Investigating risk and protective factors to mainstream safety and peace at the University of South Africa

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Abstract

Given the high fatality rates resulting from both unintentional and intentional injuries in South Africa, the identification and prevention of risk factors resulting in injurious incidents as well as the promotion of protective factors is central to the country's research agenda. While social science and public health enquiries apply these objectives to various South African contexts, few studies investigate manifest risk and protective factors within South African universities. Accordingly, this study aims to develop the first record of both risk and protective factors at the University of South Africa (Unisa) Muckleneuk Campus as a means to inform future theoretical and practical initiatives in the area. Data was collected with photo-documentaries, unobtrusive field observations, and a peace and safety checklist. The collated data was subjected to a thematic content analysis, allowing for the emergence of four distinct peace and safety promotion themes. These themes include crime, fire injury and electrocution, road and traffic injury, in addition to unintentional injuries. These four themes are discussed, and recommendations are provided, with the intention of informing injury prevention and safety promotion initiatives at the level of both theory and practice in South African tertiary education contexts. This study provides a platform upon which further work in the field can be produced to ensure the safety of students attending tertiary education institutions in South Africa.

Keywords: campus safety; crime; traffic; electrocution; injury; South Africa; Unisa

INTRODUCTION

South Africa is characterised by exceptionally high mortality rates resulting from both unintentional and intentional injuries (Seedat, Van Niekerk, Jewkes, Suffla & Ratele, 2009). While a number of South African-based studies have investigated both the risk and protective factors related to these injuries (see Jackson, 2010; Matzopoulos, van Niekerk, Marais & Donson, 2002), there have been few attempts to apply these research objectives to the context of South African tertiary education institutions (TEIs). Given that academic institutions are compelled, by law, to ensure safety in the learning environment (Republic of South Africa, 1996) and since South Africa ranked last in school safety compared with 38 other countries (Mullis, Martin, Kennedy & Foy, 2007), it is imperative to begin a process of engaging with safety issues on South African campuses.

One of the few studies investigating safety on South African campuses demonstrates that both students and staff feel unsafe at their respective TEIs (Mullis et al., 2007). More importantly, many of these students and staff personally experienced or were vicariously affected by incidences of crime and/or injury. The potential for injury occurring on campus has numerous implications. For example, students' perceptions of school safety and high crime rates are influencing factors

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when students' select and enrol at TEIs (Wiese, Van Heerden, Jordaan & North, 2009). Campus security and safety is ranked as the third most significant contributor to South African students' choice of TEI (Wiese et al., 2009). In light of the high injury rate in South Africa, coupled with students' perceptions and actual experiences of unsafe campus contexts, this paper aims to identify both risk and protective factors at the Muckleneuk campus of the University of South Africa (Unisa) located in the city of Tshwane (previously known as Pretoria).

A CONCEPTIAL MODEL OF INJURY AND CRIME PREVENTION

In line with the public health model, this study treats violence and other causes of intentional and unintentional injuries as public health issues, and as such as both predictable and preventable. Furthermore, this study draws on an interdisciplinary ethos in order to identify risk factors and develop prevention strategies. The adoption of an interdisciplinary public health approach allows a wider range of potential injuries to be targeted in addition to offering multiple prevention possibilities, which a single paradigm might not be capable of (Dahlberg & Krug, 2002; Mercy, Rosenberg, Powell, Broome & Roper, 1993). Additionally, a multidisciplinary ethos recognises that injury and violence emerge from multiple and complex personal, social and economic factors (Ontario Public Health Association, 1999). Accordingly, this study is able to focus on multiple causative or protective factors – including engineering and environmental design, education, human behaviour, as well as enforcement and legislation (Yanchar, Warda & Fusell, 2012).

In combination with the public health model, this study also incorporates Felson and Cohen's (1980) Routine Activities Theory (RAT) to further explain crime, criminal victimisation and other intentional injuries. Essentially RAT proposes that three elements occur simultaneously during a violent or criminal incident; namely, (i) a motivated offender; (ii) available and suitable targets; and (iii) the absence of capable, physical and/or passive guardians that limit an offender's access to vulnerable targets (Felson & Cohen, 1980). Person(s) who are capable of protecting targets or preventing criminal incidents are referred to as physical guardians (e.g. security guards and police), while passive guardians aim to deter or mitigate the extent of criminal activities, and typically include surveillance or security systems (Wortley et al., 2008). This theory also describes crime patterns in relation to archetypal and foreseeable activities of the target that generates anticipatable opportunities for an offender to commit an unlawful offence (Felson & Cohen, 1980). Ideal opportunities are created for criminal conduct when targets engage in risky behaviour; for instance, being vulnerable at a notorious crime location (i.e. crime hot spot).

Using the aforementioned theoretical frameworks as a backdrop, this research aims to identify the most prominent injury risk factors and safety promotion features evident at a South African university, by utilising the Unisa Muckleneuk campus as an example. This, in turn, will provide insight into the kinds of prevention mechanisms that need to be called upon in these contexts.

SAFETY ON CAMPUS: AN INTERNATIONAL PERSPECTIVE

While literature focusing on South African TEI safety is scant, international studies are able to offer some insights into the issues surrounding both intentional and unintentional injury risks on campus. The recent surge of on-campus shootings in the United States of America (USA) has simultaneously resulted in an increased literature base concerning campus safety in the country. After the Columbine High School shootings in 1999, focus remained limited to the investigation of school violence (Miller, 2011). However, subsequent to the massacres at Virginia Polytechnic in 2007 and Northern Illinois University in 2008, college and university campus safety became a prominent topic of enquiry throughout the USA (Miller, 2011; Vicary & Farley, 2011).

Various studies have revealed that, owing to densely populated environments coupled with insufficient security measures, both college and university contexts in the USA have become prime locations for multiple-victim attacks, including mass shootings, sexual assault, stalking, hazing, racial- and gender-based violence, and homicide (Carr, 2005; Sulkowski, 2011). More recently, research has focused on different campus types to explicate the experience of victimisation and perceptions of crime on-campus. For example, Tomsich and colleagues' (2011) study found lower rates of victimisation in urban universities than those reported in Jennings, Gover and Pudrzynska's (2007) study on traditional universities. This was especially true for personal and property victimisation. Additionally, Jennings and colleagues (2011) found that males reported more personal victimisation, while females were more likely to report both personal and property victimisation. Both studies found that males view their campus environments as safe; contrastingly, females were more likely to perceive their campus as an unsafe environment.

