

TVETs being essentially a preparatory school for the skilled workforce. Thus, maintaining optimum safety and health within all TVETs are a challenge to any staff or technician assigned to maintain them. These challenges are further exacerbated by the lack of resources, making attention to risk evaluation and mitigation in developing countries often overlooked (Abbas, Zakaria, & Balkhyour, 2017).

In addition to OSH hazard prevention, one of the fundamental components for OSH risk/hazard mitigation would be the knowledge to provide first aid. According to the Malaysian Department of Occupational Safety and Health (2004), Malaysian employers are required by law to provide the necessary facilities and provisions for first aid care at the workplace. By including first aid training, in TVET “classrooms” i.e. workshops and laboratories, ensuring that TVET graduates will have a working knowledge of first aid. Providing this fundamental component of OSH will help foster OSH awareness from the onset of the (future) employee’s career. It is hoped that equipped with a better OSH awareness, these future employees will adopt a better (attitude and) behavior towards OSH, which will in turn foster a better safety culture at the workplace thereby reducing work-related injuries and illnesses.

Further research related to this study should include the management’s commitment to safety by utilizing a quantitative method so as to best measure their effectiveness. Management commitment is believed by other researchers to be a strong predictor of work-related injuries (Alruqi et al., 2018). However, considerations on management commitment to safety differs greatly among the ranks of researchers in the field of safety and health. Thus, the study should adopt a particular epistemology on the definition of safety and health with regards to management commitment.

Management commitment can then be extended to ensure work processes are adhered to in order to handle workplace risks when holding OSH workshops. This is part of enforcing participation among workers by increasing their awareness to the source of hazards within their environment (Bahn, 2013). Since most types of OSH participation comprise of injury and illness prevention programs, implementing OSH initiatives will greatly assist in mitigating and preventing work - related injuries and illnesses within the workplace.

Taking management commitment, a step above, the government is a major stakeholder in TVET institutions, along with other accreditation agencies and various government departments should also be reprimed of the importance of OSH awareness at the grassroots level i.e. instilling good attitudes and behaviors towards OSH while TVET students are still being trained to be the skilled workforce of tomorrow. While there are legislations in place for both employers and employees in the private as well as the public sector, the realm of TVET students is still somewhat a grey area. Ascertaining the importance of OSH awareness in TVET institution’s student population will help the necessary agencies to set more comprehensive OSH laws and legislation in place that are pertinent to TVET institutions.

From a more detailed perspective, this study can also be used as part of a more comprehensive program where pre-tests and post-tests can be administered. Prior to attending any OSH programs, employees can be asked to take a pre-test to ascertain their awareness of OSH. In addition to determining their level of understanding, with regards to their previous work experience and education, this will help indicate their current level of OSH awareness. From a long-term perspective, the information collected from administering these tests can help trace back the effectiveness of their education (where applicable). TVET syllabus makers, government policy makers and accreditation bodies could utilize these responses in order to engender better awareness in OSH.

After attending OSH programs, the effectiveness of the program (and OSH initiatives at the workplace as a whole) can then be ascertained to better evaluate any improvement in their awareness and understanding of OSH initiatives at the workplace. This will in turn, enhance employees’ awareness towards potential occupational hazards in areas such as the provision of safety training, promoting safety advocacy, and enforcement of proper workplace safety regulations.

Accidents can happen anywhere, and at any time. Safety and health are serious issues particularly occupational safety and health. Compromising OSH at the workplace will not only incur health issues by way of work - related injuries and illnesses, but will also cause financial and economic repercussions when productivity is compromised. Therefore, everybody must be involved, both employers and employees must play their part in ensuring that the workplace environment is safe by successfully mitigating hazards, if not completely eliminating them. This, will in turn, promote a healthy safety culture at the workplace. Since TVETs are preparatory institutions for vocational and technical skills, TVET graduates will benefit greatly from being exposed to OSH during their time at TVET institutions. This ensures a skilled workforce that is both aware and knowledgeable in OSH practices.

