The REFRACTIVE THINKER

VOLUME XII

CYBERSECURITY in an Increasingly Insecure World

Foreword by Bill Bonney, Gary Hayslip, and Matt Stamper

Authors of CISO Desk Reference Guide: A Practical Guide for CISOs
AN ANTHOLOGY OF DOCTORAL WRITERS
VOLUME XII
Cybersecurity

in an Increasingly Insecure World
Edited by Dr. Cheryl A. Lentz


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The important thing is not to stop questioning. Curiosity has its own reason for existing. One cannot help but be in awe when he/she contemplates the mysteries of eternity, of life, of the marvelous structure of reality. It is enough if one tries merely to comprehend a little of this mystery every day. Never lose a holy curiosity.

—Albert Einstein

The headlines have been screaming for several years about cyber-attacks that hit every aspect of our daily lives. What once was solely the province of credit card fraud has now extended to phishing for personal details. Infections bring malicious code that does everything from destroy your hard disk to steal your personal information to encrypt your files and hold them for ransom to turn your PC or cell phone, or even TV, into a mindless drone in a massive bot army ready to wreak havoc in your digital name. Where does it stop? We can no longer trust the news now that bots push fake news to drive up clicks, we worry about the lights going off because power plants are under siege, and now we wonder if we can trust our elections.

One of the key factors that drove us to write the CISO Desk Reference Guide was the realization that we’re outmanned and outgunned. Outmanned in that we need thousands more cybersecurity specialists than are available today, and many firms are hiring their first Chief Information Security Officer (CISO). Outgunned in that the tools of the past, that aimed to deploy a firewall to protect a well-defined and completely self-contained enterprise network, are no longer even a meager deterrent for a mildly determined cybercriminal. We can no longer even draw the

distinction between cybercrime and nation-state activity, as recent reports acknowledge that the criminals are almost as well equipped as the spies.

What is critically important is that we bring all the soft power and all the hard power we can muster against this threat. We envision a world that is safe from
threats and to get there, society must become educated, we must act in unison, and we must become more informed consumers and a more informed electorate. As we engage more on how to make our world safer, we must recognize each person’s role and resist the temptation to assume our government or big industry bears sole responsibility. We didn’t eradicate most infectious disease in the developed world by leaving it to just the doctors, and we’re not going to rid the world of cybercrime and cyber terrorism by leaving it to the experts alone.

It is with this backdrop that Dr. Cheryl Lentz continues her award-winning *The Refractive Thinker®* series by bringing forth doctoral theses on cybersecurity in a new volume XII: *Cybersecurity in an Increasingly Insecure World*. In this pivotal work, her scholars are approaching the cybersecurity issue from all the right angles. Dr. Tracy Celaya and Dr. Adam Pierce look at the challenges of cybersecurity in human resources and getting talent right in *Cybersecurity in Human Resources on Multiple Fronts* and *Hiring Outsourced Cybersecurity Professionals for Government Contracts*, respectively. Several authors address cybersecurity issues in the realm of higher education, where profound changes must be made to bring critical skills to those who are preparing to enter the cyber workforce. These works include addressing integrity and ethics, as well as raising awareness of cybersecurity in the higher education domain, because yes, our schools are under attack as well.

These acclaimed authors bring critical thinking to many of the topics so important to the cybersecurity discussion. From setting policy as discussed by Dr. Loyce Chithambo, to using cryptocurrencies as put forth by Dr. Ivan Salaberrios, to understanding the effect of cybersecurity risks on business continuity and organizational performance as explored by Dr. Joe Hage, these topics are timely and the need for scholarly treatment has never been greater.

As you read the pages ahead, we ask you to ask yourself: “What should I be doing to make a safer cyber world?” This is critically important if we’re to reap the benefits promised in this new digital age.

**About the Authors . . .**
Bill Bonney, Matt Stamper, and Gary Hayslip met in the summer of 2014 as members of the very inclusive and collaborative cybersecurity community of San Diego, California. Besides being the eighth largest city in the U.S. and a very welcoming community, San Diego is home to several pockets of technological innovation. These include very successful biotechnology, life sciences, and mobile technology industries; a plethora of defense contractors and aerospace research companies; a blossoming startup community in the Internet of Things (IoT) and Cybersecurity; and a thriving academic environment. San Diego is also home to the fewest number of Fortune 500 company headquarters, per capita, in the United States.

Each of the authors has enjoyed over 30 years of success in the Information Technology (IT) field, but they have very different backgrounds. It became obvious as they got to know each other by participating on panels and speaking at industry events that these different backgrounds brought diverse and complementary perspectives to the problems the cybersecurity community currently faces. What started as a panel discussion on the role of the modern CISO sparked such a lively audience discussion that the authors began to consider turning it into a book for new CISOs and CISOs at mid-size firms in particular. The result is the CISO Desk Reference Guide, a Practical Guide for CISOs.

http://www.cisodrg.com

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About the Authors . . .
Bill Bonney, CISA, is a Principal Consulting Analyst at TechVision Research with specialties in information security, Internet of Things (IoT) security and identity management. Prior to joining TechVision Research, he held numerous senior information security roles in various industries, including financial services, software and manufacturing.