Similarly, a study conducted at the University of Lagos demonstrated that intentional injury trends differ according to university areas and settings. Specifically, Ayenibiowo (2010) found that verbal, behavioural and physical attacks predominantly occur in lecture halls and open spaces, while sexual victimisation primarily occurs in hostels. In another study linking sexual violence to campus layout, Cubbage and Smith (2009) found that sexual assaults frequently occurred in open spaces at an Australian university. Nonetheless, 73% of their participants (n = 30) continued to walk through these open areas. There is some evidence to suggest that there is a relationship between crime rates and campus accessibility (Morta, Hermosa & Castro, 2009), since campus accessibility provides offenders with a convenient channel to commit crimes, owing to the number of potential targets and the proximity of major intersections and public transport routes (Morta et al., 2009).

Given the obvious need for increased security on-campus, two recent studies examined the relationship between the use of public versus private security guards, and general security measures on American campuses (Jennings et al., 2011; Maskaly, Donner, Lanterman & Jennings, 2011). Both studies found that public security was more successful in deterring crime and serious violence, and violence was also lower on campuses where security personnel employed use-of-force devices such as tasers or firearms. In addition, Maskaly and colleagues (2011) indicated that campuses without any security personnel reported higher incidences of criminal activities. Jennings and colleagues (2011) suggested that the use of weapon-detection devices also deterred criminal activities on some campuses. Finally, both studies established that the larger the campus, the more susceptible the campus, staff and students are to crime.

Similar to intentional injury patterns, unintentional injuries are also geographically specific. For example, Schwebel, Pitts and Stravrinos (2009) found that in the USA, on-campus traffic-related injuries arise from students' increased exposure to traffic, as they frequently walk to and from campus as well as across campus grounds. Ibrahim, Kidwai and Karim (2005) investigated the behaviours of pedestrians and motorists at a pedestrian crossing on a Malaysian university campus. Overall findings indicate a gap between traffic-related knowledge and behaviours. Despite motorists' knowledge of the pedestrian crossing, motorists were more likely to slow down rather than completely stop for pedestrians crossing the road. Furthermore, of the 337 pedestrians observed, only 16% used the demarcated crossing, while the other 84% crossed the road a short distance away. Ibrahim and colleagues (2005) concluded that pedestrians and motorists do not realise the importance of a pedestrian crossing, or perhaps the pedestrian crossing is inconveniently situated. Similarly, Ibrahim, Day, Hirshon and El-Setouhy (2011) revealed that 21.9% of pedestrians (n = 1,324) at an Egyptian university had suffered an injury, primarily because of their failure to look both directions before crossing the road.

Other forms of unintentional injuries are those arising from fire and electrocution hazards. Campus fires frequently occur in student housing because of cooking equipment being left unattended, arson, careless disposal of smoking materials, the condition of electrical appliances, and open flames (Campagnola, Hebner & Kern, 2004). Other causes include insufficient

fire sprinklers and absent or disabled smoke alarms. Lateef, Khamidi and Idrus (2010) established that potential fire hazards include numerous open, exposed, frayed or damaged electrical wires, and cables around campus arising from insufficient building maintenance.

Several international studies focused their investigations on the prevention of fire-related injuries. For example, Wong (2005) tested evacuees' evacuation time and movement during a simulated fire emergency in a Chinese university building. The results suggest that longer and wider corridors have variable thermal temperatures and smoke density. These factors influence the incidence of burn injuries, as well as smoke inhalation by evacuees. Likewise, at the Hong Kong Polytechnic University, Wong and Cheung (2006) found evacuees' injury risks are influenced by the flow rate of building occupants and the width of the exit door. Despite the often-quoted recommendations for fire prevention devices, studies have demonstrated that they are ineffective unless coupled with fire safety knowledge and awareness. For instance, Argueta and colleagues (2009) examined 480 international students' residence dormitories in Australia. Only 83% of the dormitories included smoke detectors, 43% contained fire extinguishers and fire blankets, and 21% had sprinkler systems. However, more than half of the students could not operate the fire equipment, rendering the fire equipment effectively redundant (Argueta et al., 2009).

Poorly structured physical environments also contribute to unintentional injury rates. Balachandran and Baptista (2002) explored walkway safety in an American University, and they found that students feel unsafe walking between parking areas across campus because of absent and damaged walkways. At the Canadian Dalhousie University, students revealed that disruptions to pedestrian walkability arise from worn, broken and/or cracked walkways and crossroads and construction areas (Christian et al., 2010). In line with such concerns, Olanrewaju, Khamidi and Idrus (2010) evaluated Malaysian University buildings in order to determine the level of injury risk. Of the thirty defects documented, the most notable and life threatening defects included elevator failure and faulty electrical systems. These studies demonstrate that it is crucial to investigate campus safety in order to ensure that safety promotion initiatives are focused on the relevant injury risks evident in a specific university. This is significant in the South African context, given the high and often fatal injury rates.

SAFETY ON-CAMPUS: A SOUTH AFRICAN PERSPECTIVE

Despite the palpable implications of campus safety that the international literature highlights, there is a dearth of research specific to South African TEIs (Tshabalala, 2001). Studies which have methodically investigated campus safety are outdated (e.g. Potgieter, 1993), focused on primary/secondary schools (e.g. Xaba, 2006), or were conducted solely for internal use within tertiary institutions (e.g. Korte, 2007). Even more concerning is the lack of safety awareness and promotion on South African campuses (Tshabalala, 2001). Given the rate of injury and violence in South Africa, along with this gap in scientific knowledge, violence and injury within South African TEIs becomes an important derivation for new research. Such research can then be utilised by policy-makers to minimise the occurrence of violence and injury, along with encouraging the implementation of safety mechanisms.

