Dear

Thank you for your letter with the essays by your students. I apologize for the delay in responding. I got your letter just as I was getting ready for a trip to Boston; I packed your letter into my bag, hoping to work on it on the plane, but ended up sleeping instead. Then it sat in my bag until my next trip when I re-discovered it. So the essays now have about 18,000 air miles. I enjoyed reading the essays and hope you can share this reply with your students.

Your students are enthusiastic in stating their views, and they have got the right form for an argument letter: state your view, give some evidence, and then re-state the conclusion. However, they haven't always gone deeply into examining the evidence. Several themes were repeated by multiple students:

Distraction: Andrew puts it well: "*20 minutes into the class I'm thinking one thing: "What time is it? I'm bored!*." I can empathize with this point of view. I remember having the exact same thoughts when I was in Middle School. Andrew then says "*As you can see the internet is making us less intelligent.*" So the internet is Andrew's distraction. But for me, there was no internet in those days; no home computers; no smart phones. What was I distracted by? I usually wanted to go play baseball, or build plastic models. So, by Andrew's reasoning, I would say that baseball is making us less intelligent. But that doesn't seem right. I think a more accurate conclusion is *sometimes kids have interests that are more compelling than what is going on in class.*

Lilly had a more nuanced argument. She points out that *people have a difficult time unplugging*, and mentions the issue of *texts constantly popping up on our device*. I think that is correct and is an important issue, which is why I turn off all pop-ups on my devices (except when I am expecting a message). Lilly agrees, and has a good suggestion that you could *make a limit on how many hours you use the internet*. There are browser plug-ins and apps for that. Any new technology can be used well or poorly. Internet devices can be dangerous to your concentration if you don't use them properly, just as a knife can be dangerous if you grip it by the wrong end. But that doesn't mean we shouldn't use knives, it means we should learn to use them properly.

Foundation of Knowledge: Lilly raises the interesting point that *Teachers are no longer the foundation of knowledge, the internet is,* and says that experts find this *somewhat shocking*. Teacher   appears to be an excellent teacher in every way, but here are some bits of knowledge I investigated just today:

- Wing speed of a hummingbird.
- Duration of a camera strobe flash at 1/16 power.
- Ultralight sleeping bags that weigh about a pound and can fit in a 10" stuff sack.
- Directions to Guadalupe Trail.
- History of several robotics companies.
- Publications by principals of these companies.
- Open source software packages for creating N-gram databases, and their processing

speeds in words per second.
- When can I get an appointment for a haircut.
- What is this "Moto e" phone that my sister said she just got?
- A lot of stuff about views on your essays by Nicholas Carr, Steven Pinker, Andrrew McAfee, and others.

No matter how knowledgeable .   t is, she couldn't know all these things--nor could any one person. A teacher shouldn't be the foundation of knowledge, the teacher should be the foundation of using, combining, and assessing knowledge. The only thing shocking to me is that anybody could be shocked by this.

Memory: Socrates said that the new technology of writing "will implant forgetfulness in their souls." He was right. Poets used to be able to remember the entire *Illiad* by heart, even though it takes some 20 hours or so to recite. After the invention of writing, they stopped doing that, because they knew the words were stored in a book. So this is a 2,000 year old battle, not one that the internet started.

Several students mentioned a study that says we memorize less of the things we know where to find. Good for us! We have a limited memory capacity; it is a good strategy to optimize the use of it. Memorize the things that are important to remember and hard to look up; don't memorize the things that are unimportant or easy to look up. Note that this study (did you read it?) was not about synthesizing big ideas, it was about trivia. Subjects of the study were rational, and didn't remember trivia that they didn't need to, freeing their minds to remember the important stuff. I don't understand why anyone thinks this is a bad thing.

Andrew said that "*if we always use google we will be remembering less in the future. Which is very bad if we want to get a good job.*" I have a good job, and I don't see what Andrew means. A job is not a closed-book test; in a job you are expected to be able to get the job done, and if (like me and the people around me) that requires interacting with a lot of very complicated systems, then naturally the best approach is to understand deeply the important principles, to be able to recall instantly the things you do every day, and be able to look up the things you do infrequently.

Re-wiring the brain: Emma mentioned the fear that *our brains are becoming rewired*. This certainly sounds scary! But actually, learning always involves rewiring the brain--if the brain doesn't change, you haven't learned. The internet certainly does rewire our brains, and so do books, music, pencils, our friends, and all the other tools and sources of information we use.

Choice: All the students concluded that the internet is making them less intelligent. I assume the students would prefer to be more intelligent. Therefore, all the students must have stopped using the internet. If they haven't then perhaps they should question their analysis. *If I think X is bad, but I still do X, why is that? Was I wrong about X? Or am I acting against my own best interest?* That would make an interesting topic to write about.

Lilly quoted Nicholas Carr saying *You can Google all the facts you want but you'll never Google your way to brilliance*. I had a chance to ask Nicholas about this: his essay has been called brilliant, and I wanted to know what one book he deeply engaged with to allow him to write his essay. He said that in fact he did a lot of Googling. So I would say he did Google his way to brilliance. Nicholas feels that in the "good old days" he would read one book all the way through and understand it all. Now, he feels like he reads a little bit of a lot of different things, and worries that he is too distracted and unfocused. But he was focused enough to write a coherent and compelling 280-page book. And I think he did exactly the right thing by engaging with many different sources of information, not just one or two, and understanding and combining them to come up with his final book. I am sorry for him that he felt like he was not always in control of this process, and that it was more chaotic than work he had done in the past, but I think the world is chaotic, and to engage with the world fully means to give up the feeling of control.

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Yours,
-Peter Norvig