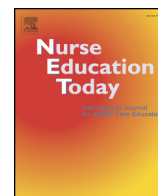




ELSEVIER

Contents lists available at [ScienceDirect](http://ScienceDirect.com)

Nurse Education Today

journal homepage: www.elsevier.com/nedt

Translating research into practice: Evaluation of an e-learning resource for health care professionals to provide nutrition advice and support for cancer survivors

Jane Murphy ^{a,*}, Louise Worswick ^b, Andy Pulman ^a, Grainne Ford ^c, Jaana Jeffery ^a

^a School of Health & Social Care, Royal London House, Bournemouth University, Christchurch Road, Bournemouth BH1 3LT, United Kingdom

^b School of Health & Social Care, Bournemouth House, Christchurch Road, Bournemouth BH1 3LH, United Kingdom

^c Dietetics Service, Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust, Castle Lane East, Bournemouth BH7 7DW, United Kingdom

ARTICLE INFO

Article history:

Received 13 November 2013

Received in revised form 4 April 2014

Accepted 21 May 2014

Available online xxxx

Keywords:

Nutrition

Cancer

e-Learning

Tablets and iPad

On-line

Innovation

SUMMARY

Background: Nurses and other allied health professionals are in a key position to provide appropriate and consistent advice on nutritional issues to support cancer survivors. However gaps in their nutrition knowledge and education warrant the need for enhanced learning as part of their Continued Professional Development (CPD). In the UK there are currently no formally recognised nutrition education programmes. Therefore e-learning offers a solution to provide flexible learning to target this need.

Aims: This study aimed to develop and evaluate the efficacy of a freely available, internet-based learning resource, for nurses and allied health professionals who provide nutrition, diet and lifestyle advice for cancer survivors. It sought to explore the attitudes and conceptions of the resource and current knowledge base of those involved in the care pathway for cancer survivors.

Method: The design and development of the e-learning resource were informed by the best available research and policy evidence and in a format to facilitate on-line learning. A robust evaluation strategy incorporated focus groups and telephone interviews to gain in depth insights into the experiences of using the resource.

Results: Themes included 'Plugging a Gap' which shows an improved knowledge base for nutrition. Information was 'All in One Place' showing that the resource was valued as being within a 'trusted' organisation. 'Everyone Benefits' illustrates how learners felt that the resource provided them with an evidence base, whilst the 'Current and Live' theme captured how professionals felt about the information being up-to-date.

Conclusions: The project has shown the benefits of interprofessional working to develop an e-learning resource for Health Care Professionals to support cancer survivors in following healthier lifestyles. Positive attitudes and potential improvements in the knowledge base and changes for professional practice were demonstrated. Further research is required to gauge sustained impact in the work environment by embedding the resource as part of CPD.

© 2014 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-SA license (<http://creativecommons.org/licenses/by-nc-sa/3.0/>).

Introduction

In health and social care, nurses and other health care practitioners (HCPs) may be called upon to provide nutritional advice, yet nutrition education has not been an important component of the training of HCPs for the past 50 years (Richards, 2009; Ettienne-Gittens et al., 2012). It is perhaps not surprising that surveys of HCPs show inadequacies in both their education and knowledge about nutrition (Murphy and Girot, 2013). Notably serious knowledge gaps about aspects of nutrition,

diet and physical activity in cancer care and for secondary prevention of cancer have been shown (Hodge, 2008; Anderson et al., 2010). There is an increasing body of evidence that a healthy diet, weight management and increased physical activity can improve cancer survival (Davies et al., 2011; Parekh et al., 2012). Therefore it is crucial that HCPs are able to provide appropriate and consistent advice on nutritional issues, physical activity and weight management and to know when to refer on cancer survivors for specialist support. To meet this demand, HCPs require enhanced learning as part of Continued Professional Development (CPD) regarding nutrition, diet and other lifestyle behaviours to understand the evidence base and be able to transfer their learning into practice. Accessing educational opportunities at work is important as research has shown career development and the availability of lifelong learning opportunities to influence nurses' job satisfaction (Hayes et al., 2010).

