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Creating trustworthy learning spaces in prison

Ross Little, senior lecturer, De Montfort University

Summary

We need to create new trustworthy learning spaces and educational opportunities that recognise the particular circumstances of people in prison.

The creation of trustworthy prison classroom spaces requires re-privileging informal pedagogic praxis and abstracted discussion to enable learning opportunities that have previously only been realised occasionally or inconsistently.

Key messages and recommendations

- **Recommendation 1:** Promote and protect people's right to education in prison, so that it is more widely practiced
- **Recommendation 2:** Create opportunities for learning that recognise the particular circumstances of people in prison, and their humanity
- **Recommendation 3:** Re-privilege the creation of informal dialogic learning spaces in prisons, and other 'low trust' contexts
- **Recommendation 4:** Recognise and promote the pedagogical value of using abstracted questions and discussion to generate discussion in low-trust contexts and enhance the pedagogical capital of learners (Little and Warr, 2022)
- **Recommendation 5:** Advocate for the creation of prison classroom spaces co-produced with learners in prison to enhance trustworthiness. This process may also involve students from beyond the prison walls to aid the endeavour.

Introduction

The right to education is a human right that has been acknowledged in both international and domestic law. For example, the Universal Declaration of Human Rights (Article 26), for example, states: 'Everyone has the right to education', implying that the right to education and training applies to all persons, including all persons in prison (cited by Vorhaus, 2014). Similarly, article two of the first protocol of The Human Rights Act states that 'no person shall be denied a right to an education' (Human Rights Act, 1998, Part II Article 2).

However, the rights and entitlements of people in prison are frequently forgotten, not prioritised or actively undermined. In recent years, the gap has widened between the educational opportunities available in the communities of England and Wales and the opportunities available in prison. This problem has a number of causes, including political neglect, a misconceptualisation of the purposes of education in prison and a growing disconnect between access to learning resources in prison relative to the outside world. If this gap is permitted to grow further, there are further reduced chances for ex-prisoners to

re-connect with the world they return to, and increased likelihood of associated socio-economic and human problems this creates.

The available evidence suggests that people held in prison have been left behind for many years in terms of their access to opportunities for education and learning in England and Wales. If anything, the gap grows further as access to learning resources in prison diminishes and the problems slip further down the political priority list. Reviews commissioned by the UK government, focusing on the adult and child prisons estates respectively (Coates, 2016) have corroborated the importance of making progress in this area. The consequences of low academic skills and achievement for individuals left behind by the educational system are considerable, particularly in a competitive market economy. Engagement with educational initiatives has the capacity to create a more stable environment in which prisoners can serve their sentences securely and safely (Nichols, 2021). Additionally, staff whose role it is to ensure that safety, can work in safe and humane conditions that should be expected in modern penal practice.

About the research

It is recognised that education in prison can have considerable benefits in the immediate prison context, including reduced pressure on adult males to adopt and display hegemonic masculine traits; helping prisoners to cope through mental escape by focusing on a meaningful activity and alleviating pains of imprisonment and allowing people the opportunity to re-create aspects of their identity, and enhance relationships with friends, family and others (Nichols, 2019) The need for significantly more attention is required in terms of the educational offer for long-term prisoners. For such individuals the purpose and utility of education and learning will necessarily differ and should be catered for. A recent study of men and women serving life imprisonment for murder, from a young age (Crewe, Hulley & Wright, 2020), found that for some, 'learning, education and trades' represented important routes to surviving a long custodial sentence. It was one of the few aspects of life over which individuals had any sense of autonomy, providing a means to modify one's mood and free themselves (albeit temporarily) from the 'grip' of the institution. In this context, the author of this policy briefing embarked on participatory evaluative research in a prison for life-sentenced prisoners (HMP Lifer). The research took place in a prison classroom shared over eight weeks between learners from the prison and a group of undergraduate criminology students from De Montfort University.

Data was generated from the pedagogical context included discussions reflecting on sessions; written reflective pieces by the prison and university student participants submitted voluntarily towards the end of the course; reflective feedback by participants at the end of the course and semi-structured interviews undertaken approximately two months after the eight-week course ended. The findings are the subject of three forthcoming publications, which underpin my PhD thesis.

Results, conclusions, and recommendations

Recommendations

Recommendation 1: Promote and protect people's right to education in prison, so that it is more widely practiced

The Council of Europe sets out three 'justifications' for education in prison (Council of Europe, 1989): to limit the damage and degradation done to men and women by imprisonment; to support to address prior educational disadvantage commonly experienced by people in prison, and to support the process of moving away from crime.

Despite, or perhaps partly because, it is more than 40 years old, this declaration has been eroded in the context of England and Wales. The review of prison education by Dame Sally Coates (2016) recognised the need to revitalise commitments to prison education, proposing the more widespread use of partnerships with universities.

The Council of Europe is clear that education for people in prison has wider purposes than preventing recidivism or finding employment, important though these are in practical terms. In particular it highlights the need for a holistic understanding of education, that recognises the benefits of learning for the sake of learning. My research with long-term sentenced prisoners strongly suggests this is fundamentally important.

Recommendation 2: Create opportunities for learning that recognise the particular circumstances of people in prison, and their humanity

As recognised by Coates and the Council of Europe, amongst others, new pedagogical approaches are required that recognise the particular circumstances of people in prison, and their humanity.

Importantly, this should not be understood as 'offender learning'. There is no evidence to suggest that so-called 'offenders' learn any differently to non-incarcerated people. Their circumstances, however, do create particular pedagogic requirements and opportunities for learning.

Recommendation 3: Re-privilege the creation of informal dialogic learning spaces in prisons, and other 'low trust' contexts

An important element here is to 're-privilege' informal learning opportunities that bring together individuals from different contexts for the purpose of exchanging, perspectives, knowledge and understanding (Warr, 2016).

This may have benefits for other 'low-trust' contexts, including HEIs whose teaching has become dominated by bureaucratic logics and associated technologies, such as pre-determined, power-laden learning outcomes.

Recommendation 4: Recognise and promote the pedagogical value of using abstracted questions and discussion to generate discussion in low-trust contexts and enhance the pedagogical capital of learners

A recently published article (Little and Warr, 2022), and my thesis submitted in 2023, argues for the importance of abstract questions and discussion in helping prison student learners engage in processes of learning. It explores how ethical pedagogical praxis, underpinned by moral sight, combine to create a trustworthy pedagogical context in a prison classroom (Little, forthcoming).

Recommendation 5: Advocate for the creation of prison classroom spaces co-produced with learners in prison to enhance trustworthiness. This process may also involve students from beyond the prison walls to help in this endeavour

It also explains how the principles and practice of co-production can help to produce a trustworthy learning space.

Bringing people from the 'outside' to engage in knowledge sharing and exchange, and to help co-produce a learning space, can bring considerable benefits, including the de-institutionalisation of the learning space.

About the author

Ross Little is a senior lecturer in criminology at De Montfort University. Between 2016-2019 he ran a series of educational courses in prison classrooms that brought together university students and prison students. He will submit his thesis *How can trustworthy learning spaces be created in low-trust contexts? Co-producing the prison classroom in HMP Lifer* by concurrent publication in 2023.

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SDG Commitments - Transformational Transnational Education

Dr Manjeet Ridon & Stuart Lawson – De Montfort University

Summary

Global universities must serve the regions and societies in which they are embedded. They must be instrumental as agents of change and through their programmes of engagement, academic practice and graduate advocacy, work to achieve Net Zero and the Sustainable Development Goals.

Key messages and recommendations

- Recommendation 1: Transnational Education Campuses should amplify SDG advocacy and impact through partnerships
- Recommendation 2: Embed Sustainability, Employability and EDI and Decolonisation strategies connected to SDGs through Nexus interlinkages
- Recommendation 3: Establish a culture of integrated, collaborative working around SDG17 Partnership for the Goals
- Recommendation 4: Orientate curricula to examine cultural difference, identity, relevance and regional specifics

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Introduction

As we face unprecedented societal and environmental challenges, Partnerships for the Goals must grow exponentially – as must the inculcation and advocacy of the SDGs by our youth.

Whilst Higher Education Institutions (HEI) are understood to have a significant role in implementing sustainable development, there is a need for this impact and influence to extend beyond home campuses in a way that is unified and measurable.

About the study/project

Transnational Education (TNE) must become transformational more than transactional – through Partnerships for the Goals. By developing partnerships with local businesses, Governments and NGOs – overseas faculties and partners can commune around the SDGs and integrate these goals into programmes of outreach, employability and internship that mutually serve all involved and deliver on the SDGs.

By inculcating in its students, a "trans-disciplinary perspective that is universal, integrated, and transformative" (Vaughter, P. UNU, IASS 2018), universities

can encourage behavioural change, bolster civil society and meaningfully work towards sustainable futures.

As trialled at the De Montfort University's Dubai Campus (DMU's first full branch campus), and in parallel with the DMU Strategic goals, a model is proposed, which incorporates four TNE Strategy Objectives:

Networks (Partnerships with Purpose). Partnerships for the goals. Creating narratives, opportunities for students and research and reputational capital through partnerships

'SEED': The development of coordinated Campus-specific Sustainability, Employability and EDI and Decolonisation strategies that are embedded within contextualised curriculums, and activities

Collaborative Working: Taking place across countries, campuses, Faculties and disciplines – specifically to create non-siloed, interdisciplinary and transdisciplinary research and learning experiences for both staff and students

Contextualised curriculums: Cultural difference and relevance, regional specifics, identity and background, network opportunities and USPs for publicity and recruitment.

*Figure 2: **Achieving the TNE Strategy Objectives:** DMU Dubai led the programming and hosted 70+ regional and international speakers, at the first UN PRME conference focussed on SDG 17 Partnerships for the Goals.*

Results, conclusions and recommendations

Recommendation 1: Networks – Partnerships with Purpose

Develop regional networks with HEIs, business, NGOs and Government. **Seek** the alignment of interests and mutual goals to bring these actors together. **Utilise** DMU's UN Hub Status for SDG16, or Global Compact Signatory status, or simply act as a knowledge Hub and venue for discussion and action for the SDGs. **Integrate** partners and opportunities for professional practice experience, placements, research, culture and knowledge exchange.

Recommendation 2: 'SEED' – Sustainability, Employability and EDI and Decolonisation strategies

Develop and integrate SEED strategies:

- Sustainability: **Embed** Carbon Literacy and SDG knowledge and advocacy within the curriculum, extra-curricular activities and campus operations
- Employability: **Embed** employer insights, SDG advocacy and *future skills (*McKinsey, 2021)
- Equality, Diversity & Inclusion: **Explore**, embed and share home and TNE campus-oriented perspectives for 'fair treatment and opportunities for all'.
- Decolonising: **Explore**, embed and share TNE campus regional perspectives to discover "new canons of knowledge" (Arshad, R. THE. 2021)

Recommendation 3: Collaborative Working

Establish a non-siloed campus through integrated collaborative working – of both staff and students. **Achieve** and maintain this through the unifying SDGs. **Integrate** a culture around SDG17 Partnerships for the goals – through interdisciplinary and transdisciplinary student projects, staff research and experiential learning. **Create** a campus identity and narrative around collaborative working – to recruit and perpetuate.

