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All articles shall be written in concise English and typed with a minimum font size of 11 point. Articles should have an abstract of not more than 200 words. Articles shall be submitted as Times New Roman print and presented in the form the writer wants published. On a separate page, the author should supply the author's name, contact details, professional qualifications, current employment position, a brief bio, and a photo of the author. This should be submitted with the article.

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Good Safety Management Makes Good Business 'Cents'

By **Jessica Lawer (Tilbury)**. BSc. (HSE) Curtin University.
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Abstract

Organisations often fail to appreciate the shared benefits of effective business and safety management. This article analyses published literature associated with the impact of leadership, engagement and risk management on business performance and safety outcomes, to establish whether the causal factors contribute to the success of both.

Key Words: Business performance, Productivity, Safety management, Safety performance, Leadership, Risk management, Communication, Engagement.

Introduction

Organisations often fail to realize the economic and social benefits associated with implementing effective safety management. The safety benefits of reduced incidents and injuries may be obvious; however organisations often draw a parallel with increased financial and human resources. As a result, research often focuses on the impacts associated with implementing a safety management system, such as improvements in safety intervention strategies, decreased lost time injury rates, increased staff retention, increased workplace productivity and investment opportunities through reputation (Department of Industry, Innovation and Science, 2016; Robson et al., 2005, WorkSafe Victoria, 2006). Safety performance is associated with leadership, engagement and risk management, all of which if integrated into existing business practices, are also contributing factors in determining business performance. This article examines the relationship between these factors in creating successful business and safety outcomes.

Methods

In order to determine the relationship between business management and safety management, a literature search was undertaken using Science Direct. Initially the search for full text, peer reviewed documents with the keywords "safety" and "business performance" yielded 62,517 results. The search was limited to open access journals published between 2006 and 2016, which reduced the results to 3,544.

A Google search was conducted using the keywords "good business management and safety" resulted in 46,600,000 results, of which links to WorkSafe Victoria, The Department of Industry, Innovation and Science and Safe Work Australia were reviewed. An article on the Safe Work Australia website was found, which concluded that rather than either safety or productivity being a causal factor to the other's success, there are common causal factors between the two (Gahan, Sievewright & Evans, 2014). This further supported the relationship between leadership, engagement and risk management on both safety and business performance.

A second search was conducted using Science Direct for full text, peer reviewed, English journal articles published between 2006 and 2016 with the keywords "leadership" and "business performance" or "productivity" or "safety". This search resulted in 3,130 articles.

Following the search for journals determining the relationship between business and safety management, a third search in Science Direct using the keywords "engagement" and "business performance" or "productivity" or "safety", for full-text, peer-reviewed journals published between 2006 and 2016, retrieved 2,588 results.

Similar searches were conducted in Science Direct for full-text, peer-reviewed journals

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published between 2006 and 2016, using the keywords "business performance" or "productivity" or "safety" resulted in 1,841 results with the keyword "risk management" and 2,196 results exchanging "risk management" with "engagement".

Out of the total searched, 30 articles were considered based on the relativity to the subject in terms of leadership, communication and engagement and risk management. Publications focused on other contributing factors to either business or safety performance were not considered. In some instances, referenced journals of interest found during the literature review were retrieved from the Curtin University Library databases.

Discussion
Leadership and Engagement
There is significant research in regards to the relationship between how organisations and their leaders engage their employees, business performance and safety outcomes. Evidence suggests workplaces with high employee engagement report lower turnover, increased talent, increased productivity and increased profitability (Hewitt, 2011; Huang et al., 2016; Raines, 2011; Vance, 2006; Wachter & Yorio, 2014). Hindley, cited in Arezes and Miquel (2003) further emphasizes the importance of leadership as they conclude leadership qualities and culture of organisations are the strongest indicators of safety performance.

Leadership and management are not one in the same and Managers are not necessarily always leaders (Kotter, 1990 & 1999; Yildirim & Birinci, 2013).

> *"To influence over others, management is depended on formal power while leadership is resulted from a social influence process. Leaders make cultures and their fundamental role is affecting others. In other words, leaders try to make changes that increase organizational efficacy and performance. These are changes that cause higher aim and expectations to the organization."*
> (Yilidrim & Birinci, 2013, p.72)

There is considerable research to suggest leaders demonstrate the behaviors and actions, which focus on continuous improvement and engagement of employees representing a genuine value on safety, while concurrently driving business strategy. Muniz, Montes-Peon and Vazquez-Ordas (2007, p.636) emphasize the importance of leaders demonstrating these behaviors as they state "good intentions have to be translated into daily experience, and management decisions should reflect an interest in investing, not only for further profit, but also for people".

This commitment by leaders positively influences employee behavior and motivation (Reason, 1997; Skeepers & Mbohwa, 2015). Motivated employees contribute to improved reliability and productivity, cost reduction, improved employee relations as well as encouragement for employees to work safely and contribute to organisational safety goals (Haslam et al., 2016; Huang et al., 2016; Skeepers & Mbohwa, 2015). A limitation to this may be businesses with contractors who are transient in nature, due to the lack of stability in leadership and as a result, their influence through engagement for a commitment to the organisational goals.

According to Hewitt (2016), leadership and employee engagement are essential to business success and those companies led by CEOs who understand the criticality of employee engagement and the responsibility of the leader are among the best, with studies showing a 5% increase in employee engagement resulting in a 3% increase in revenue growth in the subsequent year. Aon Hewitt's global engagement research also discovered in research conducted with over 2,900 organisations and 6.7 million employees between 2008 and 2010, that even in turbulent economic times, those organisations with higher engagement levels (65% or greater) posted 22% higher than the average shareholder returns in 2010 (Hewitt, 2011).

Research conducted by Tower Watson support the above (cited in Kaliannana &

Adjovub, 2015), determining organisations with high employee engagement revealed a 19% increase in operating income and 28% earnings per share (EPS) growth. Alternatively, operations with low employee engagement levels experienced more than 32% decrease in operating income and 11% decline in EPS.

In a study conducted on more than 125 organisations, Gallup compared organisations in the top and bottom quartiles for employee engagement measures. The research revealed businesses with higher employee engagement experienced 62% less safety incidents than those with lower engagement (Harter et al., 2006 cited in Wachter & Yorio, 2014). Other studies have found engaged workers were five times less likely to be involved in a safety incident and seven times less likely to have a lost time injury with the cost of injury being less for engaged workers than non-engaged workers, at $63 and $392 respectively (Raines, 2011; Vance, 2006).

Muniz, Montes-Peon & Vazquez-Ordas (2007) identified through their research the importance of leadership at all levels of the organisation demonstrating, through their attitudes and behaviors, a value on safety, representing a high level of concern and commitment to the prevention of injuries and illnesses. They emphasized the significance of good leadership (in conjunction with safety management systems) to influence employees to be engaged in safety, undertake safe behaviors and promote improvements in the workplace. Wachter & Yorio (2014) support this through their research, which revealed the effectiveness of implementing a safety management system was dependent on the level of engagement with employees.

Various studies show quality leadership and engagement with employees is a predictor of business success. These attributes increase employee dedication to the business and its strategy in both safety and productivity, resulting in a reduction in injuries and incidents, increased staff retention, increased improvements and innovations and as a result, an increase in

both safety and business performance (Dunlap, 2011; Kaliannana & Adjovub, 2015; Michael et al., 2005; Yildirim & Birinci, 2013).

Risk Management

Risk management is often regarded as a safety management tool, however Standards Australia (2009) defines a risk as an "effect of uncertainty on objectives" and further explains the effect may be positive and/or negative and the objectives may be related to financial, health and safety or the environment. Risk is further characterized in terms of being a combination of consequence and likelihood. Kot and Dragon (2015, p. 103) emphasize the integration of risk management within a business as they state "risk management is not one of the many functions, but it is spread throughout the organization in conjunction with all processes in the company". They provide evidence in their research of improvements to financial performance and stability within businesses through an effective, integrated risk management process.

Often risk management in organisations focus on the ability to prevent or mitigate losses in resources or assets by reducing the impact of predicted factors (Khameneh, Taheri & Ershadi, 2016; Ostrowska & Mazur, 2015). Kot and Dragon (2015) emphasize the importance of managing risk and not necessarily eliminating it, acknowledging risk management can also be positive and create opportunities.

Risk identification in businesses requires comprehensive understanding of the organisation, including the legal, political, cultural and social environment in which it operates in order to identify the causes and consequences of potential risks. Risk management allows senior leaders to regularly identify and review risks, analyze and evaluate them to determine the risk level (or rating), in order to prepare and respond accordingly through decision-making and resource allocation, to ensure the risks are within acceptable limits (Kot & Dragon, 2015; Ostrowska & Mazur, 2015; Torabi, Giahi & Sahebjamnia, 2016).

Studies reveal business wide risk management systems enable senior leaders to effectively manage not only health and safety risks, but dynamic business environments, challenges associated with supply chains, assets, earnings, operations, the acceleration of technological development and more (Khameneh, Taheri & Ershadi, 2016). This allows leaders to make decisions on resources to implement their strategies and business plans in order to improve business and safety performance in the organisation, as well as increasing corporate value (Nocco, 2006; Khameneh, Taheri & Ershadi, 2016).

