# Comprehensive Examination Questions

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Question 1: Prompt 1

In his now six-plus year-old TED talk that launched him as a rock star in the world of education, Sir Ken Robinson argued that schools kill creativity. As the 2012—13 academic year opened, Alfred Thompson, secondary computer science turned consultant for Microsoft (according to Microsoft's Developer Network blog biography, Mr. Thompson's formal title with them is "K—12 Computer Science Academic Developer Evangelist" ["Thoughts and Information from Alfred Thompson"]) co-penned a point/counterpoint piece for the International Society for Technology in Education (ISTE) for the question "Is Technology Killing Critical Thinking?" Mr. Thompson argued that yes, technology was killing critical thinking, citing among his talking points the safeguards put in place to "protect them from [thinking] and learning how to evaluate sources" (Thompson and Crompton, 2012, n.p.), the lack of computer science in sundry high schools due to its absence from the SAT, and how Office-based applications are all that is taught since they fit into a seeming cookie cutter curriculum of the core subjects. While Mr. Thompson certainly raises some valid points, in his piece, he takes a single-track approach that critical thinking skills apply to computer science exclusively, failing to recognize just how technology touches not only what is taught in American high schools but also what appears on standardized tests, including but not limited to the SAT.

The first volley in response to Mr. Thompson is his assertion that computer science is not taught in American high schools because "it's not on the SAT" (Thompson, 2012, n.p.). Truth be told, there are no specific courses that appear on the Scholastic Aptitude Test (SAT); rather, the SAT is a *reasoning* test, which tests "knowledge of reading, writing, and math" ("About the SAT," 2013, n.p.). According to literature provided by the founders of Learning Systems (2013), the SAT is more about finding and eliminating invalid answers than it is finding a right or best answer choice. Because of this structure, the SAT and the subject areas covered, the test is all about problem solving, ergo critical thinking, rendering Mr. Thompson's argument over computer science's apparent absence from high school because it is not on the SAT a distraction – much like many of the answers on the SAT itself.

This is not to say that the reliance and stress of standardized tests is not significant in the erosion of the presence of critical thinking skills. Even in much-ballyhooed Asian nations, such as Taiwan, attitudes towards critical thinking skills are being subsidized in favor of academic endeavors. Huang, Hung, and Chen (2012) found that geography teachers in central Taiwan "believed that a school education aims to promote students' performance on academic educations, and not on their ability to think critically" (p. 35).

Despite this disappointing discovery in the land where so much technology is assembled, Huang, Hung, and Chen (2012) also found that "by anchoring instruction in students' experiences and interests that promote learning effectively, computers have become a tool for cultivating critical thinking" (p. 33), enforcing Thompson's (2012) proclamation that "[t]echnology is a tool, not a solution" (n.p.). Pairing this with the revised Bloom's Taxonomy, the use of even limited access to tech in a classroom allows the working of one's way up the proverbial pyramid. Thompson's (2012) rhetorical inquiry that if "nothing changes from the writing surface" is progress proper, is readily resolved by looking to studies involving that antediluvian though seemingly relevant medium: the newspaper. If "[s]cience and technology courses show the appropriateness of using newspapers in the classroom, as the content of such courses is highly related to daily life and as newspapers contain data related to lesson outputs" (Kiirikkaya and Bozkurt, 2011, p. 151), then it stands to reason that technology can improve critical thinking skills of the millennials.

What, though, is genuinely meant by "critical thinking"? The term appears to be generically applied by Thompson and countless others when discussing the apparent need for kids to think critically, but, as revealed by Huang, Hung, and Chen (2012), "[c]ritical thinking has been researched in many scholarly fields which have provided diverse definitions" (p. 33). Delving into the archives, it can be divulged that Paul (1984) genuinely goes after what it means to think critically, divvying up the definition into simplistic classifications such as "strong" and "weak" senses elaborating on them to the extent that a "*strong sense* [italics original], critical thinking sills are understood as a set of integrated macrological skills ultimately intrinsic to the character of the person and to the insight into one's own cognitive and affective processes" (p. 5), while the weak sense is "develop[ed into] what typically comes down to 'vocational' thinking skills, which by themselves have little influence on a person's intellectual, emotional, or moral autonomy" (p.5). Unfortunately, it must be inferred, based on his argument, that Thompson appears to be more concerned with the "strong sense" of defining critical thinking, which "emphasize[s] comprehensive critical thinking skills essential to the free, rational, and autonomous mind" (Paul, 1984, p. 5).

