THE NEXT GREAT EDUCATIONAL TECHNOLOGY DEBATE
Personal Data, Its Ownership, and Privacy

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The educational setting has been the backdrop for numerous debates as far back as recorded history. Today's educational setting, however, contains technological elements so advanced that they by their very nature bring with them a series of highly significant implications which educators have never before been required to address. These issues reside primarily in the area of the individual user's data, including its collection, storage, privacy, and dissemination. To contextualize this issue, this article first briefly presents some of education's most prominent educational debates of the recent past, and then progresses to examine issues associated with today's educational technology setting pertaining to data collection, storage, safety, and privacy. Suggestions for further examination of this subject are provided, as well as the claim that this is a subject that *all* educators, not just educational technologists, will be required to fully understand and possess strategies for dealing with it.

INTRODUCTION

From its earliest incarnation education, has been no stranger to debates. Disagreements about the most effective methods for teaching are a particularly constant theme within the history of education, but that subject is but one debate among many waged over the arc of education's long life. Once education emerged as a separate field along with the associated field of educational psychology (both in the 19th century), debate and disagreement moved outside the narrow confines of *technique* to the vast essence of *learning itself*, to the theories and models that proponents posited were the key to understanding—and also maximizing—educational outcomes. These deliberations continue to this day. In this article, however, we discuss one of the most significant and important debates looming in the very near *future*, one that, in truth, has actually *already* begun to be waged, both in plain sight and behind closed doors, within the educational community.

It is not surprising that there have been so many debates surrounding education and

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educational technology. After all, the human mind, even with today's extensive advances in brain science, is far from being fully understood. That fact remains true whether we are in the confines of a scientific laboratory or within the "real world" where most individuals apply the educational psychology theories they have learned, and where any learning that occurs is "invisible" unless we examine the evidence of learning found within the artifacts left behind from the learning process, or, more directly, through assessment data.

THE GREAT DEBATES

To assist in orienting to this article, it is beneficial to first take a moment to reflect on a few of the more major educational debates we have recently (in the historical sense) experienced. This will help inform our ability to study the debate upon which *this* article is based. Nearly all of these examples are familiar to anyone working within the educational system, with the possible exception of the first and oldest debate which we present. After briefly touching on these recent debates, we move on to the main subject of the article.

The Great Debates—Number 1: Realism Versus Nominalism

Although we could go much further back in history to commence our list, we begin in the 13th century, where the first European universities appeared in Paris, Oxford, and Bologna (Amirault & Branson, 2006). If we employ Saettler's definition of educational technology, which is a broad view that encompasses the educational process itself and not just the hardware and software components used to *support* education (Saettler, 2005), we would identify the *realism versus nominalism* controversy as the first fully blown debate waged within a European university. And this was no inconsequential debate: this argument was considered so significant that it persisted for centuries, completely through the entire period of the High Middle Ages, ending only as the Renaissance took hold. Think the debate between constructivism and behaviorism lasted a long time? As far as *time* is concerned, that debate does not even run a close second to the debate between realism and nominalism, which ran for at least *3 centuries*.

Briefly, realism and nominalism were two viewpoints focused on the subject of "*universals*," one of the major topical areas of medieval university thought[1] carried down from antiquity (Livesey, 2016). It was universals that were considered the key, not only to learning, but to the meaning of reality itself. This metaphysical topic goes at least as far back as Plato (a concept he called "Forms") and describes classes of items named *particulars*. "Realists" believed that Universals were real, existing eternally in what Plato called the "world of forms" (Sallis, 2017); "nominalists" believed that universals did not actually exist, but were simply naming conventions (Brown, 1999; Daileader, 2001; Marenbon, 2007) used for convenience when describing groups of items (if this does not make perfectly clear sense, fear not: this is one of the most protracted philosophical topics in history). Why does this matter, and why did it consume the university's curriculum for so long? That is a question best left to another manuscript,[2] but suffice it to say, this is one of the earliest educational technology debates waged in the higher education context.

The Great Debates—Number 2: Behaviorism versus Constructivism

To higher education scholars and practitioners working during the 1960s, the 1970s, and the 1980s, the debate between behaviorism and constructivism assumed "center stage" with *strongly* held views on each side, and bringing with both sides armies of educational psychologists developing a large corpus of empirical studies investigating the relative merits of each learning approach. Behaviorism was most commonly implemented in the approaches of instructional systems design,

and constructivism in a wide variety of "opposing" instructional techniques (Ertmer & Newby, 2013). Both positions showed strengths, particularly if the specific type of content to be learned was taken into account. Eventually, over time, the majority of educators came to acknowledge that there were benefits present in both approaches. While the subject continues to possess ardent supporters of each viewpoint, the fundamental empirical research investigating basic questions within this domain has now generally waned. Today's educators often employ a mixture of techniques based on either theory, depending on the desired learning outcomes to be achieved.

