

The Impact of an Occupational Safety and Health Module on University Students' Safety Attitudes

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Abstract: This paper defines safety attitude as a person's mental state pertaining to safety, which is cumulatively shaped from inputs such as experiences, observations and learning about safety, and which influences how that individual perceives safety, behaves, and makes decisions in safety-related situations in work and other spheres of life. Safety attitude research has typically been done in the context of workplace safety culture and little focus has been placed on evaluating safety attitudes before an individual enters the working world. This paper reports on how a taught safety module impacted the university student safety attitudes and makes recommendations based on the findings. The module addressed hazard identification and risk assessments, using face-to-face and online teaching and assessment modes along with real-world risk assessments. Following collection of pre- and post-intervention data, a t-test identified 15 statistically significant improvements to students' safety attitudes within five areas, namely attitudes to learning about safety, personal safety outlook and behaviours, focus on safety of others, outlook on safety and safety leadership, and state of safety knowledge. Recommendations are made to research how workplaces shape safety attitudes, as well as what levels of safety awareness and safety attitudes exist before students enter the workplace or the university system.

Keywords: Safety attitude, Safety culture, Safety education, Occupational safety and health, University teaching

1. Introduction

In a work setting, safety attitudes, and ultimately safety performance, are influenced by organisation safety culture (Cooper, 2000). Safety culture and safety climate may sometimes be used as equivalent terms, but safety climate changes from one point in time to another (Cox and Flin, 1998; Flin et al., 2000; Gadd and Collins, 2002). It is notable that, while safety culture concerns a workplace's overarching safety context/habits/characteristics, it can differ in various locations of the same company (Edwards, Davey, and Armstrong, 2013), e.g. from one department to another or from one site to another. Given these variations, it is interesting to consider how safety attitudes of individuals might influence organisational safety, as opposed to looking at the effect of a company's overarching safety culture.

While studies have typically focused on measuring safety attitudes within industry sectors or other specific settings, such as healthcare (Berman et al. 2018), construction (Stiles, Ryan, and Golightly 2018), shipping (Lu, Hsu, and Lee, 2016), and transport (Ram and Chand 2016; Warmerdam et al. 2018), there has not been much research on the safety attitudes of individuals in more general contexts.

Based on an interest in better understanding how safety attitudes are shaped at the level of the individual, this study has measured student safety attitudes before and after the delivery of an occupational safety and health module to a group of university students to:

1. determine how the Occupational Safety and Health module impacted students' safety attitudes, and
2. make curricular and other recommendations based on the study's findings.

2. Literature Review

2.1 Safety Attitude

The word attitude was explained by Allport (1935), as an experience-informed mental state that influences a person's response to situations and objects. Further, according to Pickens (2005), attitudes are formed when an individual learns, has experiences, or models behaviours or beliefs based on observing others. The author therefore proposes that a "safety attitude" is a person's mental state pertaining to safety, which is cumulatively shaped from inputs such as experiences, observations and learning about safety, and which influences how that individual perceives safety, behaves, and makes decisions in safety-related situations in work and other spheres of life.

According to Gadd and Collins (2002) safety failures typically trace back to failures at the employee level (inclusive of individual safety attitudes) as well as at the company level (i.e. safety management). As a result of this understanding, researchers have performed safety studies that have looked into safety attitudes in the workplace (Gadd and Collins, 2002). Also, Williamson et al. (1997) caution that safety failures could be expected if worker safety attitudes are not considered.

Although so much focus has been placed on surveying individuals' safety attitudes in the context of their place of work, it is difficult to locate research that simply looks at individuals' attitudes toward safety in general. Loughlin and Barling (2001) expressed a related concern about the need to evaluate how young workers' attitudes, values, and behaviours are being shaped before they join the workforce. They posited that work safety attitudes can be shaped through a youth's part-time work experiences, latently through a child's life experiences, and even indirectly from their parents' work experiences. This highlights that safety attitudes begin to be shaped long before a person has any substantive experience as a worker, and raises the question of what role safety education plays in the shaping of safety attitudes.