Bill is a member of the Board of Advisors for CyberTECH, a San Diego incubator, and in on the board of directors for the San Diego CISO Round Table, a professional group focused on building relationships and fostering collaboration in information security management. Bill is a highly regarded speaker and panelist addressing technology and security concerns. He holds a Bachelor of Science degree in Computer Science and Applied Mathematics from Albany University.

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Matt Stamper, CISA, CIPP-US, brings a multidisciplinary understanding to cybersecurity. His diverse domain knowledge spans IT service management (ITSM), cloud services, control design and assessment (Sarbanes-Oxley, HIPAA/ HITECH), privacy, governance, enterprise risk management (ERM), as well as international experience in both Latin America and China. His executive-level experience with managed services, cybersecurity, data centers, networks services, and ITSM provides a unique perspective on the fast-changing world of enterprise IT, IoT, and cloud services.

Matt received a Bachelor of Arts from the University of California at San Diego, where he graduated Cum Laude and with Honors and Distinction in
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Gary is involved in the cybersecurity and technology start-up communities in San Diego where he is the Co-Chairman for Cybertech, the parent organization that houses the Cyber incubator Cyberhive and the Internet of Things incubator iHive. He also serves as a member of the EvoNexus Selection Committee where he is instrumental in reviewing and mentoring Cybersecurity and Internet of Things startups. Gary holds numerous professional certifications including: CISSP, CISA, and CRISC, and holds a Bachelor of Science in Information Systems Management from University of Maryland University College & Masters in Business Administration from San Diego State University.
Welcome to the award-winning Refractive Thinker® Doctoral Anthology Series. We are thrilled to have you join us for the 14th volume in the series (Vol II was published 3 times), Vol. XII: Cybersecurity in an Increasingly Insecure World. Join us as we continue to celebrate the accomplishments of doctoral scholars from around the globe. Our mission continues to be to get research off the coffee table, out of the Ivory Tower of academia, and into the hands of people who cannot only use, but also benefit from the many insights and wisdom found from doctoral research results. The goal is to continue to bridge the gap from the halls of academia into the halls of the business world. The Refractive Thinker® series continues to offer a resource by the many contributing doctoral scholars as they offer their chapter summaries of doctoral research well beyond the boundaries of a traditional textbook. Instead, the goal for this series is to use refractive thinking strategies to push the boundaries beyond conventional wisdom and to explore the paths not yet traveled particularly in this evolving digital age of technology.

As we begin a new year of 2017, this peer-reviewed publication offers readers insights and solutions to various challenges regarding Cybersecurity, such as issues within human resources, risks on business continuity and organizational performance, outsourcing cybersecurity professionals for DoD contracts, and using cryptocurrencies to fund small business; our hope is that you will find answers regarding effective strategies regarding cybersecurity to help guide your efforts in the boardroom, as well as the work space as part of this special edition Vol XII: Cybersecurity: In an Increasingly Insecure World that have come from the research and pens of professional academicians and scholars around the world. The premise is to think not only outside the box, but also beyond the box, to create new solutions, to ask new questions, to proceed forward on new roads not yet explored or traveled. Our premise is to review academic
research in a simple to digest executive summary format to offer new ways for business leaders to think about effective practices for strategies in their business based on what new research has to offer specifically moving forward in an insecure world.

With this volume, we add a new dimension to the series where Dr. Cheryl Lentz, The Academic Entrepreneur will conclude each chapter from a business point of view to link this doctoral research to applications for your business.

Remember, not only does The Refractive Thinker® series offer a physical book, we offer eBooks (Kindle, Nook, and Adobe eReader), and eChapters (individual chapters by author) that highlight the writings of your favorite Refractive Thinker® scholars, available through our website: www.RefractiveThinker.com, as well as www.Amazon.com. Be sure to also visit our social media to include our Facebook page, Twitter, our YouTube Channel, and our groups on LinkedIn® for further discussions regarding the many ideas presented here.

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We look forward to your continued support and interest of the more than 130 scholars within The Refractive Thinker® doctoral community who contributed to this multi award winning anthology series from around the globe. Our mission that began with Volume 1 many years ago is to bring research out of academia for application in the world of business to provide answers to the many questions asked.

