

A Proposal for New Zealand Human Factors/Ergonomics Workforce Development

7 May 2020

1 Executive Summary

- 1. The HFE education pathway is incomplete for the purpose of supporting comprehensive HFE competence in New Zealand**, although we receive many enquiries from people interested in gaining HFE qualifications and wanting to work in the field. **A collaborative education program to meet New Zealand's HFE needs appears possible but requires resourcing** to negotiate the challenges of current tertiary funding models. Our current HFE professionals are so few and the need for HFE services and education/training opportunities so pressing that, while we seek investment to develop domestic capacity, **interim measures are also required to ensure supply**. Scholarships for students to complete courses that meet all HFE competencies are needed and recruitment of overseas HFE qualified/certified professionals may also be necessary to supplement local expertise.
- 2. Demand for HFE services is increasing, especially in healthcare, and could be much higher if there was wider awareness** of the organisational health, safety and productivity gains HFE professionals can offer through their unique systems approach and utilisation of design interventions.
- 3.** Given the small number of fully qualified HFE professionals in New Zealand, there is insufficient capacity for the current professional base to complete their paid job-related tasks and advance the HFE profession to the extent needed. Profession-essential functions such as maintenance of professional HFE standards, advancement of education/training opportunities, organising professional development events and creating wider awareness of the profession both for those who might consider training as HFE professionals and organisations who could benefit from HFE inputs, are currently being undertaken in an almost entirely voluntary capacity. **Resources are needed to support these activities so that HFE-enabled improvements in New Zealand health and safety outcomes can be more fully realised.**

2 Purpose and overview

This paper outlines initiatives required to build the human factors/ergonomics (HFE) profession in New Zealand to supply appropriate numbers of professionals with the required competence spectrum. This exercise will be led by the Human Factors and Ergonomics Society of New Zealand (HFESNZ) in partnership with the Health and Safety Association of New Zealand (HASANZ) and associated bodies. WorkSafe is considered to be a key partner in this activity.

This work extends upon the findings in the (November 2019) *'Building the Professions: HASANZ Health and Safety Workforce Pipeline Report'*¹, and the supporting document on HFE by Bidwell². The *'Building the Professions'* report identified that an HFE competency framework existed, but is incomplete (it is due for review, in light of recent international developments). The report also identified that HFE education and training in New Zealand is 'fragmented and difficult to access,' with no one institution running a programme linked to an overall HFE qualification, though some universities have programmes that include elements of HFE education. Supply and demand for HFE was identified in this report as having 'challenges related to existing demand, demographic pressures or skill-mix issues' compounded by growing demand.

To address capacity and capability needs, refreshing the HFE competency framework must be the first step, followed by the development of a suitable New Zealand HFE education programme. Longer term actions will also be required to build and sustain the HFE profession in line with the *'Building the Professions'* report. The two-to-ten year plan is to ensure New Zealand has a sustainable human factors/ergonomics career pathway that includes qualifying courses (e.g. Post Graduate Diploma, Master's Degree) and professional certification. This may combine national and international education and supervised training. These important HFE education needs indicate that New Zealand universities will be key partners for this work. This includes education institutions currently providing HFE education, and those which might do so in the future.

This will not however ease the immediate/short term shortages and suggests that interim steps may be necessary. These might include:

- bringing in internationally certified HFE professionals, where local expertise does not exist
- supporting attendance at human factors/ergonomics courses that meet the needs for HFE competencies, including overseas courses.
- providing clearer information for HFESNZ members about current education opportunities and the fit with certification requirements
- actions to increase awareness of the profession, promote appropriate HFE uptake by organisations, and concomitant employment opportunities for certified HFE professionals
- actions to enable technical-level education for people in related professions move into HFE.

Further opportunities for building the HFE profession will be assessed during the first phase of work, recognising that the changing business and health and safety landscape will impact. This work is specific to the HFE profession and part of the broader work of HASANZ to build capacity, capability and demand within New Zealand's health and safety workforce. This supports and is part of the core WorkSafe strategy to *'make sure everyone who goes to work comes home healthy and safe'*. This is outlined in the WorkSafe/ACC harm reduction action plan³ which includes targets for work-related health and the 25% reduction of work-related fatalities and injuries by 2022⁴ using aligned approaches - multiple agencies collectively working towards these goals, with improved capability.

¹ HASANZ. *'Building the Professions: HASANZ Health and Safety Workforce Pipeline Report'*. (November 2019).

² Bidwell, S. *'Overview of the human factors and ergonomics profession in New Zealand'*. (Dec 2019). HASANZ.

³ ACC and WorkSafe NZ. *Harm Reduction Action Plan*. (ISBN 978-1-98-856744-0. Downloaded 2 April 2020).

⁴ WorkSafe NZ. *WorkSafe's strategy: 2018-2022*

It is proposed that HFESNZ and HASANZ will jointly manage this programme of work in liaison with WorkSafe. We wish to move quickly to implement these initiatives to ensure that New Zealand industry optimally benefits from the health, safety and productivity gains HFE can deliver.

3 Key Issues

HFE has a firm base in systems approaches and methods, and the use of design interventions to maximise health, safety, productivity and efficiency⁵. These approaches are now becoming better understood within New Zealand health and safety networks and are unique to the HFE discipline.

The HFE professional's broad base of knowledge includes anatomy and physiology, biomechanics, anthropometry, psychology, cognition, organisational psychology, detailed knowledge of task and activity analysis methods, and contemporary systems analysis approaches. The methods used inform risk assessments, incident investigations, intervention programs, and the design of work and the artefacts used to complete work. Further increases in the demand for HFE services are expected to result from business owners, health and safety managers, recruiting personnel and government agencies being better informed about how HFE specialists add value.

Through HASANZ we have been working with WorkSafe (and ACC) to develop understanding of the challenges relating to inadequate management of work-related musculoskeletal and psychosocial health risks, the importance of good work design incorporating a systems approach, as well as transport-related risks and other issues.