2.2 Safety Attitude Considerations

When considering safety attitudes, the focus should include learning about safety, since such learning develops "good" safety culture (Pidgeon and O'Leary, 1994; 2000) and promotes safe behaviours (Jones, Cox, and Rycraft, 2004). Employees who prioritise safety can be expected to want to learn about safety. Therefore *having a positive attitude to learning about safety* appears to support company safety. Furthermore, an improved *state of safety knowledge* in individuals could indicate that employees are making an effort to enhance their knowledge about safety topics, to be able to act more safely.

The safety questionnaires that have looked into attitudes to safety have typically focused on safety climate within a workplace (Zohar, 1980; Mearns et al., 1997), as opposed to safety attitudes of individuals. Attitude scales have been context dependent and vary by sector (Cox and Flin, 1998), but generally research has shown that the higher the safety climate measures, the lower the accident rates of companies. Jeffries (2011, 200) found that safe behaviour was influenced by intrinsic factors, namely people's ability to be morally mature, (i.e., to "reason through the information surrounding a situation and make an ethical decision") and to understand the context and consequences of decisions.

Policy, standards, and culture at the company level and attitudes at the individual level can influence safety behaviours and cause safety failures (Cullen, 1990; Smallman and John, 2001; Parker, Lawrie, and Hudson, 2006; Zohar, 2010; Van Nunen et al., 2017). The desire of workers to look out for their own safety, and ability to obtain knowledge about safety (Nahrgang, Morgeson, and Hofmann, 2011) are important considerations when seeking to develop good safety practices. In this regard, there is value in looking into individuals' *personal safety outlook and behaviours* (Geller, 1994; Flin, 2007). Another positive aspect reported in safety culture research was workers' practice of *looking out for the*

safety of others (Geller, 1994), and so this would be important when considering individual safety attitudes.

Finally, research within the field of safety has pointed to the role of managers in inspiring employee buy-in and developing effective safety management systems (Nahrgang, Morgeson, and Hofmann, 2011; Yorio, Willmer, and Moore, 2015; Nathai-Balkissoon and Pun, 2016). When looking at an individual's *attitudes about safety leadership*, consideration should therefore extend to whether they recognise management's influence on safety within the workplace.

3. Methodology

3.1 Survey Instrument

A safety attitudes questionnaire was used to measure student safety attitudes for this study. This instrument was administered as an online survey. The instrument was developed and validated in a separate study (publication in development) that included a factor analysis and structural equation modelling (SEM) study exploring how various factors influence safety attitudes. The scale had a Cronbach-alpha of 81.9%, and the reliability remained over 80% when considering the potential effect of deleting individual items from the instrument.

The questionnaire measured student attitudes in five areas, namely:

1. attitudes to learning about safety,
2. outlook on safety and safety leadership,
3. focus on safety of others,
4. personal safety outlook and behaviours, and
5. state of safety knowledge.

Attitudes to learning about safety looked at student interest in safety, focus on auto-learning (or seeking out safety information on their own), recognition that understanding safety impacts on safe practices, and willingness to work without sufficient training.

Outlook on safety and safety leadership focused on students' understanding of responsibility for safety, including the role of leaders in establishing safety priorities.

Items about the *focus on safety of others* surveyed students' instincts in emergencies and feelings of responsibility about others' safety.

Personal safety outlook and behaviours considered how students view and prioritise their own safety and whether they are willing to take up a safety leadership role when needed.

Finally, insight was sought about students' current *state of safety knowledge*, specifically whether students had furthered their knowledge about safety beyond what had been taught in the module.