The majority of South African victims of fatal injuries are young adults between the ages of 20 and 29 (Donson, 2010). This is noteworthy since most South African university students fall within this age range. While this does not necessarily indicate that these injuries occur on campuses, no campus environment is immune from the major crime and injury trends that are pervasive in South Africa (Potgieter, 1993). For example, Tshabalala (2001) indicates that the main crimes affecting the University of KwaZulu-Natal are property theft (88%), vehicle theft (53%), robbery (40%), damage to property (38%), and physical assault (16%). Potgieter (1993) demonstrated that most instances of crime on South African campuses are generalisable to other universities. Consequently, Tshabalala's (2001) results can be regarded as general estimates of crime figures on South African campuses.

In view of the overwhelming prevalence of sexual violence within South Africa (Sass, 2005), sexual victimisation is of particular concern at TEIs. MacKay and Magwaza (2008) explored the circumstances surrounding occurrences of rape,

crime and security within the University of KwaZulu-Natal student hostels. The most prominent risk factors were inadequate security measures and access controls. Students frequently opened access-controlled gates to non-residents and/or were often responsible for damaging access control systems and security barriers. The use of internal security divisions is a characteristic measure used to combat crime and violence within South African TEIs. However, Sass (2005) argues that a lack of trust between security personnel, students and staff members can undermine campus safety and the effectiveness of internal crime prevention. At the University of KwaZulu-Natal Tshabalala (2001) established that staff and students believe the Protective Services Unit (PSU) is ineffective because of a lack of cooperation and communication between university administrators and PSU, as well as an absence of the essential paramilitary training undertaken by PSU staff. Similarly, the Higher Education HIV/AIDS study of 21 TEIs' security establishments revealed that all participating campus securities are inadequate because of broken security equipment, poor and unregulated access controls, and easily bribed security personnel (HEAIDS, 2010). Additionally, security personnel often perform multiple and conflicting roles such as crime prevention, traffic regulation, and access control to maintain order and stability on-campus (Steenkamp, 2002). This results in the diffusion of tasks and a limited focus on specific crime prevention activities.

While crime is an obvious and particular concern across South African TEIs, unintentional injuries are also important safety hazards that could result in fatalities (e.g. traffic-related mortalities). There is only one documented South African study concerning unintentional traffic injuries in TEIs, which explored Unisa students' difficulties when crossing the roads in and around the Muckleneuk campus (Van Rensburg et al., 2002). Results illustrated that 40% of the participants experienced problems crossing two main roadways. Additional problems students experienced included vehicle speeding, an absence of safe pedestrian crossings, a lack of traffic controls, and carelessness of pedestrians. While none of the participants had been involved in a pedestrian accident, all had witnessed up to six pedestrian accidents caused by reduced pedestrian visibility to motorists (Van Rensburg et al., 2002). These are important considerations given Gainewe's (2011) observation that there is a tendency for South Africans to ignore pedestrian road laws, resulting in a high number of pedestrian offences, injuries and fatalities.

Fire and electrocution incidents are also key risk factors in educational contexts. During 2009, 93 fires occurred at educational institutions nationwide in South Africa (Bozsik, 2010). Electrical fires constituted approximately 8% of these fires, where faulty extension cords, appliances and plugs were key causes. Additionally, open flames and smoking materials (such as cigarettes) also contributed to these fires (Bozsik, 2010). All TEIs use electrical equipment, but if electrical equipment is unsafe or in poor working condition it can cause electrical fires and personal injury (e.g. electrical shocks and burns). For example, the Potchefstroom College of Agriculture reported various critical fire hazards and/or electrocution risks within the student hostels and kitchen. These hazards included the lack of emergency exits, subserviced emergency fire equipment, and visible live wires from missing electrical covers (Jackson, 2010).

Despite the paucity of available literature concerning South African campus safety, the reviewed research demonstrates that campus safety is a valid concern that should be subject to ongoing research. It is also important for all TEIs to provide university members access to health and emergency facilities in the event of an emergency in accordance with the Occupational Health and Safety Act No. 85 of 1993 (1993) (e.g. Van Papendorp, Coetzee & Koorts, 2007). This study therefore attempts to unpack the different types of injury risks and protective factors on the Unisa Muckleneuk campus as a means to provide risk reduction and prevention strengthening recommendations.

METHOD

Unisa Muckleneuk campus structure

Unisa Muckleneuk campus is situated along the hills of Muckleneuk Ridge in Pretoria. Between 1972 and 2010 the university had undergone extensive renovations and developments. Currently, the university boasts six main buildings as well as an

observatory on 40 acres of land. The buildings and observatory are surrounded by landscaped gardens and parking areas and feature two ponds on the east and west side of the campus. The campus consists of three entrances for motor vehicles and pedestrians: Main Preller entrance, Good Hoop entrance and East entrance connected by two roads. Muckleneuk is a residential suburb located in close proximity to lower socioeconomic areas such as the city centre. Even though Unisa is a correspondence university, hundreds of students, educators and visitors come to the university each day.

Data collection

Students completing their master's in Research Consultancy at Unisa were offered the opportunity to act as field researchers for the study. The selection of these researchers was based on the demonstration of appropriate research skills and knowledge. Prior to data collection, the students were subjected to a full day workshop, exposing them to the study objectives and methods as well as training them to utilise the tools toward data gathering.

During the first phase of data collection, field researchers captured photographic images of the Unisa Muckleneuk campus environment using a 27-flash exposure disposable camera. Fieldworkers were required to take approximately 24 on-campus photographs consisting of 12 peace and safety measures as well as 12 injury risk factors. The field researchers developed a list of narratives describing the photographic images and participated in focus group discussions to explain their findings and recommendations for improving campus safety. In total, 222 photographs were developed, although 16 were excluded from the analysis since they did not fall within the parameters of the research. The remaining 206 photographs consisted of 95 risk factor images and 111 safety factor images. These photographs were then utilised to develop a 95-item Safety and Peace checklist that consisted of a closed-ended response format (i.e. 'Yes', 'No' and 'Not Applicable') (see Appendix A).

The second phase of data collection involved unobtrusive observations by the lead author across the entire campus over a two-week period during 2010. The researcher recorded naturally occurring activities and everyday incidents on-campus while simultaneously ensuring that the observations were not biased by researcher intrusion (Takona, 2002). Field notes were transcribed in preparation for the data analysis. The field researcher employed the 95-item Safety and Peace checklist as a subsidiary form of unobtrusive observation.

