



Studying Corporate Crime: Making the Case for Virtual Reality

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Abstract

The study of what motivates corporate criminals has not yet identified the situational and structural characteristics of the corporate environment that lead to law violation. Current research methodologies do not allow researchers to fully understand these situational and structural dynamics, which influence decision-making processes that occur in the corporate world. The study of corporate crime can benefit from the use of virtual reality technology in many ways. This article explains the technology of virtual reality and how it can be applied to the study of corporate crime. Current research methodologies are reviewed and the weaknesses, and how they can be strengthened through virtual reality, are fully discussed.

Keywords: Corporate crime, white-collar crime, virtual reality, VR, technology, methodology, training, ethics education.

Introduction

Over the past 70 years, more than a few dedicated sociologists and criminologists have devoted considerable time and effort to studying the phenomenon of white-collar crime. Throughout this period, the study of white-collar crime has taken on many different forms and touched myriad areas. The current epoch in criminological scholarship of white-collar crime has focused heavily on the problem of corporate crime and deviance. Led by many influential scholars, investigations into corporate crime have produced a wealth of knowledge relating to corporate offending, corporate law, and the corporate offender (see: Benson, 1985; Braithwaite, 1982; Geis, 1962; 2007; Mueller, 1957; Simpson, 2002; Sutherland, 1949; Yeager, 1979).

The empirical literature on corporate crime has significantly influenced our exposure to the motivations and rationalizations behind corporate offending. These motivations and rationalizations distinguish “suite” offenders from “street” offenders. Unlike traditional “street crimes,” corporate crimes do not present themselves in visible and consistent ways. For example, street crimes typically involve offenders who have close, intimate contact with victims and witnesses. The intimate proximity of street offenders to their victims requires that they attempt to hide their identities in an effort to conceal their involvement in what are usually visible and public acts.

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Corporate crimes, however, are not nearly as visible and public as many “street” offenses. This is due to the fact that rather than attempting to hide their identities, corporate offenders use their identities to create a superficial appearance of legitimacy (Benson & Simpson, 2009). The reality that corporate crimes can be technically complex (i.e., manipulation of corporate financial records, large-scale ponzi schemes, and price fixing conspiracies), and that these crimes are diffused over space and time, aids offenders in hiding their misdeeds. This complexity, and the sometimes esoteric nature of the business world, creates issues for researchers attempting to study the details of corporate crimes and corporate offenders.

Traditionally, the study of corporate crime has utilized the same methodologies (self-administered surveys, collection of official data, ethnographic research) employed in the study of traditional street crimes. These methodologies, while very useful for gathering information about offenders and specific crimes, do not fully capture the processes that underlie decisions to offend in the corporate environment. Capturing the situation and role-specific influences that affect the decision-making process is necessary to advancing our understanding of corporate crime. For example, because one’s position, autonomy, industry, and peers affect decision-making within corporations, one will rarely make a decision without input from several different channels. In the business world individuals will receive, and at times solicit, information from other parties that may influence their decision on a particular issue. Gaining an increased understanding of these decision-making processes, which underlie corporate crimes, will aid in the detection and prevention of such crimes.

Prevention efforts are hampered by the fact that corporate crimes occur within complex organizations where situational and organizational characteristics affect decision-making at the individual level. Ignoring the impact of these characteristics on the opportunity structure for corporate crime ignores the social reality within which organizational offenders exist. This reality is one where the individual is at times indistinguishable from the organization. Acts attributed to the organization are in actuality the result of decisions by an individual or a group of individuals. The complexities of organizational life require studies of corporate crime to encompass individual and group-based factors that attempt to identify opportunities for unethical and illegal conduct.

This paper proposes that future studies of corporate crime integrate a new method for observing the decision-making process within individuals, alongside existing methods of data collection. To better study this complex issue, we argue that the use of virtual reality (VR) as a methodological tool will greatly advance the study corporate crime. This paper argues that this new combined methodology will have a significant impact on deepening our understanding of corporate crime as experienced through the lens of the corporate actor. While current methods of data collection are not poor, they do not fully capture the processes behind the phenomenon that is corporate crime.

