DELIVERING WEB-BASED WORKFORCE TRAINING INTERVENTIONS: THE WWHIDE FRAMEWORK AND KEY CONSIDERATIONS FOR HEALTH RESEARCH.

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Abstract

The workplace is an important setting for raising awareness of public health issues and delivering interventions to promote health and wellbeing of working-age adults. The role of employers in supporting the physical and mental health of their employees is emphasised in national and international policy and guidelines. Web-based interventions are increasingly being used in occupational settings across a range of health areas for education and training, skills development, and behaviour change. These interventions may be targeted at employees, managers, or both, and have shown promise for effecting positive changes at an individual and organisational level. Here, we report a two-stage public engagement process in which we: (a) reflected on the design and implementation of 6 web-based interventions published between 2020-2023 as 'case studies', to generate a framework of key challenges and facilitators for contemporary web-based research, and (b) engaged in stakeholder consultation to discuss, refine, and agree key considerations.

The case studies were all digital workplace interventions, developed using collaborative-participatory design approaches and using Agile or ASPIRE methodologies. Cases 1 and 2 focus on workforce education and/or skills training. Case 1 is "Alcohol Prevention in Urgent and Emergency Care" (APUEC) training to increase positive attitudes, knowledge, confidence, and skills related to alcohol screening, brief intervention, and referral for treatment. Case 2 is "Mitigating the Psychological Impact of COVID-19 on Healthcare Workers", an e-package including evidence-based guidance, support and signposting relating to psychological wellbeing for healthcare employees. Cases 3 and 4 focus on the line manager education and/or skills training. Case 3 is "Managing Minds at Work" providing line managers with the skills to actively support mental health at work. Case 4 is the "Test@Work Digital Toolkit" providing guidance and support for employers around health checks and opt-in HIV testing in the workplace. Case 5, focused on health protection, is "Covid-19 Vaccine Education (CoVE)", aiming to support health and care professionals in promoting COVID-19 vaccination and booster vaccination uptake. Finally, Case 6, focused on the self-management of a chronic condition, is the "Pain-at-Work (PAW) Toolkit, aiming to increase knowledge about employee rights and how to access support for people living and working with chronic pain.

The stakeholder consultation (n=30) was conducted as part of a masterclass on 'Workplace Health' (n=18) and one-to-one approach (n=12) involving line managers, employees, healthcare professionals and health researchers. Our professional learning and public engagement activity raised key advantages and challenges of web-based interventions for training and health behaviour change. This activity generated the WWHIDE Framework (A Web-based Workforce Health Intervention Development and Evaluation Framework) which presents key considerations around the recruitment of employers and employees, intervention design and development, delivery modality, comparison groups for trials, intervention engagement, attrition rates, and user acceptance. These insights will inform the design of future health research studies involving web-based interventions for education, training, and behaviour change.

Keywords: Digital, Web-Based, Intervention, Training, Workforce.

1 INTRODUCTION

The workplace is an important venue for health protection, health promotion and the prevention and management of chronic conditions [1, 2]. In the UK, 75.7% of people aged 16-64 years are in employment [3], spending, on average, one third of their waking hours in the workplace [1]. The role of employers in supporting the physical and mental health of their employees is emphasised in national and international policy and guidelines [4-6].

Web-based interventions are increasingly used in workplace settings for the delivery of training, education, and skills development, to promote health behaviour change, and provide support for the management of chronic conditions. These interventions may be targeted at employees, managers, or both, and have shown promise for effecting positive changes at an individual and organisational level.

There are many advantages to web-based interventions – they have potential for wide geographical reach and are therefore highly scalable, and they are often low cost (compared to face-to-face interventions). Web-based interventions standardise content and offer flexibility for the end-user who can decide where, how, and when, their engagement with the intervention takes place. There are some challenges to the delivery of web-based interventions in the workplace setting, including recruitment challenges, variable access to the internet and devices on which to access the intervention, technical difficulties, low engagement with remote interventions, and high attrition from research studies evaluating web-based interventions.

2 METHODOLOGY

This was a two-stage public engagement process in which we: (a) reflected on the design and implementation of 6 web-based interventions published between 2020-2023 as 'case studies', to generate a framework of key challenges and facilitators for contemporary web-based research, and then (b) engaged in stakeholder consultation to discuss, refine, and agree on key considerations.