The Health and Safety at Work Act (2015) specifies 'upstream design' responsibilities that sit within the expertise of HFE professionals. In line with this, HFE is likely to be a significant area of growth within WorkSafe's jurisdiction. It is encouraging to see that the new 'Health and Safety by Design' lead at WorkSafe is a Certified Professional Member of HFESNZ. This reflects the fact that integration of HFE expertise within robust design processes is a key means of achieving worker health and safety goals, improving productivity and reducing worker harm.

Furthermore, WorkSafe have indicated a plan to employ a Work-related Musculoskeletal Disorders lead role during 2020. This position is appropriate for an HFE professional and should result in significant growth in demand for HFE professionals as the contribution of HFE to reducing musculoskeletal risks is better recognised within New Zealand businesses.

HFE development work is also occurring in the health sector, with ACC supporting the development of human factors expertise. Of sixteen people delivering HFE input into District Health Board adverse event review processes (incident investigations regarding patient harm events), thirteen are HFESNZ members. Developments in the transport sector are occurring around system design for improved road safety and safety around vehicles, spurring the employment of more HFE professionals in this field. There remains room for larger NZ industries and businesses to employ HFE professionals to assist with applied research to address a multitude of work-related design activities.

Scoping work on New Zealand's HFE workforce capacity and growth needs was carried out by senior HFESNZ committee members. This work was summarised by Bidwell (2019) to inform the HASANZ 'Building the Professions' report. While it was identified that 'New Zealand has similar or slightly fewer certified HFE professionals per capita than comparable European jurisdictions' this direct comparison may not account for larger European HFE practises having senior/certified professionals,

⁵ Dul et al. 'A strategy for human factors/ergonomics: developing the discipline and profession'. (April 2012). *Ergonomics*. 55:4.

with many more junior and developing professionals carrying out work activities under their direction. This professional depth is not consistently reflected in New Zealand's few HFE practices and suggests that comparatively, the quantity of HFE work is likely to be significantly less than in European jurisdictions. Additionally, as the total numbers of New Zealand certified professionals remains low (at just 14) and the workforce is ageing (a 2019 HFESNZ member survey found that 68% of respondents were aged over 45 and 32% aged over 55) it is expected that demographic pressures will increasingly face the HFE profession in New Zealand.

The current low numbers of NZ HFE professionals and the demographic issues are particularly concerning as it is predicted that demand for HFE professionals will grow over the next five to ten years as the health and safety system matures and businesses and other agencies gain greater awareness of the value that HFE professionals offer. It is estimated (Bidwell, 2019) that another 50 HFE professionals will be required during the next decade - largely from growth in the healthcare sector, design applications, and consulting. There is already evidence of a growing need for HFE expertise in sectors including healthcare and transport, and to address musculoskeletal health risks across sectors. The recent increase of HFE roles and professionals in New Zealand government bodies such as the New Zealand Transport Agency demonstrates increasing awareness of the value of HFE.

Challenges replacing the existing workforce and meeting the expected increase in demand strengthen the case for improving access to an appropriate HFE education and training pathway within New Zealand.

A summary of the New Zealand HFE workforce challenges includes:

- **Lack of critical mass.** Only 22 of around 100 society members are Professional Members. Most work in consultancy and/or are employed in an HFE or associated role, and around a quarter are involved with teaching in HFE and associated fields.
- **Limited training and education pathways.** Whilst some HFE tertiary education papers are available and being developed, there is no NZ university programme offering a full and complete education program suitable for HFE certification. (See Appendix A). International education options are cost prohibitive and the pathways complex. However, the demand for HFE education is consistent, with requests for HFE education programmes received monthly through the HFESNZ.
- **Limited HFESNZ resourcing.** The small professional society runs on a largely voluntary basis, to date employing only a part time administrator and providing the HASANZ representative with a meeting honorarium. All other activities are run by volunteer committee members and office holders. While this largely voluntary structure is appropriate for maintaining the operation of the society, there is insufficient capacity within the HFESNZ to develop the strategic areas that would positively benefit health and safety in New Zealand.
- **Limited access to quality HFE professional development opportunities.** Existing professional members work within their time and energy resources to create and run professional development events, but these need to be boosted to meet demand.
- **Lack of job-related value in gaining professional membership.** Whilst other society (and non-society) members are in the position to become Professional Members, employers (including government agencies) are not consistently requiring and supporting the development of Professional Membership among those staff they employ for their HFE knowledge. This is slowing the movement of General Members into Professional Membership.
- **Lack of understanding and awareness of the profession.** Advice may be sought from unqualified or inappropriate sources because designers, employers, and procurement agents (and other health and safety professionals) do not have awareness of the HFE profession –

for example managers assuming that 'ergonomic design standards' can be adequately addressed by a health and safety generalist, a workplace physiotherapist or occupational therapist, or an engineer (if at all). As a result, the broad-spectrum benefits that an HFE professional could have provided may be insufficiently captured resulting in poor health, safety and productivity outcomes.

- **Provision of inaccurate 'HFE' advice by consultants asked to do work they are not sufficiently qualified or experienced to do.** Practitioners from other disciplines may have poor knowledge of their practice boundaries and may be operating completely outside of HFESNZ's professional networks and appropriate professional practice. HASANZ's work with the Register, and other activities are working to address this, but it remains a problem in the HFE field, where the titles 'ergonomist' and 'human factors professional' are not protected by law.
- **Increasing HFE service demand.** Following HSWA 2015 there has been an increase in the demand for HFE services but there remains a small number of qualified HFE professionals, and a predicted increase in service demands (e.g. with WorkSafe's imminent focus on health and safety by design and musculoskeletal and psychosocial harm in the workplace, among other developments).
- **Ageing workforce.** Two thirds of the current workforce are over the age of 45, suggesting demographic pressures for the future.

