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Online training for substance misuse workers: A systematic review

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Abstract

Effective dissemination from researchers to clinicians can improve outcomes for people using substance misuse services by providing the knowledge and skills necessary to deliver best practice. The internet has the potential to facilitate quick, accurate and affordable learning on a large scale. However, the quality of online resources for substance misuse worker training is rarely evaluated. Aim: To review the available literature on the learning outcomes, qualitative descriptions and costs of online learning. Methods: The literature on online learning, staff training and substance misuse were reviewed following PRISMA guidelines. Findings: Sixteen articles were identified with large variation in study quality and design. Descriptions of online interventions were insufficient for replication or comparison. Good quality online training should meet the needs of substance misuse workers whilst acknowledging that these needs will differ according to worker and context. Conclusions: Published research into online learning for the substance misuse workforce should be sufficient in detail to enable replication and direct comparison. More qualitative research about the needs and preferences of the workforce using online learning would fill a notable gap in the literature.

Keywords: substance use; internet; workforce development; staff training; healthcare dissemination

Online training for substance misuse workers: A systematic review

Background

The internet continues to shape how information is shared, accessed and consumed by individuals both personally and professionally. Access to well-designed online resources has the potential to improve substance misuse workers' knowledge and adoption of evidence based treatments. Online methods present opportunities for information from research settings to be made available to large numbers of substance misuse workers, and for dissemination of such information to be cost-effective. In order to realise these opportunities, issues of quality assurance must be considered. Only then will it be possible to assess whether, how and for whom, online learning can be used to bridge the gap between research and treatment delivery.

Evidence shows that addiction treatment services do not always deliver best practice as described by research or clinical guidelines. Empirically supported treatments such as opiate substitute prescribing and contingency management (CM) when provided in the community are prone to suboptimal delivery and report diminished outcomes compared to research trials (Bell, Healey, Kennedy, Faizal, & Shah, 2013; Strang et al., 2010). An Advisory Council on the Misuse of Drugs (ACMD, a UK advisory board on drug policy) review of opioid replacement therapy in England found varying quality of treatment provision and suggested staff competency as a factor (ACMD, 2015). The ACMD also reported that CM, Behavioural Couples Therapy and Family Therapy, have not been widely implemented (ACMD, 2015) despite having the strongest evidence base of psychosocial treatments for substance dependence (NICE, 2007).

Staff competence, competence and role legitimacy affect implementation of best practice (Roche, Hotham, & Richmond, 2002). Effective training can improve implementation of treatments by improving knowledge, skills, attitudes and clinical practice. Training for substance misuse staff is traditionally provided in face-to-face workshop sessions (NTA, 2006; Henggeler, Chapman, Rowland, Sheidow, & Cunningham, 2013) and, while results vary across programmes, such training can change the knowledge, skills, attitudes and behaviours of workers (Ayu, Schellekens, Iskandar, Pinxten, & De Jong, 2015; Cook et al., 2008). By contrast, an inability to access good quality training can prevent staff from being able to deliver best practice treatments (Amodeo et al., 2011; Bartholomew, Joe, Rowan-Szal, & Simpson, 2007; Bride, Abraham, & Roman, 2010; Herbeck, Hser, & Teruya, 2008; Rieckmann, Farentinos, Tillotson, Kocarnik, & McCarty, 2011; Tuchman & Sarasohn, 2011). Challenges associated with face-to-face training include difficulties attending at the required training times and locations (The Mackinnon Partnership, 2010); that the effects of training can be varied and short-lived (Moyers et al., 2008; Walters, Matson, Baer, & Ziedonis, 2005); and that large scale training can be expensive (The Mackinnon Partnership, 2010).

Good quality training can help staff to deliver treatments, but is insufficient to ensure full implementation of best practice. Organisational factors including attitudes, readiness to change, available resources and capacity to change can also impede implementation (Hartzler, Jackson, Jones, Beadnell, & Calsyn, 2014; Rogers, 2010). The present study focuses on learning opportunities for substance misuse staff rather than on organisational factors, although the authors note that online learning may also be effective for addressing organisational barriers to dissemination; and that the area merits study.

Online learning describes educational activities that take place partly, or entirely over the internet (Means, Toyama, Murphy, Bakia, & Jones, 2009) and the term encompasses many activities and subjects. A meta-analysis of online learning in the healthcare professions found that learning outcomes, including skills, knowledge and behaviour change achieved in online learning were equal to those achieved in face-to-face learning, and were significantly better than no training (Cook et al., 2008). The same meta-analysis reported that some online learning courses were highly effective at improving skills, knowledge and behaviour, yet others achieved poor outcomes.

If online learning is to reach its potential, it is important to understand how it can be made most effective (Cook et al., 2008). However, determining what affects the quality of online learning is problematic because courses vary considerably in content (the subject being taught), format (the methods used to teach the content), target audience and academic level. A compounding factor is that few research papers on online learning in healthcare professions describe either the content or format in sufficient detail to identify specific elements that might improve quality (van Gemert-Pijnen et al., 2011).