3.2 Target Group and Survey Administration

The survey was administered to a group of 67 students registered for a Masters level course on business strategy and management at The University of the West Indies

(The UWI). In the class 68.7% were female, and 31.3% were male. Most of the students (94%) were in their first year of the programme. Only 31.3% were parents or guardians. 77.6% were employed in full-time or part-time jobs, 9% had less than one year's part time work experience, and only 6% had no work experience. Just under half of the respondents (44.8%) considered themselves as having worked in high-risk jobs before, and about half (50.7%) reported that they had a parent who had worked in a high-risk job. 11.9% of respondents had been seriously hurt in a personal or work-related accident before, and 59.7% knew someone who had been seriously hurt in such an accident. Respondent characteristics are presented in Table 1.

The same survey was administered as both pre-test and post-test. The online pre-test was opened for student completion between weeks two and four of the semester, and all 67 students submitted responses. The safety materials posted on the University's learning management system were not opened up for student access until after the pre-test had been completed. The post-test survey was opened for student completion in week 11 (immediately after the teaching and coursework elements of the module had been completed) and closed in week 13. Due to student de-registrations and withdrawals, the post-test was completed by 61 students.

3.3 The Taught Module

Teaching was done once weekly, in a 3-hour session that ran from 5 to 8 p.m., including a 10-minute break. Table 2 summarises the instructional and in-course assessment approach used. The taught module focused on developing students' ability to:

1. recognise hazards that may be present at work and in other spheres of life,
2. assess risk resulting from such hazards, and
3. develop simple action plans to mitigate risk.

The module was intended to enhance students' grasp of technical content related to hazards and risk assessment, and these were assessed both during the course and a final exam. It was also hoped that exposure to the module would improve students' safety attitudes in the areas listed in Section 3.1, as measured by the

survey instrument.

According to Pickens (2005), attitudes may be shaped if interventions include both cognitive and emotional elements. The material used in the module was content-rich and sought to convey much technical safety knowledge to students. Attempts were also made to boost students' emotional connection with the material, such as by eliciting their experiences, opinions, and observations, and encouraging them to apply techniques in class activities and real-world projects that would show how safety could influence their everyday lives. Reading materials (e.g. slides, a few journal articles, short text documents) were uploaded to the University learning management platform to share underlying theory.

The long and late class could have been a barrier to learning so student-centred instruction was employed often. The importance of safety was underscored by sharing photos, videos, experiences, opinions, and stories, as well as through role play and group challenges in the classroom. For example, one group activity tasked groups with performing their first risk assessment based on a workplace scenario and photo (see Figure 1).

The teaching and assignments were intended to develop students' "moral maturity" (Jeffries 2011, 200) and their understanding of how simple conditions and acts could pose potentially severe OSH threats to their own safety and the safety of others.

3.4 Analysis of Findings

Respondent data were collected electronically within the online survey website, and exported to SPSS 21 for analysis. The data were coded so that each item's least desirable response had the lowest code and the most desirable response had the highest code. Means were calculated based on the pre-test and post-test data. Then, to assess whether the taught module had a statistically significant impact on student safety attitudes, a paired t-test was performed to compare the means of each item from the two datasets. The t-test results were first checked at the 95% confidence level, and next at the 90% confidence level. Items with statistically significant t-test outcomes were reported.

Table 1. Survey Respondent Characteristics

Characteristic		Frequency	Percentage
Gender	Male	21	31.3%
	Female	46	68.7%
Year of study	First year of postgraduate studies	63	94.0%
Status as parent	Parents/guardians	21	31.3%
Employment status	Currently employed	52	77.6%
	Less than 1 year part-time work experience	6	9.0%
	No work experience	4	6.0%
Accident and risk exposure	Do high-risk work	30	44.8%
	Parent(s) had high-risk work exposure	34	50.7%
	Seriously hurt before in personal/work accident	8	11.9%
	Knows someone who was seriously hurt in personal or work accident	40	59.7%

Total number of respondents - 67

Table 2. Instructional Approach Used for the Occupational Safety and Health Module