Data analysis

Using ATLAS.ti, Version 4.2 (ATLAS.ti, 1999) qualitative information was coded via a data-driven process using the risk and protective factors as preliminary categories. Following Braun and Clarke's (2006) guidelines for thematic analysis, the transcriptions, checklist observations, and photographic narratives were read, re-read and coded into salient themes following deep immersion in the data. These themes were then either collapsed into one another to form larger themes or structured hierarchically to form an overarching theme with sets of sub-themes. Themes were thereafter labelled and defined. The organising themes were further structured into a tabular format and categorised into broader global themes (Attride-Stirling, 2001). While this process is cyclical and requires multiple levels of re-reading and recoding, the results are presented linearly for the purpose of clarity.

RESEARCH FINDINGS

Four global themes emerged from the data analysis: (1) *Crime Safety and Risk;* (2) *Fire and Electrical Safety and Risk;* (3) *Road Traffic Safety and Risk* and; (4) *Unintentional Injury Safety and Risk*. Findings are presented for each of the four global themes according to the corresponding organising themes that emerged during the analysis. Table 1 illustrates the thematic network analysis of all four themes, while Table 2 summarises each finding according to the global and organising themes.

Table 1: Summary of Thematic Network Analysis

Global themes	Organising themes	Basic themes
(I) Crime Risk and Safety	Access controls	Security gates Security barred windows and laser beams Security fences Security access points and access smart-cards
	Security control	Security surveillance cameras Security lights Security locks Security guards
	High-risk areas	Open fields Hijacking hotspot Dimly lit areas
(II) Fire and Electrical Risk and Safety	Electrical	Electrical cables and wires Electrical warning signs
	Fire controls and smoking policy	Smoke detector devices Fire alarms Fire escape routes Fire exit doors Fire extinguishers Fire hydrants Emergency fire telephones Fire evacuation signage Fire door release Obstructed fire doors No smoking policies Designated smoking areas
(III) Road and Traffic Risk and Safety	Parking	Safe parking areas Risky/illegal parking Drop-off/pick-up zones Traffic congestion at drop-off/pick-up zones
	Road measures	Road speed bumps Road signs Speeding vehicles
	Pedestrian safety measures	Pedestrian crossings Pedestrian crossing road signs Pedestrian walkways

Global themes	Organising themes	Basic themes
(IV) Injury Risk and Safety	Walkways and stairs	Broken light fixtures Lose/hanging ceiling panels Lose and damaged tiles Water sprinklers Uneven drainage grids Stairways Water features/ponds
	Emergency and medical facilities	Health clinic First aid facilities Health education Emergency vehicles Emergency policies and procedures Disabled facilities
	On campus construction	Improper waste management Construction-related hazard signs

The findings of this study illustrate that intentional and unintentional injuries at the Muckleneuk campus are likely to arise from unsafe actions (e.g. motorists not yielding to pedestrians crossing the road) and unsafe conditions (e.g. no access controls at pedestrian campus entrances). For instance, despite the presence of a 'hijacking hotspot' warning sign outside one of the campus entrances, students and staff park in this area on a daily basis. Since it is difficult to modify behaviour, prominent environmental, legislative and engineering risks and hazards (identified in the thematic content analysis) should be minimised to reduce injuries and victimisation (Doughty & Greenwood, 1985).

Another notable trend relates to the linkages between themes. Accordingly, risk and safety factors cut across the four global themes and in some cases the emergent themes closely correspond with one another. For example, within the global theme *Road and Traffic Risk and Safety,* the campus tunnel provides pedestrians with a safe route to cross the road and it serves as a pedestrian safety measure. However, within the global theme *Crime Risk and Safety,* the campus tunnel creates a potential crime zone since there are insufficient security measures, and this renders it redundant as a pedestrian safety measure. If students and staff choose to use the tunnel they may be victimised by criminals; however, if they avoid the tunnel they may increase their chances of being injured in a traffic-related incident when crossing the road. Thus, some sub-themes overlap and safety promotion initiatives would need to consider these interconnected findings. Similarly, within the same global theme, it was occasionally noted that a safety promotion measure might also serve as a risk factor. For example, within the global theme *Fire and Electrical Risk and Safety,* the "fire alarm systems" are a fire safety measure that warns occupants of an emergency in the buildings. However, some of alarms are broken and have exposed wires, which may pose a fire and electrocution risk. Furthermore, because these findings are based solely on observational data, it is difficult to detect the proportion of fire alarms that are faulty. However, insufficient building and fire-equipment maintenance can create potentially deleterious effects and mitigate environmental safety promotion measures.

Although some of the prominent risks are evident in the organising themes, overall, the documented safety measures are consistent with other TEIs. The Unisa campus thus appears on a par with international standards of security, fire and health measures (Popa, Turcu, Gaitan, Turcu & Prodan, 2006). The current findings are also important because they add to the South African literature and provide contextual insights into global risk and safety promotion factors in tertiary educational environments.

Table 2: Overview of Research Findings by Global and Organising Themes

I: CRIME SAFETY AND RISK			
Safety Factors:	**Risk Factors:**	**In contrast to:**	**Similar to:**
Access Controls			
• Security gates • Security barred windows • Laser beams • Security fences • Security check points • Smart-card controlled gates within buildings • Security guards • Prohibition and warning signs	• No smart-card controlled campus entrances • Open small alley-gates • Broken windows and missing ceiling panels • Lack of discernible security access doors • No fencing enclosing open fields		HEAIDS (2010); MacKay and Magwaza (2008); Morta et al. (2009)
Security Controls			
• CCTV cameras • Security guards • Adequate security lights • Security locks • The Crime Watch/Whistle blowers	• Absence of security guards in some areas • Dimly lit or no lighting in parking areas and some stairwells	Sass (2005); Tshabalala (2001)	
High-risk Areas			
• Hijacking hotspot warning sign	• Open fields • Overgrown gardens • Dimly lit parking areas • Pedestrian tunnel • Hijacking hotspot area	Ayenibiowo (2010); Cubbage and Smith (2009); Steenkamp (2002)	