Recommendation 4: Contextualised Curriculums

Orientate curricula to examine cultural difference, identity, relevance, regional specifics and opportunities (See Fig.3). **Reflect** and share home and TNE campus perspectives. **Integrate** both in each other's curricula and explore other contexts through the proposed TNE 'network'.
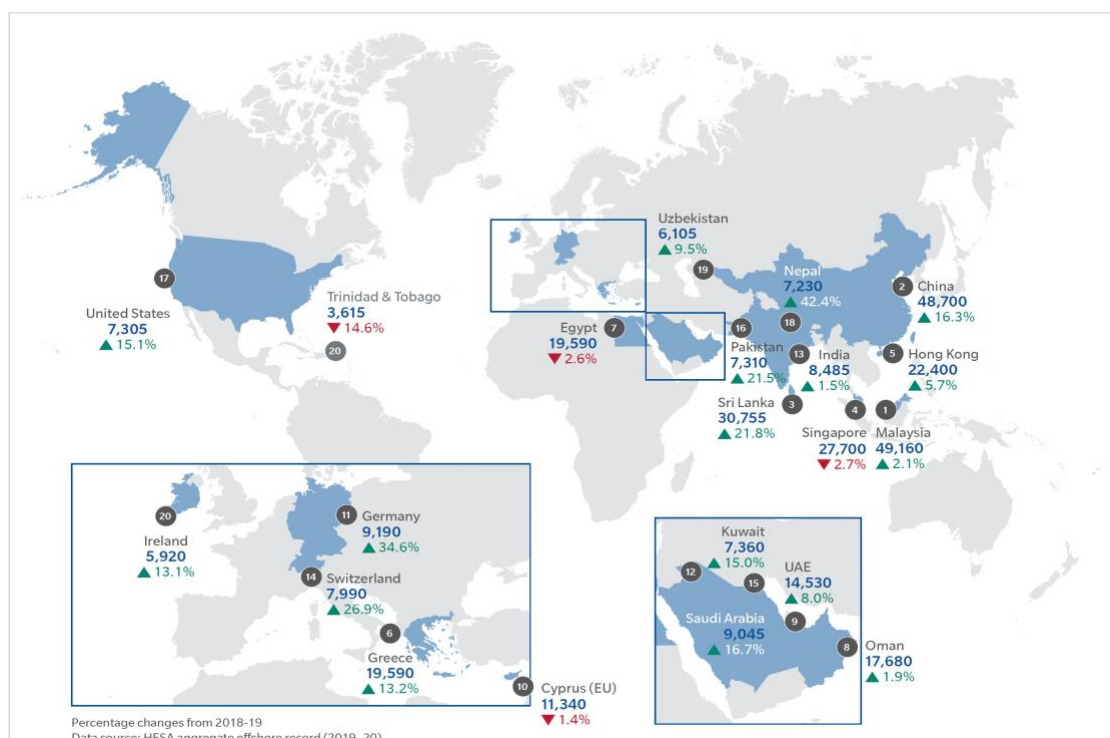

Figure 3: Universities UK 2020: The scale of UK higher education transnational education. UK TNE Worldwide 2019-20

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Strengthening Policies and Building Industrial: Public Awareness Towards Sustainable Ergonomics

Stephen T.F. Poon, Integrated Sustainability & Urban Creativity Centre, Asia Pacific University of Technology & Innovation, Malaysia

Summary

During the period of Covid-19 pandemic, there was increasing concern for human interactions with urban environmental systems. This awakening acknowledged human-induced and human-created problem resulted in greater push for wellbeing, safety, health, and comfort among work sectors that face occupational hazards and safety risks.   Data from ergonomics research in Malaysia show that the planned design, construction and functioning of human-system interactions are linked to performance, productivity, efficiency, and other socioeconomic benefits. Less addressed is industrial and public awareness about ergonomics policies that foster sustainability.   The objective of this brief is to emphasis to policymakers that ergonomics should be a stated sustainability goal of Malaysian workplace culture.   Our aim is to frame the entire chain of custody that brings together ergonomics practitioners' skills, knowledge, and understanding of risks, costs, and benefits in prioritising ergonomics for Malaysian work sectors.   Awareness building strategy must better integrate global standards with local standards.   We recommend stronger emphasis on sustainable, practical, and affordable solutions to improve resource and design efficiency applying specific United Nations *Sustainable Development Goals* (SDGs) to foster awareness towards sustainable ergonomics design.   Assessing the potential benefits of ergonomics must go beyond applied theories in the post-pandemic era.   Industrial and public awareness of sustainable ergonomics design will be critical to enhance practices in occupational safety, improve productivity, efficiency, and business performance.

Key messages and recommendations

- Recommendation 1: FIVE STEP APPROACH FOR ERGONOMICS DESIGN PLANNING
- Recommendation 2: REVIEW ERGONOMICS STANDARDS PERIODICALLY
- Recommendation 3: FOSTER AWARENESS WITH INDUSTRIAL-PUBLIC SECTOR COLLABORATIONS

Introduction

Ergonomics, derived from Greek words *ergon* ("work") and *nomos* ("laws"), mainly focuses on products and systems that attain universal design standards.   These guidelines are well received by industrial sectors for reducing and preventing workplace- and industrial-related injuries. Several Malaysian agencies play central roles in the adoption of, and adherence to, international standards such as *Ergonomics: General Approach, Principles and Concepts* by the *International Organisation for Standardisation* (ISO).   SIRIM, the Department of Standards Malaysia, is the national standards agency whose role is the development of guidelines on standards and harmonising these descriptors to international standards.   SIRIM adopts the ISO Standard as the MS ISO 26800:2013. MS is governed by the Standards of Malaysia Act 1996 (Act 549). Another agency, the *Department of Occupational Safety and Health Malaysia* (DOSH), has non-mandatory guidelines aimed to reduce occupational accidents and diseases which compromises health and safety.   DOSH applies the universal definition of ergonomics by the *International Ergonomics Association* (IEA).   It also delivers regular industrial training and seminars to identify how design solutions minimises the risks of injury, fatigue, and error.

The Challenges

In 2013, SIRIM developed the MS guideline as part of national standards policy to facilitate domestic and international trade cooperation in relation to standardisation. In the past decade, the publication of MS guidelines has not received much industry attention. Furthermore, SIRIM's Ergonomics Policy 2013 does not consolidate research data on the benefits of ergonomics design for specific sectors. Sustainability is merely an Appendix in the Policy. Sustainability of ergonomics design standards and specific guidelines for sectors that incorporate technologies in its facilities, has yet to be addressed.

1. Broad and Unspecific Guidelines

Another government agency, the *Department of Statistics Malaysia* (DOSM) provides big data analytics of national occupational accidents and fatal occupational injuries statistics from industrial cases reported between 2011 to 2021 (Figures 1 and 2). However, the long-range trend statistics use unspecified data indicators obtained from *PERKESO* and the Ministry of Human Resources for the purpose of risk analysis such as loss of workdays, production output and income due to injuries. DOSM statistics do not helpfully inform employers with industry-specific guidelines for ergonomics best practices which promote workplace safety, or to protect and improve employee health and wellbeing, as well as to ingrain OSH into a more environmentally sustainable workplace culture (DOSM, 2022). In the accompanying media statement, DOSM stated it "greatly [appreciated] the cooperation given by selected respondents [who shared] their information and [made] the survey a success", indicating the voluntary basis of quantitative data collection, which would not be comprehensive for effective planning of workplace ergonomics design (DOSM, 2022).

The first challenge lies in gathering more specific industrial data to inform on OSH guidelines, as well as consistent awareness-building initiatives demonstrating the advantages of ergonomics application. Ergonomics as a discipline of practice has not gone beyond basic knowledge of minimum regulatory requirements and provisions such as the *Occupational Safety and Health Act* (OSHA) 1994 (Act 514), Factories and Machinery Act 1967 (Act 139), ISO 11228:2003 Ergonomics: Manual Handling for the prevention of *musculoskeletal disorders* (MSD), and SIRIM-approved designs.
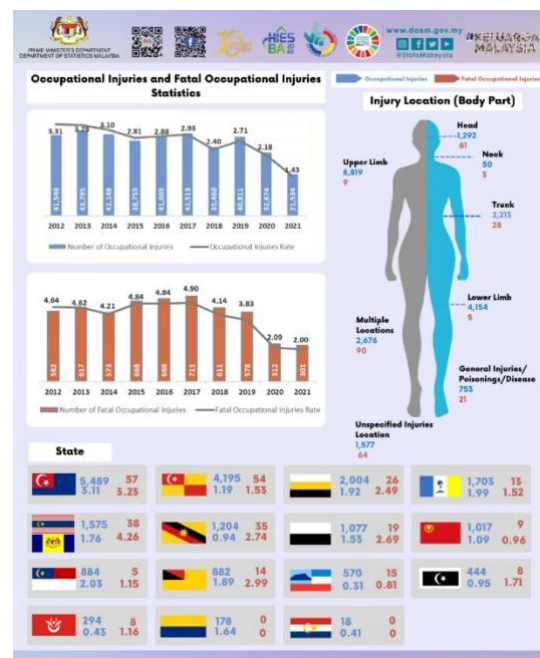

Figure 1: Statistics on Occupational Injuries and Fatal Occupational Injuries by Malaysian states and location of injuries (DOSM, 2022)

Figure 2: Statistics on the number and rate of annual occupational injuries and fatal occupational injuries from 2012-2021 (DOSM, 2022)

2. Low Practitioner Participation

Ergonomics practitioners believe that unaddressed OSH issues decrease productivity and efficiency, compound safety risks, and compromise health, physically and psychologically. SIRIM provides basic definitions of the minimum requirements for conformance to standards in ergonomics design as governed by the Standards of Malaysia Act 1996 (Act 549), but the prescribed approaches do not correlate with local benchmarking findings on OSH issues such as accidents, MSD, and injuries. Ergonomics is clearly a field noticeably less prioritised in Malaysia, with low practitioner

participation in discussing benchmarking beyond conformance to standards. With hardly any channel for direct stakeholder input, it is not surprising there is lack of enthusiasm in the promotion and implementation of the non-mandatory guidelines, and many industrial professionals are unable to identify ergonomics' economic advantages, or to associate the impact of good ergonomics design in developing a culture of sustainability through applications in enhancing efficiency while reducing costs to human health in a variety of occupational conditions.

3.   Data Insufficiency for Post-Pandemic Recovery

Reviews of ergonomics literature published in industrial research journals in fields such as mechanical engineering and public health, detail the psychological and physical pain and discomfort from musculoskeletal conditions for sectors such as metalworks, plantation, nursing, teaching, manufacturing, office administration, and others. Several local and regional studies in the past applied basic frameworks to synthesise industrial policies with OSH legislation and emphasise on professional training for occupational injuries management (Chan et al, 2011; Loo and Richardson, 2012; Rosnah Mohd Yusuff et al, 2016).   The goal is to understand the role of ergonomics in achieving higher productivity, task concentration, lower strain, and protecting against OSH risks (Isa Halim et al, 2004; Khalid Amin et al, 2017; Noorhashirin et al, 2018; Shukri et al, 2020).   However, these studies do not reflect one key national policymaking objective: to broaden awareness of ergonomics' sustainability.

In the post-Covid pandemic recovery, however, neither qualitative nor quantitative landmark studies have been produced by Malaysian public agencies to document the integration and relationships between sustainable ergonomics and productivity, with the shifts from physical to virtual and hybrid working modes during Covid-disrupted business closures.   Without scholarly contributions, there are insufficient data insights from big data to assist practitioners in strengthening policies on infrastructures, facilities, equipment, and product designs that meet the United Nations SDG Goal 3 of ensuring "healthy lives and promoting well-being for all at all ages" and SDG Goal 13 of making cities "safe, resilient and sustainable" (United Nations SDG, n.d.).   Only recently have ergonomics research begun critically examining the problems and solutions related to post-pandemic health issues including sprains and mobility-related injuries which disrupts work performance and efficiency.   Current research suggests the potential to reach a wider sector of stakeholders including occupational rehabilitation services with high-tech facilities.

Conclusions, and recommendations

Malaysian practitioners must emphasise ergonomics as an applied branch of environmental science while adapting its approaches to align with the SDGs. Malaysia's attainment of developed nation status should consider SDG indices of healthcare and wellbeing, and to improve perceptions of local industrial and services sectors' commitment to ergonomics while satisfying sustainability goals of resource efficiency and environmental concerns. Ergonomics form a valuable indicator of national wellbeing, but current standards that measure behavioural outcomes of occupational safety and health in the post-pandemic economic recovery period must be reviewed by the technical committees involved in policymaking. Improving public awareness enhances ergonomics design's capacities to meet the nation's overall economic and social goals. This enables practitioners to create better environmental conditions in which ergonomics design can be adapted to fulfil users' needs, increase productivity, reduce, or lower risks to safety, while addressing material sustainability as end-goal solutions.

Recommendations

The following recommendations discuss how to create a chain of custody to strengthen current policies and guidelines, improve public awareness, and enhance understanding of sustainable ergonomics.

Recommendation 1: FIVE STEP APPROACH FOR ERGONOMICS DESIGN PLANNING

A Five Step approach is recommended to improve current ergonomics guidelines, with materials, strategies and techniques that integrate *human-centred design* (HCD) principles, while considering affordability, economic and environmental sustainability. Essentially, these steps must:

- Identify why ergonomics design planning is critical.
- Describe the issues/settings/environment that affect occupational health and safety management for stakeholders.
- Assess and understand the scope of ergonomics design issues including low public awareness towards occupational risks factors and design affordability.
- Strategize ways to cope or resolve occupational risk problems which considers environmental and economic sustainability objectives.
- Recommend ways to change industrial perceptions with higher stakeholder participation.

Recommendation 2: REVIEW ERGONOMICS STANDARDS PERIODICALLY

Periodic meetings among the technical committees involved in policymaking is recommended among standards practitioners, authorities, and relevant public agencies. Meetings are necessary to review and update current ergonomics standards implementation to address industry-specific OSH issues. Committees representing governmental, industrial stakeholders can help change public mindsets beyond conformance to local regulations. To increase standards awareness, they must regularly publish findings on sustainable ergonomics design assessment standards, and how newer ergonomics design solutions incorporating smart technology can be sustainable, viable and affordable while positively impacting the safety, wellbeing, and health of employees in Malaysian industrial, institutional, and service sectors in the post-pandemic recovery era.