The Great Debates—Number 3: Quantitative Versus Qualitative Studies

Another one of the most intense debates within recent educational circles has been the subject of how best "measure" learners: with *numbers* or with *words*. While that is certainly a simplification of the subject, essentially the issue boils down to answer one question: How do we best understand the strength of effect an instructional treatment might be having on learners? Do we provide pre- and posttests, compare the numbers (quantification), and from that make a judgment that learning has or has not occurred (Hjalmarson, & Moskal, 2018)? The counter "argument," if one may phrase it in that manner, is that people are not numbers; they are complex, living beings, with minds, emotions, thoughts: these learners bring to the present the complex mixture of past experiences. This raises the question that, if we are to more deeply understand how an instructional treatment may be affecting learners, should we not rather examine the *words* and other behaviors these learners emit, as opposed to numeric scores from, say, multiple-choice exams (Merriam & Tisdell, 2016)? This type of data does not appear in the form of numbers (although this "qualitative" data may eventually be counted or converted into numeric data in some way for purpose of analysis), but in qualitative format. The odd thing, if we might be so bold to say, about this debate is that both positions easily display clear merit. This question resulted in some lively debates for some period of time before the majority of scholars came to recognize that both approaches have something to tell us about subjects, and many researchers went on to simultaneously employ both approaches during research in what came to be known as "mixed-method" studies (Watkins & Gioia, 2015). An entire book, or series of books, could be written about the background of each approach, with cases made for why each approach is or is not specifically suited for research on human beings. Nevertheless, over time, the recognition of the value each method provided, as well as the growth of mixed-method studies, cooled down this debate, and as long as a particular study is performed with rigor and adheres to standards set up for either approach, the debate actually dissipated to the point where it is now hardly an issue for much more than passing discussion. Much of this can be attributed to an understanding that if we first identify *what* we wish to measure, one approach or the other (or perhaps both) is likely the best way to study that particular phenomenon.

The Great Debates—Number 4: Do Computers Improve Learning Outcomes?

As education moved into the early 1980's, at the same time, the personal computer became commoditized (cf. Bain, 2013), and soon after, began to appear in classrooms. This effect was often driven by the computer manufacturers themselves wishing to acclimate students to their particular version of a computer: manufacturers hoped that this would drive personal sales by students who had used their computer in the classroom. This put many educators in a quandary: a relatively expensive and ponderous device was now present in their classroom, and yet many educators did not even know how to use the item, nor were schooled in its potential for educational use. The result was easily predictable: an open

question emerged debating whether these devices could actually improve learning outcomes, and whether these devices should even be present in the classroom at all. It cannot be said that this was education's "shining moment," as the time required to address this question was, for the most part, far too long in duration (although it must be remembered that the nature of this type of technology—hardware that is constantly upgraded, new versions of operating systems regularly being released, limited access to train-the-teacher sessions led by those skilled in using computers for education, et cetera played a significant role in lengthening this time frame). Over time, a large number of empirical studies investigating the merits of computers in education were conducted in a variety of settings and employing numerous techniques (Barrow, 2007; Terrill, 2000), and a great deal was learned about the subject, which, surprisingly, partially "passed through" to the next educational technology debate that would soon occur.

The Great Debates—Number 5: Do Today's Sophisticated, Computer-Based Technology Devices Improve Learning Outcomes?

The personal computer was an amazing innovation, and the world was taken with it. Slowly, computers became fully, or nearly fully, integrated into many education settings. More teachers became schooled in the computer's educational potential (although we must be honest and admit there *still* remains much progress to be made in this area). The relentlessness march of technology continued, however, and today we now have not only personal computers at our disposal, but a plethora of extremely advanced technological devices, including the smartphone and a number of other devices too extensive to list here. Each of these technologies was a likely subject for empirical studies focusing on their potential for use in education, and these studies continue today as new, innovative technology-based devices continue to be invented.

While perhaps not strictly a "debate," there remains ongoing questions as the educational effectiveness of each of these individual devices, and many devices continue to be the subject of investigation by those educators that are intrigued with their potential effectiveness of educational use. Most of the studies focused on the *particular instructional methods for using the device*, rather than validating the efficacy of the *device itself* (cf. Guseman, 2016; Lan, 2013; Orman & Padgett, 2017; Willis & Exley, 2018), an outcome driven, in part, by the many earlier studies that investigated that very same question regarding the personal computer. Moreover, over a relatively short period of time (approximately 2 decades) these innovative devices became fully integrated into the lives of individuals around the world, and it became increasingly apparent that it was necessary for educators to be as fluent with these technologies as their students. In a sense, we have arrived at a point where the question of the instructional effectiveness of these various advanced devices has essentially become as irrelevant as, say, studying the instructional effectiveness of the pencil. These advanced devices are now a fully integrated part of most student's worlds, and we are therefore *required* to know how to instructionally leverage them if we are to be effective educators in the 21st century.

THE NEXT BATTLE—PERSONAL DATA: ITS GENERATION, COLLECTION, OWNERSHIP, PRIVACY, AND SAFETY

Although we could have easily developed a longer list of educational debates, with this abbreviated list we have been able to establish that higher education has been the setting for numerous, often cantankerous, debates. Some debates, as we note in number one, above, are generally recognized as never being fully resolved (debate number one, concerning universals, was a debate that centered around "truth," i.e., the state of actual reality). The

other debates, however, just generally "ran out of steam," and dissipated as main topical discussions. Once the various proponents stated their positions, they followed by producing empirical studies on these topics, and, in general, most positions were found to possess validity under differing conditions. Eventually, everyone fell into their own positions and beliefs about the subjects, and today, there are not many investigations on what we might call "the great educational thematic debates" of the 20th century.

In our own time, however, a new debate has arisen, every bit as complex and unwieldy as the others, with the added aspect that the issue does not just involve educators, but also businesses, corporations, and even governments. This debate also carries with it implications and connotations that have never before been witnessed to this level in human age: *the creation, storage, control, ownership and privacy of personal electronic data* (cf. Cate & Dempsey (2017); Brooks, 2017; Langheinrich, 2019).

This debate is the result of the unparalleled technological leaps of the past 50 years which has made possible the creation of devices unthinkable even a short time ago. The ongoing creation of these devices is driven by the immense growth in computer technology and, simultaneously, tremendous strides in innovative thinking. These devices can be very different in form and function, but almost all of these devices, whether they be a cellphone or some other unique device, yield one particular type of output: *data*.