Clearly stating what is intended by critical thinking, as well as examining evidence that preparing one for standardized tests – SAT or otherwise – does not always constitute a disservice to a student's critical thinking skills; Huang, Hung, and Cheng (2012) found that "the student with higher grades in the achievement test also performed better in the critical thinking tests" (p. 41). Therefore, while Mr. Thompson does provide some substance for discussion, the crux of his argument comes across as little more than an attempt to garner support for why high schools should offer (more) courses in computer science.

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Prompt 2: Question 2

In the two decades since the publication of Jonathan Kozol's *Savage Inequalities*, which aimed to shed light on the differences between well-funded and underfunded school systems in America, a new realm of inequality has come to pass, that of the digital divide. From the sound of it, "digital divide" is just another of those catchy, alliterative terms called into creation in order to label a problem and make it stick in the public's mind. However, where monetary inequity may be a seemingly obvious case of have and have not, that of the digital divide is a bit more unclear; there continues to be debate in even defining what the digital divide is, let alone what to do about it. Regardless of how digital divide may be defined, denying it exists is moot; there is a divide between the *technirati* and non-technical people, which has only continued to widen and deepen since the days of a flashing clock on video cassette recorders.

In the Western world, the digital divide has come to commonly and simply be referred to as "divisions within and across societies according to those that have access to digital technologies (including the internet) and those that do not" (Livingstone and Helsper, 2007, p. 672) or "the fact that some groups of people (the 'haves') enjoy access to and regularly use the various forms of modern information technology, while others (the 'have-nots') do not" (Baase, 2013, p. 329). Others, such as James (2011), have broadened the definitions beyond a particular, often tangible item or items, into the relative, where "[t]he relative digital divide is defined at any moment in time simply as the ratio of information technology stock […]in the developed countries to the stock in developing countries" (p. 121). Just as digital signals can be improved by broadening sampling rate and sampling depth, Nguyen (2012) does not attempt to define, but rather recognize, the digital divide as "a social rather than a technologically driven phenomenon" (p. 251) and "by nature a very human issue, not a technological one" (p. 260). Such easily designed and digestible definitions do not render themselves as adequate in identifying a silver bullet resolution, but that does not stop some from trying.

Some see the solution to bridging the digital divide as a one of providing easier, cheaper access to digital resources—the roadways, as it were. In this sense, a Congressional research service report on broadband access to the internet (2013) defined the digital divide as "a perceived gap […] between those Americans who use or have access to telecommunications and information technologies and those who do not" (p. 2). Socioeconomic factors eventually are recognized when discussing why some Americans continue to live without broadband access. The top three factors are recognized as "cost, lack of digital literacy, and the perceived insufficient relevance of broadband" ("Access to Telecommunications Technology: Bridging the Digital Divide in the United States," 2013, p. 3), which raises the point of digital literacy, an item that has precious little to do with the speed one downloads data from the internet.

On the opposite side of the pond, an opposite approach to linking those on opposite sides of the digital divide by providing the car, instead of just the road. Morris (2011) reports on a program to "raise sponsorship and offer laptops to pupils, so they could take one home on a rotating basis" (p. 18), based on a premise proffered in the same paper by Warschauer (2003), where, in order to bridge the digital divide, one should "more narrowly focus on hardware and software provision" (p. 18). The UK study did look at internet access and found that "93% of pupils reported having access to the internet at home" (Morris, 2011, p. 22). Yet, "of those, 72% noted primarily using the internet for social networking rather than for educational purposes," (Morris, 2011, pp. 22—23), which underscores the notion that "merely providing internet access is insufficient to ensuring equality of opportunity" (Morris, 2011, p. 23). One must know what to do with the tools they are given in order to make proper use of them—teaching a man to fish, as it were.

Teaching a man, a child, what-have-you to fish or to overcome seemingly insurmountably obstacles (real or rhetorical) should be a concrete goal in education, and it is one that is included in both the TEKS and NETS for Students – and without naming use of a particular piece of hardware or software. Thus, getting over the gap society knows as the digital divide is given the appearance of succeeding simply by being integrated into the framework of classroom instruction. However, when it comes to technology, looking to a framework may not always be the best solution; oftentimes, specific tools may be attempted to be used in generalized ways with poor results.