Recommendation 3: FOSTER AWARENESS WITH INDUSTRIAL-PUBLIC SECTOR COLLABORATIONS

Sustainable ergonomics awareness needs to be promoted through encouraging stronger participation among stakeholders through more collaborative industrial and public sector programmes and initiatives organised by agencies such as *Malaysia's Social Security Organisation* (PERKESO), a department under the Ministry of Human Resources Malaysia set up to implement the Employees' Social Security Act 1969 and other employee welfare regulations.

One eminent initiative where the benefits of ergonomics can be demonstrated is at PERKESO's Neuro-Robotics Rehabilitation Centre launched in 2014 in Melaka (Figure 3). Programmes can promote its facilities incorporating high-tech ergonomics design which enhance the quality of occupational rehabilitation services for PERKESO member employees recuperating from work-related accidents, injuries, or dealing with neurodegenerative health conditions.

Figure 3: Technology and range of facilities at the PERKESO Rehabilitation Centre in Melaka, Malaysia

About the author

Stephen T.F. Poon is a social design catalyst, who has his own particular view of the world, worked and studied all over the Europe.   His multicultural background is reflected in his versatile approach and continuous interest in design, innovation, and social change.   Actively in research, published in the scholarly journals, chapters and magazines in current issues and debates on integrated sustainability and urban creativity, discourse across a wide range of disciplinarities in intra, cross, multi, inter and trans practices. Stephen currently serves on the Malaysia Chair Representative of Professional Standard & Education for ACED (Asian Council on Ergonomics & Design), Steering Committee for MINDS (Malaysia Invention & Design Society) and member for MRM (Malaysian Design Council), Advisor in Special Interest Group (Ergonomics in Design for All) for HFEM (Human Factors and Ergonomics Society Malaysia).

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Images Credit

Figure 1 and Figure 2: Department of Statistics Malaysia (DOSM, 2022) *Big Data Analytics: National Occupational Accident and Disease Statistics 2021*. [Online Infographics]. Available at https://www.dosm.gov.my (Accessed 25 October 2022).

Implementation of a Flood Risk Management & Awareness App to Public

Ms Abbhirami Sivarajan, Rajveen Kaur, Chua E Heng, Asia Pacific University of Technology and Innovation

Summary

Flood victims and citizens that are prone to flooding need a better solution to overcome the effects of flooding.

Key messages and recommendations

- Recommendation 1: Raise awareness of the effects of flood.
- Recommendation 2: Implementation of a one-stop flood mitigation application to minimize the effects of flood.
- Recommendation 3: Government should implement this application policy globally.

A flood mitigation application provides a great avenue for both victims and rescue centres to communicate and take precautionary measures in a flood crisis to minimize the effects of the flood.

Introduction

Last year, the Emergency Event Database (EM-DAT) recorded 432 catastrophic disasters, flooding accounted for the majority of 223 incidents (CRED, 2022).
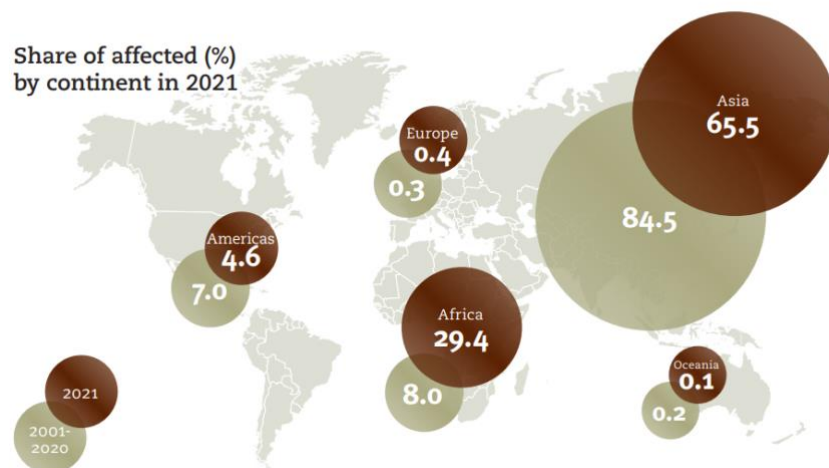
Figure 1: Human Impact from Natural Disasters (CRED, 2022)
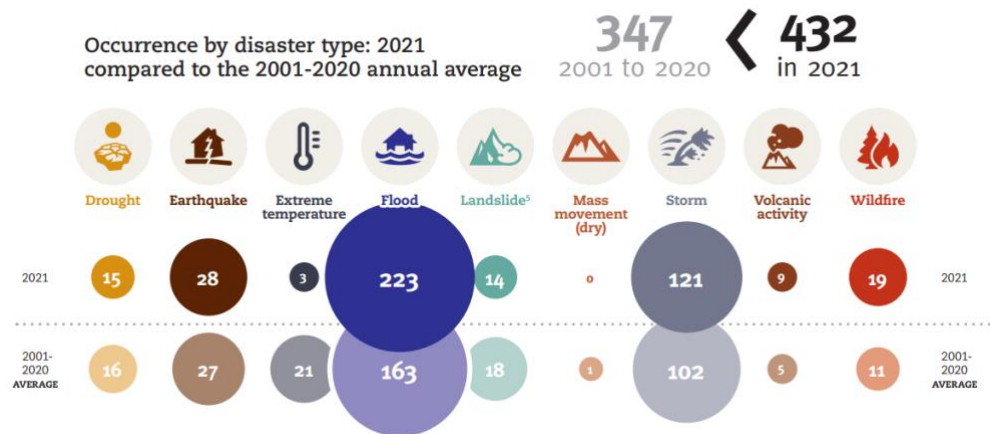
Figure 2: Occurrence by disaster type (CRED, 2022)

The numbers have soared comparably to the average flood incidents of 163 from 2001 to 2020. India witnessed a series of devastating floods from June through September 2021, during the monsoon season, that resulted in 1,282 fatalities (CRED, 2022).
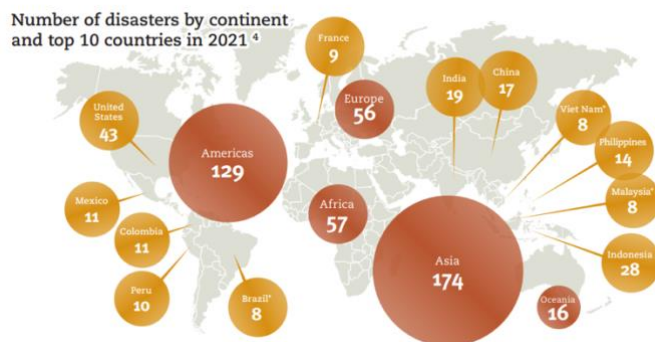

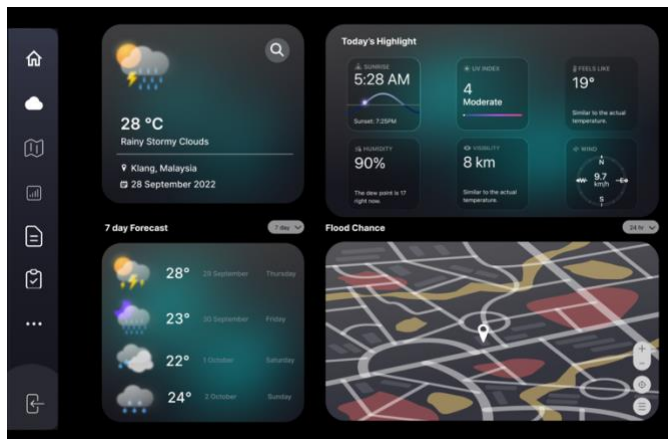Figure 3: Disasters by continent (CRED, 2022)

Severe flooding occurred in Henan, China, in July, costed $16.5 billion USD, caused 352 fatalities, and affected 14.5 million population. Concurrently, 260 individuals perished in Afghanistan's Nuristan Floods. The second-most expensive disaster, The Central European Floods, and associated landslides, in July, costed the German economy 40 billion USD (CRED, 2022). Hence, flood mitigation effects of raising awareness and taking precautionary measures must be educated to the public for their uttermost safety.

About the Project

This project will be a one-stop flood mitigation application that bridges the gap between flood mitigation awareness and swift mitigation procedures. It provides an array of services for residents in flood-prone areas to prepare in advance in case of a flood. Aims of this project:
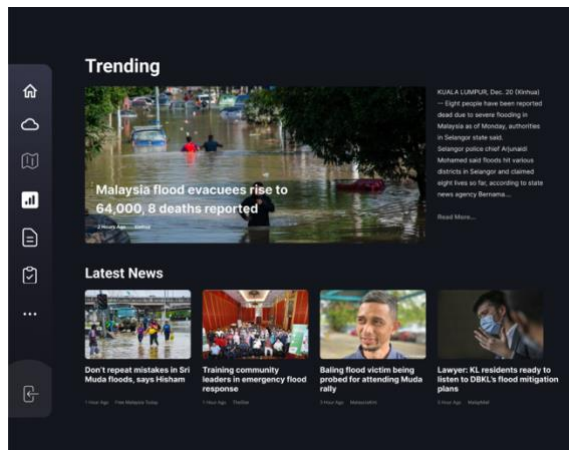

1. To mitigate the flooding effects by producing a one-stop app whereby resource centres and victims can communicate with one another during flooding.
2. Saving resources, such as manpower, time, food, drinks, including evacuation centres allocated for victims during flooding.
3. Educating and raising awareness of flood to the public (prone to flooding) to aid in minimizing the damages/likelihood of fatalities caused by flooding.

There will be a weather forecast page to provide more insights for the residents on why the application concluded that there is a high chance of flooding within their areas.

The application also provides a list of relief centres that citizens can go to in case of a serious flood happening. Once a flood occurs within the citizen's location, the application will route them to the nearest relief centre, even if there is an electricity outage. Sometimes, citizens might not be able to carry all their important documents with them to somewhere safe. Hence, this application provides a cloud storage for them to upload their important documents into the application.

To ensure that all the citizens are aware of the current flood situation, a news page is provided to increase awareness. When a flood is predicted to occur, the application will display procedures, checklists, and guidelines for citizens to follow and prepare before flooding happens. On the other hand, for response centre agents, they will be notified on the areas that will be flooded including its severity to ensure enough resources are prepared and allocated to assist victims effectively to mitigate flood impacts. When a region is starting to flood, the response centre agents will be able to send help reasonably to areas that are severe to ensure resources are allocated adequately and efficiently to save lives of many citizens as possible.

Results, conclusions, and recommendations

This flood mitigation app has shown to very useful to educate and raise awareness among citizens on ways to prepare before flooding including actions to be taken during flooding. Plus, improving the current flood management system of rescue centres with time-saving allocation of resources for the victims. Thus, reducing the effects of flooding and number of flood fatalities. This user-friendly app will be free for users to download, register and use daily. Therefore, policy makers should implement this flood risk management and awareness app policy to the public, as it will mitigate the effects of flooding for both citizens and rescue centres.

Recommendations

Recommendation 1: Government should implement this application policy globally

The government's participation in this project is extremely vital as they play a huge role in allocating resources during natural disasters. With the government considered as a stakeholder, all stakeholders are in one place and resources can be allocated wisely, and time can be reduced to save as much citizens as possible.

About the author (s)

Abbhirami Sivarajan, Lecturer and advisor of Integrated Sustainability & Urban Creativity Centre (ISUC) student Chapter at APU. The student chapter's main aim is to create a more sustainable world focusing on UN Sustainable Goal, Life on Land.

Rajveen Kaur, 21 years old, is currently pursuing her final year degree in Banking and Finance with a specialism in Financial Technology (FinTech) at the Asia Pacific University of Technology and Innovation. She completed her Foundation studies in Business and Finance in 2019.

Chua E Heng, 20 years old, is currently in his first year of Bachelor of Science (Hons) In Computer Science at Asia Pacific University of Technology and Innovation (APU). He developed an interest in contributing to solving environmental issues after contributing and volunteering in the Integrated Sustainability & Urban Creativity Centre (ISUC) Student Chapter at APU. He is the winner of the Xylem REACH Student Hackathon in 2021.

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Improving outcomes for families with parental mental illness

Written by Scott Yates & Lina Gatsou, De Montfort University

Summary

Our work demonstrates the need and the potential for multi-agency frontline services, mental health services and schools to work collaboratively with children, parents, and whole families to improve mental health outcomes. Training based on our Think Family-Whole Family Programme can help services to identify families needing support, work with families to improve mental health literacy, intra-family communication and family relationships, and develop supportive environments that reduce stress and the burdens of their illness.

Key messages and recommendations

- Recommendation 1: Improve awareness of PMI in education, health, and social services
- Recommendation 2: Train frontline workers in collaborative whole-family work
- Recommendation 3: Ensure services support such whole-family work around PMI
- Recommendation 4: Improve resources and information for schools, parents and children and

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Introduction

Parental mental illness (PMI) is a signifiant but under-recognised public health issue in the UK and across the world. Approximately 68% or women and 57% of men with mental health problems are parents[1], and 23% of children in the UK have a mother with a mental illness, with the incidence being higher in more deprived areas[2].