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References

- Abbas, M., Zakaria, A., & Balkhyour, M. (2017). *Implementation of Chemical Health Risk Assessment (CHRA) program at Chemical Laboratories of a University*. *Journal of Safety Studies*, 3(1), 53. <https://doi.org/10.5296/jss.v3i1.11109>
- Abdullah, M. S., Othman, Y. H., Osman, A., & Salahudin, S. N. (2016). *Safety Culture Behaviour in Electronics Manufacturing Sector (EMS) in Malaysia: The Case of Flextronics*. *Procedia Economics and Finance*, 35(October 2015), 454–461. [https://doi.org/10.1016/S2212-5671\(16\)00056-3](https://doi.org/10.1016/S2212-5671(16)00056-3)
- Alruqi, W. M., Hallowell, M. R., & Techera, U. (2018). *Safety climate dimensions and their relationship to construction safety performance: A meta-analytic review*. *Safety Science*, 109(May), 165–173. <https://doi.org/10.1016/j.ssci.2018.05.019>
- Bahn, S. (2013). *Workplace hazard identification and management: The case of an underground mining operation*. *Safety Science*, 57, 129–137. <https://doi.org/10.1016/j.ssci.2013.01.010>
- Baizura Zubir, W. F. W. M., & Fazidah Saad, M. R. J. (2016). *Safety and Health Awareness among Staff and Students in Workshop and Laboratory of an Engineering Technology University Campus*. *International Journal of Engineering Research and Technology (IJERT)*, 5(3), 285–288. Retrieved from <http://www.ijert.org>
- Bianchini, A., Donini, F., Pellegrini, M., & Saccani, C. (2017). *An innovative methodology for measuring the effective implementation of an Occupational Health and Safety Management System in the European Union*. *Safety Science*, 92, 26–33. <https://doi.org/10.1016/j.ssci.2016.09.012>
- Bush, D., Chang, C., Rauscher, K., & Myers, D. (2019). *Essential Elements for Effective Safety and Health Education in Postsecondary Construction Career Technical Education*. *NEW SOLUTIONS: A Journal of Environmental and Occupational Health Policy*, 29(1), 53–75. <https://doi.org/10.1177/1048291119830657>
- Cagno, E., Micheli, G. J. L., Jacinto, C., & Masi, D. (2014). *An interpretive model of occupational safety performance for Small- and Medium-sized Enterprises*. *International Journal of Industrial Ergonomics*, 44(1), 60–74. <https://doi.org/10.1016/j.ergon.2013.08.005>
- Chatigny, C., Riel, J., & Nadon, L. (2012). *Health and safety of students in vocational training in Quebec: A gender issue?* *Work*, 41(SUPPL.1), 4653–4660. <https://doi.org/10.3233/WOR-2012-0104-4653>
- Conner, M., & Norman, P. (2017). *Health behaviour: Current issues and challenges*. *Psychology and Health*, Vol. 32, pp. 895–906. <https://doi.org/10.1080/08870446.2017.1336240>
- Davis, R., Campbell, R., Hildon, Z., Hobbs, L., & Michie, S. (2015). *Theories of behaviour and behaviour change across the social and behavioural sciences: a scoping review*. *Health Psychology Review*. <https://doi.org/10.1080/17437199.2014.941722>
- Fargnoli, M., Minicis, M. De, & Gravio, G. Di. (2010). *Occupational health and safety improvement throughout knowledge management Knowledge Management integration in Occupational Health and Safety systems in the construction industry Mario Fargnoli Margherita De Minicis and Giulio Di Gravio. (January)*.
- Gardner, B. (2015). *A review and analysis of the use of 'habit' in understanding, predicting and influencing health-related behaviour*. *Health Psychology Review*. <https://doi.org/10.1080/17437199.2013.876238>
- Goetsch, D. L. (2014). *Occupational safety and health for technologists, engineers, and managers*.
- Hossain, M. A., Moazzem Hossain, M., Tarannum, S., & Chowdhury, T. H. (2015). *Factors affecting OHS practices in private universities: An empirical study from Bangladesh*. *Safety Science*, 72, 371–378. <https://doi.org/10.1016/j.ssci.2014.10.007>

- Hudin, N. S., Hudin, N. S., Jamaludin, A. A., & Muzakhir, S. (2019). Educators' preparedness towards children safety and health in Malaysian preschools and kindergartens. *International Journal of Innovation, Creativity and Change*, 10(8), 187–205.
- Institute of Occupational Safety and Health. (2017). *Promoting a Positive culture: A guide to health and safety culture*. In *Institution of Occupational Safety and Health*.
- Kelly, M. P., & Barker, M. (2016). Why is changing health-related behaviour so difficult? *Public Health*. <https://doi.org/10.1016/j.puhe.2016.03.030>
- Laukkanen, T. (1999). Construction work and education: Occupational health and safety reviewed. *Construction Management and Economics*, 17(1), 53–62. <https://doi.org/10.1080/014461999371826>
- Lingard, H. (2002). The effect of first aid training on Australian construction workers' occupational health and safety motivation and risk control behavior. *Journal of Safety Research*, 33(2), 209–230. [https://doi.org/10.1016/S0022-4375\(02\)00013-0](https://doi.org/10.1016/S0022-4375(02)00013-0)
- Mwangi, P. T. (2017). Assessment of the level of compliance with occupational safety and health act 2007 in public TVET institutions in Nairobi County, Kenya.
- Nykänen, M., Salmela-Aro, K., Tolvanen, A., & Vuori, J. (2019). Safety self-efficacy and internal locus of control as mediators of safety motivation – Randomized controlled trial (RCT) study. *Safety Science*, 117(April), 330–338. <https://doi.org/10.1016/j.ssci.2019.04.037>
- Palassis, J., Schulte, P. A., & Geraci, C. (2006). A new American management systems standard in occupational safety and health - ANSI Z10. *Journal of Chemical Health and Safety*, 13(1), 20–23. <https://doi.org/10.1016/j.chs.2005.09.002>
- Safety, O. E. A. P. on O. H. and, & Dean, T. (2011). *Expert Advisory Panel on Occupational Health and Safety Report and Recommendations to the Minister of Labour*. Ministry of Labour.
- Smith, P. M., Saunders, R., Lifshen, M., Black, O., Lay, M., Breslin, F. C., ... Tompa, E. (2015). The development of a conceptual model and self-reported measure of occupational health and safety vulnerability. *Accident Analysis & Prevention*, 82, 234–243. <https://doi.org/https://doi.org/10.1016/j.aap.2015.06.004>
- Tanner, A., & Doberstein, B. (2015). Emergency preparedness amongst university students. *International Journal of Disaster Risk Reduction*, 13, 409–413. <https://doi.org/10.1016/j.ijdrr.2015.08.007>
- Villegas-Ch, W., Palacios-Pacheco, X., & Luján-Mora, S. (2019). Application of a smart city model to a traditional university campus with a big data architecture: A sustainable smart campus. *Sustainability (Switzerland)*, 11(10). <https://doi.org/10.3390/su11102857>
- Wu, C., Wang, F., Zou, P. X. W., & Fang, D. (2016). How safety leadership works among owners, contractors and subcontractors in construction projects. *International Journal of Project Management*, 34(5), 789–805. <https://doi.org/10.1016/j.ijproman.2016.02.013>