Research cited by Webb and Jurica (2013) found that "the internet was rarely implemented effectively in classrooms" (p. 58). Similar can be inferred with most any technology resource, for so many contemporary classroom teachers are, as Prensky (2001) dubbed them, *digital immigrants*, tasked with instructing *digital natives* who "*think and process information fundamentally differently* from their predecessors" (italics original). Sadly, those tasked with teaching are seldom equipped with "[s]ufficient knowledge, training and confidence for the use of information technologies" (Uğuz, 2011, p. 630) in order to use "technology as a SUPPORTING TOOL rather than the focus in a lesson" (Webb and Jurica, 2013, p. 64 [caps original]).

There is no definitive solution to overcoming the digital divide. In fact, "[s]ome suggest that the digital divide should be understood as a series of divides" (Epstein, Nisbet, and Gillespie, 2011, p. 95), a notion expounded upon by Warschauer (2007), where diverse divides are identified as *school access, home access, school use, gender gap,* and *generation gap*, each with its own impact on education, and each with its own potential resolution(s). As mentioned earlier, and reiterated by Warschauer (2007) in his designations, the digital divide(s) go "beyond access to technology" (Uğuz, 2011, p. 630). Were it a simple matter of access or affordability, one could simply wait it out; Nguyen (2012), Baase (2013), and others have made note that it is "more accurate to think of people as 'haves' and 'have laters' rather than 'haves' and 'have-nots" (Baase, 2013, p. 330). However, even as technological wants come within especial literal reach of those who want or perhaps need them, "[i]t is probably more essential to think of the digital divide not as a new problem peculiar to the online world, but, rather, as an old problem that might be worsened by the Internet" (Nguyen, 2012, p. 260), for n the case of any technology, "those who adopt […] earlier and/or use it more substantially will be more adept in using the medium" (Nguyen, 2012, p. 261) than those who arrive late(r) to the party.

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Prompt 3: Question 5

Nick Carraway, narrator of F. Scott Fitzgerald's *The Great Gatsby* (2004), considered himself "one of the few honest people I have ever known" (p. 59) In spite of this proclamation, the character of Carraway is likely not to be considered ethical, based on his behaviors both in recollections of the past and actions of in the present. Ethics, indeed, is a tricky subject. Some say that ethics is what one does when no one else is watching. Baase (2013) clarifies ethics as the “study of what it means to ‘do the right thing’” (p. 26), while Aziz, Lukman, & Yusof (2011) say that “ethics is the philosophical study of morality” and is, consequently, “in the ‘gray area’ of the law” (p. 2580). But the definitions do not stop at the broad, venturing into the specific with applied ethics, those that are “*applied* to particular cases” (Allhof, 2011, p. 3 [italics original]). Included in applied ethics are those of computer ethics, which cast a wide net, given how much computers have come to touch nearly every aspect of human existence; computer ethics are involved with “social and ethical use of information technology” (Aziz, Lukman, & Yusof, 2011, p. 2580). Now included in computer applications where applied ethics are of likely greatest concern is that of cyber warfare. They are of greater import when it comes to warfare because “the ‘laws of war’ have not been written with cyberspace in mind” (Lin, Allhof, & Rowe, 2012, p. 24). In lesser considerations, computer piracy continues to be problematic on a literal global scale: “[P]iracy is one significant actions with regards to social and ethical use of information technology” (Aziz, Lukman, & Yusof, 2011, p. 2583). Be it petty theft of new music or movies or other medium, of the theft and public release of classified documents, ala Edward Snowden, is at issue on the immediate horizon, as forecast by Baase (2013): “Today, there are thousands (probably millions) of databases, both government and private, containing personal information about us" (p. 50). Ethics becomes even more convoluted with the so-called "internet of everything" (IOE) where "the increasing presence in our everyday lives of information and communication technologies (ICT) that are too small to notice, or integrated into appliances or clothing or automobiles, or are aspects of services we use willingly" (Pimple, 2011, p. 30). As this future comes to be realized, without sufficient implementation of ethical codes on all players' parts, "defensive cybersecurity efforts could violate the privacy or other civil rights of innocent non-state parties, or incidentally cause damage to one's own citizens, economy, or computer systems" (Dipert, 2010, p. 398). Regardless of the realm or sphere of consideration, ethics as applied to computers and/or information technology is essential and should be both regarded and taught better than what it is.

In the beginning, some several thousand years ago, and into the precursor to the modern age, the subject of ethics was not an independent one; rather, it was considered "a branch of other disciplines such as philiosophy, or alternatively of religion" (McGraw, Thomas-Saunders, Benton, Tang, & Biesecker, 2012, p. 131). However, as disciplines beyond philiosophy and religion advanced but began to demand ethical consideration, the subject of appied ethics came into play, as they are "almost precisely constructed around proprietary knowledge" (Allhoff, 2011, p. 8). Examples of areas involving "proprietary knowledge" with their own fields of applied ethics include the professions of medicine, law, journalism, and engineering (McGraw, Thomas-Saunders, Benton, Tang, & Biesecker, 2012, p. 132), although Allhoff (2011) does note that "some applied ethics are not concerned with *professions* at all" (p. 9 [italics original]).