Online learning has a number of practical advantages over face-to-face education. Firstly, once designed, online resources can be used by large numbers of people, making online learning cost-effective for large scale training (Carroll & Rounsaville, 2007; Covell, Margolies, Smith, Merrens, & Essock, 2011; Martino, 2010). Secondly, online resources can provide a range of different experiences for users according to their needs or preferences; a feature that is central to principles of interaction design (Cooper, Reimann, Cronin, & Noessel, 2014; Nielsen, 2003). A single online learning platform has the potential to meet the needs of people with different learning styles, abilities, preferences and contexts of use

(Carroll & Rounsaville, 2007; Johnson, 2001). Thirdly, online learning resources are flexible to use (Bryce, Choi, Landstrom, & LoChang, 2008) meaning that people can access learning at their place of work, at home, “on the go” (ONS, 2015), at their own pace and in their preferred sequence. Finally, online resources present research findings with an accuracy and fidelity that can be difficult to guarantee when using large numbers of training staff (Martino, 2010).

Online learning for substance misuse workers has the potential to improve the implementation of best practice, and to improve the outcomes of people accessing those services. Yet few studies describe how to optimise online learning resources. There are also few studies that identify in any detail the population (i.e. substance misuse workers) for whom such resources would be optimised. The present study aims to review the available literature on learning outcomes, qualitative descriptions and costs of online learning.

Methods:

A systematic literature search was performed following PRISMA (Preferred Reporting Items for Systematic reviews and Meta-analysis) guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009). Peer-reviewed journal articles published before 24th May 2016 were reviewed for inclusion. No articles were excluded due to their age because the authors considered inclusion to be limited by the existence of the internet. The study excluded conference, poster and meeting extracts because of quality concerns, and was limited to English language articles.

‘Training’ was defined as an activity intended to educate staff in order to improve or analyse the quality of service delivery (The Health Foundation, 2012). ‘Online’ was defined as training carried out on computers, tablets, SMART phones or other computerised systems

using the internet (Cook et al., 2008). The broader definition of “other computerised systems” was added to Cook and colleagues’ definition to enable future searches to include new technologies. Online training that disseminated information using only Word documents, email or PowerPoint presentations were excluded because their lack of interaction did not reflect the spirit or opportunities of online learning. This exclusion followed the methods used by Cook and colleagues (2008).

‘Substance misuse workers’ were defined as employees who work directly with addiction treatment service-users to aid recovery from drug and alcohol dependence. This focussed the search on people responsible for delivering treatments, rather than on managers, commissioners or people whose role is strategic.

The inclusion criteria were developed using PICOS (Moher et al., 2009) (Table 1). The participants, intervention and outcomes were defined; however, it was decided not to place limits on study design or comparators because of the ability of observational, qualitative and non-controlled studies to indicate how the quality of online learning might be improved.

Participants were identified as substance misuse workers. Studies were excluded where the content was addiction related, but where participants did not work in substance misuse treatment settings; for example, training for GPs, pharmacists or smoking cessation practitioners were excluded. The intervention was online training as defined above.

Outcomes for inclusion were changes in knowledge, skills attitudes or behaviour; qualitative data about learner experience and reported costs. The search was not restricted by location.

Opinion papers, summary or literature reviews discussing online learning without publishing new data from an online learning intervention were excluded.

[Insert table 1: Inclusion and exclusion criteria]

Search Strategy

The three elements of the search strategy were combined using Boolean operators as follows: “online learning” AND “staff training” AND “substance misuse”. The following databases were searched: CINAHL, Embase, ERIC, Medline, PsycINFO, PubMed, Scopus and Web of Science. The search was carried out on 24th May 2016.

Keywords for each search element were identified using peer-reviewed articles from each subject area. These keywords were collated to form the search strategy. Previously identified studies that met full inclusion criteria were used to validate the effectiveness of the search strategy. The full search strategy can be found in Appendix i.

Articles were collated and duplicates were removed. Titles were screened by the first author (RC), with abstracts screened by two authors (RC and TA). Full-text articles were accessed and screened by the same two reviewers. Reference lists from included articles were screened to identify relevant studies. Literature identified from reference lists were then screened by RC and TA.

The following data were extracted from all included studies by the first author using a data extraction form: study design; outcomes reporting change in knowledge, skill, attitude and behaviour; qualitative data reporting, participant experiences as well as identified barriers and facilitators to access; format; content; participant characteristics; and costs. These terms were defined, and are detailed in Appendix ii. The quality of studies was assessed using an eight-point scale by Jinks and colleagues (2011) previously used by Clark and colleagues (2014)

which can be used for both qualitative and quantitative studies. The scale rates the highest quality studies at eight and the lowest at zero.

Results

The search identified 9,552 publications which reduced to 6,837 after removing duplicates. Title screening eliminated 6,549 articles, leaving 293. Abstract screening reduced this to 48 studies for which full-text articles were accessed. Thirteen of these articles were admitted for inclusion. A further seven articles were identified by screening reference lists, of which three were admitted following full-text screening. A total of 16 articles were included (Figure 1).