HFESNZ requests a funding package to enable the HFE profession to meet current and predicted future growth needs. The primary requirement is to work with universities to build on existing HFE education programmes to develop adequate numbers of HFE professionals with the competencies needed for effective industry engagement and a reduction in worker and societal harm.

It is proposed that HFESNZ and HASANZ jointly run this project, in consultation with key stakeholders including universities. HFESNZ will bring the HFE expertise while HASANZ will provide project management support, and work will be alongside WorkSafe as a strategic partner.

4 Goals

The overall objective is to optimise the number of competent and qualified HFE professionals in New Zealand to support industry productivity whilst achieving workplace health and safety standards for all workers. The health, safety and productivity benefits that competent HFE professionals can deliver has not yet been fully appreciated by New Zealand businesses, WorkSafe and other agencies (eg ACC, industry health and safety groups) and education organisations.

To advance the impact HFE can have in New Zealand, more people with the appropriate HFE skillsets are required:

- Fully qualified (Certified) HFE professionals (CNZHFE)
- Graduating HFE professionals moving through the professional pathway (AssocNZHFE).
- Technicians (e.g. TechNZHFE) or people with appropriate qualifications and training in specific/limited areas of HFE (e.g. office or simple workstation ergonomics, manual handling assessment and interventions, patient moving and handling).
- An improved understanding of HFE among professionals from other health and safety disciplines.
- An improved understanding of HFE among employers and senior leadership teams in businesses; design professionals; and key government personnel.
- A New Zealand Health and Safety (cross-discipline) introductory course covering legislative, professional, and cultural issues suitable for both upskilling local health and safety

practitioners/professionals and introducing overseas HFE professionals to the New Zealand health and safety landscape and cultural environment.

Specific goals relating to this programme of work are:

1. Growing the number of qualified HFE professionals across all Professional Membership levels within the HFESNZ (Technical, Associate and Certified Professional Members).
2. HFE-related upskilling of practitioners/professionals at all levels, both within the discipline and those from associated health and safety disciplines.
3. Attracting new people to the HFE profession.
4. Improved health and safety system resources in specific health/safety risk areas (e.g. 'designing out' risks for musculoskeletal disorders and other risks pertaining to workplaces, plant, and equipment) via the application of HFE expertise.
5. Focussing HFE continuing professional development and industry education/engagement efforts. An (annual) **expert group review of profession advancement and emerging demand** would ensure maintained focus. This group could include: HFESNZ Professional Affairs Board; key industry users of HFE services; overseas representative/s reflecting emergent areas; and public sector technical specialists.

5 Priority Initiatives

Priority 1 and 2 initiatives to be implemented over the next 3 years are outlined below. Additional detail is provided in Appendix C.

Priority 1 initiatives are the development of a New Zealand HFE education programme (2) which will build from the competence review (1) that will inform necessary programme outcomes. The education package must be fit for purpose and sustainable, providing appropriate numbers of HFE professionals with a suitable competence spectrum for New Zealand needs. Other Priority 1 initiatives are (3) scholarships to immediately commence new student HFE education (likely via international distance learning programmes, but possibly including New Zealand programmes if they can demonstrate they comprehensively address HFE competencies). These primary needs are supported by (4) a mentoring programme and (5) education efforts to increase HFE awareness and knowledge among co-professions; (6) a means of HFESNZ acknowledging the individuals volunteering to remedy HFE needs in the health and safety system, and (7) project management costs.

Priority 2 initiatives include: (8) a programme to attract new people into the field of HFE; and (9) targeted risk-specific education for HFE professionals, and (10) the associated project management costs.

GST exclusive costs are outlined for each initiative.

Initiative	Time Frame	Estimated Cost Year 1	Estimated Cost Year 2	Estimated Cost Year 3	Rationale
Priority 1					
1 Competence Framework Review	3-6 mths	\$22,500 (15 days work, preferably CNZHFE or equivalent)	Nil	Nil	Continuing from the gaps identified in 'Building the professions' a competence framework review is necessary considering recent international competence changes and New Zealand H and S system changes. This needs completion ahead of detailed work on development of an NZ HFE education system, as this will inform course outcomes and program development. Also fits with HFESNZ's IEA certification programme endorsement review (mid-2020) and CPD system developments.
2 NZ HFE qualification	18 mths – 3 years. Initiate and sustain	\$110,000 (1.5 days per week project leader, preferably with HFE knowledge)	\$110,000	To be determined	Building on existing New Zealand university efforts, work with them to develop fit for purpose HFE education programs. Facilitation of meetings with education providers, with consideration of creating a system such as BCA (Appendix B), with international collaborators. Will require a resourced national program coordinator, and an agreed competence framework as starting points. Costing includes some travel costs and legal consultation fees.
3 Scholarships for HFE education programmes	3 x students start in year 1, and a further 3 students in year 2, assuming 3 years part time.	\$30,000	\$60,000	\$60,000 (+ \$30,000 Year 4)	Quick-start to begin increasing number of fully qualified professionals. E.g. Australian Master's programmes with consideration of NZ-based/supervised project work. Leverage off the HASANZ Scholarship Programme (one student has already commenced with this approach at Melbourne's La Trobe University, receiving \$7,000 HASANZ Scholarship). As an example, this programme cost is part time over 3 years at \$15,000 per year. A scholarship amount of two thirds this amount, so \$10,000 per year for several years, is therefore indicated (for parity with support given to other disciplines).
4 Mentoring programme	Develop and Launch	\$20,000	\$20,000	\$20,000	Train mentors to provide professional support especially to early career professionals and students ⁶ , but for all practising HFE professionals. This will ensure acceptable standards of work and be a vehicle for providing support to professionals working independently and therefore with some vulnerabilities. (This may piggy-back on other HASANZ association activities, eg NZISM's use of Coachio for providing 2 days of mentor training to senior professionals). Professional leadership development for senior HFE professionals.