Data, of course, is not a singular worry, at least in theory. The exact distance to the moon, the specific barometric pressure of a particular location, the composition of a particular rock by percentage of metals: these are all represented by, and exist as, data. The issue has arisen, though, when *a specific individual's data* is generated by a personally owned device, then transmitted to a company who collects and stores the data, and that data is permanently retained and tied to a specific, identifiable individual. This brings up multiple, problematic issues surrounding individual privacy and security that remain unanswered and show no signs of satisfactory resolution in the near future. We might be tempted to think that this issue is of greatest concern to educators working in e-learning, since by definition, e-learning is technology dependent. However, with the enormous growth rate and integration of advanced digital technology within the lives of most people on the planet, it is not difficult to recognize that, not long from now, advanced computer technology will play a role in virtually all educational efforts, and *all* educators, regardless of grade level or delivery modality, will be intimately involved with advanced technology. This means that the questions/debates surrounding the security and privacy of digital data must be understood by all educators, as soon no future educator will ever be separated from its presence.

THE CANARY IN COAL MINE: THE PLASTIC CREDIT CARD

The scene was set for our present quandary of these types of data privacy and security concerns some time ago, when the first universal, bank-based plastic credit cards were first introduced in the 1950s (Encylopaedia Britannica, 2019). The credit card was a revolutionary idea: instead of carrying stacks of paper money, a single piece of plastic with a unique number attached to an individual could be used to pay for most anything. And the credit card provided more benefits than simply convenience: there were records of purchases, a way to easily examine spending patterns through monthly statements, et cetera. But there was a hidden cost (and, no, we are not talking about the percentage rate, which was an "open" cost). Now, a corporation was able to track an individual's purchases, spending patterns, payment patterns, and other factors for every individual credit card holder.

Credit rating agencies eventually emerged, compiling ever larger and more detailed sets of consumer data, and moved on to become the

now-famous "credit bureaus" (Rotter, 2019). The amassed data held by credit card companies and credit bureaus held *intrinsic* monetary value, yet to be quantified and agreed upon, but present, nevertheless (Jarman & Luna-Reyes, 2016). At some point, a few individuals began to raise the issue of personal privacy that had never been a concern in the past. In the end, however, individuals valued *convenience* far more than the potential *privacy* concerns, and the credit card industry skyrocketed (ValuePenguin, 2019). This historical time period can truly be seen as the "canary in the coal mine," an early example of the data privacy issues that can be seen today to a much greater extent.

To understand the scope of the issue, go to an online search engine and type in *"is privacy an illusion?"* and simply scan over the returns. (While writing this sentence, the author just ran this search, and received approximately 179 *million* hits.) While we understand there is plenty of overt emotionalism associated with this topic, this in no way negates the fact that today our personal, individualized, and linked data is being generated, captured, and stored in greater and greater amounts, by more organizations, and in more finely granulated form. Just because there is some overt emotionalism surrounding the subject does not negate its reality.

Even though this concern is generally known to greater or lesser extent by most individuals in technologically oriented countries, why is this article appearing in a journal that focuses on distance education? Because as technology continues its relentless progress, we are seeing greater amounts of this technology used in the distance context as well as within traditional face–to–face classrooms. This means that personally identifiable data is being generated and collected from *all* our educational settings, be those real or virtual, drawing education directly into the path of the issues and debates surrounding this growing concern surrounding personally identifiable data.

FACTORS ASSOCIATED WITH PERSONALLY IDENTIFIABLE DATA

Like a large diamond, this issue contains many facets, all part of the whole. Here are just a few of the many factors at play when we examine personally identifiable data:

1. Does an individual have *the right* to remain anonymous when online?
2. Who *owns* personal data generated by a device? Is it the user? The owner of the device? The company that manufactures the data?
3. Who *holds the copyright* of personally generated information? Can copyrighted information be *shared without permission* of the end user if that person does not hold the copyright?
4. How *securely* is the data being stored, and how can a user be sure that the data is truly "safe?"
5. What is the result if the company *sells its data set* to another organization which is holding its own data set, largely of the same end users, and *merges the two (or more) data sets together*? What *new information* can be "mined" out of the new collection of merged data that was not immediately known when the data was residing in its original, individual collections?
6. Does an end user have any *legal rights* to the data which they themselves have created, regardless of subsequent agreements to share that data?
7. Once an individual has turned over data rights to an organization, is that data free from the individual's control *in perpetuity*, with no say in how the data might be transferred, sold, or reconstituted?
8. Are end users being *surreptitiously monitored* by specific technological devices?
9. Can data be *surreptitiously used to reveal personal information* about an individual that should not be publicly disseminated?
10. What can be the result when an individual's data is *stolen* (identity theft)? If

identity theft does occur, what *recourse* is available, and who is *legally responsible* for it?

11. What can be done if a company permits use of its product only if *the user agrees to a EULA* (End User Licensing Agreement) which contains statements that the organization may capture, own, and then make use the personalized data?
12. What happens to that data when that same company *goes out of business*, perhaps being bought out by another organization? Does the original user have *any say* in that matter in regard to existing, previously collected data? If that data is *transferred*, is the transferred data now subjected to a new set of rules not originally agreed to by the end of the day?
13. Has anyone ever *fully read a EULA*, say, from Apple, Microsoft, Google, Amazon or any other major company? If so, was the EULA's language *fully understood* by the reader?
14. Does educational use of a technology carry with it any *special privileges or restrictions*? How does education use affect, or not affect, copyright?
15. Can data that is said to be "anonymized" ever be *reconnected* to the original user?
16. What *laws and/or regulations are in effect* relating to data privacy and security within the country in which the end user resides?
17. If the end user resides in one country, and is taking courses via e-learning coming from another country, *which country's laws and regulations take precedence* regarding data privacy and security?
18. Is there any method for *removing personal data that has already been captured and stored* by any organization? Taking this further, is there any method for *removing all online "traces" of an individual*, if so desired?
19. *Why* do companies wish so strongly to collect all this user data? What are the *underlying motives* and why is this seemingly so important to these corporations?
20. How does one *"monetize" information?* We know the fair value of a pound of oranges costs at a certain point of time. But how does one apply monetization to something as ephemeras as digital data?
21. Should *government play any role in the protection and privacy of personal user data* if the individual is using technology from a private (i.e., nongovernmental) company?