[Insert figure 1: PRISMA Flowchart]

Study Characteristics

Eight studies were randomised controlled trials (RCTs). Five of these provided written manuals to a control group (Henggeler et al., 2013; Larson et al., 2013; Rawson et al., 2013; Sholomskas & Carroll, 2006; Sholomskas et al., 2005), two of the RCTs studied post-training support and offered no resources to the control group (Carpenter et al., 2012 Smith et al. 2012), and one study used a delayed training group as a control (Weingardt, Villafranca, & Levin, 2005). Of those studies that were not RCTs, one was a randomised trial comparing face-to-face and online training (Clancy & Taylor, 2016); two were randomised trials comparing different online training formats (Leykin, Cucciare, & Weingardt, 2011; Weingardt, Cucciare, Bellotti, & Lai, 2009); two were prototype, pilot or feasibility studies (Larson et al., 2009; Matejkowski, Dugosh, Clements, & Festinger, 2015); one was a cross-sectional survey of substance misuse staff (Aletraris, Shelton, & Roman, 2015); one was a longitudinal study of online learning (Shafer, Rhode, & Chong, 2004), and one was a

qualitative study reporting participant experiences of online learning (Curran et al., 2015). The 16 articles comprised 14 unique studies: two articles reported different outcomes from the same trial comparing different online training formats (Leykin, Cucciare, & Weingardt, 2011; Weingardt, Cucciare, Bellotti, & Lai, 2009) and two reported the same clinician feedback system comparing immediate online, with delayed postal assessment methods (Carpenter et al., 2012; Smith et al., 2012). Twelve trials were based in the US, one was in Australia (Clancy & Taylor, 2016) and one was in the Republic of South Africa (Rawson et al., 2013).

Fourteen studies reported changes in knowledge, skills, attitudes or behaviours (Table 2), three studies reported qualitative data on the participant experience (Table 3) and one study reported cost (Table 4).

[Insert Table 2: Summary articles reporting change in knowledge, skills attitudes or behaviour]

[Insert Table 3: Summary of articles reporting qualitative indicators]

[Insert Table 4: Summary of articles reporting cost]

Quality of included studies

The quality of studies was rated between five and seven out of a possible highest score of eight. There was considerable heterogeneity of study design and size. Four studies were large RCTs that used validated tools. The findings of the other RCTs were limited in their generalisability by having small numbers of participants, self-selected participants or by using participant self-report as an outcome measure.

No studies described the content or format of the online learning intervention in sufficient detail to enable replication. Curran and colleagues (2015) did, however, include a detailed overview of how the online learning was developed, and were also the most thorough in their description of its content and format. Two articles provided a link to the online platform that hosted their training (www.nidatoolbox.org) (Leykin et al., 2011; Weingardt et al., 2009). However, at the time of writing the website was not related to substance misuse or training. Many studies signposted source material such as treatment manuals, but did not detail the changes made in translating it to online learning. Some articles provided descriptions of format but none provided detailed descriptions of the number, type and blend of learning activities, the sequence in which they were completed, the platform through which they were accessed and the principles of learning theory or instructional design that were followed.

Participant Characteristics

Work role

The inclusion criteria for nine studies used participants' place of work (e.g. addiction treatment clinic) in order to identify them as substance misuse staff. Six studies identified participants as 'counsellors' or 'clinicians' without reference to their place of work. One study described participants as 'working with substance misuse patients in a criminal justice setting'. Articles did not describe the working contexts of participants in any detail.

Demographic Characteristics

Of the 13 studies reporting age, 8 reported an average age of between 35 and 44 (Carpenter et al., 2012; Henggeler, Chapman, Rowland, Sheidow, & Cunningham, 2013; Larson et al., 2013; Larson et al., 2009; Matejkowski, Dugosh, Clements, & Festinger, 2015; Rawson et al., 2013; Smith et al., 2012; Weingardt, Villafranca, & Levin, 2005), 4 studies reported an average age of between 45 and 54 (Leykin et al., 2011; Sholomskas & Carroll, 2006;

Sholomskas et al., 2005; Weingardt et al., 2009) with 1 reporting that most participants were aged between 35 and 55 (Shafer, Rhode, & Chong, 2004). In 11 of the 13 studies that reported ethnicity, the majority of participants were described by the study as “Caucasian” or “White”; in 2 studies the majority were described as “African American” (Carpenter et al., 2012; Smith et al., 2012). All studies reporting gender reported that the majority of participants were female; ranging from 54% to 82% of the sample. Most participants had an education level of post-graduate degree or above with those in this group representing between 40 and 77% of participant samples.

Reported Outcomes

Fourteen articles reported changes in knowledge, skills, attitude or behaviour compared to controls, face-to-face, delayed or “attentional” (irrelevant) training. One reported that face-to-face learning produced improved learning outcomes compared to online learning, but that this improvement was not significant (Clancy and Taylor, 2016). The difference appeared to be moderated by engagement with the course, with poorer outcomes attributed to online participants accessing fewer training sessions than the face-to-face group. Seven studies found no significant difference between face-to-face and online learning outcomes (Leykin et al., 2011; Rawson et al., 2013; Sholomskas & Carroll, 2006; Sholomskas et al., 2005; Smith et al., 2012; Weingardt et al., 2009; Weingardt et al., 2005). Six studies found that online learning produced better learning outcomes than a control group (Aletraris, Shelton, & Roman, 2015; Matejkowski et al., 2015; Shafer et al., 2004; Sholomskas & Carroll, 2006; Smith et al., 2012). One found no significant difference between online learning and a written manual (Larson et al., 2013).

Course content

Eight studies reported online learning for Cognitive Behavioural Therapy (CBT). Two of these found no significant differences in learning outcomes between online learning and face-to-face methods (Rawson et al., 2013; Weingardt et al., 2005). Sholomskas and colleagues (2005) found that seminar training and follow-up supervision of the type used in clinical trials achieved better learning outcomes than online learning; but that online learning was more effective than a written manual. They added that participants in the three research conditions were asked to complete the same number of training hours, however participants attending seminars completed 33hrs, those directed to a website completed 26hrs, and those given a manual completed 10hrs of training.