But somewhere along the way, with all of the diversity in the field of ethics, there became a great rift between the origins of ethics in religion and philosophy. Research conducted by McGraw, Thomas-Saunders, Benton, Tang, & Biesecker (2012) “suggests that the majority of courses in applied ethics at American colleges and universities are taught by those without degrees in philosophy or religion” (p. 133). While this is not necessarily to be thought of as a bad thing, continued professional development is not only encouraged by also expected by those teaching a particular course or field of study. However, because ethics are seldom directly related to a teacher of applied ethics outside the departments or religion or philosophy, “attending an occasional ethics conference or pursuing scholarly work in ethics may be seen as counter-productive towards [career] advancement” (McGraw, Thomas-Saunders, Benton, Tang, & Biesecker, 2012, p. 134), which would account for more than half of classes taught by those not under direction of the philosophy or religion departments (McGraw, Thomas-Saunders, Benton, Tang, & Biesecker, 2012, p. 138).

In order to resolve the seeming lack of ethics in teaching, the obvious fix is for higher education courses involving ethics to be taught by those with a bona fide vested interest in ethics in education; those whose speciality in instruction is in religion or philosophy, with, perhaps a subtle interest in medicine, technology, law, or other applicable field. At present, it is the other way around, where the interst in ethics may not be as high on the priority list, as indicated by the research conducted by McGraw, Thomas-Saunders, Benton, Tang, & Biesecker (2012).

As society moves not only to the literal internet of everything, where items as simple as the Presence Clock (http://ethicalpait.blogspot.com/2009/08/case-study-presence-clock.html), cited by Pimple (2011), pervade the homes and workplaces as a means of keeping tabs on others. Other IOE devices may not be so innocuous, but president must be set; "[r]esponsible developmentand deployment of the Presence Clock is not just a technical and marketing challenge, but also a challenge in human relations and customer/user education" (Pimple, 2011, p. 31).

Beyond the IOE of clocks and what-have-you is the tricky subject of cyberwarfare, a fairly recent phenomenon, cited by Dipert (2010) as reciving "widespread media attention only in 2009 and 2010" (p. 384), where there have been "no informed, open, public or political discussions of what an ethical and wise policy for the use of [cyber] weapons would be" (Dipert, 2010, p. 385). While "field manuals on electronic warfare and information operations (IO) of various military services of several countries have guidelines and policies that consider legal and ethical issues" (Dipert, 2010, p. 397), they are woefully in need of update. Even Protocol I to the Geneva Conventions is "flawed [...] render[ing] it fundamentally inapplicable to cyberwarfare" (Dipert, 2010, p. 399). In a nut shell, "cyberwarfare appears to be almost entirely unaddressed by the traditional morality and laws of war" (Dipert, 2010, p. 405).

A lack of ethics in nearly every area of education continues to make itself known, rendering almost an entire generation poorly equipped to exercise proper ethical judgement. The challenge, however, must be taken up in order address the literal need for ethics in every aspect of life, be it general or applied; "understanding different ethical perspectives is critical to interprofessional collaboration" (Ewashen, McInis-Perry, & Murphy, 2013, p. 326). Meeting this challenge is not just to create a perfect society, for perfection is unobtainable, much like the elusive green light and what it represents to the title character in the aforementioned *The Great Gatsby*, and that humanity should continue to persue even what may be even just out of reach; “boats aginst the current” (Fitzgerald, 2004, p. 180), as it were. To put it another way, and justifiably so, “that perfection is not possible does not absolve [society] of responsibility for sloppy or unethical work” (Baase, 2013, p. 437).

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Prompt 4: Question 6

*Trend* is one of those wonderful words that can identify with more than one part of speech; both a noun and a verb, in this case. As a noun, *trend* means "a general direction in which something is developing or changing" (trend [noun]), while as an intransitive verb not related to geography, *trend* means "change or develop in a general direction" (trend [verb {no obj.}]). Being identified as a trendsetter is generally something to be admired, especially when the trend established moves people, projects, or other enterprises in positive direction. When it comes to education, trends abound, for it seems to be an endless parade of ideas to radically reform what the public perceives as a perpetually troubled institution in need of rescue. To narrow down to just three trends that have impacted instructional technology for the past five—and will continue to impact for the next ten—is somewhat of a serious undertaking. However, after consideration of impacts seen in both academic media and the concrete realities of educators' day-to-day lives reveal that three trends at the forefront the author and his cronies are the common core curriculum (and its accompanying baggage), the STEM initiative, and gadgets—the trend towards BYOD, in particular.