Many more questions, each representing one or more facets of the issue, could be listed. But even these first 21 questions provide enough evidence to denote the scope and importance of the issue. (All of a sudden, the metaphysical problem of "universals," while intractable, seems to have "met its match" by a very practical, albeit complicated, issue.)

In discussing this issue, there is no implication of reactionary or overreactive thought.[3] Yet, it is just as much an error to *ignore* this issue and convince oneself that it is nothing to be concerned about. True, this is an extremely complex subject with components that never before have had to be addressed: but what used to be the stuff of science fiction is now considered trivial as today's advanced computational devices have become fully mainstream and financially accessible to the "average" individual. We now talk about "wearable technology," health monitoring watches, artificial intelligence approaching the point where a particular device may pass the "Turing Test" (meaning that a person cannot identify if they are interacting with a computer or with a person if they cannot see to whom they are communicating), voice-to-text technology (that actually works!), headphones that listen to a person speaking and simultaneously translate the speech to a different language so that a person can speak with someone of a different language, near-instantaneous cursive-to-text conversion, text and voice translation to a different language, minute devices that track a person's locational position within millimeters, and more than we would even have time to discuss in an article of this length.

These devices are indeed impressive, and undeniably, are often incredibly useful. There can be little question as to the facility these devices can bring to the educational setting. But have we, as an educational community, thought far too much about the *capabilities* of these devices, and far too little about the *security and safety implications* surrounding their use?

OUR CLAIM: AS IMPORTANT AS THE TECHNOLOGY ITSELF

There was a time not long ago when being an educational technologist connoted a knowledge of hardware and software technology tools and their use for educational purposes. Today, however, *it is essential that the educational technologist be just as aware of the* implications *concerning learners' personal data as they are the* instructional uses *of the devices that create such data*. As we move deeper and deeper into a world where every micromovement of our lives is quantified by our favorite technologies, as well as by the educational technologies used in our schools, the importance of a working knowledge surrounding the privacy and security of generated data also increases. Legal action taken by governments battling with commercial organizations further add to the complexity of the subject (cf. Kerschischnig, 2014). This is a reality which we barely had to consider even but 50 years ago, and it has left much of the educational community ill-prepared to deal with the concern in any meaningful manner.

We argue that, for today's educators, and particularly for those employed in e-learning, *a working knowledge of the implications posed by the generation and collection of individuals' personal data should be considered a required skill*. We make no claim to possess all the answers to this issue: it's difficult enough just to *understand* the issues as opposed to "solving" them, if the word "solving" is even a good term to use in this context. But all educators, and certainly e-educators, need to be aware of the issues of personal data that is generated, collected, and stored, including governmental legislation impacting this data, both current and proposed, as well as the other ramifications of using advanced technologies in the classrooms, whether these be virtual or physical.

This issue contains many factors that must be considered if any satisfactory response is to be constructed and implemented. Corporations make fortunes on the data they collect and then sell, and, in fact, many of the largest companies employ such data selling as an actual *business model*: give the tools away for *free,* but collect and *sell the data* that is generated (Nettleton, 2014). (Even departments within state governments in the United States do this, some may be surprised to hear.) Years ago, someone said something to the effect that if a software technology is free, then *you* are the product. I remember the first time I mentioned this concept—"people as product"—in a classroom, perhaps some 10 years ago. I was met with a return look of glassy stares, not of discourtesy, but of true inability to even begin to conceive the connotations of the statement. The truly frightful thing is that today, those statements are not only frequently met with lack of *understanding* (as awareness is now greater through the many cases appearing in the media that have brought such issues to light), but with a sense of *resignation*, because it is simply felt that there is nothing that can be done about it, or perhaps the subject is too complex with which to deal. A sense of resignation is exactly what will contribute to an outcome that is not in favor of individuals, including our students, in the educational community.

THE GOVERNMENT TO THE RESCUE? THE EUROPEAN UNION "STRIKES BACK"

Some governments have begun to openly acknowledge this as a critical problem and have attempted to enact legislation designed to address the issue. We choose here for purposes

of discussion some of the ways in which the European Union (EU) has responded to issues related to data privacy and security. This choice of example is not meant to imply that the author is necessarily in agreement with the various aspects of these pieces of legislation, but this is a good example because the EU[4] is active in this area, and has only very recently (in 2018 and 2019) passed significant legislation regarding data privacy and security issues. These two legislative enactments are entitled the General Protection Data Regulation (GDPR; implemented May 2018) and the Directive on Copyright in the Digital Single Market (passed by the EU in Feb 2019 with a 2-year provision for all EU member states to comply) (European Parliment, 2019; European Union, 2019). We discuss each in turn.