Two studies found no difference in learning outcomes between high and low fidelity versions of the same course. In these studies, the high fidelity version of the online course ensured that participants used the training in pre-determined order, whereas the low fidelity version allowed participants to select the order in which those same elements were used (Leykin et al., 2011; Weingardt et al., 2009). Although there were no differences in learning outcomes, the studies found that the low fidelity version reduced self-perceived ratings of stress and “burn-out” among participants. Larson and colleagues (2013) found no significant difference between online CBT training and a written CBT manual noting that neither method was sufficient for full implementation of CBT.

Four studies examined Motivational Interviewing (MI) training. Clancy and Taylor (2016) found poorer, learning outcomes for online training compared to face-to-face training, although this difference was not significant. They also found different levels of engagement, saying that out of a possible three sessions, people attended a mean of 1.38 sessions for

online learning compared to 2.1 sessions for face-to-face training. Shafer and colleagues (2004) found that knowledge and reflective listening skills were significantly improved after online learning compared to baseline, but that MI skills were not significantly increased. There was however a low number of participants, with just nine in the assessed part of the study. They also reported satisfaction ranging from 3.5 to 3.9 out of 5 (with 5 representing the greatest levels of satisfaction), and that video examples were “helpful” for 43% and that handouts were “helpful” for 21% of participants. Carpenter and colleagues (2012) found that the immediate feedback from online methods was more effective for clinicians without a graduate degree, whereas delayed postal feedback was more effective for people with a graduate degree. Smith and colleagues (2012) also studied immediate online feedback and delayed postal feedback and found that both online and postal feedback achieved better outcomes than no feedback.

Two studies examined online training in Contingency Management. Aletraris and colleagues (2015) measured counsellors’ perceptions of the acceptability and effectiveness of CM using a seven point scales. They found that people who had participated in online CM learning considered CM to be significantly more acceptable and effective as a treatment intervention than those who had not participated in online CM learning. Henggeler and colleagues (2013) found that online learning significantly improved knowledge compared to no training. They added that clinicians with more CM clients continued to improve their knowledge at a greater rate than those clinicians with fewer CM clients.

Sholomskas and Carroll (2006) studied online Twelve Step Facilitation (TSF) training and found that participants using online learning and a manual achieved significantly higher scores on five measures of TSF compared to those using a manual alone.

One pilot study on medication assisted therapy (Matejkowski et al., 2015) reported a significant increase in knowledge, attitudes and referral behaviour following online training when compared to “attention control training” noting however that those differences diminished at follow up.

Curran and colleagues’ qualitative study (2015) reported that training should meet counsellors’ needs and that vignettes were helpful only if they resonated with the learner’s experiences. They also reported that the course should fit around clinic schedules and that protected time helped staff access the training. Larson and colleagues (2009) reported that a third of participants had difficulty loading audio elements. They also reported that ten participants wanted more exercises; five wanted more graphics and four wanted more audio. Conversely, four participants wanted less audio.

Barriers to online learning such as technical, equipment, access, attitudinal or organisational were rarely reported. Larson and colleagues (2009) reported technical difficulties including problems with dial-up internet access. Shafer and colleagues (2004) reported that technical problems were identified by 34% as a possible reason for low use of the training. Curran and colleagues (2015) reported a lack of “protected time” from work as a barrier to using online training. The same study suggested that supervisor support and content relevance were facilitators to using the training.

Just one study (Rawson et al., 2013) reported the costs associated with the different forms of training. Their expenses figure included a proportion of the master trainer’s salary, hotel and mileage expenses for on-site visits and the costs of videoconferencing. It is not reported

whether differences in development costs were included. They reported that access to a manual for training cost \$145 per person ($n=45$), face-to-face training cost \$1,485 per person ($n=49$) and distance learning training cost \$768 per person ($n=49$).

Discussion

Despite the impact of substance misuse on society and the ability of online resources to disseminate large amounts of information, only 16 studies of online training for substance misuse workers were identified that examined changes in knowledge, skills, attitudes and behaviours, learners' experiences, or costs. With such a small number of studies it is difficult to draw definitive conclusions about the effectiveness of online learning for this population, or to describe how the quality of online learning might be ensured. The research reviewed in the present study does however support the findings of Cook and colleagues' meta-analysis (2008), that online learning can, in some circumstances, achieve outcomes that are comparable to face-to-face methods; and that outcomes from online learning are routinely better than those from control conditions which include written manuals, no training or delayed training.

The study also supports Cook and colleagues' findings that there is a wide range of quality in online learning. This, combined with the lack of detailed descriptions makes it difficult to discern whether differences in outcomes are due to online learning overall, or to the specific online learning modules studied. One study highlights these issues of quality. Sholomskas and colleagues (2005) reported better learning outcomes from face-to-face training, but was comparing online learning to the highly structured workshop training used in clinical trials. Such training is necessarily of high quality, but not universally available. Reviewed together,

the studies seem to compare online learning of indeterminate quality with face-to-face learning of indeterminate quality, making conclusions problematic.

The literature suggests that online learning can, in some circumstances, be effective for CBT, MI, CM, MAT and TSF training. This range of subjects suggests that online learning might not be limited to a particular content. Furthermore, there are indications that online learning can be used to develop specific therapeutic techniques, with one MI study reporting improved reflective listening following online training when compared to pre-training tests (Shafer et al., 2004). However, of the treatments recommended by NICE as having the strongest evidence base (CBT, CM, Behavioural Couples' Therapy and Family Therapy) just CBT and CM were represented in the present review. Although there are indications that knowledge, skills and behaviour change can be improved by using online learning, the findings of the present review are insufficient to draw universal conclusions about the effectiveness of online learning to aid dissemination of these and other therapies.