The concept of VR has been around for many decades, yet its practical application for the study of corporate crime has not been explored. We advance that using VR for the study of corporate crime will vastly improve our knowledge of the decision-making processes surrounding corporate law violation. This is because VR will give researchers a deeper understanding of how individuals make decisions regarding the choice to offend, or abstain from law violation. Where traditional survey methods allow us to identify situations in which an individual may offend, VR will enhance our ability to understand

the factors behind these decisions. Increasing our understanding of such factors will also lead to the development of better means to combat corporate crime.

The first section discusses the technology of VR, its current usages, and ideas for assimilating this process into the study of corporate crime. The general applicability of VR to the study of crime has been explored in detail only once previously (Ticknor & Tillinghast, 2011). It has been shown that there are many useful avenues for the technology within the study of crime and offenders. The adaptation of VR for use in the field of criminal justice follows on the heels of its use in the many other areas (Ticknor & Tillinghast, 2011). The positive results found from previous work with VR suggest that its applicability to the area of criminal justice is entirely warranted. VR offers to advance the study of crime in a multitude of ways, yet its use in corporate crime research, arguably, may be the most fruitful.

The second section of this paper explores the current methodologies used to study corporate crime. The use of survey vignettes, interviews, and case studies have been the primary means of data collection used in corporate crime research. While these methods have proven useful in previous data collection efforts, they have not produced an accurate picture of how the factors that affect corporate offending interact and influence one another. Without this knowledge our understanding of corporate crime, as well as our ability to detect and prevent such crimes, is limited. In order to advance the study of corporate crime and our understanding of the factors that motivate these crimes, more advanced methodologies are required. One such methodology is to use the software advancements and cost efficiencies of modern information technology to incorporate VR into future research projects.

Finally, this paper concludes with a discussion of the vast potential for VR to enhance our understanding of corporate crime and proposes avenues for its adoption into empirical explorations of corporate offending. Future research into the causes and correlates of corporate offending must be adaptable to a rapidly changing business environment. Through the use of easily modified software, response feedback, and interactive environments, VR offers the adaptability needed to study corporations and corporate offenders.

As technology advances in our ever changing world, the study of crime must also advance. In addition to studying the causes and correlates of corporate crime, VR can be used to reduce opportunities for illicit behavior by enhancing current training methods and corporate education programs. Cost concerns, poor response rates, and improper question interpretation remain areas of concern with current research methods. VR offers the possibility of reducing costs, raising response rates, and bringing to light new and important information about corporate crime.

Virtual Reality: A Brief Introduction

VR is, for the purposes of empirical research, a virtual environment created by researchers with the goal of answering specific questions relevant to an individual's conduct and cognitive or physical responses to situations. A virtual environment is a simulated, computer-generated world incorporating three-dimensional (3D) visualization that allows user interaction. This environment is viewed either directly or with the use of a head mounted display (HMD). The interaction of users is tracked by a computer, digitally recomposed, and then displayed back to the individual. Through the eyes of an avatar, a computer generated image of the user, an individual can maneuver through pre-

formulated scenarios, interact with other virtual beings, and play out realistic scenarios. Two key concepts are theorized to have the greatest impact on maximizing the users' experiences and enhancing the reality of the scenarios: *immersion* and *presence*. Both immersion and presence are crucial to the virtual experience, as a virtual environment that produces a greater sense of immersion usually produces a greater sense of presence. As will be shown, these concepts are essential to the successful implementation of virtual reality in the study of corporate crime.