GDPR

There are seven "principles" of the GDPR, as stated directly in the Regulation (please note that items 1 through 7, below, is drawn directly from the GDPR):

Article 5(1) requires that personal data shall be:

1. **Lawfulness, fairness and transparency** (Article 5.1.a, "processed lawfully, fairly and in a transparent manner in relation to individuals")
2. **Purpose limitation** (Article 5.1.b, "collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes; further processing for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes shall not be considered to be incompatible with the initial purposes")
3. **Data minimization** (Article 5.1.c, "adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed")
4. **Accuracy** (Article 5.1.d, "accurate and, where necessary, kept up to date; every reasonable step must be taken to ensure that personal data that are inaccurate, having regard to the purposes for which they are processed, are erased or rectified without delay")
5. **Storage limitation** (Article 5.1.e, "kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the personal data are processed; personal data may be stored for longer periods insofar as the personal data will be processed solely for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes subject to implementation of the appropriate technical and organizational measures required by the GDPR in order to safeguard the rights and freedoms of individuals")
6. **Integrity and confidentialit**y (Article 5.1.f, "processed in a manner that ensures appropriate security of the personal data, including protection against unauthorized or unlawful processing and against accidental loss, destruction or damage, using appropriate technical or organizational measures")
7. **Accountabilit**y (Article 5.2, "The controller shall be responsible for, and be able to demonstrate compliance with, paragraph 1")

The purpose of this article is not to debate whether the GDPR is "correctly" structured, or even to propose that the only way these issues will be solved is through governmental action. It is, however, highly instructive that the EU has taken the steps to attempt to address digital privacy and security. This has placed the EU in opposition to the wishes of a number of large and small technology-oriented corporations who feel that certain aspects of either the GDPR and/or the directive on copyright in the digital single market (discussed below) will have negative effects on technology innovation and cause stagnation in the technology

sector, for example, the Wikimedia Foundation (Wikimedia Foundation, 2019). We must of necessity leave those arguments for another article. The point is that there is governmental attention being placed on these issues because of difficulties and concerns that have been expressed in this sphere, and individuals' and/or corporations' responses to them were viewed as inadequate.

Although this subject is truly difficult and multifaceted, we can see that educators can choose to play a role or not in how such legislation and regulation is conceived and structured. If educators choose to remain apart from these discussions, they will have no say in how such legislation is developed. That would seem to be adding even more complications to an already complicated matter, since the majority of legislators do not possess a background in education, and therefore are not able to draw upon such a background to optimally develop the types of protections and guidance needed in this situation.

Directive on Copyright in the Digital Single Market

When visitors travel to Paris for vacation, the Louvre Museum is always at the top of their list, perhaps followed by the d'Orsay Museum and the Marmottan Museum (where Monet's massive lily paintings are found), the Petit Palais, the Grand Palais, and so on. Because there are some 130 museums within Paris proper, the choices are endless, and nearly all of them hold some of the world's greatest treasures in art, history, sociology, music, and many more areas. One museum, however, that many tourists do not normally visit—actually, are not even *aware* of its existence—is the *Musée de la Contrefaçon* (Musée de la Contrefaçon, 2019). This small museum, however, yields one of the most remarkable experiences a person can have in a museum.

The French word "*contrefaçon*" means "forgery," and the museum is dedicated to how products are counterfeited and then sold as genuine items. One of fascinating aspects of this museum is their displays, within plexiglass boxes, of a *genuine* item directly adjacent to its *counterfeit* equivalent, with no indication within the display box as to which is the genuine item. (Identification information is located in print, lower on the display, where one must look away from the items to read the information; the text presents where and when the counterfeit was found, where it was produced, and the subtle clues that give away the counterfeit item from the real item; one then looks back at the items and tries to recognize the subtle differences.) Viewers are encouraged to carefully visually examine both pieces and attempt to determine which item is genuine, and which item is a forgery.

It is remarkable that, for most of the items, one can examine and compare the real and the counterfeit items and in most every case, regardless of the time taken to do so, cannot distinguish the forged item from the real item. A multithousand dollar Louis-Vuitton purse, for example, sits adjacent to a knockoff copy that sells, "underground," for $50, and the visuals of the two pieces are so exacting identical that you generally just "give up" and read the information to discover how the items are different. Sometimes the similarities are so striking that, even after reading the explanatory text and returning to visually examine the items, it can still be difficult to differentiate the real item from the counterfeit. The museum points out that the forgery business has become so lucrative that a number of major worldwide crime syndicates have essentially stopped their "traditional" illegal vices to focus on counterfeiting. This is especially true in the case of clothing for major sports teams, forgeries of which can generate *billions* of dollars per year in counterfeit sales. If you are in Paris in the future for a visit, put this museum on your list.

This is forgery, and yet its close cousin, copyright and intellectual property theft, share similarities. In fact, in many cases, the forgeries mentioned above were accomplished by *using* intellectual property theft to create their forgeries, and the forgeries, of course, are

violating copyright. This problem has grown in concert with the birth and growth of the computer-based manufacturing setting, because the information about the product(s) is converted into *data* at the manufacturer's end, then stored on their computer servers, making these services a rich target for skilled hackers who can be geographically located anywhere in the world while they abscond with the data.

Intellectual property theft is not difficult to envision. Imagine an aircraft maker wins a contract with a government for a new type of military plane, with requirements for technological capabilities that have never before been developed. The manufacturer who wins the contract goes on to spend hundreds of millions of dollars on development of the new technology, and that development work is, of course, stored on computers maintained by the manufacturer. In spite of implementation of the most sophisticated security protocols on the computer, a foreign country that has significantly invested in breaking into such systems is able to gain access to the manufacturer's servers and copy all the development data to their own systems. Now the foreign country has access to all the work done on the new technology, but at virtually no cost or time (other than what it took to train the hackers, who probably invested this time on their own). Such scenarios could be repeated ad nauseum in all types of industries, and more and more recent news reports provide evidence of these events continuing unabated.