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Acknowledgments

The foundation of scholarly research embraces the art of asking questions—to validate and affirm, what we do, and why. Through asking the right questions, the right answers are found. Leaders often challenge the status quo, to offer alternatives and new directions, to dare to try something bold and audacious, to try something that has never been tried before. This 14th publication of our beloved 15 time award-winning The Refractive Thinker® series required the continued belief in this new publishing model, of a peer-reviewed doctoral anthology, by those willing to continue forward on this voyage. We are grateful for the help of many who made this collaboration possible. First, let me offer a special thank you to our Peer Review Board, to include Dr. Jamie Klein, Dr. Ron Jones, Dr. Judy Fisher-Blando, Dr. Elmer Hall, and myself; and our Board of Advisors to include: Brian Jud, Dr. Les Paul, and Dr. Jody Sandwisch.

My gratitude extends with a well-deserved thank you to our production team: Gary Rosenberg, production specialist, and Joey Root, designer of the original Refractive Thinker® logo.

Thank you—we appreciate everyone’s contributions to this scholarly collaboration.
Job well done! My best to our continued success!
Dr. Cheryl Lentz
Managing Editor and Chief Refractive Thinker®

CHAPTER 8
The Impacts of Integrity and Ethics on Cybersecurity in Higher Education

Dr. Temeaka Gray, Dr. Aaron Glassman, Dr. Cheryl Lentz & Dr. Gillian Silver

The evolving environment of digital technology presents many significant challenges to higher education. While advancements in the ability to connect to learning opportunities through distance bring much value—namely the ability to expand educational reach beyond traditionally served on-ground communities—the integration of virtual learning processes offers convenience and innovation that come with a cost, as well as unintended consequences. The focus of this chapter is to consider the impacts of digital technology on integrity and ethics within the post-secondary setting and how to manage this new platform for potential unethical behavior. The specific problem that requires attention is how educators must address the potential misuse of digital technology, namely the dilemma that accompanies more efficient access to information, and the temptation that then exists for work to be improperly attributed, copied from online sources, or even completed by someone other than the learner earning the degree.

Integrity and ethics, although often used interchangeably, are related concepts not entirely synonymous. Integrity, for the purposes of this discussion, refers to honesty, as underscored by Rhode (2006). Ethics refers to what is right in a given situation (Rhode, 2006). In line with this thought process, the question that arises when one can easily access significant volumes of content within seconds is whether those who avail themselves of digital technology do so with honesty and sufficient self-regulation. Is the contemporary student still completing their own work, devoid of shortcuts in sourcing and authorship? Or, are they leveraging technology to masquerade weaknesses in academic discipline? Some scholars in the literature suggest that compromises are increasingly common, as the temptation to fully exercise information volume
and engage in ethical dishonesty is becoming more commonplace (Harbin & Humphrey, 2013; Michael & Williams, 2013). The refractive thinker, therefore, must consider the implications of cybersecurity in academia as the postsecondary education community gains a better understanding of the issues faced in this new digital age.

As first addressed by Silver and Lentz (2012) in *The Consumer Learner: Emerging Expectation of a Customer Service Mentality in Post-Secondary Education*, the American learner model is under dramatic transition. Challenged by time poverty and the need to manage lives at home and at work, the trend for the adult learner in the 21st century is to explore virtual learning options. In addition to removing the barriers of physical classroom-based access, distance learning allows students to engage in the assignments at any point convenient to them. The contact between the educator/facilitator and the student occurs through the learning management system (LMS), the telephone, e-mail, videoconferencing, and by text rather than face-to-face. The lack of direct contact may demonstrate itself in a certain impression of anonymity behind the screen—a factor which creates, in some, a less diligent allegiance to academic integrity. Certain practices, which could be repetitively discouraged or discussed at length in the physical classroom, may be conveyed primarily in policies and short reminders. A diffusion of responsibility exists. Although the faculty member may provide a stern warning within the physical classroom, the university becomes the messenger through the LMS in the online classroom, often far less stern in more friendly terms, often overlooked completely by the online student. The resultant message can differ dramatically leaving the individual student to willingly accept the accountabilities of monitoring their own ethical performance to avoid compromised choices in sourcing and assignment completion.

Teaching in the physical brick and mortar classroom offers an important distinction regarding the elements of cybersecurity in the digital space. As noted previously, when pursuing a degree within the synchronous in-person classroom, the student becomes well acquainted with the faculty member teaching the course, and a collaborative commitment can be cultivated. The faculty also gains insight into the individuals taking the course, while gaining a sense of their personality, and their accompanying performance strengths and weaknesses. Because of the regularity of the contact, and the capacity to
provide real-time personalized feedback, there is no mystery for either side of the relationship. A psychological contract forms regarding student and faculty expectations, begging the question as to whether each side meets the needs of the other. The context of these discussions does change, however, in the online space in particular. The educator may know the name of the enrolled student, but no guarantee exists regarding who really completes the work behind the screen (Silver & Lentz, 2012), unless institutions of higher learning invest in and require students to use certain technologies (e.g., multi-layer authentication, audio/video room capture, facial recognition, etc.) that have not widely been adopted. Many universities continue to experiment with hybrid variations that combine the convenience of technology (such as digital exams and in person labs), but under the close supervision of the in residence faculty. The potential of identity fraud compromises the student and faculty relationship; leading to fractured trust. The question of who really attends the course overall is uncertain, as the educator cannot confirm any suspicions they may have culled based on the quality of work patterns and to do so requires extensive documentation to university policies, as well as understanding of digital technologies. The larger question to contemplate is the responsibility of faculty regarding the detection of cheating.