The concept of immersion refers to the actual configuration of the VR interface while the user is connected to the system. Depending on the goals of the simulation, various types of immersion techniques can be employed. There are three main types of systems: fully immersive, semi-immersive, and non-immersive (Gutierrez, Vexo, & Thalman, 2008; Riva, 2009). The most advanced are those systems that use full immersion. The goal of this type of system is to minimize the user's awareness of the real world. By isolating the user from the real world, researchers are able to increase the credibility of the virtual experience. Semi-immersive systems also seek to minimize the awareness of the real world but do so in a slightly different manner. Many of these systems use projectors, special cameras, and screens to display the virtual environment. One advantage of this type of system is that multiple users can experience the world at the same time, leading to more realistic interaction within the virtual simulation. This type of multi-user, separate site system has many advantages for corporate crime research. For example, sample size is a particular concern in the study of corporate crime because of the difficulties of reaching a large amount of subjects. With the use of VR, researchers are no longer restricted to a single group of people or just one location. Employing research that uses an online virtual world, researchers can have sample sizes far larger than what can be obtained in more costly and time restrictive manners that are found in the real world (Jarrett, 2009).

With networked environments, researchers have the capability of reaching spatially separated populations at the same time. Users from various locations, through the use of VR, can be brought into the same research study without the expense of physically bringing them to a single location. This can also help to address issues related to non-representative samples (Fox et al., 2009). The least interactive and hence, least realistic, systems are non-immersive VR systems. Non-immersive systems are usually described as desktop-based VR systems. The most common types of non-immersive systems are video games (Gutierrez et al., 2008), such as those currently being used by corporations to facilitate company wide ethics training.

All of these systems are designed with different goals in mind. For the purposes of corporate crime research, semi-immersive systems will provide an appropriate level of immersion, in a compact, cost effective package. Additionally, if the goal of the simulation requires that a group of users be immersed together, a semi-immersive system will provide the needed environment. Multiple subjects can be placed in the exact same virtual environment from one scenario to the next. This is difficult in conventional research where changes in the physical environment and unforeseen interruptions may influence study outcomes. VR ensures that all participants are receiving the same level of instruction, interaction, and treatment. By having exact replication, researchers can provide the same environment for each participant, eliminating issues of measurement validity. Additionally, one of the major benefits of using a VR system is the ability of the user to view the scenario from the perspective of others (Suler, 1999), a feature that can aid in the provision of corporate ethics training. By placing respondents in the role of an

actor, as well as an outside observer, VR can help to recreate actual situations that a person may encounter in the workplace.

All types of immersive reality depend on the psychological state of individual users, characterized by how users perceive themselves in the virtual environment (Witmer & Singer, 1998). This is commonly referred to as *presence*. For the study of corporate crime, it is essential that respondents be *immersed* to the point that they will *perceive* themselves as actually making decisions as if they were in the corporate environment. In this way, immersion and presence will work simultaneously to enhance the virtual experience, and increase the likelihood that responses obtained in the virtual world will be similar to those likely to be obtained in the real world under similar conditions.

The concept of presence is especially important with regard to the study of corporate crime because users need to feel as though they are a part of the virtual environment so they will view situations within this environment in the same way they would view situations in the real world. This connection between the virtual world and the real world is what will allow studies of corporate crime using VR to gain a better picture of the decision-making processes behind unethical and illegal corporate behavior. Virtual simulations that reflect real world business situations, however, must engage the user on several different levels in order for the connection to be made between virtual and real world behaviors.

Three types of presence are typically discussed in the literature: physical, social, and self (Biocca, 1997; Lee, 2004; Shen & Khalifa, 2007). Physical presence is the notion that, in the virtual world, a user experiences a fully functional representation of the physical world in which that user actually exists. As such, users can actually experience the virtual corporate world that is created artificially, as though it were the real corporate environment. Social presence is when various forms of behavior give the user the impression that there are other people present in the virtual world. Social presence represents the degree to which individuals will experience social interaction in the virtual environment. This is critical to the study of corporate crime because of the interaction that is inherent to the corporate world. Individuals will interact with many different people on any given day. Recreating these interactions will help to create a more realistic virtual experience, and will offer the opportunity to study how personal interactions influence decision making in corporations. Self-presence is the psychological identity of the user within the virtual world. The greater the level of self-presence, the more likely it is that users will identify with their representation in the virtual environment. Essentially, the degree to which individuals are able to focus their attention within the virtual environment helps to determine their level of involvement within the virtual environment (Witmer & Singer, 1998). Each type of presence assists users in becoming more involved in the virtual scenarios, and thus heightens the virtual experience. In short, presence is the acceptance of the virtual world as real.