Conclusions

Organisations and research often focuses on the factors of effective business and safety performance independently. However there are common factors, such as leadership, engagement and risk management, which compliment both and contribute towards a successful organisation. The analysis suggests that organisations do not need to make a trade-off between safety and production and instead have the opportunity to improve them simultaneously.

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Her passion is to ensure she adds value to the workplace by engaging with key stakeholders to seek out practical fatality and injury risk reduction ideas with the goal of eliminating fatalities and injuries. Her most memorable work was the short time she spent at a mining exploration site in India, where the impact of simple interventions was appreciated by the people working there, proving to add value and provide a safer place to work.

Occupational Disease Caused by Asbestos Containing Materials

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Abstract

From the early 1900's asbestos was considered an extremely useful material due to its flexibility and fire retardant properties. Between 1928 and 1929 links between occupational disease and asbestos exposure were made with the Asbestos Regulations (1931) being made law in Britain and a workers' compensation scheme for workers' who had developed asbestosis implemented, but it wasn't until 2003 that Asbestos was banned in workplaces within Australia. This report analyses published literature to address health risks and health effects of occupational exposure to asbestos. It includes a historical background on the uses and misconceptions on asbestos, current exposure limits and processes to deal with asbestos. Sources, uses and mining of asbestos from the 1940's until the present are covered along with the effects they caused.

Keywords

Asbestos. Workplace exposure. Disease. Mesothelioma.

Introduction

In Canada asbestos exposure caused cancers and mesothelioma cost the Canadian society over C$1.7 billion a year (Taylor, 2016a). The country that currently has the highest national average of annual deaths (2,515 mesothelioma deaths in 2014) due to its population being exposed to asbestos is the United Kingdom (Taylor, 2016b), however, Western Australia's "Aboriginal population die from mesothelioma at more than double the rate of people in the United Kingdom" (Taylor, 2016c, p.20). This high rate of Aboriginal deaths is not due to a genetic difference but is due to the type of work that the Aboriginal people were employed to do at Witternoom where crocidolite asbestos was mined. "Many of the Aboriginal cases worked in the dusty, lower paid jobs loading raw crocidolite for transport to the ports, more than 300 km from the mine (Taylor, 2016c, p.20).

Australia has the second-highest mesothelioma death rate in the world (Leigh, Davidson, et al., 2002). Six hundred and forty one Australian's died in 2001 from mesothelioma with more than 25,000 people expected to die from it over the next four decades (Leigh, Davidson, et al., 2002). Occupational Exposure to asbestos has been occurring in Western Australia since 1937, causing over 10, 000 fatalities in Australia (Safe Work Australia, 2014). In Australia in 2012, 619 new cases of mesothelioma were identified. By April 2013, 40% of these people (290) had died (Safe Work Australia, 2014). Asbestos was widely used and mined in Australia during this time as it was ruled as the most versatile material.

At Wittenoom in Western Australia, in 1946, a miner called Dignam, was the first reported Australian diagnosed as having work related asbestosis. Asbestosis has a long latency period and many cases were diagnosed after this. In 1978 the Western Australian Government included asbestos exposure legislation in its Factory and Shops Act 1978. In 1961 the first case of Mesothelioma was diagnosed in an ex-Wittenoom miner by Dr Jim McNulty. However it took until 2003 for the Government to ban the manufacture and use of all types of asbestos containing materials (Ro-ting, Takahashi, et al., 2007; Eggertson, 2012). As of 2001 only 12 countries had a complete ban on the use of asbestos products (Collegium, LaDou, et al., 2001).

With the development of knowledge of the health effects of asbestos exposure Australia's Work Health and Safety Regulations set laws for the management of asbestos. These laws include: Handling of naturally occurring asbestos; Removal of asbestos; Training of asbestos workers, and licensing requirements of abatement professionals (Safe Work Australia, 2014).

Asbestos is an occupational and environmental hazard of ruinous proportions. Asbestos use will continue to cause millions of deaths worldwide until all known sources of it are banned from use (Ro-ting, Takahashi, et al., 2007). Asbestos is a term used for several types of naturally occurring mineral fibres with an extensive range of uses. Asbestos covers the serpentine group (white asbestos), the amphibole group (brown/grey asbestos) and crocidolite, tremolite, and actinolite (blue asbestos), (Safe Work, 2014). Exposure to asbestos can lead to long-term illnesses and in many cases death. Conditions developed from exposure to asbestos include, lung cancer, mesothelioma, cancer neoplasias and asbestosis (Camplinn, 2003)

Methods
To analyse the health effects of occupational exposure to asbestos on workers a literature review was undertaken. The literature review was commenced through the use of Public Health databases including Proquest, Pubmed, Global Health and Science Direct. Following the use of the databases, relevant Safety Regulations and Laws were sourced from Safe Work Australia and government agencies such as Workplace Health and Safety Australia (WHS).

Using these databases the key words Occupational asbestos exposure were used to search for relevant publications and the number found were 4390 (Proquest), 4495 (Pubmed), 6111 (Global Health) and 7415 (Science Direct). Another search to obtain information on the nature of asbestos was completed on Proquest, searching the key word of 'asbestos' and refining the search to peer review articles only, provided 6, 257 results.

Publication abstracts were then reviewed with the inclusion criteria of relevant publications between 1990 and 2016. Duplicate information was excluded and only the most relevant publications related to asbestos exposure and its health effects were retained.

A further search focused on Safe Work Australia provided statistics on the workplace related diseases caused by exposure to asbestos, the death rates among those diseases and techniques on identifying and removing asbestos and asbestos containing products. Additional publications were obtained from National and International research on regulatory authorities' requirements.

In this article 21 journal articles were referenced along with key statistics from the Australian Bureau of Statistics, the Australian Institute of Health and Welfare and the Australian mesothelioma register. WorkSafe Western Australia and Safe Work Australia were referenced for important information. A total of 29 publications are referenced in this article.

Discussion
Asbestos history
Asbestos use in an occupational setting dates back to 1900's. At this time the accepted concentration of asbestos particles was 180 million per one metre cubed of air (Szeszenia – Dabrowska, Swaiatkowska, et al, 2011). Examples of health effects caused by asbestos mining in Western Australian history dates back to 1937 in Wittenoom, a town 1,106 kilometres north-east of Perth (Musk, et al., 1992).

Blue asbestos was mined in the Wittenoom Gorge by Blue Asbestos Ltd. but the conditions and dust control were of a low standard in both the mine and the mill (Gasparrini, Pizzo, et al, 2008). In 1944 a mine inspector raised the problem of the level of dust within the mine. To compensate for this problem all employees were given a wage increase (Mckenna, 1996). The relationship between asbestos and disease was known from as early as 1931 when the British put into effect Asbestos Regulations to provide workers who had developed asbestos, with compensation (Musk, et al., 1992). The fatal effects of asbestos exposure weren't discussed in the law courts in Australia until the 1970's and as a result of the link becoming public knowledge, lawsuits were filed by workers succumbing to what they believed were asbestos related diseases. Australia was far behind Britain who's first claim in was in 1931 (Mckenna, 1996).

The first case to go to court in Western Australia was in 1977, but the patient

died before his case was heard. The second attempt was in 1979, but no workers' compensation was awarded for this case as dying (the person died a few hours after their court appeal) from asbestos fibre exposure at work was considered by the judge as just a sad misadventure (Musk et al., 1992).

With this court ruling there were no further cases heard in Western Australian courts until the ex-workers from Wittenoom banded together to form the Asbestos Diseases Society of Western Australia and in 1989 one of the ex-Wittenoom employees, with the backing of the Asbestos Disease Society, went to court to claim workers' compensation for diffuse interstitial pulmonary fibrosis (asbestosis) caused by working with exposure to asbestos fibres. This was the longest civil litigation case in Western Australia and while this case was being heard a judge in Victoria made the first workers' compensation award in Australia for work related asbestosis (Musk, et al., 1992). In 1992 Musk, et al wrote that at that time (1992) there had been no subsequent lung cancer cases related to asbestos exposure settled through the courts in Western Australia, but there had been 336 cases settled out of court.

The general working conditions of Wittenoom were well known but the mine continued to work as the State Government believed that, "Wittenoom had one of the largest blue asbestos deposits in the world and that its exploitation could play a vital role in the development of the State" (Mckenna, 1996, p.682). Mining ceased at Wittenoom in 1966 as it was not profitable (Musk, et al, 1992).

As a result of ignoring health warnings and using money as illness compensation (rather than closing the mine) the effects of mining asbestos at Wittenoom are still causing hundreds of deaths due to mesothelioma in Western Australia (Gasparrini, Pizzo, et al, 2008).