The complication of understanding identity and personal learner commitment occurs more often in the digital space as both student and faculty attend the courses by logging in to asynchronous classroom environments within a digital LMS. The platform incorporates an e-mail address, a password, and perhaps security questions intended to verify and safeguard their identities to ensure authentication (Southern Association of Colleges and Schools Commission on Colleges [SACSCOC], 2012). The student log in regarding their indication of identity does not ensure the authenticity of the individual actually completing the work.

Faculty sign contracts with their respective institutions of higher learning agreeing to provide an ethical environment that supports, encourages, and facilitates student learning as dictated by the mission and value statements of the universities and colleges that employ them. Educators pledge to uphold the objectives and syllabi for courses. Further, they commit to build learner competencies to ensure that application and direct transfer into industry may occur (Silver & Lentz, 2012). The overarching intention is to enable the
student to grow through their learning experience, and to benefit their industry and personal capacity for success as a result (Silver & Lentz, 2012). This model is incumbent on a genuine effort by the enrolled student, not a fraudulent unknown hired to complete the coursework on their behalf or the submission of work done by others. The educational relationship or contract between faculty and student requires a foundation that assumes integrity in effort, and the direct modeling of responsible judgment. The need exists for a proactive acceptance of personal and institutional ethical standards also is necessitated. The student assumes that the faculty name on their course is the actual faculty teaching the course; the faculty assumes that the student names on their roster are indeed the actual students submitting their assignments and posting their weekly discussion posts to fulfill attendance requirement. The question to ask is whether this scenario represents reality. What guarantees, if any, can the educator have of student accountability? How can the instructor discern the origin of the work submitted? How can original effort be distinguished from work too heavily shaped by pre-existing material, or authored by someone masquerading as the learner?

According to Kessler (2012), academia needs to “apply new ways of thinking, new understanding, and new strategies to the nation’s response to cyberattacks” (p. x). This is where the concept of refractive thinking becomes especially relevant to the topic of student practice in the more remote but increasingly common world of online education. Despite the assumption that digital technology in and of itself already represents cutting edge and innovating thinking, the options for cheating increase exponentially as a result. Kessler and Ramsay (2013) suggested that “cybersecurity is about process rather than simply technology” (p. x). Kessler and Ramsay indicated in their conclusions that a larger need exists for a multi-disciplinary approach for solution to include national defense, economics, sociology, political science, diplomacy, history, as well as the social sciences (Kessler & Ramsay, 2013, p. x). As a major enterprise within the nation that encourages cognitive growth and direct application to industry, thereby enhancing operational competitiveness, there are clear implications for academia when it comes to assessing and responding to, the imminent threat of cybersecurity and intentional misuse of the digital platform.

**What Can be Done**
Students feel pressured to succeed and faculty feel pressured to ensure the success of their process. As a result of these pressures, a major dilemma of cheating emerges and assumes new dimensions. Pullen, Orloff, Casey, and Payne (2000) referred to this problem as “the bane of higher education” (p. 616). Josen and Seely (2012) indicated that a “developing body of evidence that academic dishonesty is increasing with the increase in tuition the advance in technology and the increase in online class offerings, new ways to engage in academic dishonesty are available for potential cheaters” (as cited in Josien & Broderick, 2013, p. 94). Thus, traditional means that the educator and the institution no longer serve the traditional student nor do they support the traditional modality (Silver & Lentz, 2012). A new learner who consumes knowledge emerges, and sometimes, much like the shopper who purchases consumable goods, they seek others’ support in completing the process (Silver & Lentz, 2012).

Faculty members perceived they are pushed toward making students succeed because they are judged by their peers and administration at their respective colleges and universities, based on student outcome achievements. These benchmarks take the specific form of end-of-course completion levels, grade point averages, learning-outcome-attainment-data, and grade grievances. Student evaluations of faculty also come into play, especially for the adjunct faculty member, as they may not receive future course assignments at some universities if viewed by learners as too rigorous (Silver & Lentz, 2012). Little incentive exists, therefore, to move on suspicions of fraudulent activity behind the screen, as the burden of proof falls to the educator (Silver & Lentz, 2012). If faculty have the audacity to challenge the learner, suggesting the work reflects unusually high quality or is inconsistent with prior submissions, they may or may not receive administrative support. Subsequently, students are often left unaddressed to avoid false accusations or difficult to document concerns regarding student identity. Additionally, as underscored by Kessler and Ramsay (2013), faculty may become complacent in helping the learner to maintain their status, as challenges to the authenticity of their work may compromise their ability to obtain or maintain scholarships or competitive entry into professional programs.