If more detailed descriptions of online learning were available, it might be possible to infer whether poorer outcomes reflected elements within the training (such as reliance on text, graphics or video). Two studies did report how changes in format can alter the learner's experience (Leykin et al., 2011; Weingardt et al., 2009), and suggested that flexible online learning can lower self-perceived stress and burnout among staff. Leykin and colleagues (2011) linked this seemingly anomalous finding to evidence on a positive association between highly structured management practices, emotional exhaustion and staff turnover. These particular studies also highlighted that it is possible to draw conclusions when studying two controlled and comparable online learning interventions. In commercial settings, "A/B split testing" is used to test the effects of subtle changes to large websites (Dixon, Enos, &

Brodmerkle, 2011; Nielsen, 2005) by creating two versions of the same website and comparing outcomes. More research of this type would help identify ways to improve the quality of online learning.

The problem of adequately describing online (or face-to-face) learning is one that hinders progress in the field. The requirements of research publishing necessitate abridged summaries of content and format, yet in order to build on existing knowledge replication and comparison between studies is vital. Furthermore, research indicates that even differences in small elements such as brightness of display, font style and font size can aid or hinder engagement and comprehension (Chan & Lee, 2005; Shen, Shieh, Chao, & Lee, 2009). There were two attempts, both by Weingardt and colleagues (2005, 2009), to direct the reader to the full online learning course being studied which might have solved this problem. However, the website in question had expired since publication of the article, a situation that points to other technical and administrative problems associated with online technology. For progress to be made in online learning, research reports must include sufficient detail to enable exact replication of online learning, as if it were a medical intervention. Alternatively, research reports might be encouraged to report robust testing of discrete elements of online learning. For example, a report finding that an online learning package in CBT is effective might not enhance knowledge as much as one that reports improved learning outcomes from a greater (or lesser) reliance on text.

There is little detailed understanding of the substance misuse workforce's characteristics or learning experiences in the literature. The qualitative studies reported elements that were popular such as vignettes, graphics, audio and text, noting the value of participants being able to relate to the material. Sholomskas and colleagues (2005) reported that participants directed

to a website used it for 26hrs, compared to 10hrs for the written manual group and 33hrs for the seminar group. Hence, differences in learning outcomes may be a result of the levels of exposure rather than the nature of the training. Measures such as enabling participants to stop and start the module, are aimed to help participants perceive the learning as useful and easy to use. The technology acceptance model suggests that if a resource is not considered useful or easy to use, then it is less likely to be used (Venkatesh & Davis, 2000) making such adjustments important for increasing engagement with online learning, and potentially increasing exposure and subsequent learning outcomes.

Principles of user-centred design emphasise researching the range of characteristics and needs of “end users” when designing online resources (Cooper et al., 2014; Nielsen, 2003; Williams, 2009). This importance is underlined by Smith and colleagues (2012) finding that graduate and non-graduate learners benefitted from different types of training (Smith et al., 2012). If online learning is to optimise any potential it might have (Carroll & Rounsaville, 2007; Johnson, 2001), then the learning styles, needs and preferences of those using it must be identified. None of the reviewed literature provided a detailed description of participants’ needs and working contexts. If an understanding of online learning experiences is to be developed, then more qualitative data are required. These data, combined with quantitative research would make a strong contribution to the field by qualitatively identifying important elements before quantitatively trialling them using A/B split testing.

Only one study published the costs associated with different forms of education (Rawson et al., 2013). The costs of online learning for a group of 49, were approximately half those of the face-to-face training. This indicates that online learning might be considerably less expensive, and could therefore achieve a wider impact when working with limited resources.

Whilst this is based on the costs of just one study it is in keeping with literature about online learning in other settings (Carroll & Rounsaville, 2007).

Limitations

The present study has a number of limitations. Restricting the search to English language papers may mean that relevant papers published in non-English languages have been missed. Another limitation is that the grey literature was not searched. However, an emphasis for this review is on dissemination from research settings to treatment, so the authors felt that this exclusion was appropriate.

The reviewed studies were so different in design that the ability to compare outcomes was also limited. Accordingly, the review was unable to draw conclusions about the effectiveness of online learning for substance misuse workers. A meta-analysis of studies was also not possible. A further limitation came from the international nature of the included studies. The working contexts, duties, regulations and systems that staff work in will vary making findings difficult to compare. Most of the studies were from the US which may limit how transferrable the findings are for other countries.

Conclusions

There are few studies of online learning for the substance misuse workforce and there is little conformity of methods and study design. Furthermore, much of the online learning reviewed seems to have been designed for an end user about whom there is very little knowledge.

Accordingly, few conclusions can be drawn regarding what works, who it works for and how improvements in online learning for substance misuse workers may be accomplished. There remains an under explored potential for online learning to improve economies of scale, fidelity of dissemination and personalised learning. Commercial websites rely on large

amounts of research and data analysis to understand how their users can better search for, access and consume information (Reimer, et al., 2015). Yet in the field of healthcare, research that would build the foundation of such a success is scarce and uncoordinated. To understand and implement effective online learning for substance misuse workers, it will be necessary to build an evidence base that describes online learning interventions in detail, describes the substance misuse workforce in detail, and that tests specific elements of online learning using controlled research methods.