Western Australia has a history of asbestos use, but as a result of a ban in 2003 the effects of new exposure to asbestos in WA have decreased significantly. However, in recent months asbestos was mistakenly imported into

Australia. In July 2016 asbestos was found in roofing panels that were installed in Perth's new children's hospital (Burki, 2016). The panels were imported from China and were classified as 'asbestos free' so it was not until the workers complained to their Union representative of the dust disbursed when cutting these panels that the National Association of Testing Authorities, at the request of the workers' Union, undertook laboratory testing and asbestosis fibres were found in the panels (WorkSafe Western Australia, 2016). This discovery reinforces the need for an international ban of asbestos (Burki, 2016).

Sources and uses of asbestos

Asbestos was long viewed as one of the most versatile minerals because of its flexibility, tensile strength, insulation from heat and electricity properties, chemical inertness and affordability (Szeszenia – Dabrowska, et al., 2011). Exposure to asbestos in the 1900's was as a result of asbestos used in building construction, installation and building materials such as roofing sheets. A major exposure was due to the extensive number of workers involved in the mining of asbestos, especially in Wittenoom in Western Australia (Amboina, Alfonso, et al, 2014). Asbestos has such a wide range of uses that include fire retardant coatings to concrete, ceilings, house walls, fences, brake linings and pipe lagging. The extensive uses of asbestos, especially where it is present in old houses, is a cause of thousands of deaths due to daily exposure if the fibers are breaking off and float loose in the air (Collegium, LaDou, et al., 2001).

Effects of asbestos on workers

Asbestos exposure can lead to many fatal illnesses, including, Asbestosis, Pleural Disease, Lung Cancer and Mesothelioma (Ohar, Ampleford, et al., 2007). In Australian in 2011 it was reported that 731 deaths due to asbestos related illnesses were caused (Australian Bureau of Statistics, 2013) with the deaths mainly distributed between Mesothelioma and Asbestosis. The number of deaths due to other diseases related to exposure to asbestos, such as lung cancer, is unknown. Almost 100% of these cases were due to work-related exposures to asbestos (Safe Work, Australia, 2014)

Mesothelioma is a fatal cancer of the membrane lining of the lungs, heart and abdomen. The types of mesothelioma are classed by organ respectively: pleura, pericardium and peritoneum (Kanarek, Mandich, 2016). This disease is contracted from exposure to blue and brown asbestos fibres. Mesothelioma almost always leads to mortality (Peto, Hodgson, et al., 1995) and the median survival rate after developing the disease is 12 months, almost never exceeding 2 years (Ohar, Ampleford, et al., 2007). However the disease takes 20 to 40 years to develop (Carbone, Ly, et al., 2012). In 2011, 606 deaths occurred from mesothelioma, 83% of deaths being males (Australian Mesothelioma Registry, 2013). Six hundred and seven people on the Australian Mesothelioma Registry died in 2014 and 641 Australians with newly diagnosed mesothelioma were added to this Registry in 2014 (Safe Work Australia, 2015).

Asbestosis is a chronic disease of the lungs caused by inhalation of asbestos (Ross, 2003). Asbestosis is illustrated by the formation of scar tissue around inflammation caused by the asbestos fibres inhaled into the lungs. The scar tissue will continue to harden as the disease develops, stopping the lungs from expanding and contracting resulting in a difficulty in breathing (American Thoracic Society, 2004).

Asbestosis usually takes more than 10 years to develop following prolonged asbestos exposure. Asbestosis also puts this person at a large risk of developing lung cancer and mesothelioma (Safe Work Australia, 2014). There is no cure for asbestosis. The symptoms are only treated for relief. Death from asbestosis is normally as a result of cardiac and respiratory failure (Attanoos, Gibbs, 2013). From a period of 1998-99 to 2009-10 there were 1394 asbestosis-related hospitalizations, 97% of which were male patients (Australian Institute of Health and Welfare, 2014b). In 2011 asbestosis – related deaths (which were in addition to the deaths related to mesothelioma) came to 335 (Australian Institute of Health and Welfare, 2014a).

Asbestos laws and regulations

According to Safe Work Australia (2016, p. 7) "a person conducting a business or undertaking at a workplace to ensure, so far as reasonably practicable, that exposure of a person at the workplace to airborne asbestos is eliminated or minimized".

The Occupational Safety and Health Regulations of Western Australia (1996, s. 5.42), Division 4 contain requirements in relation to certain hazardous substances. Section 1, Asbestos, outlines definitions and requirements of asbestos interaction. Under these Regulations asbestos is defined as, "any material, object, product or debris that contains asbestos", and asbestos dust as, "airborne dust consisting of or containing a time-weighted average fibre concentration of asbestos that is in excess of the exposure standard". The Occupational Safety and Health Regulations of Western Australia (1996, s. 5.42), state that, a person who, at a demolition site ... must ensure that the work –
does not commence or immediately ceases when the presence of asbestos ... is apparent and
does not proceed until the material has been removed in accordance with regulation 5.45.
Regulation 5.45 states that a license to do asbestos work or a restricted license for work involving asbestos containing material must be granted by the Commissioner in an approved form. If the license is granted the applicant must provide evidence of having systems of work in place to ensure that the work will be done in a safe and proper manner. The Occupational Safety and Health Regulation of Western Australia (1996, s. 5.42), follow on to state that, "A person entering an asbestos work area must be provided with appropriate personal protective clothing and equipment".

Conclusions

Exposure to asbestos can lead to devastating health effects and fatalities. A person can be left with a life threatening disease as a result of insufficient protection within their working environment. It is for this reason that a worldwide ban of asbestos is in need. With diseases such as mesothelioma, asbestosis and lung cancer, people today are still dying due to their exposure to asbestos fibres in the 1940 and beyond. Asbestos exposure in Wittenoom continues to be studied world-wide as it became one of the biggest epidemics of asbestosis in the world.

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Worker's Compensation Claim Barriers.

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Abstract

The underlying reason why employees are not claiming worker compensation, despite being eligible, has been overlooked even though it is governed by legislation. A significant amount of workers are not claiming compensation due to unawareness or lack of understanding of the policy, to which improvements in the workplace in the form of employee education, occupational health and safety programs and interventions may be introduced. This literature review discusses factors such as gender, age and other reasons that can affect an employee's decision not to claim worker's compensation for work-related injuries.

Keywords: Barriers. Workers' compensation claim. Work related injuries. Influencing factors.

Introduction

Work related injuries affect both the employee and employer, as well as government bodies. In Australia, there is legislation that governs an employee's benefits and entitlements in the event of an occupational injury occurrence. Under the Western Australian Workers' Compensation and Injury Management Act 1981, section 18 states that employers are liable to compensate workers for injuries, and section 5 defines injury to include "personal injury arising out of, or during the course of employment, or whilst the worker is acting under the employer's instruction" (Workers Compensation and Injury Management Act 1981 Western Australia). Despite this legislation being in place, there are employees who are not claiming workers' compensation even though they are eligible. According to a report by the Australian Bureau of Statistics [ABS] (2014), 531,800 people experienced some form of work-related injury or illness between July 2013 and June 2014, of which 39% did not claim workers' compensation.

Findings by Scherzer, Rugulies and Krause (2005), Hodges, Kirkhope, Naphtall and Slevison (2013), Qin, Kurowski, Gore and Punnett (2014) and Safe Work Australia (2009, 2011), suggested several factors and reasons that could influence an employee's decision not to submit a workers' compensation claim following a work-related injury. These reasons included that some employees found the reporting and claim process complicated, some felt that lodging a claim would pose as a risk to their job security, while others perceived the pain or injury to be manageable. In addition, many employees did not think they were eligible for workers' compensation. This is supported by a statistic in a report by Safe Work Australia (2011), which cited nearly one in ten employees were not aware that they were covered by their employer for workers' compensation for a work related injury or work caused ill-health.

It is important to address the issue of workers who do not claim workers' compensation as presentism (employees coming to work when they are sick or injured) by these employees affects their employers who become exposed to potential lost productivity and profits due to lower employees productivity. The Australian Bureau of Statistics (ABS) report that in 2014 out of the 531,800 people who suffered a work related injury or illness, 61% had some time off work and 29% had at least 5 or more days off from work. The failure in claiming workers' compensation also affects government statistics, as it could lead to the National Data Set of Workers' Compensation Statistics underreporting the number of injury occurrence in Australian workers (Safe Work Australia, 2009). Furthermore, trends in work-related injuries may become disguised as certain types of injuries appear to be less common than they actually are, or result in particular groups of workers being overlooked in targeted Occupational Health and Safety campaigns (Safe Work Australia, 2009). Qin et al. (2014) states that in order to estimate the scope of workplace injury, have efficient resource allocation, and to measure the effectiveness of intervention, the most important data source stems from workers' compensation claims.

This literature review discusses the different influence factors, such as gender, age, and other reasons that could likely affect an employee's decision not to claim worker's compensation for a work-related injury.

Method

Search process

To identify factors that may affect an employee making work related injury claims, a literature review search was conducted via databases that included Pubmed, ScienceDirect, and ProQuest. In addition, several government sector websites including Comcare, Safe Work Australia (SWA), and Australian Bureau of Statistics (ABS) were used to obtain statistical information, while the State Law Publisher was used in reference to the relevant Australian legislation.