2.1 Case studies

The case studies were 6 digital (web-based) workplace interventions, published by Blake and colleagues between 2020 and 2023 [7-13]. The interventions were all developed using collaborative-participatory design approaches and either Agile or ASPIRE methodologies. The case studies are outlined in Table 1, including a description of the target end-users of the web-based intervention, the development methodology, the primary aim of the intervention and the topic area of focus.

2.2 Stakeholder engagement

Based on practical experiences of designing, implementing, and evaluating the web-based research interventions presented as cases, the lead author generated an initial framework of key challenges and facilitators for contemporary web-based research. A stakeholder consultation (n=30) was then undertaken in two parts.

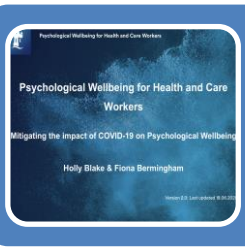
First, a masterclass on "Workplace Health" was delivered synchronously to 18 participants, by the lead author, a health psychologist with a research interest in digital interventions for health. Embedded within the masterclass was a one-hour consultation activity in which participants were organised into 6 groups of 3 people and invited to brainstorm the key advantages and challenges of web-based interventions. Participants were then presented with the initial framework and engaged in group discussions to refine it and agree on the final version.

A further 12 stakeholders were approached individually and engaged asynchronously in the same activity. The 30 stakeholders included line managers, employees, healthcare professionals and health researchers.

Table 1. Six web-based workplace interventions

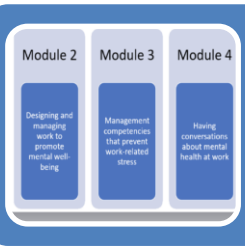
Case 1: Alcohol prevention in urgent and emergency care (APUEC)

- End-users: Healthcare workers
- Development methodology: ASPIRE
- Primary aim: Build knowledge, confidence and skills for screening, brief intervention and referral for treatment in UEC settings.
- Topic area: health promotion



Case 2: COVID-19 and mental health (MH e-package)

- End-users: Healthcare workers
- Development methodology: Agile
- Primary aim: Mitigate the psychological impact of COVID-19 and build skills for effective team working, creating psychologically safe working environments, accessing emotional and social support, and engaging in self-care.
- Topic area: mental health promotion



Case 3: Managing Minds at Work (MMW)

- End-users: Line managers
- Development methodology: Agile
- Primary aim: Build knowledge, confidence and skills relating to supporting and promoting mental health at work.
- Topic area: mental health promotion

Case 4: Test@Work Digital Toolkit (Test@Work)

- End-users: Line managers
- Development methodology: Agile
- Primary aim: Educate on employer responsibilities relating to employee health, workplace health checks and opt-in HIV screening in workplace settings.
- Topic area: health protection and health promotion

Case 5: Covid-19 Vaccine education (CoVE)

- End-users: Healthcare workers
- Development methodology: ASPIRE
- Primary aim: Increase understanding about the COVID-19 vaccine and support health and care professionals in promoting COVID-19 vaccination uptake.
- Topic area: health protection and health promotion

Case 6: Pain-at-Work Toolkit (PAW)

- End-users: Working adults
- Development methodology: Agile
- Primary aim: To increase knowledge about employee rights, how to access support for managing a painful chronic condition in the workplace, and lifestyle behaviors that facilitate the management of chronic pain.
- Topic area: self-management of chronic conditions and health promotion

3 RESULTS

As identified by our stakeholders, the key advantages, and challenges of web-based interventions for training and/or health behaviour change are outlined in Fig. 1.

Fig. 1. Advantages and challenges of web-based interventions

This project resulted in the WWHIDE Framework (A Web-based Workforce Health Intervention Development and Evaluation Framework). This framework provides a series of key questions to consider relating to the challenges and enablers of contemporary web-based research conducted in the workplace setting (see Table 2).

Table 2. The WWHIDE Framework: A Web-based Workforce Health Intervention Development and Evaluation Framework.