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Declaration of interest statement / Disclosure statement

The Authors report no conflicts of interest

Author Biographies

Mr Robert Calder

Robert Calder is an experienced substance misuse and mental health worker and manager. He was awarded the prize studentship from the IoPPN for a PhD studying how online learning can be optimised to increase knowledge of and engagement with research findings among front line substance misuse staff.

Mr Tom Ainscough

Thomas Ainscough is a third year PhD student working under the supervision of Professor Ann McNeil, Dr Leonie Brose and Professor Sir John Strang. His doctoral research focuses on the development of a CM intervention for tobacco smoking in methadone maintained opiate addicts.

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Dr Kimergård is a Postdoctoral Research Associate at the National Addiction Centre, Institute of Psychiatry, Psychology & Neuroscience, King's College London (UK). He is part of the CLAHRC South London alcohol research team where he is the day-to-day coordinator of the assertive outreach treatment for alcohol related admissions trial (AAOT). Andreas has expertise in health service implementation and evaluation, drug-related health problems, including blood borne virus transfer amongst injecting drug users, drug and health policy research, such as prevention and harm reduction, and the illicit drug market, including on the Internet. Research interests cover a range of substances, including misused medicines, new

psychoactive substances, controlled drugs, alcohol, and human enhancement drugs. Andreas completed his PhD in Medicine at Aarhus University (Denmark). He is also a Visiting Lecture at the Public Health Institute, Liverpool John Moores University (UK).

Dr Kyle Dyer

Dr Dyer is Director of Distance Learning Programmes at the Institute of Psychiatry, Psychology & Neuroscience (IoPPN; Kings College London), and is responsible for supporting the development of technology enhanced learning, and distance learning programmes within the IoPPN, including the organisation, management and delivery of distance learning programmes and MOOCS. He joined the IoPPN in 2011 as a Senior Lecturer and Departmental Lead for Addiction Education. Until 2015 he developed and coordinated the MSc in Addiction Studies and the MSc in International Addiction Studies. In 2014 he developed the Massive Open Online Course (MOOC) 'Understanding Drugs and Addiction', which has now attracted over 34000 learners.

He has extensive experience in higher education, workforce development and instructional design. He received an Excellence in Teaching Awards from the University of Western Australia (2006), Most Innovative Teacher Award at the IoPPN (2014) and was nominated for a Kings Award (Kings College London) for enhancing the Student Experience in 2012 & 2015. He has received a National Australian Drug & Alcohol Award: Excellence in Treatment for establishing the East Perth Neuropsychology Clinic.

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Appendix i - Search Strategy

Keywords used to identify staff training were “clinical supervision”, “diffusion”, “dissemination”, “ education”, “training”, “healthcare”, “education”, “healthcare training”, “implementation”, “implementation science”, “informational training”, “learning”, “learning transfer system”, “medical education”, “nursing education”, “organisational change”, “training design”, “training evaluation”, “training programme”, “transfer of training”, “vocational education”, “work-domain knowledge”, “workplace training”, “continuous professional development”, “CPD”, “work force development”, and “staff training”.

Keywords used to identify online learning were “online”, “internet”, “computer-assisted”, “computer-assisted instruction”, “distance learning”, “blended learning”, “e-learning”, “web-based”, “information technology”, “user-computer interface”, “interaction design”, “technology enhanced learning”, and “TEL”.

Keywords used to identify substance misuse were “addiction”, “addiction treatment”, “alcohol other drug”, “aod”, “community based substance misuse treatment”, “drug abuse treatment”, “substance abuse” and “substance disorder”.

Appendix ii – Definition of Terms for Data Extraction

Item	Definition	Examples found in the present study
Study design	The overall methods and methodology used by the study	Case study Cross-sectional study Longitudinal study Randomised controlled trial Randomised trial (not controlled) Qualitative study
Study outcomes	Primary outcomes measured to meet the study aims.	Changes in behaviour Changes in knowledge levels Change in skills levels Levels of staff “burnout”
Content of online training	The online learning subject matter	Cognitive Behavioural Therapy Contingency Management Motivational interviewing
Format of online training	The methods used in the online learning resource to present the content	Animations Case studies Small vignettes Teleconferencing Videos
Participant characteristics	Descriptions of the participants involved in the study	Demographic characteristics Educational levels Working context
Participant experiences of using online training	Any feedback from participants relating to their use of the online learning resource.	Problems loading materials Preferred learning methods Satisfaction levels Time spend using the resource
Costs	Any information about costs associated with providing any training reported in the study	Overall cost
Barriers to using online training	Anything that prevented people from using the online resources.	Lack of “protected time” Poor access to computers Poor access to the internet
Facilitators to using online training	Anything that made it easier to use the online resources	Managerial support Small segments of learning Learning relevant to participants’ jobs

Table 1 Inclusion and exclusion criteria

Inclusion Criteria	
i.	Report on training that used interactive online technology
ii.	Report on training where end users were substance misuse workers
iii.	Report on a specific online training course or module
iv.	Report learning outcomes: knowledge, skills, attitude or behaviour change, qualitative descriptions of learner experiences, or costs of online learning

Exclusion Criteria	
i.	Online training for smoking cessation workers
ii.	Foreign language studies
iii.	Online training for people who were not primary substance misuse workers
iv.	Studies that do not report a specific online training course or module accurately
v.	Online training where the content was limited to e-mail, word documents or PowerPoint slides.