Because nothing happens in contemporary education without a plan, the common core curriculum (CCC) will be discussed first, as it is the veritable blueprint for the direction in which American education will move.

While a relatively new phenomenon in the United States, CCC initiatives are nothing new, as "many nations have a national curriculum" (Branyon, 2013, p. 40). The rationale for such a program is in order to allow "all students [to] have access to the same knowledge" (Branyon, 2013, p. 40), but the reality of best laid plans is that, indeed, they oft do go awry. However, as noted by Brooks and Dietz (2013), "Common Core standards themselves aren't the problem" (p. 65). Rather, how the standards are utilized is what tends to cause problems for their popularity.

In Kenya, for example, where students are not bound to a particular school based on geographic dividers (Branyon, 2013, p. 41), the common core provides the guarantee that all students (at least in theory) will be taught the same material necessary to be granted admission into the school of their choosing. A cynic might surmise that the push for of the Common Core Curriculum has been in conjunction with the push for (more) voucher school programs in the United States, which is but one of many issues educators take with the Common Core Initiative. Among others, the manner in which CCC is implemented, especially as "observed in most high-poverty environments [is] one-way communication with rote memory activities" leading to a student-based perception of "school as a place to obey, to repeat what the teacher tells them, and to seek high scores on tests" (Brooks & Dietz, 2013, p. 66).

Where, then, does instructional technology figure in? Tucker (2012) observes that collaboration is key not only to standards within the CCC but also to "success beyond high school" (p. 30). In order to effectively implement these collaborative standards (both on- and off-line), many teachers are going need assistance, for "many teachers do not have the necessary professional development to support them in transitioning to the Common Core Standards" (Tucker, 2012, p. 30)—evidenced within the past year when Webb & Jurica quoted research stating that "the internet was rarely implemented effectively in classrooms" (p. 58), filters at the campus and district levels notwithstanding.

Building upon the Common Core Curriculum Initiative is another focusing on specific areas of study—those of science, technology, engineering, and math (STEM). Unlike the CCC, which seems to be test-centric (to the extent that many mandate the use of "curriculum materials produced by the same companies that are producing the testing instruments" [Brooks & Dietz, 2013, p. 64]), STEM programs being derived due to the tendency for "American youth [to] fall behind other developed countries in abilities in science and math" (Russell, Hancock, & McCullogh, 2007; Russell, 1999, as cited in DeJarnette, 2012, p. 78). However, by hooking students while they're young, studies have shown "that the best time to create a connection, awareness[,] and interest in STEM fields would be in the elementary years" (Russell, Hancock, & McCullogh, 2007; Russell, 1999, as cited in DeJarnette, 2012, p. 78), which could lead to the Holy Grail of education, the lifelong love of learning; those sampling group indicating the primary years were prime for picking up interest in STEM carried that interest through to their undergraduate years.

Despite the Presidential push for STEM programs (DeJarnette, [2012] cites the Obama Adminitration's "Educate to Innovate" as pivotal in publicizing STEM programs) and their seeming success, some are getting left out. The data inequalities in representation among the sexes in STEM programs date from 2005, which is the apparent last time the U.S. Department of Education took time to ask whether or not any children—both male and female—were getting left behind. Nearly a decade old, the data revealed that female high school students comprised shockingly low percentages of engineering and computer information sciences; 15% and 14.5%, respectively (National Center for Education Statistics, 2005, as cited in Milgram, 2011, pp. 4—5). Further, minority students other than Asians in STEM fields are grossly underrepresented. Slovacek et al. (2011) cite a report to Congress stating "that while the percentage of underrepresented minorities nationwide increased from 13% (1994—95) to 19% (2002—03), the total number of STEM doctorates awarded to the same group dropped during this period from 8,335 to 7,310" (p. 5).