The keywords used in search channels included *worker compensation claims, work related injuries*, barriers, and *influence factor*. ProQuest found 59,607 results, which was reduced to 530 by refining the search using additional keywords, and filtered to show Western Australia results between year 2000 to 2015. Pubmed found similar articles to ProQuest when the keywords 'barrier' and 'worker compensation claim' was used, with 17 results. Another search engine, ScienceDirect revealed 5,680 results from keywords 'work related injury' and 'worker compensation claim'. This was reduced to 1,397 articles when filtered by years 2010 to 2015. To obtain statistical information, an initial search was conducted at the ABS website using keyword 'worker compensation'. 1,526 results were found, with 715 matching all words; this was reduced again by filtering by years 2010 to 2015. Out of the total publications searched, 19 articles were found to be relevant to this topic, of which 10 have been cited in this review. Statistics from 6 reports were obtained through the Safe Work Australia website, which was used to provide the statistical information to analyse the trends in worker compensation claims.

Definition and legislation

In this article, the following definitions and legislation apply:

Work-related injuries and illnesses are defined as any injury or illness or disease which first occurred, in the last 12 months, where a person suffers either physically or mentally from a condition that has arisen out of, or in the course of employment (ABS, 2014).

Lost Time Injury is defined as an occurrence that resulted in a fatality, permanent disability, or time lost from work of one day/shift or more (Safe Work Australia, 2015a).

Workers Compensation and Injury Management Act 1981 is the legislation that sets the minimum standards for meeting legal requirement related to Workers' Compensation and return to work procedures following a work related injury or work related ill health in Western Australia.

Discussion

In order to develop an effective injury prevention program, access to accurate statistics on work-related injuries was fundamental and research involving workers of all ages showed that under-reporting of work related injuries was prevalent (Tucker, Diekrager, Turner, & Kelloway, 2014). It was suggested that factors affecting employees not claiming workers' compensation are multifaceted. Qin et al. (2014) presented that reasons for not claiming workers' compensation could vary from organisational factors, occupational factors, injury and illness factors, to personal factors. This discussion examines the category of gender, age, and other reasons.

Gender

Over the years, it was a consensus that males in general, are more likely to claim workers' compensation for their injuries compared to females. In a report conducted in 2009-2010, 47% of male workers claimed compensation for a work-related injury, compared to females at 39% (Safe Work Australia, 2011). In the ABS (2014) Work Related Injuries Survey 2013-2014, the percentage of males who experienced work-related injuries or illness was 61%. The higher claim levels may be due to the tendency of male workers to be more frequently exposed to higher-risk type jobs, such as manual labour. This is supported by Shin, Oh, and Yi (2011), who through statistical analysis, found that males are positively and significantly associated with a high occurrence rate of occupational injuries and diseases. The percentage of female workers who did not apply for a claim in 2009-2010 was 61%, compared with male workers at 53% (Safe Work Australia, 2011). Reed and Dahlguist (as cited in Shin et al., 2011) found that women are more likely to be employed in safer jobs than men, while Grazier and Sloane (as cited in Shin et al., 2011) also found that women are more risk averse compared to men. There were several

influence factors deterring both the male and female workers from applying workers' compensation claim. Safe Work Australia (2009) reported, male and female workers did not apply for compensation for nearly four- tenths of their injuries that involved some time lost from work because they considered the injury too minor to claim. For a further one-tenth of these injuries, male and female workers felt it was inconvenient or too much effort to apply. Male employees did not apply for compensation for more than two in ten injuries because they did not know they were eligible for compensation. For female employees, nearly two in ten did not apply due to concerns about their current or future employment.

Age
Age differences were another key factors that determine the occurrence of work-related injury. According to the Australian Bureau of Statistics (2014), the highest age group who submitted claims was the 50-54 year olds, with 52 per 1000 persons, followed by the 15-19 year olds, at 50 per 1000 persons. In Safe Work Australia's 2013 report, it was found that 63% of young workers did not submit claims for their injuries. In contrast, 58% of older workers did not apply for compensation. 43% of the young workers who did not claim compensation felt that their injuries were too minor to lodge a claim, and a further 10% were either not aware of workers' compensation, or did not think they were covered. In another report by Safe Work Australia (2015b), only 6% of participants with work-related musculoskeletal pain reported their condition to their employer, and only 1.2% claimed workers' compensation.

Young female employees were least likely to claim workers' compensation while males aged 45–54 years were most likely to claim compensation for injuries that involved some time lost from work (Safe Work Australia, 2009). Shin et al. (2011) found that workers aged between 25-54 years old tend to take more risks compared to workers lesser than 25 years of age, or more than 54 years of age.

Other reasons
Numerous publications document the barriers of workers not claiming work-related injury compensation and this has mainly been attribute to sematic information processing (Hallden, 2014). Scherzer and Wolfe (2008), identify barriers including not knowing about reporting procedures, fear of jeopardizing one's job and difficult interactions with workers' compensation agency personnel. According to ABS (2014), a total of 326,100 Australian workers did not claim workers' compensation when injured in 2013-2014, with 44% of these workers explaining that the main reason for not claiming was due to the injury being minor or insignificant, 10% did not think they were eligible to make a claim, and a further 10% were not covered or were not aware of the workers' compensation policy in the company that they worked for.

A report by Pransky, Snyder, Dembe, and Himmelstein (1999) found that workers explained several reasons for not reporting their injuries, including fear of reprisal, a belief that pain was an ordinary consequence of work activities or aging, a lack of response from management for previous incidents, and to avoid the risk of losing their jobs. As self-employed individuals are not covered by worker's compensation, their injuries are not included in the statistics. Additionally, occupational diseases may have a long latency period which makes it difficult to link the disease to work performed at a specific time or place, and thus the inability to claim worker's compensation (Safe Work Australia, 2015c).

Conclusion
The workers' compensation system was designed to be non-adversarial, and help compensate workers for time away from work and loss of income due to injury sustained in the workplace (Hallden, 2014). Removing the barriers that prevent workers from claiming compensation is important as it reduces the under-reporting of statistics, and in turn, helps identify appropriate and targeted interventions and workplace safety programs to reduce the overall risk and occurrence of injuries. An important area that requires implementation is the education of employees in the workers' compensation process, to increase knowledge and awareness of each workers' individual eligibility and entitlements as this will reduce the perceived deprivation of worker benefits.

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Rehabilitation. Work and Beyond (3rd ed.).

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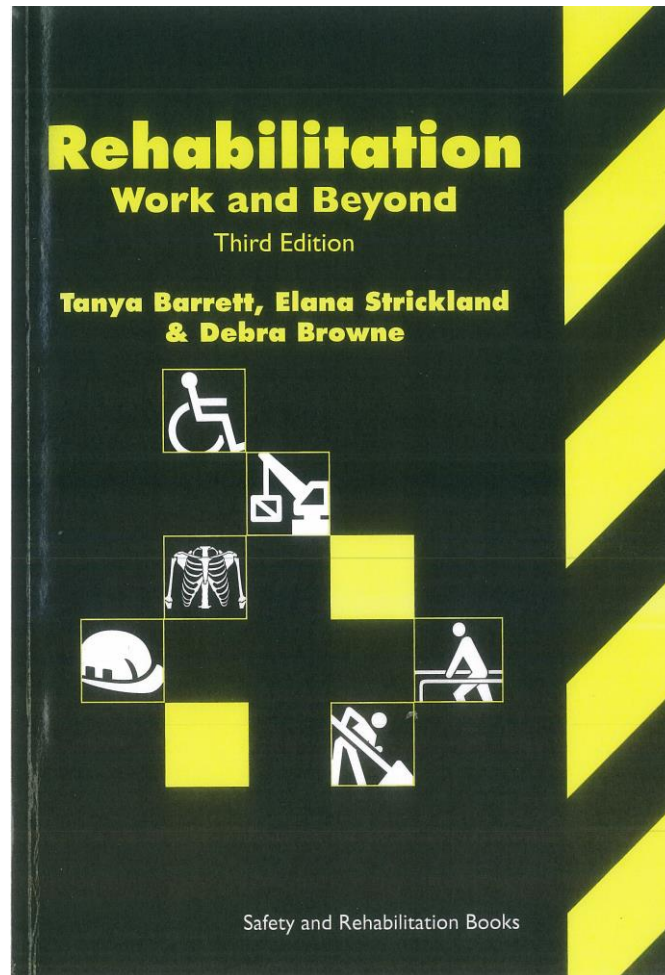
Editors: Tanya Barrett, Elana Strickland & Debra Brown. (2016). Place and Publisher: Nedlands, WA: Safety and Rehabilitation Book

When I worked as a safety and health professional in industry, as well as putting safety in the design stage as much as possible, I also had to manage what went wrong. What went wrong could sometimes result in an employee becoming sick or injured at work, needing injury management and making a worker's compensation claim. There was no published book that I found that provided me with information on what to do when I had to manage employees' rehabilitation back to work.

When teaching safety and health students at Edith Cowan University in the safety and health course we had a unit of study on Rehabilitation and Workers' compensation management, but I was unable to find any relevant textbooks to

be used for this unit of study. I spoke to Tanya Barrett about this problem. Tanya is very experienced at working in this area so, with other experts in return to work management and representatives working in the insurance industry, a book was written called Rehabilitation. Work and Beyond. I immediately used this book for classroom and distance education teaching.