Wk	Topic	Instructional Time	In-Class Instructional Approach	Assessment Approach	Materials
1	Introduction: the OSH Act of T&T	Class contact: 40 min At-home: 1½hr	20 minute Teacher slide presentation: OSH Act requirements 20 minute discussion with class: Why are certain elements (e.g. safeguarding, risk assessment, maternal protection) addressed in the Act? Teacher highlights areas such as employee duties and rights, importance of OSH advocacy. Teacher points out that some questions raised/ observations made relate to material beyond the scope of the module (e.g. emergency preparedness), and advises students that they could learn more through their own efforts.	Not assessed: The OSH Act	Teacher's slides Online link to the OSH Act of T&T (optional reading) Video: safeguards
	Differentiating between hazards and risks	Class contact: 30 min	30 minute role play scenario supplemented with teacher-led discussion: The setting is a busy, poorly maintained road used by heavy vehicular traffic and many pedestrians. Visibility varies as route is a winding one. There are few road signs or marked pedestrian crossing areas. Students volunteer to play roles of a brawny, able-bodied male pedestrian, a small-framed 7 year old girl, and a car driver. Activity illustrates how the same hazards can result in different levels of risk depending on factors such as the time of day, driver characteristics, type and speed of vehicle.		Teacher's slides
	At-risk groups	Class contact: 20 min	20 minute Teacher presentation highlighting common at-risk groups, e.g. lone workers, pregnant and nursing mothers, young workers.		Teacher's slides
	Introduction to Hazard Types	Class contact: 40 min At-home: 1 hr	20 minute "Spot the Hazard" activity: One by one, photos illustrating scenes with considerable physical hazards, chemical hazards, biological hazards, psychological hazards, and ergonomic hazards are presented to the class. Students work in small groups to identify 3-4 hazards per picture 20 minute Teacher consolidation to broaden student awareness of the range of hazards that exist in each photo, how different hazards may affect different at-risk groups, and to direct students to further resources.	Hazard Identification Blog Assignment (Individual): Students required to review and briefly critique an undergraduate student's safety blog article, posting feedback as a comment to the article.	Teacher's slides presenting range of hazards to boost student awareness and provide support for the assignment
	Physical Hazards	Class contact: 30 min At-home: ½ hr	25 minute Teacher slide presentation: Broad range of physical hazards illustrated and discussed, along with brief stories from teacher and student experiences. 5 minute lecture summary		Teacher's slides
2	Chemical Hazards Biological Hazards Psychological Hazards Ergonomic Hazards	Class contact: 2 hours, 20 min At-home: 2 hr	Four slide presentations, supplemented with interactive sessions: Teacher uses slides to present a range of hazards under each hazard type in turn. In each segment, teacher illustrates several of the hazards through the use of live demonstrations, photos, videos, sharing of experiences, and discussions with students. Student discussions and sharing of experiences: When have students encountered these hazards at home, at school or elsewhere? Did they ever have near-misses or accidents due to such hazards? Sharing of challenges, successes, and actions taken.		Teacher's slides Supporting online resources
	Introduction to Risk Assessment	Class contact: 30 min At-home: 1 hr	10 minute Teacher slide presentation: 5 Steps to Risk Assessment 15 minute Student discussion: What actions would students recommend to control some of the risks identified in earlier parts of the lesson? 5 minute lecture summary		Risk assessment examples and guidance from osha.gov.tt and hse.gov.uk
3	Risk Assessment	Class contact: 30 min At-home: ½ hr	10 minute recap: Hazards, risk, and risk assessment steps 10 minute Teacher slide presentation: Hierarchy of Controls 10 minute group challenge: For each control type in the Hierarchy of Controls, identify a control that can be found in everyday life (e.g. home, school, society). Write your group's response on the whiteboard.		Online resources on the hierarchy of controls, and how to shape effective risk mitigation action plans
		Class contact: 1 hour, 30 min At-home: 1½hr	60 minute risk assessment group activity: Part 1 (30 minutes): Students use a risk assessment template and document their first risk assessment based on a photo and scenario description provided by the teacher (see example in Figure 1). Part 2 (30 minutes): 2 or 3 groups selected to briefly present their findings with the class. Discussions result in additional hazards and risks being detailed based on other groups' insights. 20 minute Teacher consolidation: Teacher points out how many hazards exist, how hazards can remain hidden and therefore require assessor vigilance, and stresses the need for careful determination of risk mitigation actions that are likely to be effective, rather than just expedient. 10 minute module summary	Risk Assessment Assignment (Group): Students select a real-world setting (whether at a home, school or work location) and conduct a risk assessment that spans all hazard types and identifies all at-risk groups affected by the hazards. A complete action plan must be included on the template supplied by the lecturer.	Teacher's slides