Specific features of the virtual environment affect the degree to which presence is achieved. The more the VR system and programming adapts to the individual, such as changing the scenarios based upon the user interaction with elements of the scenario, the more the individual will adapt to the virtual environment (Biocca, 1997). Differences in presence can result from the features of the virtual environment, but the user's individual traits and abilities are equally as important (Fox, Arena, & Bailenson, 2009; Stanney et al.; Witmer & Singer, 1998). The goals of the virtual world should also be a consideration to researchers when designing scenarios. Individuals will experience a higher level of

presence in a virtual world and become more involved in scenarios that are relevant to their own goals (Riva, 2005). Therefore, the use of previous research using survey vignettes, interviews and case studies can inform the creation of scenarios that will create a realistic virtual corporate world that users can more easily relate and respond to.

Current Methodologies for Studying Corporate Crime

Because of its complex and often times hidden nature, corporate crime can be a difficult subject to study effectively. The scholars who have examined corporate crimes have taken a variety of different approaches, yet most studies rely on the use of survey vignettes, personal interviews, or case study analysis. While each of these methods has its own unique advantages, none can reach the depth of information offered through research using VR. This section reviews the contributions of each methodology within the current body of knowledge related to corporate crime, and contrasts them against the benefits of using VR. The advantages and disadvantages of each method are, and should be, balanced against research goals and the ability to achieve the highest quality data. There is, however, the potential to expand beyond the current methods of corporate crime data collection with VR. This expansion offers the very real prospect of researchers being able to place respondents in true-to-life situations with real corporate scenarios, rewards, and punishments. The outcome of this expansion will be a better understanding of both corporate offending and individuals' decisions to commit crime within the business environment.

Vignette Studies

The most popular approach to the study of corporate crime involves the use of survey vignettes. Vignettes are short stories reflecting specific scenarios, crafted to measure some variable of interest (Hagan, 2010). Vignettes are a preferred method because they can tap into human and personal dimensions that traditional surveys cannot (Alexander & Becker, 1978). Vignette designs are also the most effective method currently used for incorporating situational variation in empirical approaches for the examination of corporate misconduct. The main advantage to the use of vignettes is that researchers have the ability to manipulate the situations with which respondents are presented. The use of VR capitalizes on this ability. By controlling the virtual environment, researchers have the opportunity to evaluate measures that may not typically be captured by current corporate crime research.

One of the drawbacks to the use of survey vignettes is that they do not offer a high level of realism, a factor that if incorporated into empirical explorations may significantly benefit corporate crime research. Typical vignette scenarios focus on creating a situation depicting an act considered a corporate crime (Paternoster & Simpson, 1996; Simpson & Piquero, 2002). These scenarios must present enough information for the respondent to understand the background of the situation, the actor(s) involved, and the act that is being committed. Additionally, these considerations must be balanced against the fact that lengthy vignettes become tedious and may cause the respondent to lose interest in the survey. The vignette is therefore attempting to give enough information to allow the respondent to identify with the situation, understand its importance, and make an educated decision. At the same time, the vignette authors are attempting to keep the situations to a manageable and digestible length.

The juggling act of vignette creation often leaves much out of the situations presented to respondents. Additionally, the manner in which information is presented does not facilitate a deep understanding of the situational pressures that are present in real world decision-making. Without fully capturing the situation specific variables that impact decision-making in the corporate context, studies using survey vignettes will only be able to capture respondent's attitudes about the nature of the situation they are presented with. Studies of corporate crime should be more concerned with capturing respondents' decision-making processes and the factors that influence those decisions. This can be addressed by using VR.