The literature indicates that instructor concerns about student identity are genuine, and well-reasoned. According to Kidwell, Wozniak, and Laurel
(2003), 74.5% of students are cheaters (as cited in Josien & Broderick, 2013, p. 94). The compromised behaviors typically take the form of student copying and compiling work that lacks specific student signature, purchasing a paper from the many available entities on the Internet with increasing sophistication and customization available to a specific course, and the latest trend is in student surrogacy—simply outsourcing going to class all together. One need only look to the popular website Craigslist for tutor postings that specifically state that the tutor will complete online courses, including research papers and exams, on behalf of the learner. In addition, a new breed of homework help websites has appeared. Sites like coursehero.com catalog student submissions by university, course, and activity and advertise themselves as study websites when in reality a student can download complete assignments for all course activities as submitted by other users. This website and others like them require the student to upload material before they are able to download material (or pay a fee) as a way of growing the website’s repository of assignments making the website more attractive to future users.

The significant evidence of nonlegitimate student work presents a challenge to the instructor, and overall, the governance of by institutions of higher learning. According to Michael and Williams (2013), students employ recording, saving, and purchasing materials, taking tests in pairs or groups, and even paying someone else to enroll and complete course work for them as methods of academic dishonesty. The latter we have coined, academic surrogacy. The challenge becomes the sophistication from which students are finding these sources to either buy assignment completion or outsource attending class all together. Institutions of higher learning require proof of these sophisticated methods of cheating, challenging faculty who may not yet (a) be aware of such cheating schemes or (b) have the digital prowess or acumen within the world of cybersecurity to be able to catch a student and prove to administration such behavior took place in class. A foundation of understanding may be warranted to proceed forward.

Information security is a focus suggested by Kessler and Ramsay (2013), “refer(ing) to all aspects of security and protecting information from unauthorized access or use” (p. 37). This concept is relevant to college and university-level learning as technology access may be manipulated to intentionally create the appearance of original authorship or to infer work is
being completed under the student’s name. For example, a student can strip or alter the document properties of a document to make it appear as though they are the original author. In addition, The Homeland Security Act (2002) mandated that academia take an active role in homeland security education. Although this mandate does support the need for this chapter discussion, this emphasis remains concentrated on class content orientation and vague, focusing mainly on the physical sciences. The goal within this discussion is to shape the conversation at the beginning point of student enrollment and access to ensure authenticity of access in the classroom itself, as well as to the curriculum content. The importance is to take a closer look at risk vs. reward. “Risk assessment is also an important governance function, as it is essential that an organization’s management understand the pertinent threats, vulnerabilities, and risk level of information in order to define the risk tolerance” (Kessler & Ramsay, 2013, p. 39).

It is no longer enough to simply buy answers for a midterm or final exam, students can buy previously submitted papers or newly created papers customized for their specific class, program, and university curriculum—created just for them as the consumer learner (Silver & Lentz, 2012). Silver and Lentz (2012) created this term, the consumer learner, when discussing the challenges of shifting the paradigm of education from the concept of a traditional student to the one of a consumer learner in terms of shifting the concept of education—particularly of the for-profit institutions—to one of customer service; the student is in the role of the consumer when they turn to the market place as a transactional exchange of trading money for buying student consumables such as discussion question posts, papers, and now hiring a surrogate student to attend class on their behalf all together. Despite the institutions requiring students to sign a student code of conduct or sign an ethical statement of intent, students seem more concerned with the transaction of the business of academia, with less concern with the opportunity for learning that academia was intended to represent (Silver & Lentz, 2012).

The Questions

Adding complexity to the dilemma of cheating is that students are often more proficient at using technology than the faculty teaching the course (Lange & Schultz, 2014). Educators must be aware of trends in academic technology and
have a duty to prevent academic dishonesty to the fullest extent possible (Lange & Schultz, 2014). One of the impacts of this emerging digital educational paradigm shift is the continued expansion of buying the experience of an online education or candidly, the credential itself. Students find themselves short on time, but with the recognition of the importance employers place on college credentials (associates, bachelors, masters, and doctoral degrees) for career progression. Thus, the goal seems to be the pursuit of these credentials as a consumer learner (Silver & Lentz, 2012) to add to one’s resume (business) or curriculum vitae (education) to include visibility in public social media platforms such as LinkedIn and Facebook, yet there seems to be less concern of the how a student attends school or what was actually learned—to include the latest strategy in student cheating: outsourcing, hiring a student surrogate to attend classes for them.