Most families where a parent has a mental illness cope quite well, but for a a significant number, especially those facing other sources of stress, the illness can make family life more challenging and raise the risks of negative outcomes. Children of parents with PMI are overall more likely to develop mental health problems of their own, and to experience other emotional, social and academic difficulties[3].

There is also a significant population of young carers who care for a parent with a mental illness. The demands of this caring role allied with the unpredictable progress of mental illness can bring additional burdens and uncertainty[4]. Unwell parents are also more likely to find parenting more difficult and to report difficulties in their relationships with their children[4].

Despite the significance of these issues, PMI is still not well understood, identified or supported in frontline services that work with children, parents and families[5]. There is an urgent need to improve practice in this area.

About the study

The Think Family-Whole Family Programme was initiated as a collaboration between De Montfort University, and Leicestershire Partnership NHS Trust (LPT), with the input of world-leading external advisors, stakeholders and service-users, to transform practice in frontline services and improve outcomes for families with a parent with a mental illness.
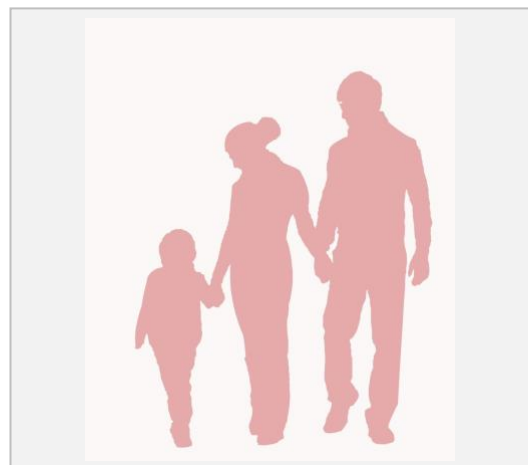
Beginning with NHS funding in 2011 this Programme set out to address two key gaps in knowledge and mental health service provision: the lack of research establishing the means by which PMI has a negative impact, and the lack of practice-focused research, reflected in the lack of family-focused interventions for working with PMI.

This initial phase saw the development of our research-based Think Family-Whole Family training intervention, comprising: (1) a programme of awareness-raising, education and training for multi-agency professionals into the nature of PMI and its impacts on families; (2) an eight-session intervention protocol; and (3) research into how PMI affects families in contact with health and social care services, how current practice works with these families, what families need and how practice can be improved.

This Programme was refined based on emerging evidence and delivered to all Early Help Service workers and Support Families workers in the Leicester City and Leicestershire County Local Authorities. In 2018 we adapted it to train teachers and pastoral staff in schools to improve how they identify and respond to the needs of pupils with a parent with mental illness. To date, training has been delivered to more than 250 professionals who work with families with PMI, including staff of more than 70 schools. This gives the project a potential reach of over 3,000 families and more than 24,000 school pupils. We also audited local mental health services to explore how PMI was recorded and assessed[6].

Findings from our research and evaluation we fed back to services to improve their practice and their impact on families' lives and were presented to strategy forums and meetings across LPT and led to changes in operational strategy and staff training. A Think Family steering group was constituted in in LPT in June 2014 (a cross-departmental group to raise awareness of PMI and ensure support for the needs of families across the Trust's services). Principles underpinning TFWF were incorporated into LPT's 2014 Families, Young People and Children Divisional Action Plan, and changes were implemented to embed PMI support across the Trust's services.

TFWF principles were embedded in mandatory training for LPT's health visitors and school nurses from September 2013. This was expanded in summer 2014 to include multi-agency training for all LPT staff. This allowed Trust staff to carry out targeted visiting for families needing support around PMI. From 2019, our evidence was incorporated into mandatory safeguarding training for LPT's mental health services, GPs, consultants and registrars, and doctors moving into consultant posts. We collected quantitative data and qualitative testimonies from professionals and families from across these services to monitor the impacts of the Programme and the needs for future development.

Results, conclusions, and recommendations

Prior to our intervention, services were not identifying or working with PMI consistently, and were not including all family members in their work. Most commonly younger children were left out. Our results show that positive impacts on individual and whole-family well-being can be made where services work with whole families to promote understanding of mental health and mental illness, and foster communication and goal setting within the family. However, many frontline staff lacked confidence and skills to work with whole families and to engage with PMI, and services worked to narrow targets and were not configured to undertake work that includes whole families. Awareness-raising and training for both frontlines staff and service managers was shown to enable changes in the focus of work and working practices to support effective work with families with PMI to improve their wellbeing.

Recommendations

Recommendation 1: Improve awareness of PMI in education, health and social services
Improving services' awareness of PMI and their understanding of its impacts had positive effects on how well it was assessed and incorporated into their working practices (see graph below).

Recommendation 2: Train frontline workers in collaborative whole-family work
When professionals who work with family members in families with PMI facilitate collaborative and supportive whole-family work using the Think Family-Whole Family programme, both professionals and families themselves reported improvement in family relationships, wellbeing and mental health. The evidence base for whole family psychoeducation and family therapy supports its wider implementation.

Recommendation 3: Ensure services support whole-family work around PMI
Services often work to specific targets that do not include family mental health, and pressures on client throughput can undermine engaged whole-family work, even where this would have positive benefits for families and knock-on impacts related to services' core targets.

Recommendation 4: Improve resources and information for schools, parents and children & young people
Whilst there has been recent emphasis in schools on pupil's mental health, the impacts of PMI on their lives and their education are still not well-addressed. Schools can play an important role in the support of children and young people and their families and the provision of information and resources to enable a better understanding of PMI and improved help-seeking.

Chart title: Assessment and support for PMI in mental health services audited pre- and post-training
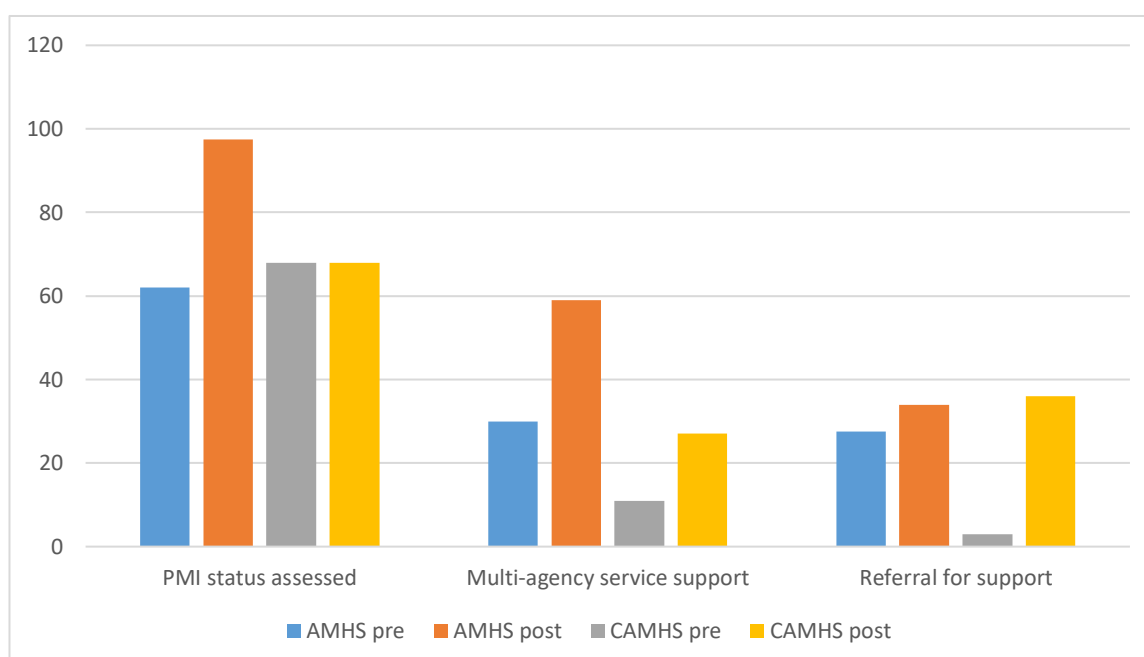
About the author (s)

Scott Yates is an Associate Professor in the Division of Social Work and Youth & Community Development. He has researched and written widely on health and illness, disability, and education and employment, especially as they affect young people and their families. His most recent research focus is on mental health and mental illness in families.

Lina Gatsou is Honorary Professor and Consultant Child and Adolescent Psychiatrist and Psychodynamic Psychotherapist for Children and Adolescents. Her special clinical interest is mood disorders, particularly child and adolescent depression, personality disorders, attachment disorders and safeguarding of children and families. Her academic interest is in developing interventions for prevention of mental illness and early intervention with children, young people and families, especially in families with parental mental illness. She has written specialised CAMHS and safeguarding reviews, protocols and procedures, policy and strategy papers, clinical audits and papers in peer reviewed journals, and has organised, chaired and presented at national and international workshops and conferences.

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Rounded Knives –Saving Lives: Crime Reduction and Accident Prevention

Leisa Nichols-Drew, De Montfort University

Summary

Bladed weapons and sharp instruments are increasingly encountered in violent offences around the world; including street based and armed robberies, homicide, sexual assaults, and terrorism. Kitchen knives are the major contributor to this criminality, and the cause of accidents within the domestic setting, often resulting in injuries and fatalities. This paper details a research study [1] that was undertaken using clothing garments, to investigate novel rounded knives in a stabbing motion, which concluded that no fabric damage occurred, compared to the significant damage caused by knives with pointed blades. These findings and recommendations will be of interest to international governments, law enforcement agencies, healthcare professionals, investigators of knife crime offences, crime-reduction units, charities, NGOs, knife manufacturers and practitioners, to share one mutual goal in advocating a safer alternative to conventional knife design.

Key message and recommendations

Rounded knives suggest an opportunity for crime reduction – a knife of culinary utility without the possibility of accidental injury, and with little or no value in violent crime.

- Recommendation 1: Promote the use of rounded knives as safer alternatives to hazardous pointed knives
- Recommendation 2: Campaign governments to form legislation regarding the restriction of pointed knives
- Recommendation 3: Engage with knife manufacturers and retailers to create and supply rounded knives

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Introduction

Within England and Wales, there were 49,027 knife enabled offences in the year ending March 2022 [2], with over 4,100 NHS (National Health Service) hospital admissions for assault by a sharp object. The UNODC 2019 Global Study on Homicide [3] reported sharp objects being responsible for more than 97,000 homicides worldwide, and over 50% of homicides in the following countries: Algeria, Azerbaijan, Bahrain, Bhutan, Cuba, Grenada, Guyana, Hungary, Kazakhstan, Morocco, Poland, Qatar, Singapore, Slovenia, Sri Lanka, United Republic of Tanzania. The UK Home Office Homicide Index recorded sharp instruments (including kitchen knives) as the most frequently used weapon for male and female homicide victims [4]. The United Nations is campaigning for ending violence against women and girls, where statistics have shown the perpetrators responsible for over 58% female homicides are known to the victim and the location is most likely the domestic setting [5]. Politicians, World Health Organisation, medical experts, the judiciary, clergy, and academics have collectively highlighted the issue of pointed knives, as being the primary factor in causing injuries and fatalities in stabbing related incidents, whilst highlighting the necessity for preventative measures such as safer knife designs, increased educational intervention, and public policy change [6, 7, 8, 9, 10, 11].

Research Study

The aim of the research study was to investigate the comparison of conventional pointed knives with novel knives with different shaped tips. Four clothing garments were utilised: two upper (T-shirt, jumper) and two lower (jeans and faux leather skirt), which replicated typical exhibits submitted to the forensic laboratory and reflected the most

targeted bodily areas in stabbing incidents (torso/trunk). Over 300 downward stabbing motions were conducted. Any resulting damage was photographed and measured for statistical analysis.

Results

The graph below shows the mean severance damage for each knife and each clothing garment. Both pointed knives: D (straight edged pointed) and E (serrated edged pointed) caused the greatest damage, followed by knives A and C. The only knife not to penetrate the garments during the stabbing motions was knife B (rounded tip) offering a safer alternative.