During the virtual simulation, situations are no longer static; they become fluid interactions with the respondent where the temporal ordering of events and information presented to the respondent can mirror the corporate environment. As opposed to having to balance between the substance in the vignettes and restrictions on vignette length, VR allows researchers to present a wealth of data, through scenarios, over a longer period of time without the threat of respondent burn-out. The interactive nature of VR, as experienced through semi- or fully-immersive systems, and its ability to give immediate feedback, create a high level of user presence while in the virtual environment. This high level of presence is what helps to create realistic scenarios that mirror the real world business environment, allowing researchers to truly capture the decision making process; an advantage that traditional data collection methods do not have.

However, the situations are adaptable. Using VR, researchers can create a multitude of situations in controlled environments, allowing them, with a few clicks of the mouse, to manipulate anything in the virtual world (Fox et al., 2009; Riva, 2005; Ticknor & Tillinghast, 2011). The ability to quickly manipulate situations, to adjust scenarios, and to change the virtual environment is particularly important to the study of corporate crime. The fast-paced nature of the corporate environment means that factors that affect decision-making will rarely remain constant. VR offers the flexibility to adjust for this lack of consistency, or environmental control, a major criticism of research in criminal justice (Eck & Liu, 2008). Vignettes and survey questionnaires cannot recreate this element of the corporate world, an element that is so essential when considering the decision of whether or not one will engage in an illicit act.

For example, a researcher may want to understand how the financial accounting scandals of the 2000s, and the resulting legislation, have impacted the business environment. In this situation, the researcher can recreate a scenario that mirrors the key variables of particular situations. The researcher can then determine if a respondent would follow similar unethical paths as the companies upon which the scenarios are based. Researchers also have the ability to incorporate vital elements, such as high-risk situations, that may otherwise be in violation of human subject guidelines are considered unethical in conventional research (Renaud et al., 2009; Thornton & Laws, 2009). Recreating the scenario in the virtual environment allows researchers to bring the consequences of specific decisions into the virtual situation so that their effects are accounted for in the decision-making process.

Interviews

Studies of corporate crime have also relied upon interviews with corporate insiders, offenders, and prosecutors (Benson, 1985; Benson, Cullen, & Maakestad, 1990; Braithwaite & Makkai; 1991; Cressey, 1953). These interviews have been especially

helpful in determining the motivations, rationalizations, and neutralizations used by offenders when committing acts of corporate crime. Additionally, interviews can help to inform researchers about the aspects of corporate crime that law enforcement agencies should focus on concerning investigations and prosecutions.

More significantly, the interviews provide a way to hear about corporate offenses directly from those who experienced or participated in the acts. The ability to have a sustained dialogue about specific events can create a trust relationship where individuals are more likely to share their true feelings and experiences (Kvale, 2006). This means that the interview process can provide access to unfiltered content and information that a survey form cannot capture. Interviews allow the researcher to gather context specific information about the subject and the situation being discussed (Alalehto, 2003; Bryman, Stephens, & Campo, 1996). Additionally, questionnaires and vignettes often times cannot capture the specific elements driving variation in subject responses (Sandelowski, 1996). Interviews allow researchers to explain the findings of quantitative studies in ways that numbers cannot describe.

Interviewing techniques, such as the intimate informant interview used by Alalehto (2003), can be research specific, meaning that the interview format can be selected to maximize the data collection effort. In essence, the researcher can select the format that will produce the most reliable results for their study. This flexibility allows researchers the opportunity to address issues not previously identified as significant to the study outcome. The main problem with this flexibility is that it further hinders the validity of the data collection process. Deviating from standard interview questions and following a subject's line of thought may yield rich data for the researcher, yet it can also lead to data that is unverifiable, or unreliable. Because different questions have been asked of different participants in the same study, answers from one subject cannot be directly checked for accuracy against the answers of another subject. Additionally, what interviews cannot do is reliably spoken to what individuals would do differently in a future situation given what they have experienced in the past. While interviews are very good for capturing situation specific information and details about corporate crimes that cannot be gathered through a survey, they cannot be used to generalize to the larger population.