Surrogacy in the Academy: A Case Study

Universities are beginning to use similar methods as credit card companies to identify a surrogate user or an imposter or hacker—anyone other than the authorized user. However, unlike credit card companies that must defend against the use of stolen credentials, cheating within a university setting does not involve stolen credentials but a student who provides login credentials to a third party for the purposes of cheating. In this instance, the normal security precautions of a strong password, two-factor authentication (login + pin), etc. are all defeated with the sharing of one’s login credentials. This sharing of credentials means the primary tool for identifying a surrogate user is through behavioral analytics and Internet Protocol (IP) address translation, a process that credit card companies use to detect unauthorized use (Dhanapal & Gayathiri, 2012). Each time a student makes a database call through a user click in the learning management systems (LMS) a single line of data is captured in a log file. This log line may look like:

27692, 54897, 862308, assignments/preview, 2016-11-21T03:41:16Z, 12.345.678.90

This data can be reidentified as Student ID# 27692, was inside class #54897, and clicked to preview assignment #862308 at 3:41:16Z on November 21, 2016 from IP address 12.345.678.90. The student, class, and assignment numbers can be easily converted to a student’s username, a specific class (e.g.,
MATH 123), and a specific activity (e.g., Activity 1.2 – Module Discussion). In addition, the IP address can be translated to the name of the IP service provider, city, state, and other identifying information.

The following steps were used to best spot a surrogate user:

**Step 1.** Filter the log data so only ASSIGNMENT, SUBMISSION, and PREVIEW calls are present. This removes a substantial amount of irrelevant data from the data set; to prove a student is using a surrogate the university must show the surrogate “did the work for the student.” Simply viewing the assignment or reading a content page does not rise to this level, so the focus is on assignments and submissions.

**Step 2.** Translate all of the IP address data to show city, state, country, and name of the IP service provider. This step can be automated using a programming language to parse the data set.

**Step 3.** Sort the data set by student ID number. This strategy allows one to review the data for patterns. Pattern discovery can also be automated using a programming language to detect certain behavioral patterns but can also be manually done depending on the size of the data set.

On the following page is an example of suspicious pattern worthy of further investigation (see Table 1).

Here one can clearly identify a surrogate user. A person with a Kenyan IP address previewed assignment #6790 at 8:08:08Z and then submitted the assignment a few seconds later. Then, approximately 4 hours later, someone in the United State previewed the same assignment. The pattern repeated itself the following day with assignment #6789.

Thus, it can be deduced that the student hired a surrogate in another country to complete the work and each time the surrogate informed the student the work was done, the student logged in to review the work of the surrogate. Although

**Database call**

6789/submissions/ previews
6789/submission 6789/submissions/ previews
6790/submissions/ previews
6790/submission 6790/submissions/ previews
TABLE 1. IP ADDRESS

Date/Time – Zulu IP Address – City/State/Country
2016-11-21T09:25:56Z United States – Providence, UT
2016-11-21T03:40:06Z Kenya – Ebene
2016-11-21T03:40:08Z Kenya – Ebene
2016-11-20T12:11:00Z United States – Providence, UT
2016-11-20T08:08:22Z Kenya – Ebene
2016-11-20T08:08:25Z Kenya – Ebene

International examples are easier to identify, domestic examples can also be identified easily when comparing a student’s normal login behavior with outlier login behavior. For example, one student hired a tutor at a different university to turn in work on their behalf. This submission was identified easily using the above behavioral analytics pattern matching schema. The argument exists that students travel, but the time between submissions is the indicator. It becomes highly unlikely that a student flew to Georgia to submit an assignment, flew home to California to preview it, and then back to Georgia to submit another assignment a few hours later. Although ways to fool these logs and spoof one’s movements throughout the Internet, it would seem as though the vast majority of students using a surrogate would not possess those capabilities.

Universities continue to invest in remote proctor software, biometric verification, locked down browsers, and platforms that record audio / video of the student taking an exam that flag suspicious behavior. Although these technologies can and will prevent surrogacy, these strategies are not yet widely used and are cost prohibitive for many institutions. One must wonder if the reason universities are slow to adopt this technology is because they lacked the awareness of how wide spread this problem could be; something IP translation and behavioral analytics could better identify.

The Final Outcome:
Employer Concerns Post Graduation

The overarching concern and focus of this writing is the outcome of these impacts on integrity and ethics regarding the mastery of skills the student / employee / consumer will have when representing themselves to the business
community for employment. Not only do academic institutions struggle with who actually attends school, but business owners will also struggle with hiring and recruitment of qualified individuals. The potential for identity and author fraud leaves the leadership of the enterprise wondering if the name on the resume represents the individual who attended the classes and completed the work, possibly making recruitment more difficult. The employer has no certainty that the candidate being interviewed is truly the person who completed the course work and academic training identified.

The Hiring Dilemma

One of the many impacts of these creative dishonesties is suggested by Josien and Broderick (2013). The authors placed emphasis on the practice that many firms engage in while on campus of requiring a minimum grade point average to sign up for interviews. Thus, for the unscrupulous or unconfident student, cheating to earn a higher GPA carries the advantage of preference. Students recognized that presenting higher scores correlates to their ability to advance in the business world after graduation. Literature indicated that younger, immature students cheat more than older, more mature students (Josien & Broderick, 2013). Upper division classes encounter less cheating than lower division classes, and unmarried students cheat more than married ones (Whitley 1998; McCabe & Trevnion, 1997; Park, 2003; Straw, 2002; as cited in Josien & Broderick, 2013).