II: FIRE AND ELECTRICAL SAFETY AND RISK			
Safety Factors:	**Risk Factors:**	**In contrast to:**	**Similar to:**
Fire Control			
• Fire extinguishers, hoses and hydrants • Smoke detectors • Fire alarms and intercoms • Fire escape routes and stairwells • Smoke stop and fire exit doors • Emergency brigade telephones • Retro-reflective fire evacuation signage	• Some faulty/damaged fire alarms and smoke detectors • Lack of clearly marked fire exit door signs • Fire escapes being used as everyday stairwells • Obstructed fire exit doors and fire equipment by vehicles	Argueta et al. (2009); Bozsik (2010); Jackson (2010)	Wong (2005); Wong and Cheung (2006)
• Fire and emergency procedures signage • Wheelchair-friendly fire escape routes and exits • No smoking policy • Trained fire safety personnel			

Electrical Risks			
• Electrical warning signs	• Exposed and open light fixtures, electrical circuits and faulty electrical systems • Open high-voltage electrical cupboards	Jackson (2010)	Campagnola et al. (2004); Lateef et al. (2010); Olanrewaju et al. (2010)

III: ROAD TRAFFIC SAFETY AND RISK			
Safety Factor	**Risk Factor**	**In contrast to**	**Similar to**
Parking			
• Traffic cones and caution tape to prevent illegal parking • Traffic patrol personnel • Disabled parking areas • Safe parking areas	• Obscured or damaged parking bays • Traffic congestion and driving difficulties • Obstruction of fire equipment and pedestrian crossings		
Road Safety Measures			
• Bright and visible road markings and road signs • Speed bumps	• Speeding vehicles • Motorists not completely stopping at stop streets • Misuse of speed bumps • Vehicles driving on the opposite side of road • Broken or missing metal buttons of speed bumps		Van Rensburg et al. (2002); Ibrahim et al. (2005); Schwebel et al. (2009)
Pedestrian measures			
• Pedestrian crossings • Pedestrian tunnel • Pedestrian warning signs	• Motorists not yielding for pedestrians • Jaywalking • Pedestrians crossing at points other than indicated safe crossing zones • Insufficient existing pedestrian crossings		Ibrahim et al. (2005); Ibrahim et al. (2011)

IV: INJURY SAFETY AND RISK			
Safety Factor	**Risk Factor**	**In contrast to**	**Similar to**
Walkways and stairs			
• Pedestrian walkways • Non-slip grips and railings • Covered grid-like drainage system • Access ramps for disabled individuals	• No suitable warning signs, fencing and/or railings surrounding ponds • Damaged concrete walkway surrounding ponds • Insufficient walkways at parking ramps and parking areas • Some damaged walkways and building terrace tiling		Balachandran and Baptista (2002); Christian et al. (2010)
Emergency and Medical Facilities			
• Health clinic • First aid facilities • Health education • Emergency vehicles • Emergency policies and procedures • Disabled facilities	• First Aid Room used as storage facility • Clinic's front entrance is locked and back entrance is difficult to locate • No directional signs to clinic		Van Papendorp et al. (2007)
On campus Construction			
• Hazard signs • Visible netting	• Block pedestrian walkways • Improperly disposed construction waste		Christian et al. (2010)

The abovementioned findings are not exhaustive, but they do demonstrate that the Unisa campus has numerous safety promotion features as well as notable risk factors related to crime, fire and electrocution, traffic-related injuries, and unintentional injuries. The implications of these risks and safety promotion factors are discussed with the intention of proposing recommendations for improving safety on-campus.

DISCUSSION

This study aimed to identify various safety promotion and risk factors within the Unisa Muckleneuk campus. Given the paucity of research relating to peace and safety on South African TEI campuses, this study is important in terms of its theoretical implications, and the practical recommendations that it provides.

Crime risk and safety

The following discussion will make reference to Felson and Cohen's (1980) Routine Activities Theory (RAT) to make sense of any shortfalls in the university's safety measures and how these shortfalls may increase the likelihood of criminal activity. In addition, the RAT is a useful framework for indicating the presence of guardians (passive and/or physical) currently in place on Unisa's campus as well as possible risky behaviours and potential targets.

The most salient themes included threats to safety and the lack of safety measures to circumvent these risks Despite the fact that notable access control measures are present on-campus, especially within the buildings, there is inadequate access control at some external areas on-campus. For example, all Muckleneuk pedestrian entrances remain open daily, and do not require smart cards to gain access. In consequence of inadequate access controls (passive guardians) any person, including a motivated offender, is able to access the campus. Once on campus, motivated criminals are able to victimise their targets and commit a crime (Felson & Cohen, 1980). The lower socioeconomic status of the area surrounding the Muckleneuk campus creates an additional threat for crimes such as theft, owing to the abundance of targets (e.g. students), access to valuable property (e.g. laptops) and the ease of trespassing. Smart cards would enable university officials (e.g. security personnel) to differentiate between authorised (e.g. students) and unauthorised persons (e.g. criminals)

(Felson & Cohen, 1980; Morta et al., 2009). Since smart cards are not required at pedestrian entrances, students may not carry or own personal smart cards and this decreases security personnel's ability to restrict illegitimate access.

The RAT suggests that universities employ guardians (passive and physical) to deter offenders from committing a crime (Felson & Cohen, 1980). Unisa may have recognised that pedestrian entrances provide no immediate protection against trespassers and have increased other measures to reinforce such restrictions. To compensate for the lack of external access controls, security personnel (physical guardian) and CCTV cameras (passive guardian) monitor the pedestrian entrances, parking areas and campus grounds. Based on the notable proclivity for security guards to check bags, vehicles and refuse access to any suspicious people, it can be viewed as a fairly effective form of crime prevention. By doing so, offenders are unlikely to be able to enter or leave the campus with weapons or stolen property (Wortley et al., 2008). The inordinate amount of CCTV implies that Unisa recognises how large the campus grounds are and that the campus may thus be more likely to be targeted for criminal activity than a smaller university (Maskaly et al., 2011). The large campus also makes it impractical for security personnel to monitor the entire campus environment alone. CCTV gives security personnel the ability to monitor different locations simultaneously enabling better control over campus activities (Welsh & Farrington, 2008; Wortley et al., 2008). Furthermore, CCTV encourages and enhances security consciousness and vigilance regarding crime (Sass, 2005). For example, during the observational periods, very few people utilised the open fields. In contrast to similar studies (see Ayenibiowo, 2010; Cubbage & Smith, 2009; HEAIDS, 2010; Jennings et al., 2011; MacKay & Magwaza, 2008; Tomsich et al., 2011), no criminal activities were documented throughout the observational period. Accordingly, it is arguable that the Unisa campus and authorised university members are safety conscious and that the existing on-campus security measures appear effective in deterring criminal activity.