⁶ Buckley and Hirsch. (2019) *Supporting Early Career Professionals and Students within the IEA and its Federated Societies*. (Report to the IEA).

Initiative	Time Frame	Estimated Cost Year 1	Estimated Cost Year 2	Estimated Cost Year 3	Rationale
5 Co-profession Core Understanding	Develop and launch Year 1, then deliver	A \$7,000 B \$20,000	A \$3,000	A \$3,000	Build understanding of HFE across associated disciplines (e.g. health and safety generalists, occupational hygienists, workplace-based physiotherapists and occupational therapists, occupational health nurses, occupational physicians, engineers). Two elements: A) education for the associated disciplines about HFE roles and role overlaps via a developed outreach programme, 1-3 hours, for workshops at associated conferences (etc). B) modules for educational programmes/ qualifications that provide a sound introduction to the work of HFE, as part of health and safety generalist, management, Human Resources, Project Management etc education programmes.
6 HFE Profession-Development activities		\$8,000	\$5,000	\$5,000	Funding to support the small number of existing HFE professionals to complete the many 'HFE Profession Development' tasks. This work is currently penalising HFE professionals via lost income and lost time with family. Until this is addressed HFESNZ's ability to advance its goals remains limited. Payments that recognise time spent on tasks or other forms of reward (access to training events etc) may be considered. Within-society capacity should increase over time as the numbers of professionals grow, and the need for this incentive reduce.
7 Priority 1 Initiatives - Project Management costs		1-\$4,500 2-\$44,000 3-\$6,000 4-\$4,000 5-\$5,400 6-\$1,600 Total-\$65,500	- 2-\$44,000 3-\$12,000 4-\$4,000 5-\$600 6-\$1,000 Total-\$61,600	- 2-unknown+ 3-\$12,000 4-\$4,000 5-\$600 6-\$1,000 Total-\$17,600+	HASANZ will receive Project Management fees at 20% of the project costs.
Total for Priority 1		\$283,000	\$259,600	\$105,600+	

Initiative	Time Frame	Estimated Cost Year 1	Estimated Cost Year 2	Estimated Cost Year 3	Rationale
Priority 2					
8 Attraction	Develop and Launch	\$5,000	\$5,000	\$5,000	In Year 1 review HFE visibility as a career and then (when educational pathway is confirmed) develop and enact a plan to increase visibility. Initial focus may be on co-professions, university graduates (eg biomechanics/sports sciences) and selected industries. This may be achieved by working with HASANZ for cross-H and S discipline career promotional activities, particularly during Year 1 when the NZ HFE educational pathway is in development.
9 Risk-specific technical or specialist training	Consider HFE needs in NZ Plan for specific upskilling needs with other stakeholders	\$20,000	\$20,000	\$20,000	Increase the current HFE capacity and capability by training people in specific aspects of human factors/ergonomics. This might for example include sponsorship for people to complete design, or musculoskeletal (including vibration) assessment and interventions, or systems analysis, or health human factors education programmes, etc. Included might be a specific training programme to fast track nurses, occupational therapists or physiotherapists into Technical Membership for patient moving and handling; musculoskeletal interventions; and health investigations, etc. Also included may be the need for development of higher levels of knowledge/ consistency around identified specialist areas of HFE. Training may need to be sought internationally – for example health system investigations.
10 Priority 2 Initiatives - Project Management costs		8-\$1,000 9-\$4,000 Total-\$5,000	8-\$1,000 9-\$4,000 Total-\$5,000	8-\$1,000 9-\$4,000 Total-\$5,000	HASANZ will receive Project Management fees at 20% of the project costs.
Total for Priority 2		\$30,000	\$30,000	\$30,000	
Total for Priority 1 and 2		\$313,000	\$289,600	\$135,600+	

6 Programme Governance and Administration

HASANZ and HFESNZ propose to jointly run this project. HFESNZ will bring the expertise of the discipline, while HASANZ will provide reporting, programme support and other services. HASANZ will be the contracting agency with WorkSafe New Zealand. Because there is specific interest in HFE education as part of the suite of initiatives, engagement with NZ Universities will also be built into the programme.

It is suggested that a HFESNZ/HASANZ **Governance Group** be formed to provide oversight to this work and funding release, perhaps meeting two-monthly, with six monthly reporting back to WorkSafe linked to funding release. A broader-reaching **Advisory Group** is also indicated for industry engagement to ensure the relevance of competencies (Priority 1, Initiative 1) and a review of overall programme effectiveness. Industry sectors to engage with include manufacturing, public service, defence/emergency services, injury prevention providers, the health and safety inspectorate, research providers and transport.

The following principles underpin the approach:

- a) *Evidence based.* We will implement and adjust initiatives based on evidence and uptake.
- b) *Collaborative.* We see this programme as a collaboration between WorkSafe New Zealand, HFESNZ, HASANZ, education stakeholders and New Zealand businesses.
- c) *Devolved.* The funding and programme delivery will be devolved to HASANZ/HFESNZ.
- d) *Transparent.* We will be open and transparent on the initiatives being implemented, the results and overall programme performance.
- e) *Sustainable.* We plan on building a longer-term programme that will build the HFE profession over the next 2-10 years.
- f) *Agile.* We will adjust initiatives based on feedback, analysis and results. New initiatives will emerge during the course of this work and will be assessed and implemented as appropriate.

7 Risks

The risks and impact (L = Low, M = Medium, H = High) for this programme of work are outlined in the table below, with mitigations.