Another piece of legislation, the EU's Directive on Copyright in the Digital Single Market, also referred to as the EU Copyright Directive (European Parliment, 2019) is aimed at protecting copyright and intellectual property, much of which takes place in the digital world. The legislation has been surrounded with highly contentious hearings during its construction and revisions since its initial release in 2016. One would think that such legislation would be a straightforward matter, as it is well known that both copyright and intellectual property theft is a large problem that has grown in scope over time. But because so many groups who would be affected by such legislation (content creators, content providers, content aggregators, data mining companies, educational providers who wish to search for data, etc.) have different views and goals for how they use data, development of the specific of legislation became mired in disagreements between companies, individuals, and governments. The directive's proposed wording was repeatedly adjusted and was finally passed by a vote of 438 to 226 (Vincent, 2018). Nevertheless, the most controversial portions of the directive, Articles 11 and 13, are still berated by detractors, verbally debasing them by referring to them as the "*link tax*" and the "*upload filter*" (para 2). Regardless of our personal positions, we can at least say that the extended disagreements about a subject that, at its face, should be simple and uncontested provides evidence of the difficulties involved legislating data safety and security.

A simple example illustrating how this area might impact the educational word is easy to conceive. Imagine that a student is in a graduate class covering the topic of the development of innovative technology (an area of study currently experiencing rapid growth, by the way). Students in the course learn the "lean startup" method of innovation and commercialization of technology (Blank, 2012) and work in a small group setting within the class to use that methodology to develop an innovative technology of their own. Student work, as it is in most all courses, is stored on the school's computer system and is accessed through a learning management system (LMS). One of the student groups develops a truly innovative idea for a product that, were it to be properly commercialized, could generate a significant amount of money. This group's work, of course, including idea description, technical specifications, marketing plan, customer segment, and so on is stored on the school's LMS.

Ask yourself these questions. *Who owns this material (stored on the LMS)?* The student group? The school? The maker of the LMS? The network provider*? Is the material secure from unauthorized access?* How secure is the

LMS' security protocols? *Is the material protected by any type of legal copyright? Is the text communication between group members, stored on the school's equipment, private?* How sure are you to the answers to these questions, and what is the basis for your answers? These questions, and many more that could be asked, are but one of many that could be asked about this single example. Multiply this example by the number of students and instructors that use advanced technology in their educational work, and the scope of the problem begins to come into view.

The "Right to Be Forgotten"

The Court of Justice of the European Union in 2014 enacted "the Right to be Forgotten" (Consulting Intersoft, 2019). This legislation, which applies principally to EU member states and a handful of other countries in or near the European mainland, but not necessarily a part of the EU, is designed to allow individuals to have their personal information, which appears on multiple web sites without their knowledge or explicit consent, to be removed upon request. To do so, the individual puts in a legal "right to be forgotten claim" to organizations which house the sites containing the personal information, say, for example, Google, and the company must then make reasonable attempt and accommodation to remove the personal information from such sites. The ruling came as a response to a court case arising from a Spaniard who found that a repossessed home he once owned remained listed online for all to see, even though the repossession had occurred in the past. The removal techniques applied are not foolproof, nor are they fully complete in their function, but America's *npr* radio network stated that since its enactment in 2014 and up to 2018, some 650,000 such requests have been made (Doubek, 2019). In 2018, a French regulator (the Commission Nationale de l'Informatique et des Libertès, or CNIL) put forward a test case to the European Court of Justice stating that the right to be forgotten should be *universal* in scope, not limited within the EU and the few additional countries covered in the court's 2014 ruling. Just recently, in 2019, the Court of European Justice gave a preliminary opinion against the case. *The Guardian,* a United Kingdom-based newspaper, reported that "the advocate general said the right to be forgotten must be balanced against other "fundamental rights," such as the right to data protection, privacy and the legitimate public interest in accessing information" (Bowcott, 2019). Groups opposed to the general notion of the right to be forgotten legislation made the argument that universal adoption of the rule could play into the hands of dictators and despots by backing them with the force of law to remove online content which works against them. For now, the right to be forgotten is essentially an EU-based legislation and unlikely to be implemented in other countries. The legislation nevertheless serves as an example of data privacy and the attempts some governments have made to improve the power of individuals over data that is personally related to them. It is also another example of the complexities involved in legislating digital data.

Proposed Sample Framework— The Advanced Technology Impact Framework

We have argued in other recent publications that educators should be developing the skills to produce their own mental framework for examining and evaluating the implications that come with the use of today's technology innovations in the learning space, including the privacy and protection of personal data. In that vein, we developed a sample framework which we entitled the *advanced technology impact framework*, as a means to guide each individual in developing their own framework. That proposed sample framework reads as:

1. Do not limit review of a new technology to its features and capabilities. Actively consider and explore *potential ramifications* of the technology's use. (This is dif-

ficult and speculative, probably the very reason why few have ever attempted the task.)

2. Consider how the new technology interacts with *existing* technologies, not just the features of the new technology itself. (It is often the combinatorial effects of two or more technologies that become more than the sum of their parts, and therefore, by implication, are prone to bringing with them unexpected consequences.)
3. Review the security and privacy all new technologies as essential factors to be understood. Assume nothing in this area. (Attempt to specifically identify who stores data, where they store the data, and the type of data collected and stored. If anonymization is said to be applied to the data, what mechanisms are in place to protect the data, and the organization's stated policies about who owns and controls the data?)
4. Think about how others might possibly use the new technology for *nefarious* purposes. (*You* are a good person with good motives; not everyone *else* is.)
5. After examination, consider whether the potential learning benefits outweigh the potential risks of using the technology. (Are there other less risky, yet equally effective, ways to achieve the same learning outcomes?)
6. Do not limit your field of you to technology alone: proposed and or and acted legislative directives (such as the GDPR and the EU Copyright Directive) are factors just as important to today's digital educator. (The framework applies to the entire set of elements that make up the learning setting, including applicable legislative components.)

An argument can also be made that a universal framework should be established for all to use, and doubtless, various professional educational groups have done work in the area, but there is also great benefit in having *individuals* develop their own heuristics so that these concepts may be more deeply considered, learned, and valued.

