they were saying. The droners and narrators were the worst by far; you could tell they were there because it was a requirement for their placement, and all they cared about was getting back to their research. I am a college lecturer and I absolutely refuse to use PowerPoint. A good class of any kind that is well-taught should be a conversation. Important parts of the conversation are written on the board. That indicates importance and tells my students to write as well, and it illuminates the relationships between things that I write, because they see the order that I choose, the position on the board that I choose, and the lines that a draw between things as I write them. Conversation is important simply because no two classes are the same; different groups of students have trouble with different parts of the material; a good instructor is willing to talk through this, shift the focus of the lecture or the balance of time split between points so that the trouble areas are given more time, the areas the class understood easily less time. There is also no room to adapt; what is on the slide is what the class is about, in those proportions, take it or leave it. Slide 6 that was difficult gets as much time as slides and , which the class had no trouble with. Beyond this, lecturers that use PowerPoint tend to do so simply because they have stage fright. Not good, for all of these reasons. Matthwe The problem is not Powerpoint. Before there was Powerpoint, there were overheads. I had the same issues in college. If we did learn something about Powerpoint 10 years ago, then it is probably considered wrong now. Sloppy lecturers are sloppy lecturers and powerpoint, if anything improves them a bit! I went to uni right at the cust of the first profs using PowerPoint or similar , Back in the

old days I used to spend all my time copying down what was on the board instead of listening to the lecturer. Have you tried to read maths in chalk from the back of a person lecture hall? The rest of time is spent listening, not copying. Long live PowerPoint well, in this context at least! I believe the problem can be summed up as an over-reliance on PowerPoint. I through most of my years of teaching, I minimized the use of the canned presentations that came with the books my final year forced me to use them more due to a change in available technologies and the student group, but that is a different story. I taught mostly adult students, so we would typically start with discussions of the general field brought to the table by the students themselves. If I saw something of note in the slides that we had not covered in our other activities, I would stop, switch back to the whiteboard, and go from there. The key to using PowerPoint is that it was intended to be a supporting tool for a spoken presentation. It was never intended to take the place of a lecture, to become a handout with all of the information, or to be some avenue to show off an insturctors skills at adding sound effects and clipart. A good slide should serve as a memory aide to help students recall the content of the lecture. Many have already written boatloads of information with tips and tricks for making PowerPoint and similar multimedia tools useful. If you need to decrease the font size to fit things on the slide, you have too much information. Better yet, re-create the graph or chart to fit the slide. Otherwise, they can become a distraction. I am a full time student and work full time. I use PowerPoint in my job everyday and wish so much that I could spend one class teaching my instructors how PowerPoint is supposed to be used. Welcome to your 15 minutes of interweb fame. Richard While it is important that there are opportunities for you to use your different learning styles, you have to realise that there are others that learn differently to you. You may find it best to take notes on everything that the professor is saying â€" there are others for whom it will be most productive to sit and listen intently and not taking any notes at all. The problem seems to be then, not the PowerPoint itself, but the pacing that the professors use. If they are to do problems on PowerPoint, they should have the steps appear gradually as they are working through the problem, and use the appropriate pacing, to ensure that students have the opportunity to follow the problem. You are an adult and responsible for your own learning. If you know that you learn best by taking notes, then take notes anyway. The availability of the notes after the class will be something very positive for many others, and to request that they not be available for your sake is to fail to recognize the learning needs of others. Everything else is either me talking or writing on the whiteboard. Sometimes I have handwritten notes to remind me what topics I wanted to cover. My students, for the most part, HATE this. It completely turns their expectations of a class upside down. None of this is made up. When I receive these complaints, I explain as patiently as I can that these are precisely the reasons I eschew slides, and why I value the attention and dialogue that writing and extemporaneous speaking facilitate. They came to college so they could get a degree so they can get a job, and anything that stands in their way must be stopped. Benjamin I am taking a C class at my local community college. I get nothing out of the class. The instructor uses Web CT for grading, submissions, and announcements. His lectures are all Powerpoint Presentations. No new material that is not in the book or on the powerpoints is introduced. The only reason I go to class is because he will display a screen shot of what he wants done in the programming assignments. As a tuition paying student I should get more out of class than what I would get if I just phoned in well I am not using a dial-up connection, but you get the idea. Even if they explain it some I can get the gist from the slides and pick up the rest from the Internet and other classmates. What happened to 3 10ish word lines of text per slide? Is it too much to ask for the people we pay so much for an education to actually explain these things to us verbally, to PROFESS them to us? Sorry this has been a pet-peeve of mine for yearsâ€¦. You are right on. As a former science teacher and a current engineering grad student, powerpoint has made a mess of education. I was wondering if you could present it in PowerPoint for us? Scotland Tom PowerPoint, to me, simply represents some of the undercurrent laziness that runs through the American educational system. I can find the same or similar presentations for free using nothing more than a Google search, and there is nothing stopping me from buying a used textbook and reading it on my own. I recently decided that it might be interesting to learn a programming language. Instead of spending thousands of dollars on Computer Science classes at a university and grad school like a good friend of mine did I found libraries of information, lessons and examples that I can educate myself with online. I have to say the