Risk	Likelihood	Impact	Mitigation
Failure to resource and support HFE education initiatives may result in the lack of adequately skilled professionals working in this field, and therefore able to reduce harm in NZ workplaces via application of HFE's unique skillsets.	M	H	Collaborative and focused approach between all relevant agencies to seek optimal outcomes.
Lack of resources within HFESNZ to carry out development work that is required	H	H	Ensure payment/reward for HFESNZ members working to develop programmes and involved in outreach teaching etc. Ensure appropriate programme resourcing. Use international resources where relevant eg Australia/UK. Use of HASANZ project management to manage resource allocation.
Inadequate interest and take-up of scholarships and training initiatives.	L	M	Information/marketing campaign. (Ensure people outside HFESNZ have opportunity to participate). Reach through all HASANZ member groups and other potential student groups, eg psychology, sports science.
Perception or actual unfairness/ inequality/ favouritism in receipt of scholarships/training opportunities.	M	L	Selection process, transparency, reporting.
Incomplete scholarships/ persons not completing qualification.	M	M	Selection process. Follow-up, review of any reasons for incompleteness. Quarterly monitoring of progress and outcomes. Support and mentoring.
Education/training/ professional development selected is inadequate/ inappropriate for audience resulting in remaining gaps in competency.	L	H	Completion of Competence Framework to guide education needs. Good engagement with educators, linked with HFESNZ certification process. Programme follow up. Mentoring programme. Society engagement and consultation.
Industry demand does not build to optimum level due to failure of education/ engagement strategy	M	H	Staged approach, starting with most receptive sectors and building on strong work already there to expand services undertaken. Engagement and alignment with regulatory actions. Lessons learned applied. Awareness and education to co-professions to build demand/knowledge.

8 Next Steps

We would like to discuss this proposal with WorkSafe New Zealand with the goal of quickly establishing the programme and beginning to implement initiatives.

Yours sincerely,



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HASANZ Executive Director



Hamish Mackie
HFESNZ Chairperson

Appendix A

HFE Education in New Zealand

Initial discussions on options to build New Zealand's HFE education offerings (and therefore to develop the HFE profession) suggest a possible way forward. New Zealand tertiary education providers Auckland University of Technology (AUT), Massey University (MU), Otago University (OU) and Victoria University (VU) have all indicated motivation to work together for a possible combined HFE education solution.

Knowledge of several potential models for multi-university collaboration for qualifications strengthens the likelihood that this will be possible - and has been discussed in New Zealand HFE circles for over a decade. The models for consideration include:

- the recent New Zealand occupational hygiene education agreement incorporating two New Zealand universities and one Australian university
- the Biostatistics Collaboration of Australia's 6-university agreement, with a successful programme that has been running for around 20 years <http://www.bca.edu.au/>. (See summary at Appendix B).
- Skills NZ indicated they have information on a recent New Zealand educational programme (linked with Maori culture) that is run across several institutions.

It is recognised that the funding models for NZ tertiary education may provide potential barriers for suitable programme development, suggesting that this work must consider the strategic levers that may stimulate and support such essential programmes. Specifically the Committee on University Academic Programmes (CUAP, see www.universitiesnz.ac.nz/about-universities-new-zealand/unz-committees-and-working-groups/committee-university-academic) the Tertiary Education Commission (TEC), and the New Zealand Qualifications Authority (NZQA) will be essential parties for further communication. Issues of funding, who 'owns' the qualifications, and badging will all require resolution, along with issues of delivery – such as curriculum development and mode of delivery eg online, block courses etc.

There is a suggestion that an international universities collaboration utilising an appropriately accredited (eg IEA and other national professional societies) curriculum might be more likely to succeed. Such offerings would by nature be largely online (post-graduate, Masters), so the means of gaining suitable supervised training (an essential component of HFE certification) must be addressed. It is of note that whilst Australia is a natural partner for such discussions, that the Human Factors and Ergonomics Society of Australia's professional certification program is not yet endorsed by IEA, so program accreditation processes may be incomplete and should be closely reviewed for any such partnerships.

Designing HFE tertiary education programmes is a topic of international interest, with a good summary of related issues in the December 2019 article by Oakman et al⁷. Thus, there are a number of potential international collaborators and partners.

All education initiatives should be based on industry best practice and linked to formal recognition by HFESNZ's Professional Affairs Board (PAB) processes, based on a recognised competence framework. HFESNZ's existing HFE professional competence framework as used by the society's PAB is due for review. This follows the recent International Ergonomics Association (and other

⁷ Oakman et al. 'Tertiary education in ergonomics and human factors: quo vadis?'. December 2019. Ergonomics.

international society) competence framework reviews and should be done prior to the work on development of New Zealand HFE education programmes.

HFESNZ's Professional Membership system has been accredited by the IEA (2006), and this accreditation is also due for review in 2020. Ensuring that HFESNZ maintains this accreditation will evidence that the HFESNZ certification system is sound and meets globally recognised best standards for HFE professionals. This will ensure that New Zealand business, WorkSafe New Zealand and workers have access to the highest standards in the profession.

Appendix B

Biostatistics Collaboration of Australia

The Biostatistics Collaboration of Australia (BCA)⁸ is a consortium of Australian biostatistics experts from around Australia, with representatives from universities, government and the pharmaceutical industry. Formed in 2001, six universities work together via the BCA to offer a program of postgraduate courses to the required standard. The creation of the BCA came about with recognition that there was an ongoing shortage of highly skilled biostatisticians both in Australia and internationally. The outcomes are to provide Australia with well-trained professional biostatisticians, and to upgrade the skills of clinical researchers.

Accredited by the Statistical Society of Australia, the BCA offers a Graduate Diploma of Biostatistics, a Graduate Certificate of Biostatistics, and a Master of Biostatistics, with the programmes run via the six participating universities. The universities collaborate to deliver a single specialist programme, with partner universities fully recognising those courses taught by other member universities. Most courses are part time, with units delivered by distance learning methods, enabling study to be from home and tailored to suit work demands. Students may enrol at any of the participating universities (the 'home' university) to access the qualification. All units of study are accredited by all consortium universities, and each unit is delivered by one of the universities in any semester. Most students are working professionals aiming to broaden their career and research opportunities in the field.