Fire and electrical risk and safety

Traditional fire risk and safety research in TEIs mainly focuses on fire risks that occur in student housing facilities (e.g. Campagnola et al., 2004). Because Unisa is a distance-learning institute, there are no student housing facilities. Thus, previous research may not be directly applicable but can, nonetheless, provide valuable information regarding fire safety and prevention measures. For example, the community may possess the basic fire safety knowledge, but may not actually know how to use the fire equipment (Argueta et al., 2009). The current study did not examine students' and staff members' fire safety knowledge and/or their ability to use the fire equipment. However, the abundance of fire safety measures, and the trained fire safety personnel imply that Unisa recognises that there will be a significant loss to property and high rates of injury and/or fatality if a fire occurs, particularly since it is a large campus with a multitude of building occupants. Nevertheless, the abundance of fire escape routes along with measures to safely evacuate occupants and control the spread of fire indicates that Unisa acknowledges the magnitude of this risk. Although notable safety mechanisms are in place, damaged and/or exposed light fixtures and electrical wiring within campus buildings undermine these safety promotion strategies. This is a crucial concern since electrical fire injuries are pervasive in South Africa (Bozsik, 2010). It is possible that hazardous electrical wires and light fixtures may have occurred more frequently in 2010 as a result of reconstruction and renovation on-campus. However, construction and renovations are generally temporary and it is feasible that since the project was completed, some of the documented risks may have been addressed.

Road and traffic risk and safety

Pedestrian safety in and around the Unisa campus is particularly important given the recent and distinct increase in student numbers over the past few years. This factor seems to cause unnecessary competition between pedestrians and motorists for space owing to limited parking availability. During the observational period, numerous vehicles were illegally parked, creating obstructions near pedestrian crossings as well as reducing roadway visibility. The Unisa Muckleneuk campus utilises enforcement and engineering interventions to promote safe road practices and behaviours. However, a commonly observed risk factor involved unsafe pedestrian behaviour such as jaywalking. For example, even though there are numerous pedestrian crossings on-campus, the majority of pedestrians did not use these crossing areas. Potential reasons for this risky pedestrian behaviour may include a lack of awareness of the importance of pedestrian crossings and the tendency for pedestrians

to overestimate motorists' driving abilities (Ibrahim et al., 2005). Pre-existing pedestrian crossings and walkways seem to be inconveniently located or insufficient considering the magnitude of the campus grounds. For example, the absence of pedestrian walkways on parking ramps and within parking areas forces pedestrians to walk in the roadways which can create additional injury risks. These factors are of concern given the high pedestrian injury and fatality rate in South Africa (Gainewe, 2011).

Unintentional injury risk and safety

Unintentional injury risks may have been amplified during the course of this study since the Muckleneuk campus was undergoing renovations during the time that observations were conducted. Although renovations are typically beneficial in the long term, they can increase transient injury risks. For example, the arrangement of the construction sites provided non-university members easy access to the campus premises. In addition, some of the construction areas obstructed walkways, and these construction materials could increase the risk of nearby falls. Similarly, there is some evidence of walkway damage which creates uneven surfaces and may have been exacerbated by the heavy machinery used during construction. Another concern is the inappropriate disposal of construction waste such as fluorescent light bulbs. The broken glass and associated chemical waste is hazardous to individuals on-campus. Additionally, two large unenclosed ponds may pose injury or drowning risks for students, staff or visitors, particularly if they are distracted, visually impaired or disabled. However, Unisa appears to recognise the potential risk of these injuries and the importance of health and safety on-campus. Accordingly, various emergency facilities (e.g. first aid areas and emergency personnel) are located throughout the campus and they can be used to treat minor injuries/illnesses, and serve as protective factors. A fully functioning health care clinic is also located on-campus, although its back entrance is inconspicuous and may prolong response times in an emergency.

Gap between intervention/policy implementation and practice

From the findings and discussion we can deduce that there is a disjunction between public health interventions and policies and the implementation of new safety promotion initiatives at the Unisa campus. Possible explanations for this disjuncture are high costs to maintain or implement interventions, the lack of involvement and responsibility of stakeholders, lack of resources, limited research and a lack of awareness concerning campus safety (Comstock, 2012). Moreover, the sheer size of the campus as well as the correspondence structure of the university makes seemingly basic interventions difficult to translate into reality. For example, restricting access though implementing smart card access gates may in turn restrict the global university community such as students visiting the campus from another country. These potential reasons aside, it is vital for stakeholders to develop effective interventions and policies towards the objective of campus safety (Finch, 2012). In lieu of this, potential solutions to existing on-campus safety-related issues are addressed below.

RECOMMENDATIONS

The public health approach values primary prevention since it is crucial to decreasing both crime and injury (Mercy et al., 1993). Given the cost of violence and injury to both human and social capital, a public health approach that focuses on primary interventions is likely to be more cost effective if it aims to prevent injuries rather than to address consequences of current or past injurious and violent situations. Furthermore, while interventions that focus on environmental modifications are the most time consuming, most difficult and expensive to implement, they are considered to be the most effective and sustainable (Peek-Asa & Zwerling, 2003). Recommendations are thus largely concentrated on primary prevention techniques. Nevertheless, the following recommendations can be used individually or in combination with current interventions and policies at Unisa. Even though this study is conducted in a distance learning institution, some of the recommendations could be implemented in TEIs with similar problems. The recommendations provided below are not exhaustive, but rather aim to propose prevention strategies that are of high priority.

Crime

It is possible to reduce crime risk factors across the campus through the implementation of additional engineering and environmental prevention initiatives (Xaba, 2006).

Educational interventions, while fairly easy to implement, may not necessarily target crime directly:

(a) An annual crime and injury statistics report could be disseminated along with the campus newsletter. The proposed report might highlight the types of on-campus crimes, the affected areas, as well as the required interventions (e.g. Korte, 2007).