Framework components	Items for consideration
Intervention design and development	• Is this a needs-based intervention? Did the intervention arise from users' needs? Or address a gap identified by end-users? • Has there been patient and public engagement activity? Was the intervention developed with input from, or co-created with end-users and stakeholders? • Has content been externally peer reviewed? • What are the pre-determined dose parameters (e.g., duration, and frequency) of the intervention? • Is the intervention based on a Theory of Change? • Does the intervention have any theoretical underpinning? Is the intervention informed by theory or theories? (e.g., behaviour change theories, communications theory).

	• Is the intervention evidence-based? Is the content informed by relevant research? • Does the intervention content align with national and/or international guidelines and policies? • Does the intervention incorporate good pedagogical design practices? • Does the intervention incorporate other principles that inform content design (e.g., persuasive systems design, behaviour change principles)? • Does the intervention adhere to current accessibility guidelines? Is it inclusive for people with disabilities or barriers to learning? • What language is the intervention developed in? Is it available in other languages or formats? • What type of media does the intervention include? (e.g., brief text, images, multimedia, hyperlinks). • Are logos for the institutions that developed the intervention and funded its development visible to end-users to demonstrate credibility and trustworthiness? • Are those individuals and organisations who were involved in the development given appropriate credit (i.e., named within the web-based intervention?) • Are there strategies in place to maximise end-user engagement with the intervention? (e.g., flexibility for access, low technological skill requirement). • What approach is used to communicate information and/or behaviour change principles? (e.g., direct instruction, experiential learning). • Is the content perceived to be relevant by end-users? • Is the content and format acceptable to end-users?
Delivery modality	• Is the intervention stand-alone or designed to be used alongside another intervention or with support? • Is the web-based intervention adjunctive to another treatment? (i.e., to supplement face-to-face intervention or print materials). Or is another treatment modality adjunctive to the web-based intervention? (i.e., web-based supported by email, text, or telephone support). • If there is an adjunctive treatment, what is the purpose, duration, and frequency, and how will uptake and engagement be documented? (e.g., this may be to reinforce material, facilitate skill acquisition or initiate behaviour change, provide additional support, enhance motivation and engagement). • Who will deliver the intervention? Is it automated or does it involve support? (individual or group). • Is training required for the intervention delivery (or its use)? • How is the intervention accessed? • Is the web-based intervention opt-in or opt-out? • Is the adjunctive treatment modality (if relevant) opt-in or opt-out? • Is delivery of the web-based intervention synchronous or asynchronous? • Does the intervention cost anything to access? Will participants be paid to access it during the trial? • Can participants access the intervention in their workplace / during their working hours? • Is technical support available throughout the trial to resolve any arising technical issues?

	• Will participants be sent reminders to access and engage with the intervention? What will be the content, frequency and duration of reminders and how will this be determined? -
Intervention engagement	• What efforts will be made to maximise the engagement of end-users with the intervention? • How will intervention engagement be measured? • What are the defining active ingredients of the web-based intervention and/or any components of the intervention (to be able to discern intervention effects)? How will this be measured or explored? -
Research design	• How will the web-based intervention be evaluated? • Will the intervention be tested in a trial (feasibility, acceptability, effectiveness)? • For trials, what will the unit of randomisation be? Organisations or individual participants? Who will conduct randomisation? • Will control or comparison conditions be utilised? • What is the allocation ratio? Is there any blinding to group allocation? • Where relevant, are organisations and participants willing to be randomly allocated to groups? How will this be measured? • Where relevant, has the risk of contamination been minimised? How will this be achieved? • How is assessment of outcome being undertaken? Objective or subjective measures, paper-based or online? • Are outcome measures assessed independently of intervention delivery? • How will delivery of the intervention be implemented? • How will delivery of the intervention be monitored? • What are the inclusion and exclusion criteria? For both organisations and individual participants. • What are the target sectors and organisations? Are organisations small-to-medium sized enterprises, large organisations, or both? • Who are the target participants? What is their work status, occupation, work pattern? What information will be recorded? (e.g., age, gender, ethnicity, job role or job type). • Will settings and participants be heterogenous (through minimising exclusion/inclusion criteria) and if so, what information will be documented? • What data will be collected for participants and organisations? • How will data be collected (e.g., interviews, focus groups, surveys - paper-based or online)? • Is data self-reported and/or from organisational records? • Will there be any data captured on the cost-effectiveness of the intervention?
Comparison group	• If appropriate, what will the comparison group be? Does the comparison group have 'real-world' relevance? • Will the trial have "Reasonable treatment alternative intervention choices" (practical trial) • Or will be trial have "No-treatment or usual care comparison groups" (pragmatic trial) • Is there heterogeneity in the comparison group? How will this be documented or explored? (i.e., what is usual care?)