Key bodies are:

- the **BCA Coordinating Office** (admin, liaison and communications) linking the students, academic unit/program coordinators, governance, participating university, government, and other stakeholders and contractors.
- **Governance** via the BCA Steering Committee (including an Executive Committee) and Teaching Committee (bi-annual face to face meetings, and video conferences as required).
- **Steering Committee** – The BCA Executive and an Academic Representative for each affiliated university, and representatives from government and industry. This committee does strategic and operational planning, liaison with and responsibilities to BCA members, renewing the Memorandum of Agreement, etc.
- **Teaching Committee** – Program Coordinators from each university, principal coordinators for each unit of study delivered within the BCA program, and a Student Representative. This committee deals with curriculum and unit development, student's pastoral care, assessment and results communication, etc.

The program is largely self-funding, with some assistance from the NSW Ministry of Health. The Coordinating Office is funded by the application of a capitation fee – per student and per unit of study, according to a pricing schedule outlined in a Memorandum of Agreement. The NSW Ministry of Health contributes an annual annuity to support the function of the Coordinating Office. Funding to support the courses at participating universities comes from tuition fees paid by students, that are redistributed across the participating universities according to a pricing formula outlined in the Memorandum of Agreement. Also, per the Memorandum of Agreement, one of the universities provides support by hosting the BCA Coordinating Office, with the BCA paying a quarterly overhead. Another university is the nominated secretariat (Hosting University) housing the accounts for the BCA within the university's accounts. Other committees may be convened as required.

An Executive Officer (full time) and a Senior Administrator (2 days per week) are employed.

⁸ Biostatistics Collaboration of Australia website www.bca.edu.au, accessed 17 February 2020.

Initial consideration of the BCA model and its potential application in NZ suggests that the reasons for such a model are similar for the Australian Biostatistics and New Zealand HFE situation. This model is attractive in that it has now been running for 20 years, indicating that it is both functional and sustainable within the complex tertiary education sector.

Consideration for the application of this sort of system in New Zealand suggests a clear role for the HFESNZ (Professional Affairs Board) to outline the required professional competencies. Whilst HFESNZ could be the owner of the HFE curriculum, it might also be possible for HASANZ to become the owner of the curricula for HFE and possibly other member societies, with cost-savings for centralised administration. Should this model be followed, work will be indicated to consider best fit with the existing organisations and structures. Contact with BCA personnel highlights the critical importance of a well-formed Memorandum of Agreement, covering all legalities.

Appendix C

Funding must cover the necessary time and expertise to administer this project work, and to cover travel and other costs. This is a HASANZ/HFESNZ collaboration with transparency of funding allocation and use in both organisation's operation and management processes. HASANZ project management costs are given as a separate line item.

Priority 1, Initiative 1 - Competence Framework

The revision of the HFESNZ Competence Framework will ensure:

- a. Fit with recent international and IEA updates. This refresh is required ahead of the now due 2020 IEA HFE certification programme review.
- b. The refresh must take into account a formal Treaty of Waitangi inclusion/NZ cultural component.
- c. Some comparative work between existing NZ, European, UK, Australian, Canadian, US and other countries is indicated, with consideration of the INSHPO framework for generalists as a reference point of interest.
- d. Make sense as a useful education system guide – it should identify required curriculum outcomes based on competencies
- e. Make sense for our Professional Member application process, the upgraded Continuing Professional Development processes, and HASANZ Registration.
- f. The redrafted competency framework will require a consultation phase with our Professional Member group/broader membership/other stakeholders to ensure it is fit for purpose.

This work could be carried out by existing PAB personnel, independently or working together with those with HFE education experience. Existing revisions of competence documents (for example from the UK, USA and IEA) should be reviewed alongside the current NZ document. Consideration of the recent INSHPO competency document may also be a useful guide. New Zealand-specific cultural competence elements must be included, via linking with relevant Maori advisors.

(15 days at \$1500 per day = \$22,500)

Priority 1, Initiative 2 - Developing New Zealand HFE Qualifications

The development of an HFE education solution that meets New Zealand needs for the long term is key. We also note that this is a re-development of an HFE programme, given Massey University's prior involvement in this field. Whilst primary consideration is for a post-graduate pathway that allows mature students to enter the field as a second (plus) career, thought should also be given to ensuring a valid pathway for young graduates to move through directly from school leaver and under graduate university studies, into the field. This might capture more of the sports science and psychology students that are coming out of, for example, Otago University.

Bringing together the known educators working in the field is a first step, with consideration of the possible models for 'doing it differently', including:

- a. The model under development from the New Zealand Occupational Hygiene Society, with New Zealand and Australian universities collaborating.
- b. The Biostatistics Collaboration of Australia (BCA) model of multi-university collaboration for a single set of post graduate qualifications for this specialist field (Appendix B).
- c. The NZ model for different universities working together for a Maori qualification (information may be available from Skills NZ).

Individuals (not necessarily as representatives of their employers) who have indicated interest in supporting a collaborative HFE education effort include:

Ian Laird (Massey University, Palmerston North)

David Tappin (Massey University, Albany)
Lyn Garrett and Rod Adank (School of Design, Massey University, Wellington)
Mark Boocock (AUT)
Fiona Trevelyan (AUT)
Felicity Lamm (AUT)
Vanessa Beanland (Otago University)
Liz Ashby (independent contractor, teaching with Massey University and AUT)
Diane Marshall (Auckland University)
Joanne Crawford (Victoria University)
Tim Bentley (Edith Cowan University, Perth, Australia, recently with Massey University)
Jodi Oakman (La Trobe University, Melbourne, Australia)
Mike Fray (Loughborough University, Leicestershire, UK)
HFESNZ Professional Affairs Board (Marion Edwin, Convenor)
HASANZ (and member organisations)
WorkSafe New Zealand.

Other industry groups and potential international collaborators should also be engaged with.