* Corresponding author.

E-mail addresses: jmurphy@bournemouth.ac.uk (J. Murphy),

lworswick@bournemouth.ac.uk (L. Worswick), apulman@bournemouth.ac.uk

(A. Pulman), grainne.ford@rbch.nhs.uk (G. Ford), jjeffery@bournemouth.ac.uk (J. Jeffery).

Consideration needs to be given to the form of the delivery platform for CPD and the extent to which this might influence and impact upon the learning experience and its outcomes. This paper examines the extent to which HCPs experience enhanced learning technologies with a focus on e-learning to improve the provision of nutrition and lifestyle advice for cancer survivors as part of professional practice.

Background

In the UK there are currently no formally recognised training programmes specifically covering nutrition education and training for health professionals involved in the care of cancer survivors. The challenge remains about how to deliver nutrition education and training for health professionals given the ever increasing challenges to balance work responsibilities against commitments for lifelong learning and career advancement through CPD (Bradwell, 2009; Jones and Sclater, 2010; Carter and Tourangeau, 2012). Moreover continued education in health traditionally usually occurs through workshops and conferences rather than at the workplace and can be costly, time-consuming and is often an inconvenient fit with work commitments (Schardt et al., 2002). Whilst short courses have been recognised as appropriate for providing new skills (Wilson, 2007), innovative educational strategies to deliver high quality learning have the potential to overcome these issues. As such web-based education offers an ideal solution to provide flexible learning for nutritional training and education (Brug et al., 2003; Schmitt, 2004).

Web-based distance learning in medical and nursing education has been advocated for some time (Cook et al., 2008; Du et al., 2013) and is an attractive platform for continued education for HCPs (Santerre, 2005). It offers many advantages for the learner, as course material can be accessed without geographical boundaries (Penny, 2011) which suits the learner, can be revisited at any time and is convenient and flexible. Materials can be presented in an attractive, visually stimulating style to engage the learner, encouraging them to become active seekers of knowledge and the contact time with them can result in exploiting the potential to learn (Santerre, 2005). Online resources can support different learning styles, enhance learning and allow for self-paced learning (JISC, 2004; Ellis and Calvo, 2006; Penny, 2011). On the negative side from a communication perspective, the experiences that Atack (2003) noted included students not being able to quickly and simply exchange information and the opportunity to clarify and validate learning with others. Other themes included students studying at home either because they chose to or, as a result of the problems surrounding attempted study at work and a problem with recognition of web-based learning at work by management (Atack, 2003). Other barriers reported include poor information literacy resulting in inappropriate operation of web learning (Lu et al., 2009) and feeling isolated in web-based education (Adams and Timmins, 2006). Some learners experience difficulties learning new sets of concepts simultaneously, such as web-based learning and nutrition and lifestyle knowledge (Kay, 2011).

There have been relatively few studies that have specifically explored and evaluated web-based general nutrition education for HCPs (Cohen et al., 2011; McCullough and Micklewright, 2011; Valsamidis and Kontogiannis, 2011; Ada, 2013; Lenders et al., 2013). Therefore an e-learning platform could offer an ideal solution to provide flexible learning for nutrition training and education specifically for HCPs to provide nutrition advice and support for cancer survivors.

Study aim

The aim of this project was to develop and evaluate the efficacy of a freely available, internet-based learning resource, innovative in its design for HCPs who provide nutrition, diet and lifestyle advice for cancer survivors. It sought to explore the attitudes and conceptions towards

the resource and the current knowledge base of those involved in the care pathway for cancer survivors.