Regardless of whether or not women and minorities can be courted and encouraged to not only enroll but also remain in STEM programs (a recent article on *Slate* discussed disparities encountered by women in postgraduate academia, with especial interest on STEM fields), the very thing that could benefit STEM—Common Core—could torpedo it. Bencze (2010, as cited in DeJarnette, 2012) observes that much of what goes on in education today seeks "to tightly prescribe what is to be taught and learned and assessed and evaluated in discrete bundles" (p. 80). STEM programs certainly have potential for granting students access to "21st Century skills such as critical thinking, collaboration, and communication that will help prepare them to compete on the global level" (DeJarnette, 2012, p. 82), marking a success in not only the STEM programs themselves but also the education system as a whole.

One way to do this is enable "students to use their tools the way they want to support their learning" (BYOD: One Year Later, 2013, p. 36). This Burger King approach to education is the trend of BYOD (Bring Your Own Device) or BYOT (…Tech), for a more sanitized version of the same concept of not only teachers but also—and *especially*—students bringing their own electronic devices as a supplement to the learning tools provided to them by the school district. While some districts cling to the antediluvian notion that communication tools in the hands of youngsters will distract them from their learning (in spite of communication and collaboration being at the core of the Common Core Curriculum those same districts so readily embrace), others have embraced the idea, seeing "incredible instructional results" (Ullman, 2011, p. 34). Perhaps, though, it's just a branding issue. *BYOD* does carry with it the stigma of being associated with or confused for an acronym commanding for the self-provision of certain beverages. Plug the aforementioned *BYOT* into a search engine of choice and "BYOT, or Bring Your Own Technology, returns more results related to education" (Nelson, 2012, p. 14).

If not branding, then certainly diction plays a role in the acceptance of BYOD (henceforth used interchangeably with *BYOT*). Naysayers or the trend define BYOD as "the notion that schools *should expect* students to use their own computing tools" (Fingal, 2012, p. 5 [italics added]), inserting negatively charged words in lieu of a calmer, gentler, *allow* or *permit*. None of the research performed by the author indicated districts *expecting* students to provide their own devices. On the contrary, reflecting on the year after the implementation of a BYOD program in Farmington Public Schools, IT director Michael Johnston put it this way:

> Although the district-wide policy has changed [giving the blessing for rather than banning of student devices], it is still at the teacher's discretion to allow or not allow the use of technology in the classroom. Schools have come up with their own systems for when and where personal technologies can be used. (BYOD: One Year Later, 2013, p. 36)

Empowering students to be the deciding factor on what will work for them extends benefits into the classroom, immediately and a year into the future. Some have noted how, in implementing a BYOD solution, "[t]he best thing we did was not to tie ourselves to specific technologies," (BYOD: One Year Later, 2013, p. 38), letting the process be organic, driven by those who use it, rather than those who merely governed its permissive status. In doing so, and by letting students take control of their learning (student-centered learning doesn't get much more student centered when they get to call the shot on what tool works best for them), teachers "are much more focused on their content specialties" (BYOD: One Year Later, 2013, p. 36), allowing them to genuinely teach. To put it another way, regardless of what tool—pencil, paper, programs—"[r]emarkable teachers have always been able to do remarkable things with their students" (Norris & Soloway, 2011, p. 114). BYOD is just one more tool in the toolbox.

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## Question 5: Prompt 7

Over the past few years, a subtle plan has been formulating with the goal of persuading the school board to overturn their ban on cell phone and electronic devices. After all, when the ban was put into place, a cell phone was little more than a device to send and receive voice calls or rudimentary text messages. The introduction and popularization of the smart phone radically altered personal communications, and the cell phone has graduated from status of toy to tool. As educators, we should be willing to relinquish the reins of control over what tools are considered best, sanctioning students to use “tools the way they want to support their learning” (BYOD: One Year Later, 2013, p. 36). Unfortunately, the time is not considered right to grant this degree of independence to students, but the first steps are being taken in order to eventually attain the autonomy afforded by BYOD. For the 2013—14 academic year, students enrolled in AP English 3 at Steele will be granted wider access to the campus Wi-Fi network by means of district-provided Chromebook laptop computers. The purpose of this document is to outline the training that will be designed first for the aforementioned AP English 3 teachers before a broader audience at both secondary and primary levels within the district.

The reason for use of the Chromebook, as opposed to the laptops in the Computer on Wheel (CoW) configuration is that computers with larger operating systems and boot files, such as those running Windows or Macintosh operating systems, require longer for bootup and configuration, taking upwards of five-to-ten minutes of classroom/instruction time to boot. Add into that the frequent security and plugin updates by the OS publisher, and half or more of a 50-minute class period can be wasted. In the Chromebook configuration, all files exist in the cloud, so startup time is minimal; any system or plugin updates are automatically configured each time the system starts and downloads its data. Further, any student bookmarks or saved files are stored in the cloud, eliminating excuses of inability to access district network resources remotely, as is commonplace with students' X-drives.