Engineering interventions would work best in combination with other interventions:

(b) Low alley-gates should be replaced with higher gates that are locked at all times;
(c) Smart-card controlled gates could be introduced at all pedestrian campus entrances; and
(d) Additional CCTV should be installed where campus security patrols are infrequent and/or where cameras are absent.

Environmental interventions would be the most effective crime prevention intervention, albeit the most time and resource consuming:

(e) Automatic floodlights should be installed to increase safety at or along open fields, particularly for low light periods (e.g. dusk);
(f) Suitable boundary walls and/or fencing could be erected to enclose open fields and their surroundings areas;
(g) The overgrown fields and gardens should be maintained, and long grass should be cut regularly; and
(h) All first floor building windows should be installed with security bars.

Fire and electrical

Enforcement and environmental prevention initiatives can be utilised to decrease fire and electrocution risks within the Unisa buildings and campus grounds:

Enforcement interventions would include:

(a) A protocol which should be introduced for reporting and requesting electrical/fire maintenance work to be out-sourced to qualified individuals; and
(b) An all-hazard emergency response plan which could be established in order to provide a detailed guide of emergency procedures and tactics.

Environmental interventions would be most effective to prevent fires:

(c) Additional and noticeable warning signs on the internal and external sides of the fire exit doors should be installed to prevent motorists from parking in front of the door and from using these doors for any other purpose except for an evacuation;

(d) Escape path floor lighting should be installed in all corridors in order to assist evacuees during emergencies where visibility is limited;
(e) All visible, damaged electrical wires or cables and broken light fixtures must be repaired and replaced; and
(f) Firebreaks in the open fields should be initiated to prevent open fires from spreading.

Road and traffic

It is critical for TEIs to promote initiatives that combine educational, engineering, and enforcement designs to reduce pedestrian injuries (Kwan & Mapstone, 2006) while simultaneously taking into account unsafe behaviour of pedestrians and motorists.

Environmental interventions would include:

(a) Additional safe parking areas must be constructed;
(b) Alternatively, a pedestrian drop-off and waiting area can be introduced if extra parking is not feasible;
(c) New, conveniently located pedestrian crossings should be constructed and faded crossing areas ought to be repainted;
(d) The pedestrian crossing at the apex of the campus entrance must be altered to increase motorists' ability to view pedestrians; and
(e) Bespoke pedestrian crossings for visually and hearing impaired university members/visitors should be installed (Matshedisho, 2007).

Unintentional injury

Engineering and environmental prevention initiatives are also expected to reduce the likelihood of unintentional injuries occurring on-campus (Matzopoulos et al., 2002).

Engineering interventions most effective to prevent unintentional injury:

(a) Railings and fencing should enclose ponds;
(b) The foundations of the ponds and the surrounding walkways must be repaired;
(c) Grid-like drainage systems need to be covered or replaced with smaller grids;
(d) Existing walkways should be repaired where they are damaged, and additional walkways need to be constructed along parking ramps and within parking areas; and
(e) Tiled floors inside the campus buildings also need regular repair and maintenance.

Environmental interventions may have less impact in the prevention of injuries but are easier to implement than their engineering counterparts:-

(a) All construction and hazardous waste should be disposed of in an appropriate and legal manner; and
(b) Caution signs should be erected to warn individuals about the ponds and steep walkway nearby the pond.

LIMITATIONS

Although this study attempts to be reasonably comprehensive, it is limited by its descriptive nature. Follow-up studies should consider performing face-to-face interviews or surveys with university members to gain an overall view of the existing perceptions of the peace and safety mechanisms on-campus. Alternatively, a quantitative needs assessment can be conducted so that prevention initiatives are informed by the most pertinent priorities. Further limitations relate to the research methodology. Firstly, since no observations were made after 17:00, no information is available regarding the status of staff and student safety at night. Secondly, the current findings may not apply longitudinally since the campus appears to be in a state of continual flux, and some of the observations include transient risks (e.g. construction and maintenance related risk factors). Thirdly, security personnel logs and campus clinic records were not examined, and this secondary data may have been beneficial in corroborating the present findings. Finally, although the observations were conducted as objectively as possible, it must be acknowledged that qualitative research involves subjective interpretations. Thus, the researchers' perceptions of safety, risk and injury informed the analysis, selection, and write-up of the results.

CONCLUSION

This study attempts to address the scientific oversights in current South African literature concerning intentional and unintentional injuries on tertiary campuses. The key indicators of crime, traffic, fire, electrocution and unintentional injury

risks highlighted by this research are particular to the Unisa campus. However, this marks an entry point into further developments in the field whereby other studies based on alternative campuses with different methodological objectives can expand on these identifications, and the implications thereof. While Unisa campus has demonstrated relatively few (albeit significant) injury-related concerns, it is likely that campuses characterised by classroom contact time and increased student presence will potentially reveal more injury-related risks. This study should thus be treated as a platform upon which further work in the field should be produced in order to ensure the safety of students attending tertiary education institutions in South Africa.

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APPENDIX A: Safety and Peace Checklist