Dave Moore (previously of AUT and Massey University, now employed at WorkSafe New Zealand) is a potential interested party. Dave was engaged with work behind the 2019 HASANZ '*Building the Professions*' report and as a former HFE educator is well versed in HFE education issues. Of this list, Lyn Garrett, Mark Boocock, Fiona Trevelyan, Vanessa Beanland, Marion Edwin and Dave Moore are on the current HFESNZ committee, and Liz Ashby is on the HFESNZ Professional Affairs Board.

Tasks in this initial phase may include:

- Developing relationships with relevant education providers.
- Working from established competence framework/certification requirements to establish teaching programme requirements – paper types and content.
- Collaboratively working with all parties – including HFESNZ and PAB, WorkSafe NZ, HASANZ, ACC, tertiary education bodies eg TEC, NZQA, CUAP and universities, and other international professional bodies.
- Determining and setting up the necessary governance and operationally focussed structures, potentially a steering committee/governance group, and a teaching committee.
- Legal consultation to develop agreements.
- Society member consultation.
- Consideration of numbers of course positions and supply/demand needs.
- Multiple funding aspects and issues – determining the methods for money flow between universities etc.
- Consider associated political actions and means to gain long term support/sustainability of the programme – a politically 'required' continuation of such a programme will have greater likelihood of ensuring longevity.
- Work with HFESNZ to create possible course accreditation – so that those that complete the education programme are recognised as having met certification education requirements.
- This may require course educators to be recognised/Certified HFE professionals.
- Consider strengthening educational position not just via teaching of a full and complete HFE education programme, but via insertion of HFE modules into other course programmes.
- Consider associated programme development for meeting the needs of specific industries – e.g. Healthcare human factors/ergonomics is showing (international) growth and interest. Potential to link with other international programmes for these specific programme types that could lead to Technical Professional Memberships.

- Meeting with HFE educators and university administrators at the different universities.
- Meeting with associated tertiary education bodies e.g. SkillsNZ.
- Running meetings with multiple university educators/administrators participating.

Cost estimates:

Part time project lead, 1-2 days per week at \$1500 per day, for 18 months (to be spread between years 1 and 2) 115 days	\$172,500
Travel to/from Auckland (AUT/AU) for Project Lead or university representative x 4 at approx. \$1,000 per trip	\$4,000
Travel to/from Wellington/Palmerston North (VU, MU) for Project Lead or university representative x 3, at approx. \$700 per trip	\$2,000
Travel to/from Dunedin (OU) for Project Lead or university representative x 3, at approx. \$1300 per trip	\$4,000
Travel to/from Australia (Melbourne/other) x 1	\$4,000
Travel to/from UK x 1	\$7,000
Legal advisory	\$25,000
TOTAL – costs to spread between years 1 and 2 (Rounded to \$220,000, so \$110,000 per year)	\$218,500

Priority 1, Initiative 3 - Scholarships

Scholarships can target the rapid development of appropriately educated/trained HFE professionals, able to qualify for HFESNZ Professional Membership. A HASANZ Scholarship is already supporting one student who has commenced a La Trobe University (Melbourne) HFE programme, as a means of commencing HFE-specific education/training (they are already working in an associated discipline). While scholarships would not be exclusively for overseas courses, we are not aware of any New Zealand based courses that provide comprehensive coverage of HFE competencies at this stage. But if such a local course did emerge, then scholarships for such courses would also be considered.

More work may identify other international (predominantly online) programs that may be suitable for aspiring HFE professionals. For example, the UK's CIEHF lists accredited course options at https://www.ergonomics.org.uk/Public/Careers_Jobs_CPD/Degree_Courses.aspx. International students may still require additional coverage of NZ Health and Safety topics, and cultural expertise. A number of programmes may be suitable for scholarship opportunities, and it may be that the HFESNZ endorses some programmes.

The courses are generally post graduate, often requiring an existing bachelor's degree (three years of study). The La Trobe University course requires an investment of around \$15,000 NZ per year, generally over 3 years, so a total of \$45,000 per student. HFESNZ understands that HASANZ scholarships have targeted an approximate two thirds contribution to fees costs, and that parity with other HASANZ organisations is indicated. The figures for these HFESNZ calculations are based on this assumption. Applications would be open to all with the pre-requisite academic qualifications, with advertising of scholarships via industry groups – HASANZ and HFESNZ. Potential applicants may be asked to submit a preliminary Associate Professional Member application so that HFESNZ is able to suggest an appropriate education programme, given their interests, goals and background.

It will be important to develop a process for the management of scholarship applications to provide clarity about the decision-making process, and whether students must be admitted to the programme before gaining a scholarship.

Priority 1 – Initiative 4 – Mentoring programme

HFESNZ does not have a formal mentoring scheme, though since the commencement of the certification program in the late 1990's this has occurred informally within the member network. The value of a formalised mentoring system has been discussed in association with a Continuing Professional Development programme and the recognised need to support all professionals, particularly early career professionals. It is recognised that, in a field with limited numbers of professionals who are at times marginalised and their value under-recognised, support for those carrying out HFE work is essential.

Limited numbers of senior professionals, and the inconsistent supply of educated graduates has not provided a consistent demand for mentors.

Ensuring that existing experienced professionals are provided with education to allow them to step into formal mentoring roles for new professionals is indicated, possibly with some funding allocation to recognise the time inputs required of mentors. (This group has had considerable pressure to provide multiple voluntary professional services over recent years due to the Health and Safety system reform). Some recognition will be more likely to secure their support until a new cohort of professionals is in position and able to carry out these duties. Mentoring will enable Associate (and possibly Technical) Professional Members to progress towards full Certification.

Work is occurring to create a Continuing Professional Development Programme (CPD) that applies to all classes of Professional Member, not just Certified Professional Members as it is currently. A mentoring programme will be a valuable component of this CPD programme.