This book is divided into six sections. The first section is called setting the scene. It includes an introduction to what rehabilitation is, what needs to be completed in a workplace to support employee return to work programs and the findings of a research study on pre-claim prevention of long duration workers' compensation claims. The second section includes information about employee rehabilitation from a business perspective. It provides an overview of workers' compensation in Australia and other countries, how the organisational structure can be used to facilitate employee rehabilitation and injury management programs, case study stories about how companies improved staff productivity and reduced workers' compensation costs and how to do a cost benefit analysis to show management that having a well-managed return to work program can increase business profitability.

The following section of the book provides information about the services and interventions required to support employee return or entry (for a redeployment program) to the workplace. It covers the role of the occupational physician in workplace rehabilitation, how to conduct a functional capacity evaluation, and the role of other members of the employee return to work program team. This is followed with book chapters that include information on evidence based practice in treatment and how to partner with treatment providers who include physiotherapist, psychologist and occupational therapist.

The fifth section of 'Rehabilitation. Work and beyond' focuses on the management of return to work for employees, rehabilitation and claims management. It provides information about the role of the insurer and how to use the insurer to better manage workers' rehabilitation and return to work. Information is provided about using people employed to work at the company (in house rehabilitation providers), external rehabilitation providers and when it is best to use each of these providers. Information is then provided on key strategies to use for successful rehabilitation and advanced case management strategies. The last section of the book chapters are related to quality management for effective workplace employee rehabilitation and includes a rehabilitation checklist for practitioners, what it takes to be an effective workplace rehabilitation provider, how to evaluate the quality of service and providers' return to work management.

For me, what makes this book an effective learning resource is that it is the only book that I have found that has practical experience stories from people working in the rehabilitation and workers' compensation field, it includes checklists for practitioners to use, key interventions and advanced case management strategies. The book is easy to read and it looks at important factors that include mental, as well as physical, health and a cost benefit analysis for workplace rehabilitation strategies, which is a very useful tool to use to convince management of the value of effective employee rehabilitation.

I now work at Curtin University and continue to use this book as a text for our Compensation and Injury Management unit of study. I receive very good feedback from students about how useful this textbook is, not only for their studies, but also to use when working in industry. As well as being used by Occupational Health and Safety students, Occupational Medical Professionals and other people who are involved with managing employee return to work programs and workers' compensation, this book is also a prescribed textbook for students studying Occupational Therapy. All profits from the sale of this book are donated to recognized research organisations for research in the areas of rehabilitation and safety. More information on the content of this book is available from the web address:
http://www.safetyandrehabilitationbooks.com/book-contents

Safety Culture to Gain Commitment for Good Occupational Health and Safety in the Workplace.

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Abstract: Safety culture is the overall values, attitudes and behaviors of an organisation and can be a difficult challenge to influence and change in a workplace. Although the Occupational Safety and Health Act 1984 contains occupational provisions, appropriate policies and procedures need to be implemented and followed in each workplace to shift safety culture in a positive manner. This article reviews published literature associated with factors that influence safety culture and the commitment for good occupational health and safety (OHS) in a workplace. This article considers the legal obligations of an employer and employee, what safety culture is and how it may positively change the workplace.

Keywords: Commitment to occupational safety and health. Safety culture. Organisational culture. Attitude. Employers. Employees. Occupational safety. Construction safety culture.

Introduction

The concept of 'safety culture' is relatively new to many industries and workplaces (Mohamed, 2003). There has been a surge in interest of this area as organisations aim to reduce the number of injuries or illness, accidents and disasters (Cooper, 2000). Safety culture entails positive behaviours, positive values and a unified commitment to occupational health and safety in the workplace, which results in increased employee satisfaction, reduced occupational injuries and reduced costs due to injuries (Guldenmund, 2000).

Safety culture is embedded within organisational culture and is defined as the values, attitudes, norms, beliefs, practices, policies and behaviours of safety within an organisation (Choudhry, Fang & Mohamed, 2007). It is recognised as a necessary precursor to improving safety in the workplace. Developing and maintaining a positive safety culture is an effective method of improving occupational health and safety management in a workplace (Vecchio-Sadus & Griffiths, 2004).

This paper explores what safety culture is, factors that influence safety culture and how it may be improved.

Methods

To investigate how a positive safety culture may influence commitment to good OHS. This review focused on applied research, published research and literature that addressed what safety culture is and the benefits of a positive safety culture in the workplace. The main question addressed by the review was "How can safety culture improve an organisation?" Further questions included "What is safety culture?" "What factors affect safety culture?" and "How can safety culture be improved?" In investigating these aspects of safety culture, this review will provide a method of gaining a commitment to good occupational, health and safety.

A search of five electronic databases was used to identify qualitative and quantitative peer-reviewed studies that were published in English from 1997 to 2014. The date restriction was implemented as a filter in the search databases. These databases included: HSELINE, NIOSHTIC, RIOSH, Proquest and Google scholar. Search terms were used to identify relevant studies and articles that answered the questions for the purpose of this review. Search terms used included: safety culture, commitment to OHS,

organisational safety and benefits of safety culture. Useful peer reviewed studies included ones that used questionnaires, focus groups and behavioural observations to assess the quality and correlation of safety culture in a workplace. Initially, a search using Google Scholar database with the phrase "safety culture" AND "safety climate" AND "organisational culture" yielded 120,000 results. A filter for scholar journals published between the years of 1997 to 2014 was applied, refining the results to 18,600 journals. Twenty-two of these were used to conduct a literature review n the effect of safety culture of gaining a good commitment to OHS in the workplace.

Discussion

Benefits of a positive Safety Culture A positive safety culture possesses management commitment to OHS, genuine concern for the workforce, reciprocal trust and credibility throughout all levels of the organisation and employee empowerment (Luria & Rafaeli, 2008). Employer and employee behaviour and risk management is switched from reactive to proactive, when a positive safety culture exists in an organisation (O'Toole, 2002). Proactivity of OHS, results in finding and prioritising issues, such as hazard identification, risk assessment and applying relevant controls (Gong et al., 2012). This proactivity leads to the benefits of prevention and reduced number of injuries, illness and accidents in the workplace (Parker, Lawrie & Hudson, 2006). Reduction of injuries, illness and accidents is economically beneficial for the organisation and results in cost effectiveness and stronger shareholder value (Vredenburgh, 2002).

Factors that influence Safety
Culture
There are many ways the safety culture of an organisation can be assessed. A measurement scale questionnaire of safety culture conducted by Sherif Mohamed (2002)

encapsulated five broad aspects that affect safety culture, namely; management, safety systems, competence, work pressure and risk appreciation (Mohamed, 2002). This assessment found that management, safety systems and employee risk appreciation influenced the safety climate of construction sites, whereas work pressure and competence demonstrated limited influence on the safety culture (Mohamed, 2002). Improvement of procedures, systems, the physical set up of the working environment and overall health and safety management system of the organisation should be implemented (Young, 2014). These improvements will allow continuous advancement to safety and safety culture in the workplace (Mearns, Whitaker & Flin, 2003).

Management Involvement
Prior to implementing and advancing the safety culture, the organisation is required to possess a good OHS management system, which is compatible to the desired safety culture (Earnst, 1997). Positive commitment to safety by management has a strong influence on the safety culture of a workplace (Gracia et al., 2004). It is believed that through this commitment, management will lead by example and model employee's safety behaviours. In leading by example, management establish and reinforce positive norms and attitudes toward safety practices, resulting in creating a safe environment (Zohar, 2002).

Employee empowerment
Employee contribution and empowerment in OHS is just as important as management involvement, when creating safety culture in a workplace (Griffiths, 2001). Employee empowerment results in proactivity, instead of reactivity and positive behaviours for OHS, resulting in better risk management and an overall decrease of illness, injury and property damage (Vecchio-Sadus & Griffiths, 2004).

Improving Safety Culture

Many studies have included suggestions on how to improve safety culture in an organisation (Leape, Berwick & Bates, 2002). Goal-setting has been suggested to be an effective method of improving safety culture if implemented correctly (Cox & Cheyne, 2000). The goal of achieving a 'safety culture' should be split into sub-goals that are attainable and directs the employees to ultimately the 'safety culture'.

Establishing a companywide safety culture from management to front-line workers, throughout all levels of the organisation has been demonstrated to positively influence the safety climate (Mohamed, 2002). A non-adversarial safety culture in combination with an open environment for exchanging safety ideas has been suggested as a method of improving the management arm of safety culture (Mohamed, 2002). Management should set norms and standards for safety and lead by example (Glendon & Stanton, 2000). Front line workers should actively be aware of the behaviour of themselves and colleagues (Michael et al., 2005). Furthermore, employees should be aware of a support system from management, where they feel safe to report unsafe behaviour and put suggestions forward (Michael et al., 2005).