experience of self-education, at home, at my own pace and on my own time has been extremely refreshing and surprisingly enjoyable. In order to do so I suggest PowerPoint presentations be used situationally, like any other tool. Chris Powerpoint Presentations are passive learning. I feel the same way when I attend conferences. My first reaction is to make sure the PPT will be available on a website, so that I can relax and follow the presentation, at least for the first 15 minutes! I still use Powerpoint to show certain images and plots that are too complicated to draw in a reasonable amount of time, or for short movies. But mathematical derivations, sketches of conceptual relationships, simple drawings, and lists of categories or topics seem to go over much better when I have to take the time to write them thus slowing me down and the students have to write them down which helps at least some of them remember. I put my notes on our class web page, so students who miss something can find it there.

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7: Lectures aren't just boring, they're Ineffective, too, study finds | Science | AAAS

Lecture 1 - Why Finance? Overview. This lecture gives a brief history of the young field of financial theory, which began in business schools quite separate from economics, and of my growing interest in the field and in Wall Street.

Things a Computer Scientist Rarely Talks About a series of public lectures about interactions between faith and computer science Donald E. Why I am unqualified to give these lectures. Why the lectures might be interesting anyway. Lecture 2 October The advantages of unbiased sampling as a way to gain insight into a complicated subject. Dangers to avoid when using this approach. Lecture 3 October How to translate Bible verses without knowing Hebrew or Greek. The surprising rewards of such attempts, even though the task is difficult or impossible. Lecture 4 November 3: Scientific work as an artistic endeavor. The deep influence that beautiful presentation can have on our understanding of texts. Panel Discussion November Creativity, Spirituality, and Computer Science. Lecture 5 December 1: What I think I learned about God from the 3: What I think I learned about theology from the 3: The difference between the two. Lecture 6 December 8: God and Computer Science. Computer programmers as creators of new universes. Computational complexity as a way to approach questions of free will and omnipotence. Other concepts of computer science that may give insights about divinity.

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8: Why Students Don't Attend Class

One way to do this might be to finish the lectures by stepping down from the position of professor, and taking the view of the students, to try to talk more on a level with them. As a 'student' [the professor] could run through everything he had 'learned' in that class, describing it in broad, quick strokes.