Methods and materials

Design and development of the e-learning resource

The evidence base for the design and content of the e-learning tool was drawn from the core curriculum for Nutrition in the Education of Health Professionals (Department of Health, 1994) and current guidelines for nutrition and physical activity for cancer survivorship (World Cancer Research Fund/American Institute for Cancer Research, 2007). The resource consisted of four sections – a test of existing knowledge, core principles of human nutrition, advising cancer survivors about nutrition and eating well. This was followed by a retest of knowledge to evaluate learning – including the provision of feedback (Cooner and Rainger, 2009). The resource was informed by the development teams' previous work in designing innovative online health resources (Pulman et al., 2009, 2010, 2012). Design of the resource was undertaken in collaboration with Registered Dietitians from local and regional teams who had expertise in delivering evidence-based nutrition advice in practice with cancer survivors. Sub-sections were created as short, succinct pages which supported the development of conceptual learning and were combined with video clips, animated drawings, areas for reflection and links to useful or informative web resources (JISC, 2004). For online usage, the original material needed to be reformatted and substantially altered from the more linear style of traditional writing into a format which allowed users to read and digest it more quickly and easily (Nielsen, 2000). The technique of *Chunking* was utilised (Becta, 2002). Although *Chunking* concentrates on maximising a learner's ability to absorb information, the approach also lends itself to producing clear and easy to follow information.

Implementation of the e-learning resource

In the first instance we undertook some preliminary work to test the design and content of a prototype version of the e-learning resource with a group of practice nurses (n = 8), registered dietitians (n = 2), a general practitioner and service user. Their comments and feedback were then used to inform further modifications to the resource. Subsequently, the e-learning resource was commissioned by a national cancer charity and modified to a style and format that could be accessed within the learning section of their website (Macmillan Cancer Support Learn Zone, 2014).

Evaluation of the e-learning resource

Convenience and snowball sampling were employed to identify suitable HCPs who would be interested in accessing the resource including a regional cancer network and other clinical and dietetic networks. Over the duration of the evaluation, access to the resource was enabled using an enrolment key and instructions were provided. Following a minimum period of a month's engagement with the resource, individuals known to have interacted with the resource (contact details supplied during enrolment) were invited to attend a focus group discussion.

There were 43 participants for the focus groups including practice nurses, cancer nurse specialists, exercise professionals, GPs, and registered dietitians (Table 1). Fifteen focus groups and three telephone interviews were delivered in total. One focus group also comprised service users who were cancer survivors (identified through the cancer network).

Evaluation used qualitative methodology – utilising focus groups and telephone interviews to gain in depth insights into the experiences of HCPs using the e-learning resource. Focus group participants received an outline of the purpose of the evaluation and the focus group, and their informed consent to participate was obtained and documented.

Table 1
The health care professionals who participated in the focus groups and interviews.

Professional role	No of participants
Practice Nurse	10
Cancer Nurse Specialist	14
Academic Registered Nurse	2
Academic Registered Nutritionist	2
Academic Chartered Physiotherapist	2
Registered Dietitian	1
Chartered Physiotherapist	1
Service User	4
GP	2
Exercise professionals	5
Total	43

Focus groups occurred after completion of the e-learning resource and were guided by a set of prompts (see Fig. 1).

A choice of face-to-face or telephone interviews was offered to those unable to take part in focus groups. Each of these was recorded digitally. Reasons for declining focus group sessions included a lack of time to contribute and also not managing to access or complete the e-learning resource within the specified timeframe.

A unique aspect of the data collection phase was the use of iPads (a mobile tablet) within focus group sessions. This enabled participants to access the e-learning resource during the sessions and allowed sections to be viewed at the same time as feedback was given, so that any specific issues could be clarified. Ethical approval for the study was given by the Bournemouth University Research Ethics Committee in accordance with the University's Research Ethics Code of Practice.

Analysis

Focus groups and interviews were recorded and downloaded onto the researcher's computer. They were then transcribed and a thematic analysis was used to gain an understanding of the perceptions of the HCPs who used the resource. Analysis began by the process of allocating a code to each unit of meaning on each transcript. Data from each transcript was grouped under each code and re-ordered alongside codes that formed from patterns, categories and themes across the data from all of the transcripts (Creswell, 2014). A cognitive map was constructed

- Overall how did you find the e-learning resource?
- (Ease of access, navigation, content, style)
- Did it help you learn about the relevance of providing nutritional advice to cancer survivors?
- Would you say you know what the relevant best practice guidelines say about nutrition and physical activity for cancer prevention and survivorship?
- What did you like best about the resource?
- What did you like least about the resource?
- Is there anything not included that you would find helpful?
- Did you manage to put into practice the things you learnt using the resource?
- Has the resource made you change the way you practice? Any examples?
- Would you say that patients you see in your practice benefit from your having used the e-learning resource?