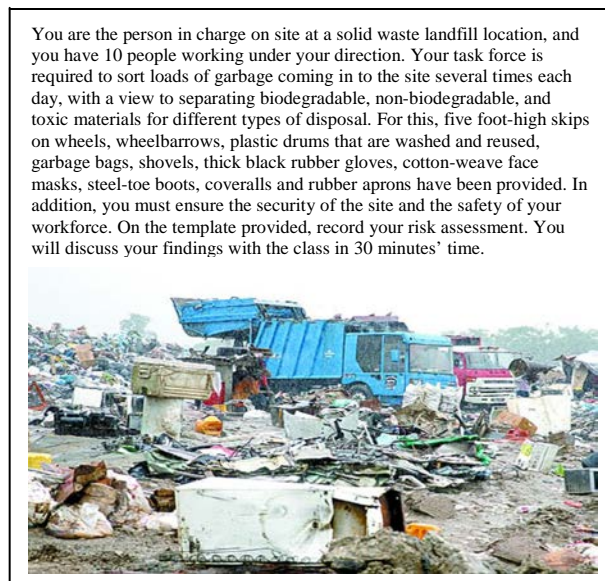


Figure 1. Risk Assessment Activity Example: Photo and Description of a Work Setting

4. Findings and Discussion

A total of 15 items were found to have been positively influenced by the delivery of the taught module of safety. These are presented and discussed below.

4.1 Attitudes to Learning About Safety

Students' interest in, and attitude toward, learning about safety showed significant improvement in three areas (see Table 3). At the 95% confidence level, there was an increase in students' attentiveness to work safety guidelines affecting themselves (mean increased from 4.71 to 4.89). At the 90% confidence level, there were improved safety attitudes in two areas. Learning more about safety increased students' perceptions of work safety as an interesting field (mean increased from 2.96 to 3.07). Also, students reported that they were using the internet more, to actively seek out information about

how to stay safe (mean increased from 3.16 to 3.52). Thus, it appeared that students recognised that they could discover more beyond the material that had been taught and had developed an interest in learning even more about general safety and work safety.

4.2 Outlook on Safety and Safety Leadership

Research has found that leaders' commitment has a positive effect on safety management system operation (Zohar and Polachek, 2014). For example, Nathai-Balkissoon (2016) noted that top management involvement is instrumental in setting safety policy, providing safety resources, and positively influencing employee participation in safety management.

Recalling from Section 2.1 that safety attitudes include safety perceptions, Table 4 reflects that students' perceptions about safety leadership improved. They better appreciated that safety leadership is an important factor in boosting employees' safety behaviours. Specifically, students recognised that there are improvements in employee's safe behaviour when top managers meet them to discuss safety issues and share ideas (mean increased from 4.31 to 4.57), communicate with employees in writing about the importance of safety (mean increased from 3.88 to 4.20), and set examples for employees by acting safely themselves (mean increased from 4.21 to 4.49).

4.3 Personal Safety Outlook and Behaviours

The taught module strengthened students' safety outlook, perhaps in part because the assessment approach required them to evaluate hazards and mitigate risks within their own spheres of operation (home, school, and work).