Legislative requirements

The Occupational Safety and Health Act 1984 governs the legislative requirement of occupational safety and health in Western Australia. Although the legislation does not detail how a safe occupational environment should be achieved, it does outline the minimal requirements of occupational health and safety, and duty of care relationship between an employer and employee in the workplace. The Occupational Safety and Health Act 1984 section 19 states that the duty of an employer as; an employer shall, so far as is practicable, provide and maintain a working environment in which the employees of the employer are not exposed to hazards.

Section 20 of the act, states the duties of employees. An employee shall take reasonable care to a) ensure his or her own safety and health at work and b) avoid adversely affecting the safety or health of any other person through an act or omission at work.

If an organisation has a strong and positive safety culture, where employers and employees think and behave in a safe manner, the legislative requirements of both employers and employees will unlikely be breached (Lin & Mills, 2001).

Conclusion

This paper attempted to examine how safety culture may be used to gain commitment to good OHS and factors that may influence and determine the safety culture of an organisation. Peer reviewed articles, published journals and studies were reviewed for support and evidence of this paper. Studies found that management, employee empowerment and safety systems have a strong influence on safety culture in an organisation. Positive management, employee empowerment and efficient safety systems have the power to positively influence safety culture, as management are able to lead by example, employees are actively involved in hazard identification and risk assessment of their environment and there are proper support networks to facilitate their awareness for OHS. Although implementation and drive of safety culture may be difficult to obtain, organisations need to be constantly assessing; if the safety culture is working, requires change and effectively reduces the risk of injury and accidents. Once a positive safety culture is present throughout all levels of the organisation, it leads to reduced injuries, illness, accidents and costs.

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How do Ergonomic Factors Affect Perceptions of Student Online Learning in Tertiary Education?

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Abstract

Aim: The aim of this research was to identify and evaluate the physical, environmental, organisational, cognitive and social ergonomic factors associated with student learning in online tertiary education.

Results: Results of this exploratory descriptive study identified that physical, environmental, cognitive, organisational and social ergonomic factors were all important in facilitating student online learning, but could also hinder learning when any of these 5 ergonomic factors were unsatisfactory. The Tutor was identified as having an important role in students' online learning. Environmental ergonomic factors were of most concern followed in descending levels of concern by physical, organisational, social and cognitive ergonomic factors. The environmental ergonomic factor of most concern was noise as it distracted students' concentration, thereby negatively impacting on student satisfaction and learning.

Conclusions: It was concluded that students perceived organisational ergonomics to be the most important of all five ergonomic factors for providing an effective online learning environment followed in declining levels of importance by cognitive, physical, environmental and social ergonomic factors. The organisational ergonomic factor considered of most concern was technical issues with inadequate access to the learning platform Blackboard, which interrupts and limits students' online learning.

Key words.
Online learning. Tertiary education. Ergonomic factors.

1. Introduction

Out of various pedagogical methods, online teaching is gaining ground in the tertiary teaching environment (Jansz, Walker, & Bay, 2016; McBrien, Jones & Cheng, 2009). Research indicates that there is a close association between variations in student's perceptions of their learning environment and the quality of their learning outcomes (Ginns & Ellis, 2007). To greater support and improve teaching and learning practices for the future there is a need to have a greater understanding of study practices in tertiary students 'online' education environments.

Studies undertaken over the course of the last decade document that ergonomic factors such as the physical environment (e.g. workspace, computer and furniture) (Earthman, 2004); environmental conditions (e.g. lighting, noise and ventilation) (Zandvliet & Fraser, 2005); organisation of the environment (e.g. course structure, workload and tutor support) (Ginns & Ellis, 2007; Woolner, Hall, Higgins, McCaughey, & Wall, 2007); cognitive factors (e.g. how study material design affect learning) (Benjamin, 2014; Ginns & Ellis, 2007; Jansz, 2011; Lavrov, Kupenko, Lavryk, & Barchenko, 2013); and psychosocial factors (e.g. opportunities for interaction with peers and tutor) (Zandvliet & Fraser, 2005) have a significant impact on student learning outcomes, along with well-being and satisfaction. Smith (2007) suggest that applying ergonomic principles and practices, long proven to be successful in paid workplaces, would likely achieve similar improvements in performance when related to student learning. In practice, the design of learning spaces involves consideration of the five ergonomic factors: physical, social, environmental, organizational and cognitive, however currently little is known about how these five factors interact individually and in

combination to impact upon the tertiary student's online learning experience.

In a comprehensive literature review under taken by Soroka (2015), a gap in knowledge was identified in relation to how ergonomic factors in an online learning environment affect student learning. No study was found that had been completed in order to investigate the relationship between all five ergonomic factors (physical, environmental, organisational, cognitive and social) and what impact they have on learning in the educational environment (Grattan Institute, 2014). This study involved students drawn from the School of Education, the School of Design and the Built Environment and the School of Public Health to identify the ergonomic factors which impact student learning and engagement in online tertiary study.

2. Research Aim

The aim of this research was to identify and evaluate the physical, environmental, organisational, cognitive and social ergonomic factors associated with student learning in online tertiary education.

3. Research Methods

This research was conducted as an exploratory descriptive study using a mixed method approach of obtaining both quantitative (numbers) and qualitative (text and images) data. It was conducted to assess student perceptions of how ergonomic factors impact on their learning in the online education environment. An exploratory descriptive methodology was used as the five ergonomic factors that can affect on-line learning in this population has not been previously research and as such this was the best method to use to gain insight for the cohort studied (Denscombe, 2014; Babbie, 2015). Exploratory research is inductive as it leads to the discovery of new knowledge (Gray, 2013) and this was a desired outcome of the research. A mixed method approach was used as quantitative data can be used to gauge the level of the significance of the findings while qualitative data provides sequential discovery of new knowledge through the themes identified which is what is required in exploratory research

(Creswell, 2013). This assists with identifying current problems and developing theories based on the exploratory descriptive research findings (Zikmund, et al., 2012; Denscombe, 2014).

The target population was Curtin University students studying fully online. Cluster sampling was used as the required participants were in selected units of study in the School of Public Health, School of Education, in the School Design and Built Environment and all students enrolled in these units of study had an equal chance of participating in the survey. Participation in the study was on a voluntary basis. Multi-stage sampling was used for the School of Public Health and for the School of Design and Built Environment participants as the opportunity to complete an online questionnaire was available for these students in weeks 4 (1st questionnaire and checklist) and in week 13 (2nd questionnaire) of their on-line study period. Students in the School of Education only completed the first questionnaire and the checklist in week 4 of their online study period. Ethics approval to conduct this research was obtained from the Curtin University Ethics Committee. Data was collected from study participants via a self-administered online ergonomic checklist and two questionnaires in Qualtrics. One hundred and thirty (130) students participated in this research.

The validity of the content of the Ergonomic Questionnaires and Checklist was verified through literature review and the review of experienced researchers. The use of NVivo software to conduct the data analysis added rigour to the qualitative research. Results from the 'Most Frequent Word Queries' and themes identified through the node classification process were compared for similarity and good correlation was found. A Pilot Study was conducted with 18 university students. Improvements made to the questionnaire and checklist following the pilot study improved the validity and reliability of the research tools used. Questionnaire responses for this research were analysed using Cronbach's alpha and revealed that good internal consistency existed as Cronbach's Alpha was 0.866

which is within the acceptable value range for reliability.

The student perception responses were analysed using both qualitative and quantitative statistical tests. Descriptive statistics, including frequency and percentages, were calculated in STATA and Excel for categorical variable data and for the mean for continuous variables. Perception scores were calculated for each of the five ergonomic factors and expressed in terms of the percentage positive and negative perception scores. Descriptive statistics of mean and standard deviation were calculated. A significance level of 0.05 was used, due to the exploratory nature of the research study. A 2 sample t-test was used to determine if there was a significant difference between the responses of males and females and between the responses of international and Australian students with questionnaire answers. A 2 sample t-test was used to determine if two means were significantly different (McDonald, 2016). A 1-way Analysis of Variants was used to determine if age and if the School that the students were completing their online units of study through was a variable that affected questionnaire responses (Steltman, 2015). Qualitative data collected from checklist responses were analysed using NVivo to determine common themes (Kuckartz, 2014). The 'Most Frequent Word Queries' were run to identify the most frequently used words in the checklist (70%) responses. Participant responses were also coded into nodes for each of the qualitative responses and categorized under each of the five ergonomic factors (physical, environmental, organisational, cognitive and social) and themes expressed in terms of frequency of references and percentages.

4. Results
The checklist contained 7 general, mainly demographic, questions, 10 questions related to physical ergonomic factors, 7 related to environmental ergonomic factors, 10 questions related to organisational ergonomic factors, 11 related to cognitive ergonomic factors and 12 questions related to social ergonomic factors. Results of the demographic questions indicated that most of the students were Australian (93%) with the remaining international students coming from a variety of countries. The majority of the respondents were female (70%), with the remaining 30% being male. Respondents' age varied from less than 18 years to more than 46 years old, with the most common age being 26 to 35 years (33%). The most commonly reported study location was a study desk (53%) with other study locations being the kitchen or dining room table, couch, bed or the floor. The most common way for students to access their study materials was from their laptop computer (63%). However a mobile phone, desk top computer and tablet were also used by students to access their online study materials. Forty nine percent of students studying fully online spent more than 1-2 hours studying without a break with 21% reporting spending more than 2 hours studying online with no break.