The NZISM indicate that the Coachio Mentoring Programme they have used (one full day of training, followed by 2 x half days over the next months) has cost around \$20,000 to provide for up to 20 participants. HFESNZ may be able to share this programme cost with other societies or run its own program annually.

Priority 1, Initiative 5 - Co-profession core understanding

In order to develop stronger demand for HFE services, it is important that the work of HFE professionals is understood and valued by the professions we commonly work alongside. More recognised within the health and safety field, HFE is also relevant to design, technology and other fields.

For the health and safety sector it is important for HFE to be understood across the associated disciplines, including health and safety generalists, occupational hygienists, occupational psychologists, workplace-based physiotherapists and occupational therapists, occupational health nurses and occupational physicians, and engineers working on safety applications and plant/equipment design.

Two possible elements of this co-profession core understanding may be:

- A** A developed outreach programme for education of the associated H and S disciplines about HFE roles and role overlaps, 1-3 hours, for presentation/workshops at associated conferences.
- B** Formal education programmes that provide a sound introduction to the work of HFE, as part of health and safety generalist, management, Human Resources, Project Management, engineering etc qualifications.

There is need for an HFE education module/s suitable for co-profession outreach and education, to be provided at conferences and other meetings, and importantly - within other discipline's formal

educational curricula. This outreach education material will take several days of work to develop, at \$1500 per day. We do not think it is good enough that teaching personnel on a health and safety generalist training programme had no awareness of HFE as a profession – just a couple of years ago.

Formal education modules for inclusion in other profession's training programmes also require development. Approximately two weeks' work (at \$1500 per day) for a Professional Member/s with an interest in this is indicated, ensuring that they consult with other society members and HFE educators regarding the content. It is important that this material is relevant to the profession receiving the educational programme, so it should be delivered by individuals (preferably HFE professionals) with knowledge and experience of working alongside that professional group.

Teaching institutions should be encouraged to use Certified HFE professionals to deliver the material, via paid programme inputs/honoraria. A fund administered by the HFESNZ, to support the provision of this education is suggested. The education material requires development into suitable packages held within the HFESNZ and available to Professional Members for use, and promotion to the co-professions.

Priority 1, Initiative 6 – HFE Profession Development activities

As a small professional society, the work of HFESNZ is done by volunteer society members who have stepped up to take additional (and sometimes considerable) responsibilities. The health and safety system reform and the work of HASANZ has vastly increased the necessary 'profession-development' work that is required, and this is taxing the capacity (and patience and willingness) of our HFE professionals. Importantly, participation in the important health and safety system reform work is penalising those who do the work in terms of lost income and time with families. Supporting the society's capacity to sustain this effort is recommended. Until this issue is addressed in some way, HFESNZ will struggle to advance its goals.

We recognise that whilst HFESNZ is a professional society with expectations for all professionals to support the work of their profession – we are beginning to suffer from burn-out and have as yet, few new members to fall back on. Some key recognition and support would really help maintain forward momentum at the pace that is (still) required.

Priority 2, Initiative 8 - Attraction

Ensuring that school leavers, recent University graduates, and other professionals from associated disciplines have an awareness of HFE as a career option is a priority to ensure long term sustainability of this field.

The first step is to create a functional education and training pathway (or pathways) for HFE, and then to campaign to promote the profession. It is likely that this can be done in conjunction with HASANZ, and general promotion of all the Health and Safety disciplines. Many HFE professionals have come to HFE from other fields – often health, design, psychology or engineering professions, and other health and safety disciplines. Recognising that HFE is a specialty field makes this no surprise – it may be an interest that is learned of and develops through other work, prompting further study in the field.

Material that presents job options in all the health and safety disciplines including HFE should be developed, such that it is appropriate for school careers expo's, and use by career development practitioners. This includes the job selection web tools (for example <https://www.careers.govt.nz/tools/careerquest/question>) that ask about the interests and skills of

individuals, and gives job suggestions – noticeably, HFE is missing from current New Zealand versions of these apps. On the tool at the link above, searching ‘human factors’ inaccurately leads to ‘human resources advisor’, ‘ergonomist’ results in no information - but a suggestion to search ‘ergonomics’, which leads to Industrial designer and (bizarrely) chiropractor. This clearly shows some room for improvement. Making HFE careers information available from the website would also be helpful.

Priority 2, Initiative 9 - Risk-specific technical or specialist training

It may be necessary to increase the current HFE capacity and capability by training people in specific aspects of human factors/ergonomics. This might include sponsorship for people to complete design, or musculoskeletal (including vibration) assessment and interventions, or systems analysis, or health human factors education programmes, etc. For example, it is recognised that with WorkSafe’s developing interest in musculoskeletal harm prevention that additional HFE expertise in the field of vibration assessment and risk management methods is likely to be required.

Therefore, content might include:

- fast tracking training around musculoskeletal injury prevention interventions, for example the use of vibration measurement as part of musculoskeletal risk evaluation
- specific training programmes to fast track nurses, occupational therapists or physiotherapists into Technical Membership with patient moving and handling expertise
- developing skills to carry out health system adverse event investigations.

This includes the potential need for development of higher levels of knowledge and consistent approaches for specialist areas of HFE application. Training may need to be sought internationally – for example, around health and safety by design processes, and musculoskeletal interventions. Linking with the Occupational Hygiene Society is indicated for vibration measurement/intervention topics, with this fitting alongside HFE expertise in addressing musculoskeletal harm risks. This might include specific sponsorship of NZ attendees to relevant international conferences and bringing in international trainers to provide local training.

Processes for identifying these needs must be developed, including mechanisms for determining the changing needs. This could be via an expert group incorporating HFESNZ PAB, demand-side industry input, and public sector HFE representatives, e.g. from WorkSafe, Health Boards etc.

(Priority 1 Initiative 7 and Priority 2 Initiative 10 are the Project Management components for each initiative).

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