Table 2: Summary of articles reporting change in knowledge, skills attitudes or behaviour

Study	Study type	Participants	<i>n</i>	Programme description	Outcome measures	Limitations	Q.I
Carpenter et al., (2012)	RCT of training follow-up methods in MI	Clinicians working directly with addiction in the US	58	MI: Clinicians complete face-to-face MI sessions with actors and receive real-time feedback through an earpiece using internet to link with the trainer. This was compared to videotaped sessions that were sent for feedback by post.	Clinician characteristics Motivational Interviewing Treatment Integrity	Relatively small sample and little description of content	7
Clancy and Taylor (2016)	Randomised trial of online and face-to-face follow-up from MI training.	Clinicians working in mental health and addiction services in Australia	63	MI: The online training comprised video lectures, written material and “internet resources”. Three sessions of 90 minutes each. This was compared to three 90-minute face-to-face sessions following an identical curriculum.	Engagement in follow-up sessions Motivational Interviewing Knowledge, Confidence, Attitudes and Practices scale	No control group. Relatively small sample. Not all participants were addiction practitioners	7
Henggeler, et al., (2013)	RCT of computer assisted and workshop methods of follow-up CM training	Staff in US public sector addiction treatment organisations	161	CM: Content was based on the CM manual and divided over seven modules. Format included video examples, printable PDFs, description of tasks, troubleshooting tips, suggestions for engaging families and extensive examples and scripts. It was developed using the criterion based development model using clinical and educational experts and was modified following end-user feedback.	Demographic characteristics CM use CM knowledge CM Implementation	Compared web-based training with no training rather than with equivalent workshop training.	6
Larson, et al., (2013)	RCT of a web-based course in CBT compared to written manual	US counsellors with an addiction qualification	127	CBT: Format was 30 short screens that included online exercises, questions with feedback, audio vignettes, dialogue of a role played scenario and online assessment.	Demographic characteristics Application of eight counselling skills assessed in videotaped sessions.	Little description of content and format of online training	7

Study	Study type	Participants	<i>n</i>	Programme description	Outcome measures	Limitations	Q.I
Leykin et al., (2011)	Randomised trial rigid and flexible online training in CBT	US addiction counsellors interested in CBT training	149	CBT: The article directs readers to www.nidatoolbox.org to view the content (which can no longer be accessed there). Participants on the flexible condition were able to choose the order of topics and nature of discussions. The rigid condition pre-determined these elements.	Demographic characteristics, Work training and experience Preferred clinical practices Burn-out	No control group. Limited description of the content due to the web resource expiring.	7
Rawson et al., (2013)	Longitudinal RCT of in-person and distance learning for CBT	Addiction clinicians in the Republic of South Africa	143	CBT: The in-person arm of the trial comprised a three-day conference followed by six bi-weekly supervision sessions. The online arm comprised the same three day materials accessed over televised, interactive instructional platform with telephone call follow-up supervision.	Use of CBT Techniques CBT Knowledge CBT Skills Costs of training delivery	Little description of content and format	7
Sholomskas et al., (2005)	RCT of website, and seminar training in CBT	US addiction clinicians	78	CBT: Based on the CBT Manual the training included quizzes, feedback, virtual role play and clinical vignettes. Training linked to the manual (control) and to the eight session topics within.	Assessed CBT techniques CBT knowledge of theory and technique	Little description of the format or content of training	7
Sholomskas and Carroll, (2006)	RCT of computer assisted training (CAT) in 12 step facilitation	US community based addiction clinicians	25	Twelve Step Facilitation (TSF): Based on the TSF manual and structured in to six modules. Included vignettes, interactive tasks, multiple choice questions, “matching” activities and “fill in the blank” questions.	Demonstration of key 12-step techniques	Small sample size	6
Weingardt et al., (2005)	RCT of workshop and web-based training in CBT	US addiction counsellors	166	CBT: A “Coping with Craving” module from www.nidatoolbox.org (content no longer available) that lasted 60 minutes. This was compared to a 60-minute face-to-face training workshop delivered at the same time.	Demographic characteristics Work experience Education level Existing familiarity with CBT “Coping with Craving” knowledge	Little description of content and format	7

Study	Study type	Participants	<i>n</i>	Programme description	Outcome measures	Limitations	Q.I
Smith et al., (2012)	RCT of live teleconference and postal MI supervision	US addiction clinicians in the clinical trials network	97	MI: Clinicians complete face-to-face MI sessions with actors and receive real-time feedback through an earpiece using internet to link with the trainer. This was compared to videotaped sessions that were sent for feedback by post.	Motivational Interviewing Treatment Integrity (MITI)	Training conditions were so different that attributing difference is problematic.	7
Aletraris, et al., (2015)	Cross sectional survey assessing the impact of CM training	Addiction treatment workers in the US	731	CM: The format includes videos featuring top researchers and clinicians. It covered the history and principles of CM demonstrating its effectiveness through video demonstration.	Demographic characteristics Counsellor acceptability of CM Perceived effectiveness of CM Perceived effect of CM on client-counsellor relationship, treatment attendance and abstinence.	Little description of format. Online training not the focus of the original research	5
Matejkowski et al., (2015)	Pilot testing of online training in medication-assisted treatment	US criminal justice addiction referrers or decision makers	70	Medication Assisted Treatment (MAT): The online training was under 2hrs, "easy to use" for people with limited computer experience, gave feedback on assessments. It contained quizzes audio, animation, and hyperlinks to external information and was developed in consultation with treatment experts.	MAT Knowledge MAT Attitudes Willingness to refer	Low response rate so sample not necessarily representative. Prototype study.	6
Shafer et al., (2004)	Longitudinal study of online training in MI	US behavioural health professionals	23 <i>(full data available for 9)</i>	MI: Five video workshops (telecasts) delivered monthly. Each three hours long containing lecture, demonstrations, small group activities and homework assignments.	Demographic characteristics MI principles and knowledge MI Skills Understanding of substance abuse Readiness to Change	Small sample size	7