Because it is accepted and proven within the instructional tech community, a template for training based on the ADDIE model of instructional design will be utilized. For the unfamiliar, ADDIE is an acronym for the steps and order of the process: Analyze, Design, Develop, Implement, Evaluate. Each of the steps will be expanded in greater detail through the course of this document.

## Analysis

While computers have been in SCUC schools since the early 1980s (Commodore 64s were put into a single lab during the author's third-grade year at the original Wiederstein Elementary), teachers outside of computer literacy (as it was once known) here and abroad have not been exactly successful in implementing them in instruction. Education blogger Gary Stager puts blame on schools, saying they "have largely failed to inspire teachers to use computers in even pedestrian ways after three decades of trying" (LaMaster & Stager, 2012, p. 7). The Chromebook is a different kind of computer for a different kind of audience: There is no "hard drive," per se; rather, all actual content (documents and other user-accessible/-editable files) are stored in the cloud. Consequently, many traditional uses for the computer will be unavailable or otherwise altered in order to "nudge" both teachers and students into more innovative uses of the available technology. Further, communication between all stakeholders, teachers, students, parents, is likely to improve, as evidenced in a similar program utilized by

Saline Area Schools in Michigan; they found "[t]eacher-to-student communication [improved,] thanks to Gmail and Google Apps" (BYOD: One Year Later, 2013, p. 36). These applications are native to the Chromebook.

Because of the Chromebook's unique method of operation (no internal storage; mandatory connection to the internet), the target audience for this training, then, will be all users of a Chromebook. Prior knowledge is needed to the extent that they are familiar who are unfamiliar at a higher competency level with Google Apps. This "higher competency" level will be defined by frequent use of Gmail, Google Docs, and/or Google Drive for more than three months. Standards for the use of Google Apps will be aligned with both the district AUP and curriculum requirements at the district and higher levels (state, College Board, etc.) for a teacher's given subject area; at this time those of English 3. Delivery of training will be done in person, with support videos by topic area posted to the school's YouTube channel. Links to these videos will be posted in the *TechKnow Tidbits* section of the Steele Campus folder in FirstClass, allowing anyone with campus access to link to the videos and subsequent training. However, given the limited number of Chromebooks—and that Central Office can add or remove any person's (teacher or student) access to the apps and/or Wi-Fi—not all viewers of the link will be able to take immediate advantage of what they cover. However, should the Chromebook initiative advance, a template for widespread training will be in place.

The initial budget for this project will be approximately $30,000; a breakdown is illustrated in Table 1. Note that the Chromebook item includes the machine itself (Samsung Chromebook [full specifications available at http://bit.ly/W6ZImH]; includes power adapter/charger and Google Drive storage subscription). Continued expenses will be realized in the forms of additional (or replacement) Chromebook purchases and any one-on-one training, as necessitated by new hires or applications not covered in the posted videos, estimated at three hours per employee, at the district standard for non-contract time of $22.00 per hour.

Table 1. *Estimated Expenses for Initial Implementation of SCUC ISD Chromebook Initiative*

| Line Item | Units | Unit Cost | Line Item Cost |
|---|---|---|---|
| Samsung Chromebook computer | 99 | $280.00 | $27,720.00 |
| Trainer/video production | 100 | $22.00 | $2,200.00 |
| Teacher Training (3 hours/ea) | 6 | $22.00 | $132.00 |
| Total Cost | | | $30,052.00 |

*Note: Three teachers will be included in the launch of the Chromebook Initiative, though only two will be included in the training, as the third is the trainer/technologist developing the materials. Each teacher/class will receive 33 computers, based on largest class size, plus one, from the 2012—13 academic year.*

## Design

The purpose for designing this project is to assist teachers with the implementation of a different kind of computer system in the classroom environment. Where, historically, teachers have simply utilized computers in lieu of traditional classroom staples, such as pen/pencil and paper (Norris & Soloway, 2011, p. 114), the Chromebook is no simple computer, ironically enough. The objective, then, is to make teachers aware that Google Apps (and the means of access, the Chromebook) expands avenues of collaboration both in and out of the classroom; further, the software needed for completing tasks is built into the operating system. Topics for discussion will be divided into the primary applications to be utilized (Gmail, Docs, Drive) and then subdivided for specific applications (Docs, Drive) and why these should be opted for over orthodox methods of document/assignment creation and delivery. Discussion topics will be aligned with ISTE NETS for teachers and, eventually, for students.