Chart title: Average damage length (mm) on Clothing Garments Using Knives with Different Shaped Tips
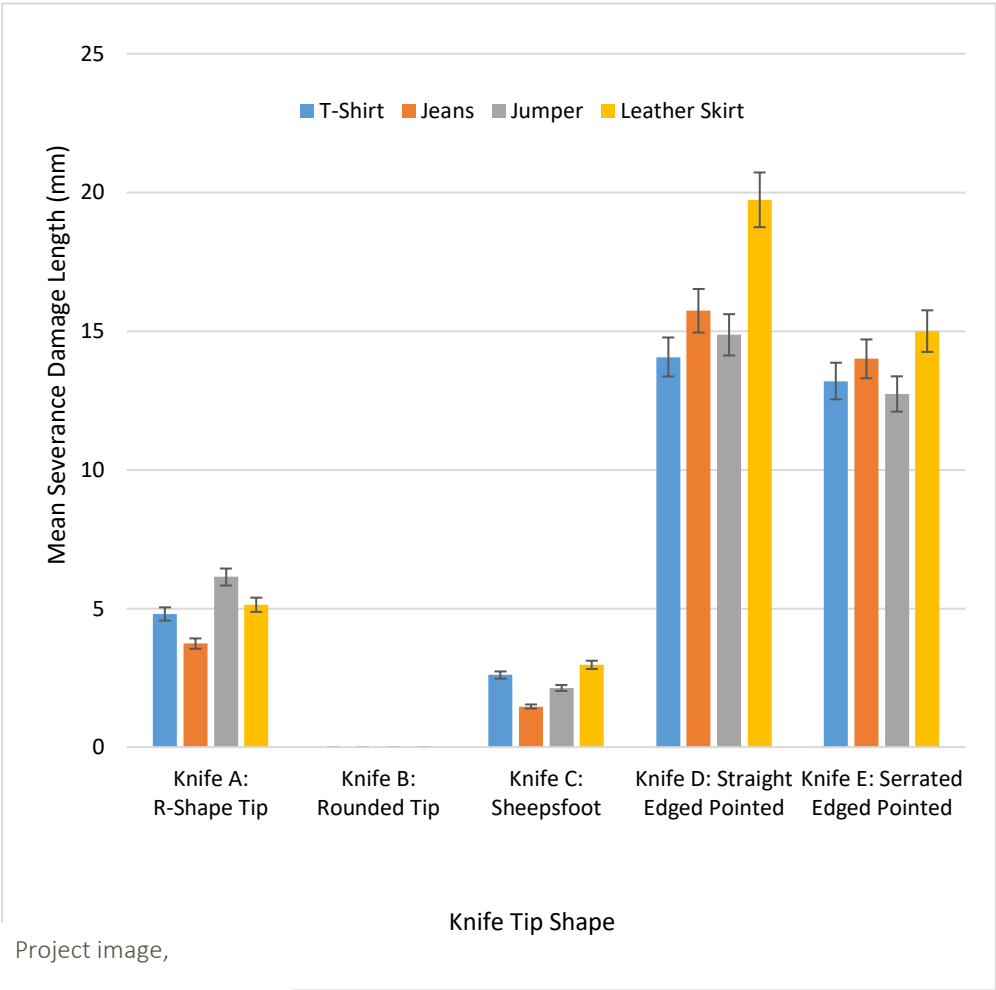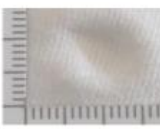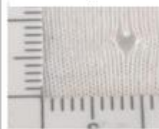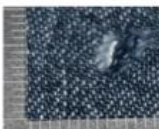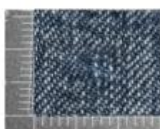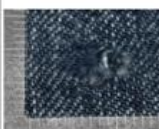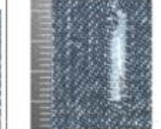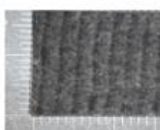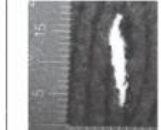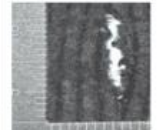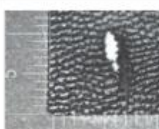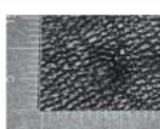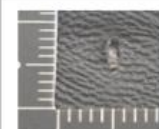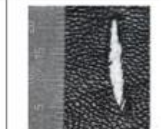
Project image,

© Leisa Nichols-Drew

The table below shows images of the resulting damage from five knives on four clothing fabrics. The appearance of this damage varies depending upon the knife responsible. The most severe damage was produced by both pointed knives (D and E), resulting in pronounced openings in the garments. Knives A and C created small holes. Whereas knife B impacted the fabrics (this can be seen on the T-shirt and leather skirt), but this rounded tip blade failed to penetrate.

Table title: Garment surface damage resulting from various knives in a downward stabbing motion

	Knife A: R Shaped	Knife B: Rounded	Knife C: Sheepsfoot	Knife D: Straight Edge Pointed	Knife E: Serrated Edge Pointed
T-shirt					
Jeans					
Jumper					
Leather Skirt					

Project image,

© Leisa Nichols-Drew

The ability of a fabric to impede a stabbing action, could potentially offer protection in the event of a knife incident. By combining this information with the effect of knife tip shape, a "hazard map" of knife and clothing combinations was constructed that ranges from very limited (green) to very significant (red) damage as shown in the table below. The rounded knife was rated as 'green', as none of the fabric surfaces were breached.

Table title: Hazard Map of Knife Tip Shape and Clothing Garment Surface

Project image,

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Conclusion and recommendations

A research study established a relationship between knife tip design and clothing damage resulting from the knife being used in a penetrating stabbing action. Conventional pointed tipped knives produced the greatest damage, whereas a novel knife with a rounded tip blade resulted in no significant damage to any of the garment fabrics. This suggests a clear alternative to pointed tip knife blades, offering an opportunity for crime reduction – a knife of culinary utility without the possibility of accidental injury, and with little or no value in violent crime.

Recommendation 1:
Promote the use of rounded knives as safer alternatives to hazardous pointed knives -

To educate communities with accessible age specific information regarding rounded knives as alternative culinary tools. Communicating research findings to the public in an open, transparent, and informative way.

Recommendation 2:
Campaign governments to form legislation regarding the restriction of pointed knives -

To encourage policymakers and stakeholders to create policies as a public healthcare and safety measure. Multi-agency involvement of health professionals, police, judiciary, charities; integrating expertise and influencing strategy.

Recommendation 3:
Engage with knife manufacturers and retailers to create and supply rounded knives -

To work in collaboration to share the goal of designing and providing safer alternatives to conventional pointed knives. Creating partnerships for changing blade tip design as proactive crime reduction and accident prevention opportunities.

About the author

Leisa Nichols-Drew is a Chartered Forensic Practitioner (ChFP), National Teaching Fellow (NTF), and an Associate Professor at De Montfort University in Leicester. Her career in forensic science casework commenced in 2000, at the former Forensic Science Service, and more recently Cellmark Forensic Services. Leisa's expertise is in the forensic science laboratory evidential examination, recovery, and documentation of crime scene exhibits, from a range of knife crime offences (homicide, sexual assaults, armed robberies, historic investigations, and terrorism related). One of Leisa's subject specialisms is the analysis of clothing for severance damage or sharp force trauma, which can be used to identify the weapon or instrument responsible.

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Sustainability Challenges in Social Community Projects for the lower income community in Malaysia

Cynthia Mala Paul Dorairaj, Integrated Sustainability & Urban Creativity Centre, Asia Pacific University

Summary

There is great concern for social community projects that are for the lower income community in Malaysia. In the circumstances of the 21st century challenges, the organizations and countries have started to review their sustainability in their community project and supervision approaches due to the lack of continuity or follow up.

Key messages and recommendations

- Recommendation 1: SDG 1 Maximise the utilities and resource available as source of sustainable income
- Recommendation 2: SDG 2 and SDG 8 Creating small plantation by producing for their own consumption
- Recommendation 3: SDG 3 Creating mental Health awareness among the lower income areas
- Recommendation 4: SDG 4 Donating recycle learning tools for the lower income public school and learning centres in rural areas and low-income living areas
- Recommendation 5: SDG 8 Partnering with companies that have funds for Corporate Social Responsibility (CSR) and resources from NGO

Introduction

The problems faced by Social Community Projects on the low-income earners in Malaysia as shown in diagram below on the income classification in Malaysia. The projects are huge funding that caters to the right target audience and a lot of time and effort is spend on making the projects successful but there is lack of continuity in long term or even lack of follow up by respective groups. As most projects last for 3 months, there is lack of commitment from the donors and the receivers.

About the study

Recommendation 1: SDG 1 No Poverty

According to government statistics, the pandemic led to an increase in the share of Malaysian households living below the national poverty line to 8.4 percent in 2020, following a record low of 5.6 percent in 2019. Over the same period, income inequality increased slightly, continuing a recent trend after years of declining. Official statistics reported that the Gini index for total household income increased from 40.7 percent in 2019 to 41.1 percent in 2020.

For achieving and managing sustainability with social sustainability, it is urgent required for skill, resource, knowledge, and organizational capability (Lund-Thomsen and Lindgreen, 2014).

Methods

Two projects that were successful: First a project in Kuala Lumpur which is the HIV Community that was not given jobs due to their condition therefore with collaboration with Soroptimist International Club of Shah Alam a Non-Governmental Organisation (NGO) was given three goats that amounted to RM600 each to rear and finally over the years it multiplied to 300 goats and was sold for meat and milk. The community had a source of income that is sustainable that became a community activity as they had ample land manpower from the HIVs recover patients. Second project is the spastic and orphanage home in Petaling Jaya, the children between the age of 12 to 16 years old in the home had a baking room with all the facilities therefore the students from Asia Pacific University taught the children to bake and this was their source of funding for the home during festive season.

University of Bonn has developed a marginal abatement cost curve (MACC) shows that the G7 target of lifting 500 million people out of hunger by 2030 would require investment of US$11–14 billion per year, and could be achieved with least cost through agricultural research and development efficiency enhancement, agricultural extension services, information and communications technology, agricultural information services, small-scale irrigation expansion in Africa, female literacy improvements and scaling up existing social protection. To end hunger by 2030, investment of US$39–50 billion per year could lift 840–909 million people out of hunger. (Mullen.A, 2021)
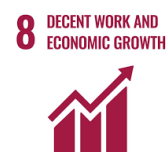
The spastic and orphanage home in Petaling Jaya, the home had a lot of used land at the back of the house which was used as dumping rubbish. The students from Asia Pacific University cleaned the area to plant vegetables that can be used for their own consumption and saves the home a lot on food supply and the extra produce is sold to nearest market and night market. If the area is smaller to build a Aquaponic system for the homes to have a constant supply of food which is collaborated with the University Pertanian Malaysia as part of their research.

3 GOOD HEALTH AND WELL-BEING

Although the economy is on track for a stronger recovery, progress has not been experienced equally across Malaysian households. Findings from the HiFy survey showed that, in May 2022, nearly 60 percent of households felt that they were not at all or only partially able to cover their monthly basic needs (Poverty and Equity Brief, 2022). This can be a form of mental stress which causes many to have mental breakdown due to lack of income to cover their basic needs. An NGO called Yayasan Health on World (YHOW) trained about 70 NGO in 2021 on Psychological First Aid for Non-Mental NGO to help the low-income community by motivating them in being financial independent. This initiative was by the Ministry of Health who gave grants for organisation with this expertise to run programs for community as public service to the community.

The growth in consumer electronics has also had an impact on the environment with the amount of electronic waste (e-waste) or Waste Electrical & Electronic equipment (WEEE) generated has been increasing year on year. Currently this e-waste is predicted to grow by 21% by 2018 (Baldé et al., 2015). E-waste is a complex waste stream with many diverse materials from precious metals to plastics and presents us with many challenges as to how to manage, dispose and recycle it.

4 QUALITY EDUCATION

Before pandemic Soroptimist International Club of Shah Alam did a project by collecting used laptops from companies that disposes their laptops and computers after five years but are still functionally. Therefore about 40 laptops were collected and 20 computers over period three years and given to learning centres and schools at the low-income residential areas. To refurbish each computer and laptop the cost is RM80 which is sponsored by the NGO.

8 DECENT WORK AND ECONOMIC GROWTH

Different types of organization like multi-national corporations, non-government organizations, and international governmental organization are faced challenges to incorporate and practice as well as in partner organizations (De Lange et al., 2012). A project with the indigenous community in Janda Baik was a collaboration with HSBC Bank and Soroptimist International Club of Bangsar who had funds for farming material and the club had students who help in the farming process as seen below and teaching the children on financial literacy.

Results, conclusions, and recommendations

- Recommendation 1: SDG 1 Maximise the utilities and resource available as source of sustainable income
- Recommendation 2: SDG 2 and SDG 8 Creating small plantation by producing for their own consumption
- Recommendation 3: SDG 3 Creating mental Health awareness among the lower income areas
- Recommendation 4: SDG 4 Donating recycle learning tools for the lower income public school and learning centres in rural areas and low-income living areas
- Recommendation 5: SDG 8 Partnering with companies that have funds for Corporate Social Responsibility (CSR) and resources from NGO

Recommendation 1: SDG 1: Maximise the utilities and resource available as source of sustainable income

In any Community service project undertaken, to evaluate the resources that are readily available and to fully utilise it such as land and building space this will eventually be a source of sustainable income in the long run.

Recommendation 2: SDG 2 and SDG 8 Creating small plantation by producing for their own consumption

Creating a plan to produce small plantation it could be through vertical plantation or even Aquaponics where the produce is used for own consumption and if there is extra produce to be able to sell the produce and this will be a sustainable income.