Recruitment of organisations to research involving web-based interventions	• In which geographical region(s) will recruitment take place? • How many organisations should be approached and/or recruited? Is a sample size calculation required? • What recruitment routes will be taken? Professional / business networks and bodies, local government, social media, print media, websites, charities. How will this be documented? • Who are the gatekeepers? Who provides consent on behalf of organisations? How will this information be recorded? • How will you recruit organisations? Who will approach them? • Who will determine whether organisations meet eligibility criteria? • Will recruitment of organisations be concurrent or rolling? • How and where will study information be communicated and how will consent be taken, and by whom? • Will non-responders be re-contacted? • How long will each organisation be in the study? • Will social marketing approaches be used to generate messages that appeal to groups that share specific characteristics? • How will anonymity (for organisations and employees) be highlighted? • How will potential discomfort with using technology be addressed to minimise technology-related barriers to take-up? • Can the benefits of web-based interventions be emphasised? • How will the researchers explain and detail the responsibilities of organisations and individuals (to help with informed decision-making)? • How will the researcher ensure credibility? (e.g., through relevant affiliation or endorsement). • How will the process of trials and randomisation be explained (i.e., to ensure perceptions of the 'offer' and 'result' are aligned).
Recruitment of employee participants to research involving web-based interventions	• How will end-users be reached? Directly or through employment settings? • How will you recruit participants? Is it opt-in or opt-out? Who will approach participants? • How many participants should be approached and/or recruited? Is a sample size calculation required? • Who will determine whether participants meet eligibility criteria? • Will recruitment of participants be concurrent or rolling? • How and where will study information be communicated and how will consent be taken, and by whom? • Will non-responders be re-contacted? • How long will each participant be in the study? • If study promotion occurs via employment settings, what marketing and messaging will occur? How will this be recorded? • How will recruitment of employees be managed? • Will end-users be representative of the population? • Is recruitment open, or limited to a known participant pool? Is it possible to calculate a response rate? Calculating the denominator can be challenging with open recruitment in real-world research.

	• What efforts will be made to address the digital divide? Differences in internet access, economics, and/or low computer literacy. • What efforts will be made to reach under-served employment settings and communities?
Outcomes and intended actions / behaviour change	• What participant outcomes will be measured, how, and over what timescale? • How will outcomes be measured at each time point? • What is positive change or action in this context? • Does the change or action impact others? How will the views or actions of others (towards the intervention and/or the participants' resulting behaviours or actions) be documented or measured? -
Attrition and retention	• What efforts will be made to minimise attrition and maximise retention? • What level of attrition is acceptable? This may relate to the intervention (e.g., accessing and engaging with the intervention), and research participation (e.g., completion of study outcome measures). • How will attrition be recorded? • Are there incentives or rewards for intervention participation and/or research participation/completion of outcome measures? Are incentives or rewards for individual participants, or host organisations?
User acceptance and satisfaction with intervention	• How is acceptance and satisfaction with the web-based intervention being measured? This relates to end-users, programme adopters (e.g., employers), healthcare providers (where relevant), policy makers. • Is the measurement or evaluation of acceptance informed by a theory or model? • Are there measures of technology adoption?
Routes to 'real-world' contexts and scale-up.	• How will routes to impact be explored? • Consider generalisability, implementation, cost-effectiveness, and social validity. -

4 CONCLUSIONS

This professional learning and public engagement activity identified key advantages and challenges of web-based interventions for training, health behaviour change and self-management of chronic conditions. This study generated the WWHIDE framework which presents key considerations for researchers who are designing, delivering, implementing, and evaluating web-based interventions in the workplace setting. Overarching areas for reflection include i) web-based intervention design, delivery modality, and engagement, ii) research design including comparison groups, iii) recruitment of organisations and participants to workplace interventions, iv) outcomes and intended actions, v) attrition and retention, vi) user acceptance and satisfaction, and vii) routes to 'real-world' contexts and scale-up. The WWHIDE framework can be used to inform future workplace research involving web-based interventions.

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