## Development

Development for the Chromebook Initiative will consist of both in-person training (three hours) and online videos for refreshment of the in-person training. These in-house produced videos will serve as supplementation already provided by Google for the successful implementation of their Chromebook and Apps products in the secondary classroom. The trainer and other campus technologists will produce the in-house videos through use of the Mac OS screen capture feature of Quicktime and video cameras; audio narration will be added through use of GarageBand and iMovie in postproduction. Each video will be segmented by topic of discussion and then uploaded to the campus's (private) YouTube channel for viewing by school personnel as needed. Time necessary for the completion of both the in-person training and production of the videos is approximated at 100 hours.

## Implementation

The Chromebook Initiative will first be initiated through the AP English 3 classes of three teachers on the Steele campus: Seiler, Perdue, and Whitson. Based on its reception, implementation through other courses taught by those same teachers may be utilized during the spring semester. Assessments will be gathered during periodic meetings of the AP English 3 level, as well as during as-needed (daily?) check-ins during the technologist's planning period.

## Evaluation

Evaluations of student feedback will be compiled through a survey form posted on the technologist's website (or through Survey Monkey, as permitted by Central Office) rating frequency of use of the Chromebook in class, comparative use of Google Apps in and outside of class/campus time, and additional uses of the Chromebook and/or Google Apps. In settings where use of student-driven technology is a daily occurrence, "more thoughtful tech integration" (BYOD: One Year Later) has been observed.

As the program expands, student feedback surveys will be posted at intervals in conjunction of the pacing calendar for AP English 3 and, eventually, other courses where the Chromebook will be utilized. Results of these surveys will be posted on the webpages of each AP English 3 teacher, as well as at school board meetings after the conclusion of the first grading cycle and then each semester.

## Outline of Training Topics

Table 2 outlines training topics to be discussed in the district's Chromebook Initiative in both the initial training and the videos to be posted to the campus YouTube channel.

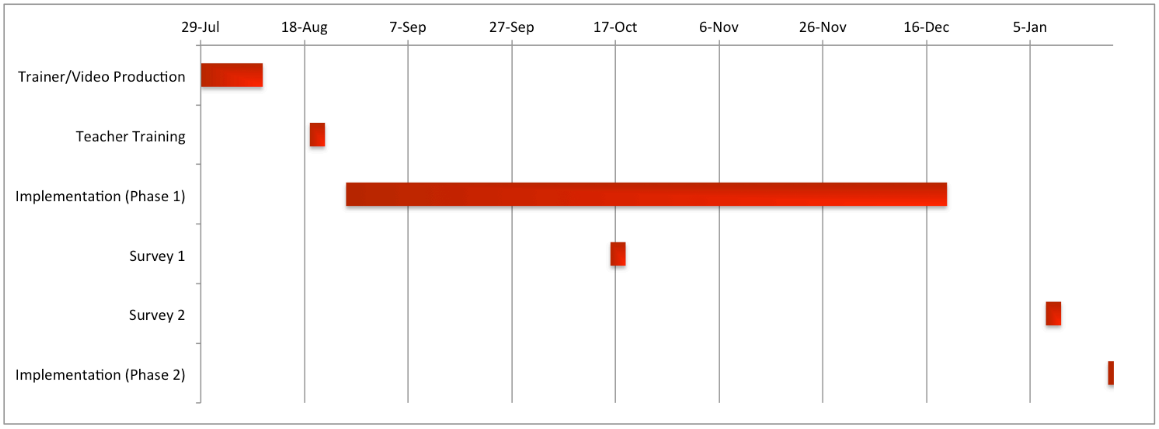
Table 2. *Topics for SCUC ISD Chromebook Initiative Training*

| | Topic | Additional Information |
|---|---|---|
| 1 | Why Google/Chromebook? | Rationale for selecting Google Apps for instruction and the Chromebook for delivery |
| 2 | Setting Up Google Account | Establish/link Gmail account with school district address |
| 3 | Gmail | Sending/receiving/filtering/searching with Gmail |
| 4 | Drive | Using Google Drive to store & share documents |
| 5 | Docs | Using the Google Docs suite of software products in lieu of other Office-esque suites |

Timeline

Figure 1 sketches an estimated timeline for initial implementation of SCUC's Chromebook Initiative.

Figure 1. *Estimated Timeline for Initial Implementation of SCUC ISD's Chromebook Initiative*



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