Study	Study type	Participants	<i>n</i>	Programme description	Outcome measures	Limitations	Q.I
Weingardt et al., (2009)	Pilot randomised trial comparing rigid and flexible online training in CBT	US addiction counsellors	147	CBT: Participants on the flexible condition were able to choose the order of topics and nature of discussions. The rigid condition pre-determined these elements. The course was “media rich” and covered eight topics in the CBT manual. It included vignettes, video role plays, graphics, and animated sequences. No longer available at www.nidatoolbox.org	CBT Knowledge CBT Self-efficacy Job Burnout	No control group. Content no longer available because of expired web resource	7

Q.I – Quality indicator; CM = Contingency Management; MI = Motivational Interviewing; RCT = Randomised Controlled Trial; SACCP = Substance Abuse Counselling Certificate Programme; CBT = Cognitive Behavioural Therapy; EMCDDA = European Monitoring Centre for Drugs and Drug Addiction

Table 3: Summary of articles reporting qualitative indicators

Study	Study type	Participants	<i>n</i>	Programme Description	Main Themes	Limitations	Q.I
Curran, et al., (2015)	Qualitative study using interviews and focus groups to aid development of online CBT training	US addiction counsellors from seven clinics	8	CBT for depression: Three modules totalling 16hrs of online learning. They included interactive exercises, video vignettes of patients, groups and counsellors, and exam questions throughout.	Feedback suggested that adjusting training content to the counsellors' needs was important. Some vignettes did not resonate with the counsellors' experiences so were less helpful. It was important for learners to be able to pause and re-start the course without losing work. It was important for course section length and timing to fit in with clinic schedules. A lack of protected time was a barrier and supervisor support was a facilitator to accessing training. Some participants reported technical problems such as videos loading slowly or not at all. Participants reported trying to find "workarounds" to technical problems rather than contacting support. Participants were more motivated if they felt that the training content was within their scope of practice.	Qualitative study with a small sample	6

Study	Study type	Participants	<i>n</i>	Programme Description	Main Themes	Limitations	Q.I
Larson, et al., (2009)	Prototype study of a CBT web course	Counsellors with over two years' experience of working with substance misuse clients in the US	22	The prototype module was developed using material from NIDA CBT Manual and other research resources. It contained "drag and drop" games, interactive questions, client handouts, written exercises, offline assignment, audio segments, graphics and a quiz.	One third of participants had difficulty with dial-up connection. Over half of participants, took over 45 minutes to complete the 27-screen module although it took under 35 minutes for 17% of counsellors. Ten did so in one sitting, nine in two sittings, and three in more than two sittings. Ten participants wanted more exercises, five wanted more graphics, and four wanted more audio. At the same time, four wanted less audio, and four wanted less text material.	Small sample with self-selected participants.	7
Shafer et al., (2004)	Longitudinal study of workshop training in MI delivered over the internet.	Behavioural health professionals in the US	23 <i>(full data available for 9)</i>	MI: Five video workshops (telecasts) delivered monthly. Each three hours long containing lecture, demonstrations, small group activities and homework assignments.	Video examples of MI were seen as the most helpful element. The question and answer elements were seen as least helpful. A third of participants thought that technical difficulties had affected attendance on the course. Satisfaction varied from 3/5 to 3.9 (on a 5-point scale) for the telecasts.	Small sample size	7

Q.I – Quality indicator; CM = Contingency Management; MI = Motivational Interviewing; RCT = Randomised Controlled Trial; SACCP = Substance Abuse Counselling Certificate Programme; CBT = Cognitive Behavioural Therapy; EMCDDA = European Monitoring Centre for Drugs and Drug Addiction

Table 4: Summary of articles reporting cost

Study	Study type	Participants	<i>n</i>	Programme Description	Reported costs	Limitations	Q.I
Rawson et al., (2013)	Longitudinal RCT of in-person and distance learning for CBT	Current practicing addiction clinicians in the Republic of South Africa	143	CBT: The in-person arm of the trial comprised a three-day conference followed by six bi- weekly supervision sessions. The online arm comprised the same three day materials accessed over televised, interactive instructional platform with telephone call follow-up supervision. Control was by providing a manual with 2hr orientation.	Costs were reported in total and per person (<i>pp</i>): Control = \$6,522 (<i>pp</i> \$145); Distance = \$37,648 (<i>pp</i> \$768); Face-to-face = \$72,791 (<i>pp</i> \$1485)	Little description of content and format	7

Q.I – Quality indicator; CM = Contingency Management; MI = Motivational Interviewing; RCT = Randomised Controlled Trial; SACCP = Substance Abuse Counselling Certificate Programme; CBT = Cognitive

Behavioural Therapy; EMCDDA = European Monitoring Centre for Drugs and Drug Addiction

Figure 1: PRISMA Flowchart