ITEM No.	SAFETY AND PEACE CHECKLIST			
ON-CAMPUS TRAFFIC SAFETY & RISKS		**YES**	**NO**	**N/A**
1.	Are there multiple illegally parked vehicles?			
2.	Are the on-campus roads generally safe for vehicle use?			
3.	Are most of the pedestrian crossings well-marked & generally used by pedestrians?			
4.	Are the majority of parking bays clearly demarcated?			
5.	Are there sufficient parking bays for vehicles on a daily basis?			
6.	Are there often obstructions to traffic & vehicles on-campus?			
7.	Are there many blind corners & blind rises on-campus affecting vehicle navigation?			
8.	Are all roadways wide enough for two-way traffic?			
9.	Are traffic signs both clearly visible and suitable for motorists & pedestrians?			
10.	Are all traffic laws and road markings generally adhered to by all road users?			
11.	Are there sufficient and safe pedestrian crossings that are clearly marked?			
12.	Do pedestrians frequently jaywalk?			
13.	Are there sufficient speed bumps & other traffic calming measures aimed at reducing vehicle speeds & protecting vulnerable road users (i.e. pedestrians)?			
14.	Are there sufficient booms to slow traffic and monitor vehicle access?			
15.	Are there adequate parking bays for disabled individuals that are not illegally occupied?			
ON-CAMPUS INJURY SAFETY & RISKS				
16.	Are indoor floor surfaces level & unobstructed?			
17.	Are outdoor floor surfaces generally unobstructed and level?			
18.	Are stairwells generally unobstructed?			
19.	Are stairwell landings generally even and level once stairs have been descended or ascended?			
20.	Is office/lecture room furniture typically well-maintained and safe for use?			
21.	Does on-campus construction work pose an injury threat to construction workers?			
22.	Does on-campus construction work pose an injury threat to Unisa students and staff?			
23.	Are there suitable fencing/railings near potentially hazardous water features (i.e. ponds)?			
24.	Do all escalator and elevator services work satisfactorily?			
25.	If elevator/escalators are not properly functioning, do they pose an injury risk to Unisa students and staff?			
26.	Are there visible and effective warning signs and barriers preventing injury where hazards are present (e.g. wet floors)?			
27.	Are there effective barriers to prevent falls from heights?			
28.	Are outdoor water mains/man-holes etc sufficiently covered to prevent accidental injury?			
29.	Are irrigation and electrical pipes properly fitted and covered to prevent accidental injury?			
30.	Are there areas where refuse has been discarded which may pose a risk to Unisa staff and student's general safety (e.g. glass, florescent lighting)?			
31.	Are most warning signs pertaining to hazards functionally mounted & visible?			
32.	Are stair handrails in good condition?			
33.	Are stairwells well-lit and sufficiently illuminated?			
34.	Are non-slip surfaces provided on stairs?			

35.	Are transparent glass doors marked so they are easily visible?			
36.	Are outdoor walkways for pedestrians well-maintained and reasonably illuminated?			
37.	Are Emergency Protocol Posters and associated information prominently displayed?			
38.	Are Emergency Protocol Posters displayed in languages other than English or Afrikaans?			
39.	Are there adequate facilities to prevent accidental injuries for disabled individuals (including visually and hearing impaired persons etc.)?			
40.	Is there satisfactory indoor signage for evacuation procedures?			
41.	Are the required exits clearly evident & marked with illuminated signage?			
42.	Are pathways and signage to emergency exits easily accessible & straightforward to follow?			
43.	Do the exit doors swing outward for emergency purposes?			
44.	Are illuminated exit signs & emergency lights properly functioning?			
45.	Are emergency exits unobstructed & ready for immediate use?			
46.	Are the emergency exits unlocked?			
47.	Is there satisfactory outdoor signage for evacuation procedures?			
48.	Are there designated individuals in specified areas to assist during emergencies?			
49.	Is the on-campus medical facility easily accessible to all Unisa staff & students?			
50.	Is the on-campus medical facility readily available for any emergency or health-related issue?			
51.	Are all indoor corridors both functionally & sufficiently illuminated?			
52.	Are there sufficient emergency phones available to both Unisa staff & students?			
ON-CAMPUS CRIME SAFETY & RISKS				
53.	Are there adequate boundary walls on-campus?			
54.	Is there sufficient security in isolated areas on-campus?			
55.	Is there functional lighting in dark locations on campus (e.g. outdoor stairwells)?			
56.	Are security guards on duty at open boundary gates?			
57.	Are there security/burglar bars on most accessible windows?			
58.	Are there on-campus areas which are possible hijack risks to Unisa students and staff (i.e. high grass areas, open fields, dark, non-secure locations)?			
59.	Is there sufficient illumination in parking garages?			
60.	Are lights and CCTV functional in isolated areas?			
61.	Are access cards building specific?			
62.	Can individuals easily gain admission to on-campus buildings without access cards?			
63.	Is there sufficient security inside Unisa buildings?			
64.	Are the bathrooms safe to use, especially for female staff & students?			
65.	Is there a dedicated and easily accessible helpline for all emergency purposes?			
66.	Are there satisfactory and reasonable security measures to prevent unauthorised access to the Unisa campus?			
67.	Are there sufficient surveillance mechanisms in place on-campus?			
68.	Are satisfactory security checks routinely performed on vehicles entering and exiting Unisa's campus?			
69.	Are there barricades to prevent unauthorised vehicle and pedestrian access?			
70.	Are there satisfactory locks on doors to prevent theft?			
71.	Are there functional security check points?			
72.	Are there decent warning signs alerting people to dangerous/high risk areas?			

73.	Are there security alarms and laser beams installed for safety purposes?			
74.	Are there sufficient security mechanisms in place for on-campus ATMs?			
75.	Is there 24-hour on-campus security?			
76.	Do security personnel provide useful protection tips to Unisa students and staff?			
ON-CAMPUS FIRE/ELECTRICAL SAFETY & RISKS				
77.	Are there exposed electrical cables and/or wires inside buildings?			
78.	Do most electrical outlets & switches have cover plates to prevent accidental contact?			
79.	Are there electrical cords running over/under walls or through doorways etc?			
80.	Is there unobstructed access to fire hose reels, extinguishers & fire alarm call points (break glasses)?			
81.	Are appropriate fire extinguishers in place & wall mounted?			
82.	Are key personnel trained to use fire extinguishers?			
83.	Are there adequate electrical sockets to avoid overloading?			
84.	Is the university smoking policy typically adhered to & enforced?			
85.	Have any emergency evacuation fire drills been carried out in the last six months?			
86.	Do electrical cords look exposed, frayed or damaged?			
87.	Are there multiple exits for large auditoriums?			
88.	Are there functional smoke detectors in most Unisa buildings?			
89.	Are there accessible and visible fire alarms?			
90.	Are there adequate reflective lights and illuminated signage in the event of a fire?			
91.	Are unused electrical sockets covered with plugs or safety covers?			
92.	Are there exposed electrical cables and/or wires outside buildings & around campus?			
93.	Are high voltage electrical outlets sufficiently inaccessible to unauthorised persons?			
94.	Do high voltage electrical outlets have sufficient warning signs to prevent accidental injuries?			
95.	Are there multiple locations where electrical wiring is visible and may pose a potential electrocution risk to Unisa staff & students?			