VR offers the possibility of addressing these issues of validity and generalizability, which are naturally a part of the methodology of personal interviews. The virtual corporate environment can be similar to an interview in that it will react to the user by offering situation specific responses to the users' choices. As opposed to maintaining a single story line, VR can move and change in response to the choices of the user. As with interviews, the instrument is not "fixed," yet unlike interviews, the researcher knows the scenarios. Responses to the user's decisions at key trigger points in the scenario come from a list of potential responses, responses that can be randomly assigned thereby addressing issues of validity. Additionally, by virtue of the fact that the researcher has access to the results of the subject's virtual experiences, he/she has access to the data that can support or refute information gained in post-study interviews about the situations.

Because of the controlled nature of the VR simulation, data on the user's interactions within the virtual environment can be collected automatically. When a user interacts with the VR simulation, data related to response times, situational choices, and the impact of environmental influences (influences that take place within the corporate environment, yet involve input and interaction from others) are captured by the computer software. This data can subsequently be coded to fit pre-determined measures developed by the

researcher to be used in later statistical analyses. Furthermore, as opposed to using a survey to ask user's what they did at a particular point in the virtual situation, VR automatically captures what user responses and reactions actually were.

Case Studies

Finally, a very well received method of studying corporate crime has relied on the use of case studies (see Brickley, 2003, Cagle & Bacus, 2006; Cullen, Cavender, Maakestad & Benson, 2006; Freidrichs, 2004; McClean & Elkind, 2003; Simon, 2000; Vaughn, 1997). Case studies in the area of corporate crime research have typically been in-depth examinations of specific instances of corporate misconduct by individual corporations or an industry. Typically, the misconduct has been very high profile and has resulted in drastic changes in the regulatory and social environment. The most prominent case studies of recent years have focused on the financial accounting and housing scandals of the 2000s.

Recent instances of corporate improprieties make good case study material for several reasons: 1) the offenses are still fresh in the public mind, 2) recalling specific details related to the case is easier for those involved and, 3) the temporal proximity of the actual offenses to the release of detailed information about the crime and the offender aids in understanding the crimes. Case studies, in part, are an attempt to recreate where things went wrong and what factors contributed to the criminal conduct in question. For example, corporate standards and procedures focused on compliance are intended to prevent criminal or deviant acts. Not surprisingly, reductions in compliance program effectiveness can lead to increased opportunities for individuals to engage in corporate crime and deviance. Employees or corporations that subvert parts of these standards and procedures reduce their overall effectiveness, and create situations where corporate crime can occur. When crimes do occur as a result of such reduction in standards, case studies can effectively highlight the specifics of these situations.

Because they examine the actors, work processes, and the corporate environment, case studies can help to identify industry or corporate-wide patterns of malfeasance, as well as how to block future opportunities for engaging in similar acts. The obvious drawback to case studies is that they may not properly represent the working environment of other corporations. Because case studies focus on individual corporations, employees, industries, or crimes, the information gathered through this type of research is often limited to the specific case being examined. The ability to take this same information and apply it in such a way that we can better understand future corporate offending is hampered by the fact that the data does not speak prospectively.

VR offers the ability to take data gathered from case study research and, as with vignette and interview data, apply it to situations where accurate assessments of an individual's conduct can be made. When creating scenarios in the virtual world, data gleaned from case study research can be used to craft scenarios in such a way that important aspects of previous, high profile, unethical/illicit corporate behavior are included. This is important because such scenarios can be used to test one's propensity to engage in similar acts, thereby assessing the possibility of having recurring corporate law breaking. Additionally, the simulation can be adapted based on changing and emerging corporate standards. This type of flexibility allows the participant to experience the scenario, as modified for the particular research focus at hand, in such a way that they are now part of the new scenario.