As shown in Table 5, the survey found that they became more safety-centric, incorporating a safety focus within all their activities (mean 3.87 to 4.28) driving safety improvement in their spaces (mean 3.62 to 4.08), adopting a proactive accident-prevention mindset (mean

Table 3. Enhanced Attitudes to Learning About Safety

Item	Pre-test Mean	Post-Test Mean	t	Sig.
If someone offers to share safety guidelines with me about work I am involved in, I would listen attentively.	4.71	4.89	2.282	.024*
Work safety is interesting	2.96	3.07	1.725	.087**
I do online searches just to know how to stay safe	3.16	3.52	1.731	.086**

* significant at 95% Confidence level; ** significant at 90% Confidence level

Table 4. Enhanced Outlook on Safety and Safety Leadership

Item	Pre-test Mean	Post-Test Mean	t	Sig.
When managers and leaders meet with employees to share safety issues and ideas, employees will act more safely	4.31	4.57	2.043	.043*
When managers and leaders write to tell employees that safety is important, employees will act more safely	3.88	4.20	1.757	.081**
When managers and leaders act safely, their employees will also act safely	4.21	4.49	1.922	.057**

* significant at 95% Confidence level; ** significant at 90% Confidence level

Table 5. Enhanced Personal Safety Outlook and Behaviours

Item	Pre-test Mean	Post-Test Mean	t	Sig.
I think about safety in everything I do	3.87	4.28	2.438	.016*
I work to improve safety where I live and/or work	3.62	4.08	2.967	.004*
I handle all situations as if there is a possibility of having an accident	3.47	4.08	3.248	.002*
I follow all safety procedures regardless of the situation I am in	3.90	4.28	2.341	.021*
I think about safety when I enter a room	3.76	4.11	1.806	.073**
I keep my working space well-organised	4.41	4.54	.892	.374**
I keep my gear/ equipment in safe working condition	4.34	4.59	1.872	.064**

* significant at 95% Confidence level; ** significant at 90% Confidence level

Table 6. Enhanced Focus on Safety of Others

Item	Pre-test Mean	Post-Test Mean	t	Sig. (2-tailed)
I am responsible for the safety of those around me	4.28	4.54	2.003	.047*
I encourage my co-workers/ colleagues to be safe	4.24	4.61	2.947	.004*

* significant at 95% Confidence level

Table 7. Enhanced Knowledge about Action in an Emergency

Item	Pre-test Mean	Post-Test Mean	t	Sig.
I know the emergency evacuation procedure for where I am right now	3.91	4.38	2.149	.034*
I know how to act in an emergency	3.91	4.18	1.695	.092**

* significant at 95% Confidence level; ** significant at 90% Confidence level

3.47 to 4.08), and consistently adhering to safety procedures (mean 3.90 to 4.28). Their proactivity was evidenced by their reports that they are safety-focused from the time they enter a room (mean 3.76 to 4.11), keep their workspace in order (mean 4.41 to 4.54) and maintain their gear in good working condition (mean 4.34 to 4.59).

4.4 Focus on Safety of Others

The taught module also required students to interact with others in their work, home, and school settings. They were sensitised to how safety breaches had led to accidents and how seemingly innocuous conditions and events could cause serious safety repercussions. The research revealed that the module increased students' feelings of responsibility for, and commitment to, others' safety.

From Table 6, it can be seen that students assumed greater levels of responsibility for the safety of those around them (mean increased from 4.28 to 4.54) and also increased their overt efforts to encourage those around them to act safely (mean increased from 4.24 to 4.61). This reveals that students went beyond caring about their own safety to caring about others' safety. They became more willing safety advocates, as they were more likely to assume responsibility for others, and tried to influence others to think and act more safely.

4.5 Current State of Safety Knowledge

The taught module included much content about safety, but the survey questions did not focus on how students'

knowledge had increased in the areas specifically taught in the module (e.g. types of hazards, how to do a risk assessment). Instead, the researcher was interested in evaluating whether students had ventured beyond the module's content to autonomously grow their safety knowledge. Indeed, while the taught module focused mostly on hazard identification and risk assessment, the teacher had underscored the importance of proactively seeking knowledge about safety in areas beyond what was being taught. The survey questions thus looked into student knowledge about emergency preparedness, a topic that the teacher had noted to the class as being outside of the scope of the module, but important for personal and general safety.