For physical ergonomic factors students reported the most important factor for helping them with online learning was having a comfortable desk followed by having a comfortable, adjustable ergonomic chair and enough workspace. Not having these factors made it difficult for students to do their online learning. With environmental ergonomic factors 51% of students found that the noise level in their learning environment distracted them from learning. Other environmental factors that caused problems was not having control of lighting (53%), glare from windows or over-head lighting (21%), uncomfortable room temperature (62%), poor room ventilation (18%), having the room air too dry or too humid (13%). Students reported that having satisfactory lighting, ventilation, temperature and a quiet work environment facilitated their learning. In general the students were satisfied with the organisational ergonomic factors as all organisational factors, with the exception of technical issues with their learning platform (Blackboard) was above 70%. Of concern is that 50% of the students reported experiencing technical issues with their learning platform. The most important organisational factor for facilitating online learning was constructive and timely feedback from, and communication with, Tutors (18%) and

learning support provided by their Tutors and other university staff (12%). For cognitive ergonomic factors the students generally reported that their on-line study materials easy to understand and had a level of satisfaction between 72%-93% for the cognitive ergonomic factors in their online learning environment. With social ergonomic factors 90% of students felt that they were provided with sufficient support and guidance for their on-line studies with 86% reporting opportunities to interact, to provide and get feedback and 78% reporting having opportunities to learn from their peers in their unit of study. The social ergonomic factor that was most helpful for students to learn was interaction with their peers (27%) and with their Tutor (25%). The social ergonomic factors that made it most difficult for student to learn on-line were limited time due to work, social and family commitments (38%) and group assignments (14%) when everyone in the group did not contribute equally to the assignment work.

At the end of the checklist students were asked to rank their perception of the ergonomic factors in their online work environment. The most positive perception was that the cognitive ergonomic factors in their online learning environment were good (81%), followed by social (80%), organisational (76%), physical (72%) and the least positive perception was for the environmental ergonomic factors (66%). This indicated that environmental and physical ergonomic factors, which is something that student have control over, were the least satisfactory while cognitive ergonomic factors, which the Tutor has a high input into, were the most satisfactory in the on-line learning environment. Students then ranked the ergonomic factors in order of importance for their on-line learning. When reporting on importance the ergonomic factors were ranked in the following order. Organisational (79%), cognitive (74%), physical (70%), environmental (65%) and least important was social ergonomic factors (54%). The theme that emerged was that organisational and cognitive ergonomic factors were most important to students studying online. These were ergonomic factors that university staff had the most control over.

The first questionnaire was completed by 122 students. It had 23 questions that related to students' perception of studying in the online learning environment. A Likert scale was used by students to answer each question by scoring the answer from strongly agree (1), agree, do not know, disagree or strongly disagree (5). For the three Schools' participants responses the highest agreement score was for 'I am engaged in learning when I receive direct and timely feedback from my tutor (91%). The four other highest agreement scores were for 'I am engaged in learning when the tutor is engaging, supportive and friendly' (88%). 'In the online learning environment I feel motivated to learn' (86%). 'I am engaged in learning when I answer assignment questions' (85%). 'I am engaged in learning when I communicate by email with my tutor or coordinator' (83%). Looking at the highest agreement responses the most common theme to emerge is that the Tutor has an important role in the students' online learning. There was a high agreement that the students had adequate computer skills to manage online learning (88% agreement). The highest disagreement score (57%) was that the students had ill-health affects from studying online. The other 5 highest disagreement scores were for 'My sense of community mostly comes from Facebook and my own initiative rather than the online learning environment (39% disagree; 28% agree). 'I use non-Curtin media, such as Facebook, etc., to enhance my learning (36% disagree; 40% agree). 'I feel isolated by the lack of a classroom with physical proximity and face to face interaction with Peers, Lecturers and/ or Tutors' (36% disagree; 38% agree). 'I feel a sense of community in the online environment' (28% disagree; 41% agree). 'I find it easy to work with others in the online learning environment' (28% disagree; 36% agree). A theme to emerge from this data is that most students do not have ill health effects from studying online. The other theme to emerge is that the students studying fully online tend to work more in isolation than to work with each other.

With the questionnaire answers international students showed significantly more agreement in their questionnaire answers compared to domestic students, difference being 0.52 using the 2-sample t-test (p=0.001). The Age Groups answers were not significantly different (p=0.125) in agreement, using the 1-way Analysis of Variance. The three Schools were found to be significantly different using the 1-way Analysis of Variance (p<0.001). Post-hoc comparison the overall score for the 3 schools showed that students from School of Public Health showed significantly more disagreement to answers to the questions in the first questionnaire compared to the School of Education (p<0.001) and School of Design and Built Environment (p=0.002). Male students questionnaire answers were not significantly different in agreement compared to Female students using the 2-sample t-test (p=0.092). Pearson correlation regression analysis was used to analyze the mean scores for the categories of School, student type (domestic or international), age and gender. Analysis results showed that 17% of the variance in the mean score was accounted for by whether the student was international or domestic (p = 0.00); 12% of the variance in the mean score was accounted for by School (p = 0.00); 3% of the variance in the mean score was accounted for by gender (p = 0.06) and 0% of the variance in mean score was accounted for by age (p = 0.78) indicating that both gender and age were not significant variable for on-line study.

The follow up questionnaire had the same questions as the first questionnaire with the exception of question 23 (why students chose to study online) that was not asked. Due to technical problems this second questionnaire was only answered by 7 undergraduate and 6 postgraduate students (13) from the School of Public Health. The purpose of the follow up questionnaire was to see if there were any changes in the factors that facilitated student learning between the beginning and the end of semester. For this reason the students were asked to write 'yes' or 'no' for if 'from the first survey at the beginning of semester have any of these aspects changed' to each question. If there was a change the students were asked to comment on the reason for the change and the significance of the change; good or bad. Due to the small number of students completing this questionnaire the answers could not be analyzed statistically. When asked about change there were 161 (73%) of responses that reported change and 48 (22%) responses reporting no change during the semester. The remaining responses were Not Applicable (N/A). For all responses some students reported that there had been change in factors that affected their online learning from the beginning of semester to week 13/14 of semester. For example 100% of students reported 'I think that visually stimulating course content in the online environment helps me to learn' opinion had changed during the semester. The least amount of opinion of change was for the factor 'I have ill-health effects from studying in the online learning environment' with 77% of respondents reporting no change. No clear themes emerged from the students comments about the reasons for the change as most students did not write the reason for the change and no students wrote whether the change was good or bad. A further limitation was the small sample size due to technical difficulties with Qualtrics.

5. Conclusions and recommendations

The study conclusions were that students perceived environmental ergonomic factors to be the ergonomic factor of most concern in the online learning environment. Although students have the most control over the physical and environmental ergonomic factors in their learning environment, they were often not able to able to adjust the physical and environmental ergonomic factors in their learning environment to ensure their comfort. Noise was the environmental ergonomic factor of most concern which caused students to be distracted from their studies. The educational organisation has the most control over the organisational, cognitive and social ergonomic factors in the online learning environment that influence student learning. Technical issues with Blackboard were the organisational ergonomic factor of most concern that made it difficult for students to learn. Students

require easy access to online learning resources that are up to date, clearly articulated and well-structured, including tutorials and i-lectures, require clear instructions to ensure adequate decision making for assignments and require detailed and timely feedback from their tutors for effective learning. Students choosing to complete online learning prefer working alone, complete learning activities when time allows around work and family commitments, and have limited ability to participate in group work.

It was concluded that students perceived organisational ergonomics to be the most important of all five ergonomic factors for providing an effective learning environment. The organisational ergonomic factor considered of most concern was technical issues with and inadequate access to the learning platform Blackboard, which interrupts and limits time for learning, thereby negatively impacting on student satisfaction and learning. Inadequate physical ergonomic factors such as not having access to adjustable furniture and equipment, and inadequate and uncontrollable environmental ergonomic factors in the student's learning environment affect their comfort and wellbeing, and distract them from their learning thereby negatively impacting student satisfaction and educational performance. Inadequate access to learning resources, unclear and not well articulated or delivered course material, unclear expectations for assignments, and inadequate feedback from tutors affect student cognitive functioning and learning performance. A lack of social interaction with peers, affects the ability of students to learn from each other and develop new ideas, thereby impacting on their learning performance.

Recommendations that have arisen from the findings of this research include to:
- Develop student awareness training on the five ergonomic factors (physical, environmental, organisational, cognitive and social) that impact learning and strategies to improve the ergonomic factors especially the environmental and physical ergonomic factors in their learning environment over which they have most control. Deliver this student ergonomic awareness training as part of the introduction module of their unit of study.
- Create greater awareness by the educational organisation, staff and tutors of the five ergonomic factors, especially organisational, cognitive and social ergonomic factors, that impact online student learning and teaching by sharing this research with them.
- Conduct further research into the ergonomic factors that affect the online learning of students with students studying in other Schools and in other universities to create a wider base of knowledge to improve online student learning.