Recommendation 3: SDG 3 Creating Mental Health awareness among the lower income areas

Mental Health is an issue for many therefore to tie up with NGO to motivate in creating a sound mindset to be able to sustain projects in the long term and the project will be able to continue for some time.

Recommendation 4: SDG 4 Donating recycle learning tools for the lower income public school and learning centres in rural areas and the low-income living areas

By donating recycle laptops and educational gadgets will not only help the children who are going to schools but also help the parents who are running small business and the children are able to help set up social media for the families to run their business more effectively and sustain their income in the long term

Recommendation 5: SDG 5 Partnering with companies that have funds for Corporate Social Responsibility (CSR) and resources from NGO

By partnering with corporate and Non-Profit Organisation they have funding, expertise, knowledge and skill in making the project sustainable, but we need two hand to clap therefore the resources such as land building and manpower, knowledge and skills and expertise by being hand on the project comes from the receiver. To conclude with the community and funding from the organisation the project will be sustainable as shown in the graph below.

Developing a Sustainability Plan in Project Proposal (Eva Wieners, 2017)

About the author

Cynthia Mala Paul, Lecturer in the School of Business at Asia Pacific University, Kuala Lumpur have been doing a lot of social work for the past 20 years with different learning centres and community by creating a source of income sustainability income towards the economic growth in Malaysia.

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Demonstrating Photovoltaic Thermal (PVT) Device to Promote Awareness of Sustainable Development Goals

Anka T. Petkoska, Fuad Khoshnaw, Ilija Nasov,

Summary

Key messages and recommendations

- Recommendation 1: Utilization of renewable energy sources - solar energy as an indispensable source of clean energy
- Recommendation 2: Concept of PVT device – principles and potential for further improvement
- Recommendation 3: Experimental set up /Measurements / Data acquisition / Results
- Recommendation 4: Promotion /Dissemination activities
- Recommendation 5: LCA: case study of PVT

Photovoltaic-thermal (PVT) collector is a single device that produce clean energy in form of electricity and thermal energy. It has substantial advantages in performance over solar thermal or photovoltaic systems, separately.

Introduction

The use of fossil fuel energy is still the main source for covering these energy demands that cause other environmental-economical-social issues, for example, the rise of the global average temperature at a rate of 1.7 ^{0}C per century since 1970. Based on that, many nations are adopting renewable energy sources (RES) as a replacement for fossil-based ones. A lot of ideas for devices and technologies that utilize RES are promoted in the last decades including solar energy as one of the very attractive sources. [1,2]

Since sustainability of the whole Planet mainly depends on replacing harmful energy production processes with environmentally friendly ones, most renewable energy sources are considered sustainable based on their ability to generate clean and reliable energy for the future. However, all the indications show that the global efforts are still behind to stop the expected risks that associate with continuing on producing energy based on traditional processes. For example, global warming is a direct result of those energy-related emissions and greenhouse gas (GHG) emissions generated by humans. Therefore, there is an urgent focus on actions to mitigate these emissions through switching to low-carbon and RES used in industrial capacities, residential/office buildings, the construction sector, low-carbon building materials, nature-based solutions as well as equipment and system efficiency. Raising awareness and knowledge about RES has been considered as an effective method to provide a better and healthier world for everyone. Young generation/students should be taught, educated and enrolled in this mission and be aware of the importance of reaching carbon neutral world, by knowing how to utilize RES, sustainable resources, and to promote the idea further to other parts of the world to be an example of living and working sustainably in harmony with the nature. [3]

On the other hand, the United Nations Sustainable Development Goals (UN SDGs) outline the global consensus on social, economic, and environmental targets that humanity is striving to achieve by the year 2030 (UN, 2015). Namely, the UN established the universal 2030 Agenda for SDGs and all countries committed to adhering and conducting them for a better future for the whole planet and life on it. [4]

Therefore, the world is striving for green energy resources to support sustainable living and planetary wellbeing. RES are considered to be a solution to the problem, and solar energy is one of the best potential candidate to cope with energy crisis compared to others, due to low maintenance cost and the enormous supply of solar power coming for free from the Sun. A long time ago, someone quoted that "*The sun will be the Fuel of the Future*" (Anonymous, 1876, Popular Science) and we can whiteness now that it became a reality especially at the moment of economic crisis. For example, for time of only 60-90 min enough sunlight strikes the earth to provide the entire planet's energy needs for one year. However, even solar energy is abundant, still it represents a tiny fraction of the world's current energy share.

Solar energy in general has been one of the most accessible and affordable renewable energy technologies for the last few decades. For example, photovoltaics and solar thermal collectors are mature technologies to harness solar energy and they only could be further developed in terms of their efficiency and optimization. [5]

There are variety of devices that convert the solar energy into electrical or heat energy, or both. The effectiveness of these devices is dependent on various factors, such as its geometry, photothermal to photovoltaic conversion, its position relative to sun rays, etc. [6]

The *photovoltaic* (PV) system consists of solar cells; they convert this sunlight directly into electricity through the photoelectric effect, but the power output highly depends on solar radiation, ambient temperature, wind speed, cell material, age and stability of PV. Solar radiation is converted into thermal energy in a solar system with the help of a working fluid; the performance of a *solar thermal collector* (ST) depends on design parameters and working fluids. The optical absorption, heat transfer of the working fluid should be optimized in order to have good performance of these devices. Researchers have tested variety of fluids for this purpose, water and its mixtures, then nanofluids that significant increase the photothermal efficiency, for example. Despite the suitable properties of nanofluids, their dispersion stability is a key challenge for utilizing these in solar collectors. [2,6]

Photovoltaic thermal (PVT) collector consists of a typical solar PV module, integrated with a solar thermal (ST) collector (Figure 1) which transfers the unused heat from PV module to heat transfer fluid. The PVT system generates electricity using PV cells and thermal energy with ST adhered to PV module, simultaneously.

PVT technology has been considered in many energy-system studies during the last four decades due to its ability to combine the advantages of photovoltaic and solar thermal collector technologies for electrical and thermal energy production. Photovoltaic efficiency is negatively affected by high temperatures, and hence, the PVT technology facilitates the cooling of PV cells for enhanced electrical efficiency. In addition, the extracted heat is used generally for low-temperature applications. This system usually requires system needs innovative absorber designs and better heat transfer to avoid a high stagnation temperature. The materials used for heat extraction should be of high thermal conductivity and high electrical resistivity. The literature review reveals that the thermal efficiency of ~60% and the electrical efficiency of 20% can be achieved in water- and nanofluid-cooled PVT collectors. It is important to note that the output from PVT depends highly on the climatic conditions. The life cycle and environmental analysis of PVT systems are usually examined through energy payback time and carbon dioxide emissions. Many studies reported better payback time for PVT over a separate PV and solar thermal collector. [5,7-13]

PVT is attractive from many points of view, e.g., for applications with limited space since it produces thermal and electrical energy at a reduced cost compared to a separate PV and thermal collector system (PVT uses the same space/area and generated heat and electricity at the same time produced per the same area). The overall efficiency of a PVT system reached up to ~ 81% nowadays; it depends upon the system design and environmental conditions, and there is generally a trade-off between thermal and electrical efficiency that depends on used materials, collector design, long-term stability, design optimisation, techno-exergo-economics and photovoltaic recycling. [5,7]
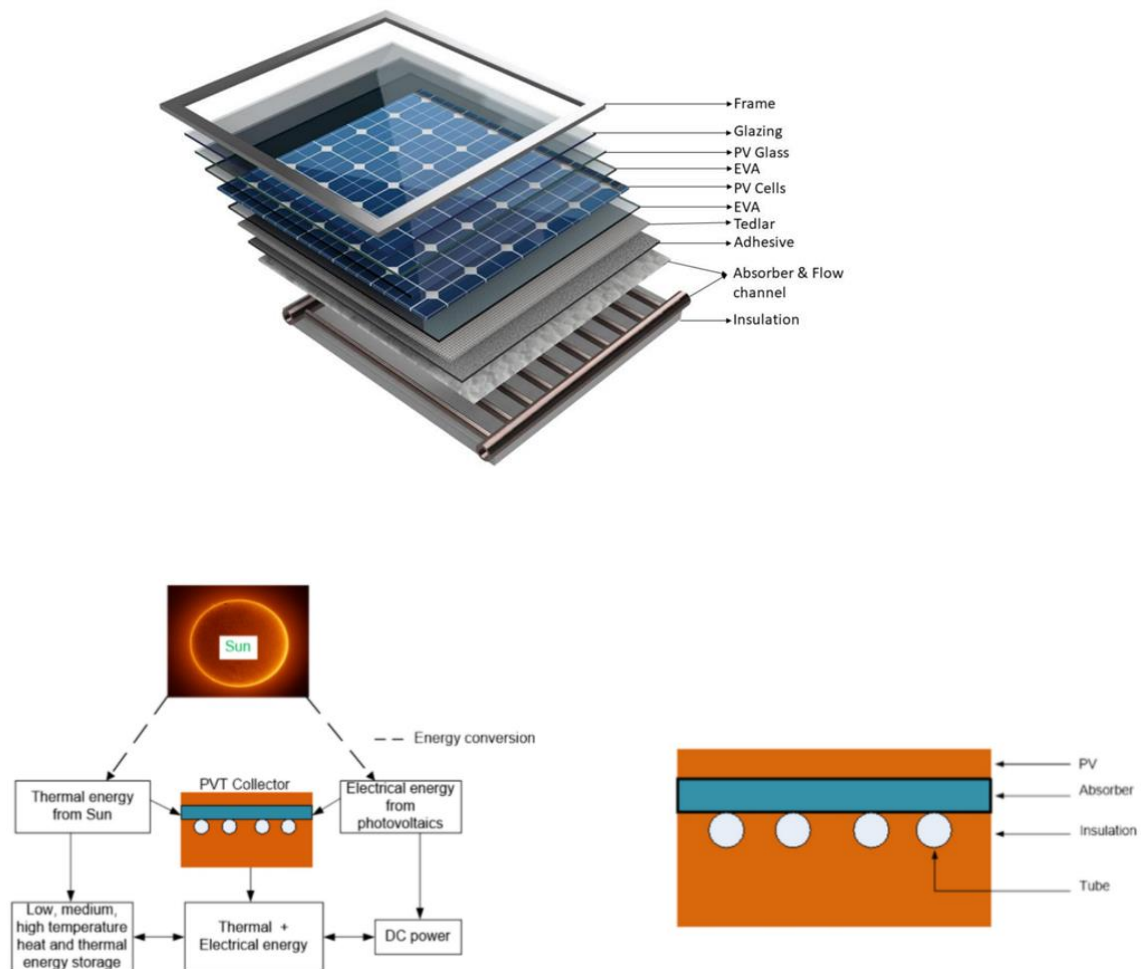
Figure 1. Scheme of typical PVT collector: a) main components, b) energy conversion, c) cross sectional view of PVT. [1,5,7]

About the study

Photovoltaic-thermal (PVT) collector is one of the technologies to produce clean energy which has been used due to their substantial advantages over solar thermal or photovoltaic systems, separately. Even though PVTs have been studied for a long time, their popularity is still not well-established in some of the societies, as PVTs are still not as popular in their implementation in industrial capacities or construction/civil sectors. Applications of PVTs are relatively in the early stages and need a good deal of attention for large-scale applications. [2] Therefore, this proposal aims to increase awareness of RES and their utilization through demonstrating a prototype of PVT (~2 m^2 surface area), at De Montfort University campus, Leicester, which the same experience can be repeated in other campuses, Dubai and Kazakhstan, to promote knowledge and research activities to the related programmes like engineering, technical sciences, and sustainable energy, consequently enhance the awareness of the relevant societies about PVT and its global effect towards clean energy and sustainability. One device will be provided to DMU by a company, Camel Solar-Skopje, from R. N. Macedonia. [14,15]

Environment
- ✓ less harmful actions
- ✓ respect the nature/biodiversity
- ✓ GHG emission reduction
- ✓ resource efficiency
- ✓ green options

SDGs and PVT

Social aspects
- ✓ cooperation with local inhabitants
- ✓ inclusion of minority, younger, female groups
- ✓ providing better and satisfactory lifestyle

Economy
- ✓ benefits to local economy
- ✓ local prosperity
- ✓ employment opportunity
- ✓ decrease of energy bills

Figure 2. a) Main benefits of PVT in terms of environment, social and economy and b) distribution of SDGs in the three main pillars of sustainability.

Results, conclusions and recommendations

The project proposal deals with installation of PVT device (~2 m^2) at De Montfort University (DMU), Leicester campus. Students will have an opportunity to do practical analysis of the benefits of device that use free solar energy and transfer into electricity and thermal energy. The analysis of such device will provide practical knowledge in addition to theoretical insights about sustainable future by use of renewable energy and make a better a healthier world, better planetary wellbeing. Students and their academic advisors will be directly included in on-site measurements and comparing data year-around in different seasons (e.g., summer-winter) and temperature variation (e.g., day-night). We believe that this hands-on experience and knowledge gained will contribute to experienced young generation that proudly will wear their titles in engineering or social degrees enhanced with privileges of understanding global trends in terms of sustainable community, better economic growth, dealing with climate changes, cleaner world (air, water, soil).