Making participant's part of the scenario allows them to react at key points where decision-making is important to the final situation outcome. Key decision points, or triggers, can be presented at crucial times that previous case study research suggests will have an impact on the outcome of the situation. As opposed to simply being told about what has happened in the past then being asked what one would do in a similar situation, individuals can be placed within a situation and allowed to make their own choices. The freedom to make choices in simulated situations gives VR an advantage over other methodologies when incorporating case study data. Participants now have the ability to follow a multitude of paths, each one reflecting a different pattern of decision-making, regardless of the final situation outcome. Mapping these decision trees allows researchers to understand how situational dynamics and the influences of previous corporate offending affect decision-making.

Conclusion

Virtual reality offers many advantages, which are superior to current methods, for the study of corporate crime. First, real-life situations can be presented to the subject and modified to fit their specific roles and responsibilities. Specifying the context of the subject's role and their position within the corporation will allow the subject to respond in ways that will more closely mirror their real-world responses to situations. Second, responses to the subject's actions are not fixed; they can vary depending on the subjects specific actions. The subject's actions are responded to with situation appropriate modifications that mimic real-world conditions related to the work environment. Additionally, VR creates temporally appropriate responses to the user's interactions, thereby increasing the level of realism within the simulation – this is something that traditional survey methods cannot simulate. Third, multiple methods of data collection are incorporated into one setting. VR allows researchers to gather data from the subject during their virtual interactions, which can later be used in place of other methodologies, for example, to answer the survey-type questions. Computer programs can be used to collect information related to the subject's interactions at specific moments throughout the situation. Thus, recall issues and various forms of response bias can, in many cases, be eliminated.

Despite the fact that VR and computer based learning programs are new to the field of criminal justice, and have never been applied to the area of corporate crime research, corporations have been using this technology for several years. The growth of the internet, rapid technological advancements, and a focus on process efficiencies has hastened the entrance of computer based learning strategies into the corporate world (Dagada & Jakovljevic, 2004). Everything from new employee orientations to annual ethics trainings are now being conducted on-line throughout many corporations.

Corporations have already found that employees find computer-based leaning/training programs are a more effective and accepted method than traditional instructor led forums. This is because employees feel that they have more control over their instruction, the tasks in which they participate, and the time they spend on those tasks (Brown, 2001). If individuals within corporations are already comfortable interacting in computer-based environments, the use of VR to study corporate crime offers a natural method for studying the corporate environment. This is because using VR as a research methodology will more closely resemble current corporate training practices. Corporations do not use vignettes, surveys, or interviews to conduct employee trainings; they are, however,

increasingly using interactive methods that allow the subject to respond to changing situational variables. Modeling and enhancing on this approach may increase the desire for corporations to collaborate with researchers, and make respondents more accommodating to the research process.

As with all computer-based learning/training advances, VR will be shaped by the context and situations that it is meant to recreate (Homan & Macpherson, 2005). Advances in the usability of VR will therefore be shaped by changes in the corporate environment. As the presence of VR within corporations' increases, the study of corporate crime through the use of VR will adapt and as a result, our knowledge of corporate decision-making will be enhanced.

Additionally, the use of VR allows for current computer-based learning to be expanded to more fully achieve real world goals (Fox et al., 2009; Riva, 2009; Schultheis & Rizzo, 2001). In the corporate world, ongoing ethics education has become an area of focus for many corporations. VR based corporate ethics programs can be created that study unethical decision-making and meet criminal justice research goals, while at the same time providing the ethics training corporations seek to reinforce ethically positive behavior among employees. As it stands, corporations spend a considerable amount of resources managing risk and balancing obligations in an effort to mitigate the effect of market downturns and product failures (McLean & Nocera, 2010). Incorporating VR into corporate training, and creating a virtual corporate world, will allow corporations to better manage the risk that emanates from their employees. Additionally, researchers will better understand how employees make decisions when faced with real-world unethical choices.

Various professions are already taking advantage of the real world experience that VR has to offer. VR is currently being used as a platform for teaching and training in a variety of vocations including medicine and aeronautics (Gutierrez et al., 2008; Tichon, 2007; Sherman & Craig, 2002). Training using VR allows participants to interact in a safe and controlled environment while they practice and perfect particular skills. Trainees can respond to high risk or high stress situations while avoiding real world harm.