Students tend to cheat more at the end of their program, than at the beginning (Josien & Broderick, 2013). A related conclusion is that many seniors saw their colleagues cheat without consequences, and thus the option of if you can’t beat ‘em join ‘em seems to be part of the emerging movement (Josien & Broderick, 2013). In addition, Josien and Broderick (2013) suggested that plagiarism is not as prevalent as in the past perhaps because of the attention paid to plagiarism and the integration of plagiarism detection tools in most learning management systems. Knowing that plagiarism will not be tolerated according to policy of the student code of conduct in institutions of higher learning is sometimes a preventative to compromised citation practice (Silver & Lentz, 2012). The emerging downside however, is that this caution in one area of conduct perhaps opens the door to more creative types of cheating, such as the idea of surrogacy—to simply cut out the middle man where the
student simply hires someone to go to school for them.

**Encourage Integrity and Ethical Accountability?**

Students and faculty have a responsibility to academia and to each other. Students are responsible for their own education (Cook-Sather, & Luz, 2015). Faculty members include the responsibility for providing the opportunity for students to learn and for engaging student in a way that encourages learning. Engagement can seem elusive and tracking student learning in the online classroom can seem cumbersome and time consuming at a time when institutions of higher learning continue to ask faculty to take on more responsibilities in the form of additional teaching workload and committee work to meet the demands of tenure clocks. The question becomes, what is the incentive for spending the time and effort?

Ethics in academe is an important topic of discussion for faculty teaching in all levels of education and are a key component of the educational process. It is essential that faculty practice and teach ethical behavior (Turk & Vignjevic’, 2016). Many theories about ethics exist and each one has a number of scholars willing to accept or deny their validity; however, it is important that some sort of consensus is reached and taught to students in a way that encourages students and faculty to remain ethical. Student handbooks ask that students follow specific rules with regards to academic dishonesty and detail what disciplines can occur when and if these rules are not followed. Contracts, appointments, and mission/vision statements guide ethical behaviors for faculty members. How are these ethical guides developed?

Ethical guidelines for faculty and students are based on ethical theories of what is considered *right* for society (Rhode, 2006). Leaders in government and organizations use concepts of universalism, utilitarianism, deontology, and consequentialism to construct definitions of acceptable behaviors for students and faculty; however, there is much debate over if one theory is best for all situations, or if more than one theory applies to specific situations. A goal of academic institutions, and therefor of faculty, is to be inclusive. Doesn’t this imply, that sometimes the rules need adjustment to ensure that students are successful? So that tenure clocks do not run out? Why maintain integrity and why be ethical? Ethics serve many purposes, not least on the list is preserving the integrity of the educator’s credential, preservation of individual reputation,
and preservation of the reputation of the academic institution. Ethics remain based on what is morally right per society values. Dishonesty is not a moral right so any form of cheating in academia, including surrogacy must be wrong.

What We Could and Should Do

A goal of this chapter was to discuss the impact that digital technology has on academe and the need to contemplate the integrity of efforts invested by learners within their own educational process. Another goal of this chapter was to discuss what educators and students are responsible for in relation to integrity and ethics in academia using digital formats. Again, as digital technology uses computers to review resumes for key search words that match the job description and needs of the employer, how will the hiring authority have confidence that the applicant actually can do the job and truly possesses the actual skills as listed on their resume? How will society trust, but verify, skill mastery when looking to the newest graduates to join the corporate world to advance the world of business?

Ultimately, ethics are an important part of the education process. The key to avoiding unethical behaviors occurs in two steps; recognition and self-control. Students are responsible of exhibiting ethical behaviors despite the availability of technology that makes academic dishonesty easy. To achieve this result, students must make the conscious effort to recognize that the temptation to behave dishonestly exists, even for the *perfect* student. Faculty members are responsible for teaching and modeling ethical behaviors for the preservation of their credentials, to encourage ethical behaviors in their students to help them become ethical citizens of the world in a time when technological advances provide the opportunity to, and unscrupulous people and organizations encourage, achieve without paying attention to how achievements are made.

Conclusion

As presented in this article, the continually emerging world of digital technology offers many significant challenges to the world of higher education. Although digital technology offers the ability of education to expand its reach beyond traditionally served communities in traditional brick and mortar environments, offering convenience of the online classroom comes with a price. A question considered was whether the impacts on integrity and ethics
within post-secondary education is worth the price paid. A truth discussed was that online learning is not a fad; it is an educational modality that requires educators to learn to manage a new era of unethical behavior in academia. As educators promise to uphold the objectives and syllabi for courses, they commit to build learner competencies to ensure that application and direct transfer into industry may occur (Silver & Lentz, 2012). The focus of this chapter was to explore the challenge to refractive thinking of the next generation of ethical dishonesty and cybersecurity faced in this new digital age to provide additional thought and purposeful discussion in thwarting this next generation of trying to circumvent the educational process.