Plasma – Centre for plasma technologies – Skopje (a company located in R.N. Macedonia) has agreed to give one PVT device to place at DMU, however the university needs to take the responsibility and the cost related of the transportation and installation. It will be a nice cooperation between academia-industry (RTO) at international level and be a recognized leader in activities that are in context of the most of UN SDGs and especially with SDG# 7, 13, 16 and 17 (Figure 2).

The win-win benefit for both sides encompasses extending the testing/evaluation of PVT collector at different climate region (N. Macedonia vs. UK) and collecting data for further comparisons. In addition, new studies could be performed that are not performed until now such as change of fluid type e.g., different mixture or experimenting with different nanofluids, then combination with PCM (phase change materials, or combination with both nanofluids-PCM, etc. Moreover, focussing on a different applications of PVT collectors like desalination of water or to fit into net-zero energy buildings (NZEB) concept or other applications will be also considered. [15-22]

Recommendations

Recommendation 1: Utilization of renewable energy sources - solar energy as an indispensable source of clean energy

Solar energy is one of the most used renewable sources between all unconventional energy sources. Suitable theoretical courses and dissemination materials will be delivered.

Recommendation 2: Concept of PVT device – principles and potential for further improvement

PVT concept potential is already explained above. However, further improvements are possible. They are going to be performed at origin place/facility but now it will be explained to the DMU campus as well.

Recommendation 3: Experimental set up /Measurements / Data acquisition / Results

Experimental set ups will be established at the DMU Campus. Young generations (students) and the academic staffs will have opportunity for close observations and measure the capability of it. At the same time their creativity in improvement of the device in terms of characteristics or application could be established. Data acquisition and results of such observation will contribute hands-on experience beside the theoretical insights as well as diploma thesis are possible.

Recommendation 4: Promotion /Dissemination activities

Through this work there is a great opportunity to disseminate the PVT concept far from its place where it was manufacturing. Preparation of part of the scientific work or thesis are part of this activity. Further cooperation and instalment of novel PVT devices could be possible following this example and later comparison for their efficiency, climate dependence, GHG reduction etc.

Recommendation 5: LCA: theoretical insight for PVT case

LCA was not observed by now for the PVT case by Plasma company. It is an opportunity this study to continue to evaluate few scenarios for PVT in terms of LCA, benefits for climate changes e.g., expressed through CO2 emissions per kWh

About the authors

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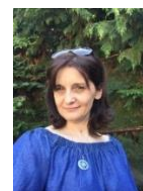
Dr. Fuad Khoshnaw is the Subject Head/Link Tutor of Engineering and Computing programmes at DMU - Dubai campus. He joined De Montfort University in 2018 in the School of Engineering and Sustainable Development. In 2010, he received PhD in Mechanical and Manufacturing Engineering from Loughborough University, United Kingdom. He has become a Chevening scholar through joining Chevening Technology Enterprise CTES programme, through finishing the Innovation and Technology course at London Business School in 2005.

Dr. Ilija Nasov is Dr. of Technical science and Associate prof. at Solar energy department. He was also Dean of Faculty for ecological resources (MIT University-Skopje), Co-owner and President of the Board of directors in Camel Solar-company for producing solar thermal collectors, and Director and Co-owner of Center for plasma technologies - Plasma doo where he developed many new components in Solar energy collectors and systems. In addition, he is President of Macedonian Solar Association and author /co-author of many scientific papers recognized and reviewed by international bodies.

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Achieving Net Zero Commitment Through Government Green Procurement

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Summary

Even though Net Zero Commitment target is still a long way to go, it requires the involvement of various key players and stakeholders to achieve a long-term benefit in terms of sustainable economic growth. The idea of this brief is to look at how Government Green Procurement Guidelines in Malaysia can help organisations achieve a net zero economy and establish sustainable public procurement practices.

Key messages and recommendations

- Recommendation 1: Engaging a seamless transition by leaving no one behind
- Recommendation 2: Strong reporting requirements and monitoring coordination
- Recommendation 3: Establish a better capacity building
- Recommendation 4: Provide more tools and incentives

Introduction

Recently, public procurement is no longer limited to purchasing the cheapest products or services. Alternatively, public procurement can be used to promote Sustainable Development Goals (SDGs) framework, specifically focusing on the Target 12.7 – "to promote public procurement practices that are sustainable, in accordance with national policies and priorities" [1]. Malaysia is no exception in this case. With current active spending of at least RM616.8 million, Government Green Procurement (GGP) plays an important role in Malaysia's economic development [2]. Alongside with this agenda, the 12th Malaysia Plan begin to associate SDGs targets with the commitment to pursuing green growth and adopting sustainable consumption and production concepts [3]. Besides, we only have one earth and only one country – Malaysia. In order to save our country, we need to reduce any environmental harm that was caused by our own hands. But a carbon-free earth does not just happen in one snap. Procurement is one of the entry level before engaging more efforts in achieving Net Zero Commitment. A carbon-neutral supply chain doesn't just happen — procurement is where it starts. The introductory of Net Zero Commitment 2050 is nothing new. In pursuing a vision of becoming a low-carbon nation, Malaysia has set a long-term goal of being a carbon neutral country at the earliest in 2050 [3]. This effort includes collaboration in the main GHG emitting sectors, namely energy, transport, industrial processes and product use, waste management, agriculture, forestry and land use. The ambitious commitment will further contribute the SDGs Framework of Goals No. 7, 11, 12 and 13.

Government Green Procurement Guidelines

A well-designed national policy framework in NetZero Commitment is necessary to facilitate the fundamental shift towards a sustainable consumption and production patterns. Malaysia has first published the Government Green Procurement (GGP) guidelines in year 2016 to encourage public organisations to incorporate environmental criteria in their procurement process [4]. As the global supply chain begin to shift their product and service preferences towards sustainability and climate-aligned elements, Malaysia's organisations need to reconsider embedding a sustainability strategy to stay relevant in the industry.

GGP can be a strategic lever to achieve the NetZero Commitment 2050 pledged in the 12th Malaysia Plan by managing the natural resources efficiently and at the same time enhancing the low-carbon initiatives in all industries [3]. With public procurement responsible for 15% of global greenhouse gas emissions, it is critical that government procurement organizations determine their emissions baseline, set targets and define the product and service standards needed to reduce their contribution to global warming. At the same time, the cost over time of Net Zero pledge will boost the green economic growth with plenty of new job offerings and consequently contributes to a healthier society.

Through GGP, apart from the existing product group that can lead towards sustainability, identifying the main contributing sectors of GHG emissions is merely important such as steel, cement & concrete production, heavy transport, electricity as well as the construction process. Besides that, it would also be a better solution to consider new product or model innovation solution at the early stage of technological changes. Box 1 illustrates five (5) main sectors that contributed to the GHG emissions and their target in 2050 [5].

Conclusions and Recommendations

To ensure that the market is ready to move towards NetZero Commitment 2050, a significant transformation within the procuring organisations must take place and be aligned with other agencies. Considering the spending power of public procurement, a great extent of influence to combat global warming through public purchasing can be achieved across various medium. Over time, the reasonable cost and benefits will not only reduce carbon emissions, but also enhance the green economy, offers more job opening and lead to a healthier community.

Recommendations

There are four (4) recommendations proposed to be taken as part of achieving the NetZero Commitment by Malaysia through Government Green Procurement framework:

Recommendation 1: Engaging a seamless transition by leaving no one behind

After five (5) years of implementation, it is now time to work on the harmonization of GGP's framework to facilitate the product group that can help the nation to achieve more low-carbon products amongst local manufacturers and suppliers. A better alignment across the nation through on-going engagement with all key players, industry movers and academia.

Recommendation 2: Strong reporting requirements and monitoring coordination

A strong reporting format should also align together with the compulsory measure to easily demonstrate the actual implementation status by the participating organisations. The Government should develop a user-friendly reporting format that leverage on the existing global standards with common assessment tools and can be further modified according to different implementing industries or sectors.

Recommendation 3: Establish a better capacity building

Develop an inclusive training programs which value skills of managing NetZero in procurement. At the same time, increase the awareness campaigns on NetZero procurement through reusability, repairability and recoverability concept.

Recommendation 4: Provide more tools and incentives

To scale up current implementation, the Government can offer the participating companies' various tools and incentives, such as capacity building, financial aid or any additional tax exemption. By approaching a wider market, this effort will be able to create more industry coalitions for a low-carbon products and promoting decarbonization. The "carrot-to-stick".

GHG Emissions and Targets:
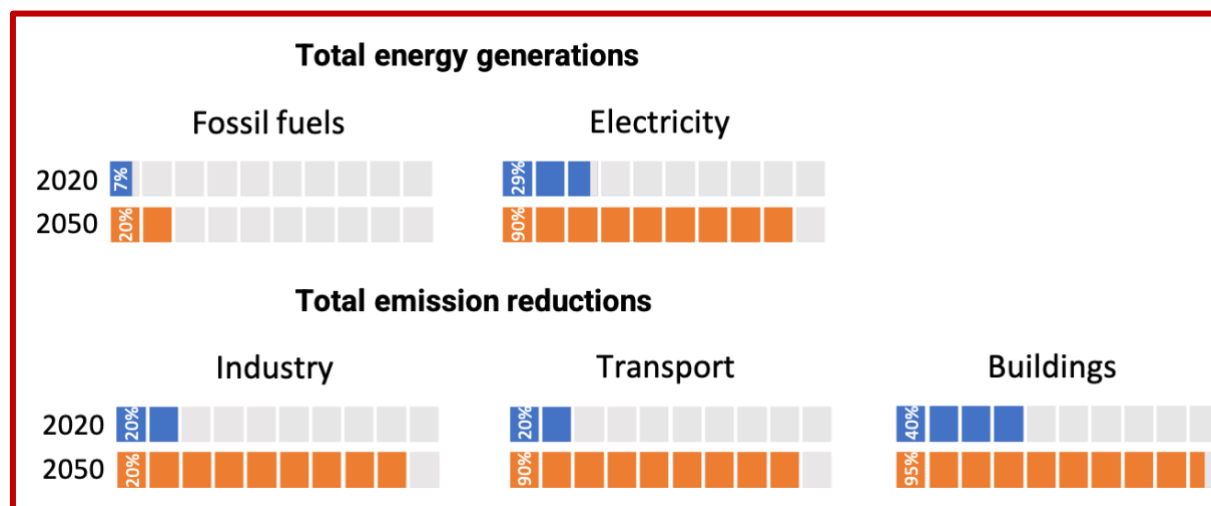
Box 1 illustrates five (5) main sectors that contributed to the GHG emissions and their target in 2050 [5].

Reference: Net Zero by 2050 – A Roadmap for the Global Energy Sector, 2021

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Nur Faiza Ishak is a research associate at Integrated Sustainability and Urban Creativity Research Centre, Asia Pacific University of Technology and Innovation, Malaysia. Her research interest includes Sustainable Development Goals, public procurement and Government Green Procurement.

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Strengthening Young People's Peace with Peace-Informed Practice

Dr Michael Ogunnusi,

Summary

Young people, school, family, and community engagement is critical to address the community challenge of youth conflict and violence in contexts of high marginalization and vulnerability. Young people are crucial actors in this, yet their contributions towards peaceful communities in schools and beyond are often overlooked. Using an innovative approach to school-based work and community work, the central aims of this project were to explore how young people understand and enact peace as part of their everyday life, and to strengthen cohesion between young people and different stakeholders and communities in response to the community challenges of youth peace, violence and conflict.

Key messages and recommendations

- Recommendation 1: Understanding and Involving Young People
- Recommendation 2: Moving from Concepts to Peace-Informed Practice
- Recommendation 3: Prioritising Research-Informed Practice

Introduction

School, home, and community are often not 'safe spaces' for many young people (YP) in England as they experience direct violence, marginalization, and conflict (Ogunnusi, 2006). Evidence shows that "Schools make ideal environments to challenge…harmful social and cultural norms…that tolerate violence towards others" (WHO 2019:2), this involves the type of "peace education [that] may shape any or every experience in school … while recognizing the many rich opportunities that formal schooling allows for informal learning" (Cremin & Bevington, 2017); and "that school and education-based approaches are effective in reducing youth violence" (Russell 2021:7). Yet, there is little research in England on how teachers, parents, and educational leaders outside school, can work with YP and the local community to collectively respond to issues of peace, conflict, and violence. Crucially, even less is known about how YP position themselves in relation to peace, and the ways they contribute to everyday peace in their lives and communities. Evidence suggests that engagement with YP is critical to address the community challenge of youth conflict and violence; and that participative methods can create opportunities for those who most experience violence (direct, structural, cultural) to become an active part of the solution (Ogunnusi, 2019, 2000, 2021).