The data revealed that students had become better prepared with respect to functioning in an emergency (see Table 7). Students reported that they knew the emergency evacuation procedure for their current location (mean 3.91 to 4.38) and they had developed their preparedness to act in an emergency (mean 3.91 to 4.18).

5. Study Implications and Recommendations

5.1 University Education Curriculum Development

In this research technical safety practices and content were the focus of the taught module, which was delivered to students pursuing a Masters level management programme. The research found that student safety attitudes significantly improved following delivery of the three-week safety module. Since one of the aims of university education is shaping graduates'

attitudes in efforts to enhance their work-readiness, university programme developers should consider:

1. incorporating more safety training elements in non-science and non-engineering degrees since establishing safety foundations would benefit students' private and work lives, and
2. developing co-curricular courses to allow students from different degree programmes to access safety training together, thereby sharing their diverse experiences and perspectives, and enhancing their development of safety attitudes that could augur well for their private and work lives.

5.2 Implications for Company Managers

To properly manage their people and other resources, company managers must factor safety into their plans and budgets. Proactively managing safety requires time-consuming and potentially costly efforts to be expended, including induction and orientation training, mentoring, ongoing technical training, as well as operation of monitoring and assessment programmes that identify and address shortcomings and continually improve safety systems and performance. Safety practices and safety performance vary from company to company, and this is because safety culture influences the way that managers and employees prioritise safety and carry out their tasks.

Although the training took place in a classroom instead of in a work setting, many of these attitudes would be valued within the workplace. Thus, companies might not need to wait to hire workers to start shaping employee safety attitudes. An alternative could be to begin constructing positive safety attitudes through community interventions or the education system, not only in technical-vocational or science classes, but in all subject areas. Perhaps companies might one day comprehensively screen safety attitudes as a part of their recruitment and selection criteria. The most safety-minded companies should recognise how individuals' safety attitudes could impact on their safety performance and bottom lines. Companies would be well-served if they are able to select candidates with superior safety attitudes.

In this age of corporate social responsibility, companies could create excellent value by supporting safety attitude development programmes in the community and at school, as this would shape better safety attitudes in their own pool of future candidates. In-house safety training could be made much more specific to the work setting, if general safety tenets have already been strongly inculcated before candidates are hired.

5.3 Recommendations for Further Work

While considerable work has been done in the workplace to assess safety considerations including safety culture and workplace safety attitudes, insufficient focus has been placed on measuring and influencing individuals'

safety attitudes outside of work settings. This could have important individual safety and economic impacts. Additional work related to safety attitudes is needed to take this thinking further, so the following recommendations are put forward:

1. Develop a model of what constructs contribute to people's safety attitudes. Most research in this area has been constrained within a single field, e.g. healthcare or mining. Exploring safety attitudes from broader contexts would be instructive.
2. Investigate what safety attitudes and safety awareness levels exist before students enter the workplace or university.
3. Learn more about safety attitudes within the workplace. This could include determining how individuals' safety attitudes are shaped within the workplace, and whether there is correlation between candidate safety attitudes at recruitment and employee safety attitudes some time after being hired in various industries. This could give employers insight into safety attitudes resident in employees even before selection, how much impact is achieved by employee training programmes, and how to more effectively design their in-house safety interventions.

6. Conclusion

It was found that teaching a three-week safety module as a part of a 12-week Masters-level Management Studies course had a statistically significant impact on individuals' safety attitudes in 15 areas under five themes, namely attitudes to learning about safety, outlook on safety and safety leadership, focus on safety of others, personal safety outlook and behaviours, and state of safety knowledge.

More research is needed to develop empirically-derived safety attitude models, and to understand how positive safety attitudes could be shaped within the education system and during employment.

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