CONCLUSION

In this article, we have argued that data privacy, security, and safety is one of the most important issues the educational world has ever had to face. Government sponsorship and government regulation is certainly an important component for all educators working with technology to consider, but it does not entail the entirety of the problem. Only a few short decades ago, that number was a small and dedicated cadre of individuals who were intrigued, and often convinced, that computers would positively impact educational outcomes. But today, the percentage of educators using technology in the classroom or at a distance will continue to grow, and in the future, will progress to the point where advanced technologies will be present in virtually all educational settings. This, in turn, implies that nearly every educator will eventually have to be cognizant of the issues surrounding the use of such technology, particularly when the technology *captures* and *stores* learners' personal data.

Technology's relentless march will doubtless be accompanied by an increasing amount of generated data, both in quantity and in type, further magnifying the importance of the issue. Individuals are often virtually powerless in the face of the massive companies, generally the largest in the world, who collect and store this data. Even reading and understanding the EULA of software programs is often a task that feels impossible even for those holding advanced degrees and with multiple years of higher education behind them. We find that the situation is that the ever-increasing sophistication level of technology is seemingly mirrored by increasing complexity of the issues surrounding them, particularly in the areas of data privacy and security.

The apparent powerlessness that individuals feel in these matters speaks to a need for

some type of protection that has not yet been devised. There is great debate about whether governmental regulations impede or expand any domain in which they are applied. Nevertheless, regardless of one's viewpoint on the subject of regulation *per se*, the educational world has a genuine consequential issue which it must address that is only going to grow more complex and deeply penetrating over time. The question is, *what shall we, as educators, do about it*?

NOTES

1. There is no connection between the word "university" and "universals," even though the terms appear similar.
2. The question remains essentially unanswered to this day. Even the great medieval scholar Abelard (1079–1142 A.D.) wrestled with the question, and the intermediary view he developed in response, called *conceptualism* (Peter, 2002), was not universally accepted in spite of its promise. Today, Abelard's "third way," residing between the Nominalist and Realist views, may or may not have cut the "Gordian Knot," and whether or not it is a viable solution to the problem of Universals remains debated today by those in the field of metaphysics.
3. Compare "Association for Computing Macinery," (2016); "Bolstering Data" (2018); Cuppens-Boulahia, Cuppens, & Garcia-Alfaro (2012); Livraga and Zhu (2017); Livraga, Torra, Aldini, Martinelli, & Suri, 2016; "Privacy and Data" (2011); Torra, 2017; Wong, 2013).
4. As we have described in a number of publications, the idea of a European Union has been the goal of countless individuals over the millennia. As far back as the Roman Republic, there was a drive to unite under a single political auspice those land areas we now commonly refer to as "Europe." Norman Davies of Cambridge University, author of the monumental *Europe: A History* holds to this view (and it is essentially one of the main themes of that volume). Charlemagne's 9th century conquest of Europe was another early precursor to this notion (Barbero, 2004). The best way to look at the EU today is to see its sequential developments in steps after World War II ended. First, the European Coal and Steel Community, was formed in 1951. Next came the European Economic Community in 1958. The EU was formalized by the Treaty of Maastricht and was fully actualized by 1993. The original founding members of the EU included France, the Netherlands, Belgium, Luxembourg, Germany, and Italy. The current count is 28 members, though if Brexit ever does go through, the number will be reduced to 27.

REFERENCES

Amirault, R. J., & Branson, R. K. (2006). Educators and expertise: A brief history of theories and models. In K. A. Ericsson, N. Charness, P. J. Feltovich, & R. R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 69–86). New York: Cambridge University Press.

Bain, C. (2013). *Guide to commodities [electronic resource]: Producers, players and prices, markets, consumers and trends*. Hoboken, NJ: Wiley.

Barbero, A. (2004). *Charlemagne: Father of a continent*. Berkeley, CA: University of California Press.

Barrow, L. (2007). *Technology's edge the educational benefits of computer-aided instruction*. Chicago, IL: Federal Reserve Bank of Chicago.

Blank, S. G. (2012). *The startup owner's manual: The step-by-step guide for building a great company*. Pescadero, CA: K & S Ranch.

Bolstering data privacy and mobile security: An assessment of IMSI catcher threats: Hearing before the Subcommittee on Oversight, Committee on Science, Space, and Technology, House of Representatives, 115th Cong. 2 (2018, June 27).

Bowcott, O. (2019, 2019-01-10). "Right to be forgotten" by Google should apply only in EU, says

court opinion. Retrieved from http://www.theguardian.com/technology/2019/jan/10/right-to-be-forgotten-by-google-should-apply-only-in-eu-says-court

Brooks, T. (2017). *Cyber-assurance for the Internet of things*. Hoboken, NJ: Wiley/IEEE Press.

Brown, S. F. (1999). Medieval Christian philosophy: Realism vs Nominalism. In (pp. 271–278): Columbia University Press.

Cate, F. H., & Dempsey, J. X. (2017). *Bulk collection: systematic government access to private-sector data*. New York, NY: Oxford University Press.

Consulting Intersoft. (2019). Art. 17 GDPR—Right to erasure ('right to be forgotten') | General Data Protection Regulation (GDPR). Retrieved from https://gdpr-info.eu/art-17-gdpr/

Cuppens-Boulahia, N., Cuppens, F., & Garcia-Alfaro, J. (Eds.). (2012). *Data and applications security and privacy XXVI 26th Annual IFIP WG 11.3 Conference, DBSec 2012, Paris, France, July 11–13,2012. Proceedings.* Berlin, Heidelberg: Springer Berlin Heidelberg.

Daileader, P. (2001). The first universities. *The high middle ages* [CD]. Chantilly, VA: The Teaching Company.

Davies, N. (1996). *Europe: A history*. New York, NY: Oxford University Press, Inc.