About the study

By combining research and research-informed practice, the *Young People Peace & Change project* aimed to explore how YP in England understand peace in their everyday life, and what they do with this knowledge; and to encourage YP's solutions for peace in their communities. This work actively sought to foreground the voice of YP and apply new knowledge to existing collaboration practices for teaching and learning with YP, students, teachers,

Nelson Mandela, Martin Luther, you hear about them but you weren't there.

We don't have a Nelson Mandela or Martin Luther in our generation. There is no-one that is sticking up for us.

and practitioners in the community. Data gathered longitudinally over two and a half years showed for the first time how YP in England understood peace as a tool of analysis for social change be this philosophical or practical; and what this means for their everyday life. Photovoice (PV) was used effectively with 21 YP, in five inner-city settings, to record and reflect their community's strengths and concerns and to promote critical dialogue and knowledge about important issues through large and small group discussions of photographs (Wang and Burris 1997:369). YP clearly understood peace as representing more than the absence of violence and conflict, and

they highlighted a disconnect between "lived" peace, and the significance of change and peace. Findings further demonstrated how YP developed tactics to shape and navigate peace in their everyday life, including school and the community influenced by ideas of equality, respect, and social justice; and what this meant for their relationships with themselves and others. YP also took action for peace, seeking a community response, based on their own concerns and aspirations; explicitly expressed as a gesture towards social change in their immediate environment that included a collective hope to disrupt the consciousness of their audiences by opening a dialogue about what is known, or assumed about peace" (Ogunnusi, 2000: 192). This resulted in youth-led community engagement in different contexts of high marginalization and vulnerability. In summary, the project: (1) shed light on the ways YP understands peace in the continuum of structure and agency in the minutiae of everyday life, and what this means for the conceptualizations of peace in peace studies. (2) Evidenced how YP's knowledge of peace contributes to peace, and what YP do with what they know, which is rarely documented longitudinally. And (3) methodologically, an original approach to PV influenced by Participatory Action Research, theoretically rooted in dialogue that seeks to problematize and act in the world, enabling genuine opportunities for participation within and outside the scope of the research - creating a safe space for self-introspection, dialogue with peers, and for action, engaging communities, and connecting with wider audiences, to "speak back" with the research. Additionally, YP reported having increased knowledge, self-confidence, and increased skills for group work, collaboration, decision-making, problem-solving, critical thinking, and critical analysis, such as making links between personal and political. For some, this change was underpinned by a sense of responsibility and purpose that extended outside of the research. The study has shown great potential for replicability and local engagement with significantly marginalized or at-risk communities, whom themselves recognized trends by which they were ignored or misrepresented as youths. Working towards community-based change within schools and the broader community, the learning from the project continues to inform opportunities for YP and adults to actively share their ideas and solutions for peace, promoting knowledge transfer to develop the capacity of teachers, youth workers, and educational leaders beyond the school walls, for everyday learning and teaching practices. This work has also been shown to play an important role with YP at risk and those who tend to find school relationships challenging (Ogunnusi 2020; 2021). As one example, learning from the *Young People Peace & Change project* has contributed towards the *MinusViolencePlusPeace* and *Positive Peace* programs facilitated with Peacemakers (WMQPEP) in over 14 schools since 2018. This work was originally developed in response to funding from the

Home Office, and later the West Midlands Police and Crime Commissioner, to work with young people and schools in response to youth violence and conflict in areas of high marginalization in Birmingham. To conclude, research aimed at furthering social justice with marginalized communities, that aims to serve those communities, such as YP who are underrepresented, misrepresented, overlooked, vulnerable, or at risk of violence, can be a valuable tool in educational, youth, and peace work. The

Young People Peace & Change project successfully elicited the viewpoint of those being researched through their own eyes and words and has also evidenced how YP acted towards solutions for peace in their communities.

Results, conclusions, and recommendations

It is commonly understood that young people have a right (and a need) to learn peace, and to live peacefully (UNESCO, 2002).; and that learning peace and finding ways to 'do' peace, can be beneficial for those involved and wider communities. Yet, YP remain disproportionately vulnerable to violence, and the evidence suggests they feel disconnected from "lived" peace. Evidence for the Young People Peace & Change project suggests that through a learning process in the context of research YP have(re)worded and (re)known peace as part of their social existence, and so come to understand and enact peace more. More specifically, the findings have illustrated how YP have given meaning to peace (through their own words, photography, group dialogue, and action), as something situated and contextualised in ways that are deeply experiential, placed, non-reductionist, visceral, observable, temporal, routine, culturally significant, set within the continuum of praxis in their everyday life. Generally, our knowledge of peace needs to be studied more, promoted more, and critically reframed.

It is vital that practitioners (in and out of school) become "peace-informed" with young people in a way that is informal, and responsive and flexible; building on what the young people introduce at the time, as well as drawing from existing theory, methods and 'curriculum' (Ogunnusi, 2021). Such work can be supported by independent learning about peace theory that carries important messages about the normalisation of violence, transforming conflicts of different types, managing conflict non-violently, and "positive peace". Advancing peace-informed practice may also require identifying foundational knowledge, foundational skills, scaffolded by coaching and supervision, and collaboration and partnership working (Ogunnusi 2021). At an organisational level, being more peace-informed may involve reviewing mission and vision statements of the organisation, organisational practices and code of ethics, reviewing organisational capacity (training, curricula and practice), potential partners, networking and outreach strategies, and impact/evidence (Besseling et al., 2014).

The process and findings of research have been shown to be inextricably linked to educational practice; defying the idea that research is only for researchers and that it is too burdensome or complicated for educators. In keeping with a PAR approach, YP in the project have taken action for peace seeking a community response; and learning from the project has been used to develop a greater understanding of peace and conflict for YP, students, teachers, youth workers, and educational leaders beyond the school walls. These examples of knowledge transfer can help those involved to be better equipped to engage positively in the community in schools and outside the school walls.

Recommendations

The six recommendations below are intended to help you reflect on your own position, and how the work you do might strengthen young peoples' knowledge and experience of peace. Each one can be responded to with carefully co-ordinated training and support activities.

Recommendation 1: Understanding and involving young people
1. Identify how you/your organisation understand young people and their behaviour with regards to peace, conflict and violence, including young people who might be marginalised or at risk of youth violence.
2. Critically assess if your practice informs or tests your existing knowledge about young people and peace, conflict and violence; and the extent to which this knowledge is co-created with young people.
3. Create regular opportunities to discover and discuss (in/formally) young peoples' lived experience of peace, conflict and violence, including how they contribute to everyday peace, and what helps them to manage violence and conflict.

Recommendation 2: Moving from Concepts to Practice
4. Research and define how your practice can be (more) "peace-informed", and what it would mean to be "peace-informed" at an organisational level.
5. Evaluate how you/your organisation understand some of the complexities of "genuinely" engaging young people, making contact and encouraging active participation, with a view to building involvement and responsibility to strengthen young people's peace.

Recommendation 3: Prioritising Research-Informed Practice
6. Develop research opportunities and research-informed practice to further understand how to thicken young

About the author

Michael Ogunnusi has award-winning expertise in Photovoice and successfully completed his doctorate in 2020 focused on how young people understand and take action for peace in everyday life. Additionally, Michael writes about Participatory Action Research built around an original approach to Photovoice. His interests include replicable methods for youth voice, action, and impact, and how participation strategies for how young people can become an integral part of organizational culture, programs, and providing services - with an emphasis on anti-oppressive practice, transformative pedagogies, consciousness-raising, reflective spaces, collaborative learning, and strengthening relationships and co-responsibility.

An experienced and qualified youth & community worker, and social worker, Michael joined De Montfort's Youth & Community Division in 2009. His background also includes civil rights work and police monitoring, research, and advocacy with children in care. Michael is passionate about issues of social justice and community-based pedagogy with significantly vulnerable communities such as young people who are marginalized or at risk of serious violence. Michael continues as an experienced youth worker and peace educator, with over twenty years of experience, delivering conflict resolution workshops and training in schools and communities as an alternative provider.

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Municipal Solid Waste Management for Consistent Fuel Supply to Bioenergy Plants in Urban Malaysia

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Summary

Municipal Solid Waste (MSW) is ubiquitous wherever human beings reside. If it is not managed well, it could prove hazardous to human health as well as to the environment. A comprehensive MSW management scheme would address these and could concurrently contribute to bioenergy production.

Key messages and recommendations

- Enforce key collection points.
- Enforce rigorous waste segregation.
- Incentivise supply of organic MSW to Bioenergy Plants.
- Avail prediction capabilities for accurate planning.

Introduction

According to the World Bank (2022), Malaysia's urban population has been steadily increasing since 1960. In 2021 the number stood at 78%. Integral to an increase in urbanisation are an increase in MSW generation and an increase in electricity demand. Converting MSW into electrical energy would be a two-pronged, symbiotic approach that tackles both matters simultaneously whilst addressing SDG 11 and SDG 7.

About the study

MSW management has been a challenge in Malaysia as in many developing nations. The current preferred method of disposal is via landfills and which are mostly open dumping grounds (Samsudin & Don, 2013). This practice is not sustainable and could pose health and environmental hazards. In Malaysia, solid waste management is governed by the National Solid Waste Management Policy (2016) (DPSPN 2016) issued by the Prime Minister's Office. Six objectives have been laid out, and the second objective briefly touches on converting waste into energy (Strategy 8, Action Plan 28). In addition, the fifth objective calls for centralised data collection (Strategy 15, Action Plans 44, 45 and 46). These policies directly address the need. However, the expected outcomes are yet to be realised. Clearly, the gap lies in the implementation of government policies. Capitalizing on strategies employed in other nations as well as studies conducted locally, some methods are proposed herein to realise the policy objectives. In addition, an improvement is also proposed in the spirit of continual improvement.

To ensure success downstream, the effort must be kicked-off correctly. In this case, the first step is collection which when coupled with segregation makes the practice generally more efficient. Kubota, Horita and Tasaki (2020) reported on the use of Waste Banks (WB) in Indonesia. In the study, this practice mainly benefitted recyclers. However, if more sub-steps of the process are monetised, it would be an added motivation for all stakeholders. Local communities should be empowered in running this to encourage a stronger buy-in. The segregated organic wastes could be used for local bioenergy plants if these are available in-situ. In 2019, Zulkifli et al. implemented a successful pilot project of converting MSW into methane gas using anaerobic digestion (AD), citing this to be the most promising technology to meet this end. This prototype could be suitably developed and scaled up to cater to local needs. For localities without in-situ bioenergy power plants, biomass could be pelletized and transported to the nearest plants. This exercise could be spurred on by attractive benefits like tax exemptions, toll-free delivery and higher rates for long term sustained commitments. Data collection at every level should not be neglected. In "What a Waste 2.0" (2018), Korea was singled out as having used information management to reduce waste. A similar centralised platform could be set up which acts as a database for logging relevant information, centre for regulatory information, geo-locations of Waste Banks and Bioenergy Power Plants. The statistics gathered, read in conjunction with population growth, change in lifestyle and other relevant socio-economic factors, could be used for projecting future availability of biomass for effective planning.

Results, conclusions, and recommendations

The rising trend of urbanization would require rethinking of essential practices like MSW management. Deliberate micromanagement at grassroots level may be required at the onset until a sense of ownership is developed amongst stakeholders. Eventually, a self-regulating ecosystem could emerge.

Recommendations

Recommendation 1: Identify Strategic MSW Collection Points

Select key sites for MSW collection based on relative location from main contributors like townships. Simultaneously satisfying human health requirements and minimising environmental impact. The MSW should be modelled after WBs described above.

Recommendation 2: Incentivise Waste Collection and Segregation

Monetise every level of waste collection and segregation. Extract organic waste for bioenergy production in-situ or off-site.

Recommendation 3: Facilitate Organic Waste Supply to Bioenergy Plants

Boost supply of MSW organic wastes to bioenergy plants employing attractive benefits like tax exemptions, toll-free delivery and higher rates for long term sustained commitments.

Recommendation 4: Forecast Future Supplies to Enable Continuity

Formulate appropriate algorithms to predict rate of availability of fuel for Bioenergy Plants for effective planning and management. This forecasting should include consideration for population growth, change in lifestyle and other relevant socio-economic factors.

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Ir. Jacqueline Lukose is a Senior Lecturer at the School of Engineering, Asia Pacific University of Technology and Innovation. She graduated with B. Engg. (Hons.) degree in Electrical Engineering from the University of Roorkee, India in 1996 and M. Engg. degree in Electrical Energy and Power Systems from the University of Malaya in 2008. Her area of interest is in the application of machine learning techniques in solving power system problems. She is a Professional Engineer registered with the Board of Engineers, Malaysia. Prior to joining academia, she had practiced in the industry for 15 years. She has also been called as an Engineering Accreditation Council (EAC) evaluator, including as head of panel, for several engineering programmes at local public and private universities.

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