The old fashioned way works better. When it comes to college students, the belief that more is better may underlie their widely-held view that laptops in the classroom enhance their academic performance. Laptops do in fact allow students to do more, like engage in online activities and demonstrations, collaborate more easily on papers and projects, access information from the internet, and take more notes. Indeed, because students can type significantly faster than they can write , those who use laptops in the classroom tend to take more notes than those who write out their notes by hand. Moreover, when students take notes using laptops they tend to take notes verbatim, writing down every last word uttered by their professor. Obviously it is advantageous to draft more complete notes that precisely capture the course content and allow for a verbatim review of the material at a later date. New research by Pam Mueller and Daniel Oppenheimer demonstrates that students who write out their notes on paper actually learn more. Across three experiments, Mueller and Oppenheimer had students take notes in a classroom setting and then tested students on their memory for factual detail, their conceptual understanding of the material, and their ability to synthesize and generalize the information. Half of the students were instructed to take notes with a laptop, and the other half were instructed to write the notes out by hand. As in other studies, students who used laptops took more notes. In each study, however, those who wrote out their notes by hand had a stronger conceptual understanding and were more successful in applying and integrating the material than those who used took notes with their laptops. What drives this paradoxical finding? Mueller and Oppenheimer postulate that taking notes by hand requires different types of cognitive processing than taking notes on a laptop, and these different processes have consequences for learning. Writing by hand is slower and more cumbersome than typing, and students cannot possibly write down every word in a lecture. Instead, they listen, digest, and summarize so that they can succinctly capture the essence of the information. By contrast, when typing students can easily produce a written record of the lecture without processing its meaning, as faster typing speeds allow students to transcribe a lecture word for word without devoting much thought to the content. To evaluate this theory, Mueller and Oppenheimer assessed the content of notes taken by hand versus laptop. Their studies included hundreds of students from Princeton and UCLA, and the lecture topics ranged from bats, bread, and algorithms to faith, respiration, and economics. Content analysis of the notes consistently showed that students who used laptops had more verbatim transcription of the lecture material than those who wrote notes by hand. Moreover, high verbatim note content was associated with lower retention of the lecture material. It appears that students who use laptops can take notes in a fairly mindless, rote fashion, with little analysis or synthesis by the brain. This kind of shallow transcription fails to promote a meaningful understanding or application of the information. If the source of the advantage for longhand notes derives from the conceptual processes they evoke, perhaps instructing laptop users to draft summative rather than verbatim notes will boost performance. Mueller and Oppenheimer explored this idea by warning laptop note takers against the tendency to transcribe information without thinking, and explicitly instructed them to think about the information and type notes in their own words. Despite these instructions, students using laptops showed the same level of verbatim content and were no better in synthesizing material than students who received no such warning. It is possible these direct instructions to improve the quality of laptop notes failed because it is so easy to rely on less demanding, mindless processes when typing. In real classroom settings, however, students are often assessed days if not weeks after learning new material. Thus, although laptop users may not encode as much during the lecture and thus may be disadvantaged on immediate assessments, it seems reasonable to expect that the additional information they record will give them an advantage when reviewing material after a long delay. Mueller and Oppenheimer included a study in which participants were asked to take notes by hand or by laptop, and were told they would be tested on the material in a week. When participants were given an opportunity to study

with their notes before the final assessment, once again those who took longhand notes outperformed laptop participants. These findings hold important implications for students who use their laptops to access lecture outlines and notes that have been posted by professors before class. Because students can use these posted materials to access lecture content with a mere click, there is no need to organize, synthesize or summarize in their own words. Indeed, students may take very minimal notes or not take notes at all, and may consequently forego the opportunity to engage in the mental work that supports learning. In the Mueller and Oppenheimer studies, all laptops were disconnected from the internet, thus eliminating any disruption from email, instant messaging, surfing, or other online distractions. Technology offers innovative tools that are shaping educational experiences for students, often in positive and dynamic ways. The research by Mueller and Oppenheimer serves as a reminder, however, that even when technology allows us to do more in less time, it does not always foster learning. Learning involves more than the receipt and the regurgitation of information. If we want students to synthesize material, draw inferences, see new connections, evaluate evidence, and apply concepts in novel situations, we need to encourage the deep, effortful cognitive processes that underlie these abilities. When it comes to taking notes, students need fewer gigs, more brain power. Are you a scientist who specializes in neuroscience, cognitive science, or psychology? And have you read a recent peer-reviewed paper that you would like to write about? She explores mechanisms for optimizing cognitive function in college students, older adults, and individuals with intellectual disabilities. She is also the project director for a TPSID grant from the Department of Education, which promotes the inclusion of students with intellectual disabilities in postsecondary education.

9: Why do 60% of students find their lectures boring? | Education | The Guardian

This essay riffs off lecture 16, The Believing Brain, in Neuroscientist Dr. Andrew Newberg's Great Courses lecture series The Spiritual Brain: Science and Religious Experience. But even that.

WHY THE LECTURES MIGHT BE INTERESTING ANYWAY pdf

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