6. Limitations
The study included only three schools at one university, therefore limiting the applicability of the research outcomes to other schools or tertiary education providers. During the information collection stage of the study there were some technical issues experienced by students attempting to access the checklist and the first and second questionnaire in Qualtrics. This had an impact on response rates, particularly for the second questionnaire.

7. Research significance
The significance of this research is that it is the first known study to investigate all five ergonomic factors (physical, environmental, organisational, cognitive and social) and the impact that these have in the online learning environment (Jansz, Walker, & Bay, 2016; Soroka, 2015). A significant research outcome has included the development and validation of a questionnaire and an Ergonomic Checklist, used to assess ergonomic factors that affect online student learning. Baseline data has been established for the ergonomic assessment of physical, environmental, organisational, cognitive and social ergonomic factors in the online learning environment. The research results can be used to improve the effectiveness of online learning; to enhance student engagement,

and to improve student satisfaction with online education. This research has discovered that organisational ergonomic factors are the factors that most affect online student online learning.

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Nisha Paudel comes from the beautiful South East Asian country Nepal and completed a Masters of Public Health at Curtin University in 2016. She has a Bachelor degree in Physiotherapy, which was completed at Rajiv Gandhi University, India in 2012 and currently lives and works in Perth, Western Australia. Nisha has a very positive attitude towards life and tries to live as happily as she can no matter the circumstances. Nisha likes travelling with her husband and friends, loves reading books and does not hesitate to binge watch TV shows now and then. Her other interests include home decor and hosting parties for friends and families at her home.

Abu Yousuf Swapan, March (Germany), BArch (Bangladesh), is a PhD Candidate in Curtin University Sustainability Policy (CUSP) Institute in the School of Design and Built Environment at Curtin University. Swapan is currently investigating the community building potential of the Australian inner city residential suburbs. He is interested in sustainable built form, community building and urban design. Swapan is an architect, academic and researcher, worked in Germany, Singapore and Bangladesh.

Ria Smith is National Health Safety Environment Director for Sodexo Australia. Ria oversees nearly 50 Australia-based professionals dedicated to health and safety. Her teams are responsible for implementing HSEQ processes and systems and promoting a culture of safety throughout the Sodexo teams.

The World Safety Organization (WSO)

The WSO was founded in 1975 in Manila, The Republic of the Philippines, as a result of a gathering of over 1,000 representatives of safety professionals from all continents at the First World Safety and Accident Prevention Congress. The WSO World Management Center was established in the United States of America in 1985 to be responsible for all WSO activities, the liaison with the United Nations, the co-operation with numerous Safety Councils, professional safety/environmental (and allied areas) organizations, WSO International Chapters/Offices, Member Corporations, companies, groups, societies, etc. The WSO is a not-for-profit corporation, non-sectarian, non-political movement to "Make Safety a Way of Life…Worldwide."

World Safety Organization Activities

The WSO publishes WSO Newsletters, World Safety Journal, and WSO Conference Proceedings.

The WSO provides a network program linking various areas of professional expertise needed in today's international community.

The WSO develops and accredits educational programs essential to national and international safety and establishes centers to support these programs.

The WSO presents annual awards: the James K. Williams Award, Glenn E. Hudson International Award, J. Peter Cunliffe Transportation Award, WSO Concerned Citizen, WSO Concerned Professional, WSO Concerned Company/Corporation, WSO Concerned Organization, Educational Award, WSO Chapter/National Office of the Year, and Award for Achievement in Scientific Research and Development.

The WSO provides recognition for safety publications, films, videos, and other training and media materials that meet the WSO required educational standards.

The WSO receives proposals from professional safety groups/societies for review and, if applicable, submits them to the United Nations for adoption.

The WSO establishes and supports divisions and committees to assist members in maintaining and updating their professional qualifications and expertise.

The WSO has Chapters and National/International Offices located throughout the world, providing contact with local communities, educational institutions, and industrial entities.

The WSO organizes and provides professional support for international and national groups of experts on all continents who are available to provide expertise and immediate help in times of emergencies.

Benefits of Membership

The WSO publishes the "WSO Consultants Directory" as a service to its Members and to the Professional Community. Only Certified Members may be listed.

The WSO collects data on the professional skills, expertise, and experience of its Members in the WSO Expertise Bank for a reference when a request is received for professional expertise, skill, or experience.

The WSO provides a network system to its Members whereby professional assistance may be requested by an individual, organization, state, or country or a personal basis. Members needing assistance may write to the WSO with a specific request, and the WSO, through its Membership and other professional resources, will try to link the requester with a person, organization, or other resource which may be of assistance.

The WSO provides all Members with a Membership Certificate for display on their office wall and with a WSO Membership Identification Card. The WSO awards a Certificate of Honorary Membership to the corporations, companies, and other entities paying the WSO Membership and/or WSO Certification fees for their employees.

Members have access to WSO Newsletters and other membership publications of the WSO on the WSO website, and may request hard copies by contacting the WSO World Management Center. Subscription fees apply to certain publications.

Members are entitled to reduced fees at seminars, conferences, and classes given by the WSO. This includes local, regional, and international programs. When Continuing Education Units (CEUs) are applicable, an appropriate certificate is issued.

Members who attend conferences, seminars, and classes receive a Certificate of Attendance from the WSO. For individuals attending courses sponsored by the WSO, a Certificate of Completion is issued upon completion of each course.

Members receive special hotel rates when attending safety programs, conferences, etc., sponsored by the WSO.

Membership

The World Safety Organization has members who are full time professionals, executives, directors, etc., working in the safety and accident prevention fields, including university professors, private consultants, expert witnesses, researchers, safety managers, directors of training, etc. They are employees of multi-national corporations, local industries, private enterprises, governments, and educational institutions. Membership in the World Safety Organization is open to all individuals and entities involved in the safety and accident prevention field, regardless of race, color, creed, ideology, religion, social status, sex, or political beliefs.

Membership Categories

Associate Membership: Individuals connected with safety and accident prevention in their work or individuals interested in the safety field, including students, interested citizens, etc. **Affiliate Membership**: Safety, hazard, risk, loss, and accident prevention practitioners working as full time practitioners in the safety field. Only Affiliate Members are eligible for the WSO Certification and Registration Programs. **Institutional Membership**: Organizations, corporations, agencies, and other entities directly or indirectly involved in safety activities and other related fields. **Sustaining/Corporate Member**: Individuals, companies, corporations, organizations or other entities and selected groups, interested in the international effort to "*Make Safety A Way Of Life...Worldwide*."

The WSO Membership Application is included just inside the back cover and is also available on the WSO website: http://worldsafety.org/application-for-wso-membership/ and http://worldsafety.org/quick-downloads/

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✓**Institutional Member:** Organizations, corporations, agencies and other entities directly or indirectly involved in safety activities and other related fields.

Annual Membership fee in United States Dollars is as follows:

Application Fee	$20.00	Institutional Membership**	$195.00
Associate Membership	$65.00	Corporate Membership	$1,000.00
Affiliate Membership*	$90.00		

Please circle the membership for which you are applying.

*) For your country's fee rate, please contact the World Management Centre at info@worldsafety.org.

**) For this membership, please indicate name, title, and mailing address of the authorized representative.

By submitting this application, you ore accepting that WSO will use tile information provided to perform on independent

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APPLICATION FOR WORLD SAFETY ORGANIZATION MEMBERSHIP

Please print or type:

Name (last, first, middle): _____

Complete Mailing Address (please indicate if this is a Home or Work address):

_____

Work Telephone Number:_____ Fax Number: _____

Home Telephone Number: _____ Email:_____

If you were referred by someone, please list their name(s), chapter, division, etc.:

WSO Member: _____

WSO Division/Committee:_____

WSO Chapter: _____

     Other:_____

For Affiliate Members Only

Only FULL TIME PRACTITIONERS in the safety/environmental/accident prevention and allied fields are eligible for the WSO Affiliate Membership. Briefly describe your present employment position, or enclose your CV. _____

Please specify your area of professional expertise. This information will be entered into the WSO "Bank of Professional Skills" which serves as a pool of information when a request for a consultant/information/expertise in a specific area of the profession

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World Safety Organization
Code of Ethics

Members of the WSO,
by virtue of their acceptance of membership
into the WSO,
are bound to the following Code of Ethics
regarding their activities
associated with the WSO:

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Members must be responsible for
ethical and professional conduct in relationships
with clients, employers, associates, and the public.

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Members must be responsible for professional competence
in performance of all their professional activities.

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Members must be responsible
for the protection of professional interest,
reputation, and good name of any deserving WSO member
or member of other professional organization
involved in safety or associate disciplines.

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Members must be dedicated to professional development
of new members in the safety profession
and associated disciplines.

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Members must be responsible
for their complete sincerity in professional service
to the world.

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Members must be responsible for continuing improvement
and development of professional competencies
in safety and associated disciplines.

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Members must be responsible
for their professional efforts to support the WSO motto:

"Making Safety a Way of Life…Worldwide."