Academic misconduct and integrity in postsecondary education is an international concern for stakeholders of postsecondary education (Chapman & Lindner, 2014). The impacts of the evolution of online education on integrity are vast, continually expanding, adding to the concern about integrity in the classroom. Traditionally, faculty faced the same issues of integrity violations regardless of modality. Documentation of student cheating whether on assignments or exams, fabricating information, facilitating academic dishonesty in others, and plagiarism are well documented (Erikkson & McGee, 2015). Issues of plagiarism (to include self-plagiarism) on assignments and exams are an issue seemingly as old as time. Not only do institutions of higher learning find and convict students of submitting papers by someone other than the student author, digital technology affords students the ability to buy papers by many disreputable businesses who will gladly sell students papers, problem sets, and discussion posts for specific classes, customized to meet their needs (Bain, 2015; Taylor 2014). The question of why should one do what is honest and considered right when there are in increasing number of ways and, maybe even, incentives to act dishonestly can be answered best by considering what are the cost and consequences to the stakeholders. Students have a duty to know what they say they know, educators have a duty to provide the instruction they say they have provided, and employers have an expectation that the employees they higher have the knowledge and skills they claim to possess.

THOUGHTS FROM THE ACADEMIC ENTREPRENEUR
The problem to be solved:
• How to identify and thwart new student cheating strategies within the digital space
• How to overcome the potential impact of cheating and student surrogacy on employer recruitment

The goals:

• Understanding how to prepare faculty to identify and prove various innovative strategies for cheating as well as student surrogacy.

The questions to ask:

• How can institutions of higher learning effectively prepare for student learning in the online space regarding the issues of plagiarism and student surrogacy?

• Can cheating issues be overcome to create strategies for managing student ethical behavior effectively?

• How will employers recruit quality candidates based on potentially incomplete or misrepresented educational achievements?

Today’s Business Application:

• Institutions of higher learning need to create strategies to understand the student culture of cheating to respond successfully

• Effective administrative leaders within institutions of higher learning need to create effective identification strategies to understand the student culture of cheating to respond successfully

• Effective business owners need to create effective identification strategies of skill mastery regarding new hires

REFERENCES


About the Authors . . .

Dr. Temeaka Gray resides in the mid-western town of Toledo, Ohio. Dr. Temeaka holds several accredited degrees; a Master of Business Administration (MBA) from Tiffin University; a Master of Nursing (MSN) from the University of Cincinnati; and a Doctorate in Psychology (Health and Wellness focus) from the University of the Rockies. Dr. Temeaka also holds an Online Teaching Certificate from the University of Toledo.

Dr. Temeaka, an Assistant Professor at The University of Toledo, teaches and works with students across undergraduate, graduate, and doctoral curriculums in the nursing program. She enjoys teaching and mentoring in psychological, sociological, and nursing disciplines. She is a member of the American Psychological Association, the Ohio Association of Advanced Practice Nurses, Sigma Theta Tau International (President elect of Zeta Theta Chapter at large, Order of the Eastern Star (Pride of Composite Chapter), and Delta Sigma Theta Sorority, Inc.

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Dr. Glassman is an Assistant Professor in the College of Business at Embry-Riddle Aeronautical University in the Technology Management department. His interest in cybersecurity and student surrogacy stem from a need to ensure degree authenticity and provide mechanisms from which to identify cheating. Using his experience in learning analytics, social analytics, forensic data analysis, and online learning, he believes that universities must actively safeguard against cheating to ensure degree value is preserved and industry can rely in degree presentation as a statement of personal accomplishment.
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Dr. Gillian Silver Rodis, ABC, is an accomplished integrated marketing communications and strategic planning professional. Her extensive experience spans corporate-level vice president and director positions for companies with both domestic and international operations, and she has nearly two decades in the postsecondary education arena as a professor at the Bachelor’s, Master’s and Doctorate level.

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Nevada Women’s Hall of Fame. Dr. Silver-Rodis has been recognized for her competency and student-oriented philosophy with educator excellence awards from numerous organizations including the College of Southern Nevada, Maricopa Community College, and the University of Phoenix.

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This book provides a distinctive approach to the transformation of the higher education culture within the U.S. Authors Dr. Gillian Silver and Dr. Cheryl Lentz, noted content experts, professors and curriculum/program developers, explain that the contents will initiate an intensive dialogue about the implications and impacts on administrative structure, faculty practice, and learner outcomes. Says Lentz, “This is a frank, encompassing work that has the capacity to ignite a national dialogue. We think the review will give voice to the significance of this evolving environment. The voices of experience leading this change will emerge.”

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