The goal of using VR for the study of corporate crime is to deepen our understanding of how factors within the corporate environment affects decision making processes; factors that are difficult to measure with current research practices. Research practices that pull away from, or fail to advance this goal will only serve to add volume or breadth to the amount of knowledge currently available relating to corporate crime; it will not increase or deepen our understanding of these crimes. By recreating situations, manipulating how situational and organizational factors interact with respondents, and collaborating with corporations to create realistic virtual environments, the study of corporate crime through VR can yield significant insights relevant to understanding corporate crimes and, more importantly, the prevention of such offenses. Furthermore, the scenarios that are presented to respondents must be continually updated to reflect current, real-world business situations so that the element of realism is consistent and present.

However, there are both tangible and theoretical issues involved with the implementation of VR as a methodology for the study of corporate crime. Resources, both human and financial, need to be dedicated on a long-term basis to such an undertaking. Creating a virtual environment from scratch requires access to significant funds for hardware and software development. Cost considerations may prohibit the rapid adoption of the technology and its subsequent use for research purposes.

The price of acquiring the hardware and software, developing the scenarios, and training research staff may give some potential users sticker shock. What must be remembered is that these costs are short-term, upfront implementation costs. The long-term expenses associated with continuing operation of VR are minimal. Yet the front loading of costs may serve as a potential barrier to entrance for some researchers. It is suggested that a long-term analysis of usage be conducted where start-up and maintenance costs are mapped out in line with the long-term benefits of the technology.

Gathering the financial resources to implement a VR program presents the opportunity for further collaboration between criminal justice researchers and the corporate world. As corporations become more invested in the processes of computer based learning, they will begin to invest in technologies that are capable of maintaining virtual environments. Working with corporations and using their existing hardware, corporate crime scholars need only to bring the program software designed to measure the constructs of interest.

There are other potential limitations to the use of VR as an instrument to study corporate crime. First, because some individuals are more comfortable using emerging technology than others, self-selection could become an issue for sampling. Individuals who are more comfortable with technology and are more willing to explore new technological advancements may be more willing to participate in VR based research than those who are more technology averse. If these differences correlate with age, issues of representativeness within the study of corporate crime may be significant. Younger business people may be more comfortable with technology than older business people. If the latter group is under-represented in study samples there is the potential to lose vital information regarding the correlates of age, employment tenure, and job role to corporate crime.

Secondly, researchers may face issues with getting approval to use VR based research when applying for project approval. Institutional Review Boards (IRB) may have specific concerns regarding human subjects and the use of VR. Although research using VR does not reach the level of potential harm that may be caused by medical research or drug trials, it may still be viewed as being potentially more harmful than traditional survey research methods. As such, researchers seeking to use VR as part of their research agenda should be careful to fully explain to their IRB the full extent of potential costs and benefits of using the technology. Additionally, disclosure of such potential harms should be made explicit to potential subjects in as clear a manner as possible.

Finally, there are potential medical related drawbacks to the use of VR. Some common problems associated with the use of VR include nausea and dizziness, which may result from viewing and interacting with the virtual environment (Greenfield & Cocking, 1996). Additionally, due to the realism created in a virtual environment, some participants may experience symptoms associated with motion sickness. Another type of physical side effect associated with the use of VR is “cybersickness,” in which the user typically experiences eye strain, headache, paleness, sweating, dryness of the mouth, disorientation, or vertigo (Ticknor & Tillinghast, 2011). Most individuals, however, do not experience such problems during a virtual simulation.

The implementation of VR will not always negate the influence of traditional methods of data collection. Which methodology, traditional or VR, is more feasible will be determined by the overall research scenario and the goals of the research. When financial or human resources do not allow for data collection via VR, then traditional methods will still be useful. When the resources are present, however, VR will present the most

appropriate method available for the collection of data relating to the corporate environment.

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