Encyclopaedia Britannica. (2019). Credit card. Retrieved from https://www.britannica.com/topic/credit-card

Doubek, J. (2019). Google has received 650,000 'right to be forgotten' requests since 2014. Retrieved from https://www.npr.org/sections/thetwo-way/2018/02/28/589411543/google-received-650-000-right-to-be-forgotten-requests-since-2014

Ertmer, P. A., & Newby, T. J. (2013). Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. *Performance Improvement Quarterly, 26*(2), 43–71. Retrieved from http://libproxy.lib.ilstu.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2014-32793-003&site=eds-live&scope=site

European Parliment. (2019). EUR-Lex - 52016PC0593 - EN - EUR-Lex. Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2016:0593:FIN

European Union. (2019). EUGDPR information portal. Retrieved from https://eugdpr.org/

Guseman, K. J. (2016). *Increased personalization through the use of technology in the secondary mathematics classroom*. DeKalb, IL: Northern Illinois University.

Hjalmarson, M., & Moskal, B. (2018). Quality considerations in education research: expanding our understanding of quantitative evidence and arguments. *Journal of Engineering Education, 107,* doi:10.1002/jee.20202.

Kerschischnig, G. (2014). *Cyberthreats and international law*. Hague, Netherlands: Eleven International.

Lan, Y.-J. (2013). The effect of technology-supported co-sharing on L2 vocabulary strategy development. *Journal of Educational Technology & Society, 16*(4), 1–16.

Langheinrich, M. (2019). *Privacy in mobile and pervasive computing*. San Rafael, CA: Morgan & Claypool.

Livesey, S. (2016). The Medieval University. Companion to the History of Science. Retrieved from https://search.ebscohost.com/login.aspx?direct=true&db=edscrc&AN=edscrc.24917468&site=eds-live&scope=site

Livraga, G., Torra, V., Aldini, A., Martinelli, F., Suri, N. (Eds.). (2016). *Data privacy management and security assurance: 11th International Workshop, DPM 2016 and 5th International Workshop, QASA 2016, Heraklion, Crete, Greece, September 26–27, 2016, Proceedings*. Cham, Switzerland: Springer.

Livraga, G., & Zhu, S. (2017). *Data and applications security and privacy XXXI: 31st Annual IFIP WG 11.3 Conference, DBSec 2017, Philadelphia, PA, USA, July 19–21, 2017, Proceedings. (2017).* Cham, Switzerland: Springer.

Marenbon, J. (2007). *The many roots of medieval logic: The Aristotelian and the non-Aristotelian traditions. Vivarium 45, 2–3.*

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). San Francisco, CA: Jossey-Bass.

Musée de la Contrefaçon. (2019). Musée de la Contrefaçon. Retrieved from https://musee-contrefacon.com/

Nettleton, D. (2014). *Commercial data mining: Processing, analysis and modeling for predictive analytics projects*. Amsterdam, Netherlands: Morgan Kaufmann.

Orman, J. P., & Padgett, R. M. (2017). iPad implementation: A study on efficacy and achievement in reading. *Dissertation Abstracts International*. Retrieved from http://gateway.proquest.com/

openurl?url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:dissertation&res_dat=xri:pqm&rft_dat=xri:pqdiss:10640964

Padgett, R. M. (2017). *1:1 iPad implementation: A study on efficacy and achievement in reading.* Retrieved from http://libproxy.lib.ilstu.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=ED580289&site=eds-live&scope=sitehttp://gateway.proquest.com/openurl?url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:dissertation&res_dat=xri:pqm&rft_dat=xri:pqdiss:10639728

Peter, S.-A. (2002). Conceptualism in Abelard and Rand. *The Journal of Ayn Rand Studies, 4*(1), 123. Retrieved from http://libproxy.lib.ilstu.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.41560206&site=eds-live&scope=site

Rotter, K. (2019). A history of the three credit bureaus. Retrieved from https://www.creditrepair.com/blog/credit-score/credit-bureau-history/

Saettler, L. P. (2005). *The evolution of American educational technology* (3rd ed.). Mahwah, NJ: Erlbaum.

Sallis, M. (2017). Gödel, Plato, Xenakis: Eternal forms, numbers and rules a portfolio of compositions. In: University of Liverpool.

Sallis, M (2017) Gödel, Plato, Xenakis: Eternal forms, numbers and rules—A portfolio of compositions (Unpublished doctoral thesis). University of Liverpool, Liverpool, England.

Terrill, L. (2000). *Benefits and challenges in using computers and the Internet with adult English learners.* Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement, Educational Resources Information, National Center for ESL Literacy Education.

Torra, V. (2017). *Data privacy foundations, new developments and the big data challenge*. Cham, Switzerland: Springer.

ValuePenguin. (2019). Credit Card Usage and Ownership Statistics (2019 Report). Retrieved from https://www.valuepenguin.com/credit-cards/statistics/usage-and-ownership

Vincent, J. (2018). EU approves controversial copyright directive, including Internet 'link tax' and 'upload filter.' Retrieved From https://www.theverge.com/2018/9/12/17849868/eu-internet-copyright-reform-article-11-13-approved

Watkins, D., & Gioia, D. (2015). *Mixed methods research*: New York, NY: Oxford University Press.

Wikimedia Foundation. (2019). We do not support the EU Copyright Directive in its current form. Here's why you shouldn't either. Retrieved from https://wikimediafoundation.org/2019/02/28/we-do-not-support-the-eu-copyright-directive-in-its-current-form-heres-why-you-shouldnt-either/

Willis, L.-D., & Exley, B. (2018). Using an online social media space to engage parents in student learning in the early years: Enablers and impediments. *Digital Education Review, 33*, 87–104.

Wong, R. (2013). *Data security breaches and privacy in Europe*. New York, NY: Springer.