Fig. 1. Focus group prompts.

to assist in understanding incidents and interactions. Eventually codes were grouped together into a small number of constructs to form themes, sub-categories and finally emergent major categories. The evaluation approach used Kirkpatrick's four levels of evaluation to ensure that the necessary aspects of learning were included, these being student reaction, learning as increase in knowledge, change in behaviour and results of this on the organisation (Kirkpatrick, 1994).

Results

The findings of the thematic analysis are shown in Fig. 2.

Plugging a Gap

Before using the e-learning resource, only a few HCPs had received any training about nutrition for cancer survivors. *Plugging a Gap* in their education and knowledge using the resource improved their awareness of the evidence relating to nutrition, exercise and lifestyle change for cancer survivorship which made them aware of national guidance and gave them the confidence to have an intelligent, informed discussion with their patients. Time, or lack of it, arose as a concern.

Everybody's budget is stretched so much at the moment, people aren't able to go on study leave, and this is one way round that really.

The learning resource also provided much needed opportunities for HCPs to deliver nutritional advice to patients and it also gave them opportunities to learn:

Unless a patient asks, I don't think there's necessarily time or resources within the period of giving treatment where somebody talks to them about diet and lifestyle issues after treatment.

All in One Place

The resource contained the right information as it was relevant for HCPs and patients and HCPs would be able to provide consistent



Fig. 2. Themes identified from the data analysis.

and safe advice to their patients. The resource content was pitched correctly, as it directed users to key literature and could accommodate different learning styles. It was also considered to be in the right place. There was an awareness of where to go for up-to-date guidelines and nutritional advice, and it was always available:

It's so good to have it there to actually have one area that we can just go directly to and find this information out, it's just brilliant.

There was overwhelming support for the idea of making the e-learning resource accessible for all those with an interest by sharing it (or an adapted version of it) with patients as well as HCPs:

It is something they need. They do want it. It improves their quality of life.

Everyone benefits

HCPs' confidence increased after using the resource, such as when talking about different diets as they had learnt new information:

It gives me confidence to know that I am providing the right nutritional advice for people, so I thought it was really, really good.

They became informed and empowered, as they were newly equipped with knowledge to allow them to have an informed discussion with patients. When the trigger for the patient occurred – such as at the end of treatment – HCPs needed to be prepared for discussing nutrition with them and the resource had prompted them to be more proactive:

Before I was reactive about when patients ask; talked about it only if patients asked. I will now be more proactive.

The resource was deemed to be very useful as it allowed HCPs to update their skills and feel empowered to deliver better care and would change their practice as a result of using the resource. Most users felt it would usefully contribute to their professional development by linking to performance review and CPD requirements as well as helping them to improve practice. As a learning tool, most staff found it easy to fit into practice.

Current and live

The HCPs appreciated that the content of the resource was up-to-date and felt it was important to continuously update it in order to keep their knowledge alive. It was considered of value that the resource used well-known evidence-based websites. All of the participants (100%) liked the resource,

Yes, it's good, it's structured, it feels evidence based, it feels intuitive, it's all clickable, all the links work, they feel up-to-date, so someone coming away from learning that package would certainly be of benefit to patients.

Discussion

The present study has shown a highly positive role for the provision of web-based nutrition education for HCPs who support cancer survivors. The need to provide different teaching and learning approaches is highly relevant for HCPs in practice (Cottrell and Donaldson, 2013), and setting against a landscape of diminished budgets for health and health education (Lintern, 2013) was very relevant for this group and subsequently reflected in user feedback.

The findings extend the current body of evidence to support new approaches to transfer new knowledge and skills via flexible learning (Brug et al., 2003; Wilson, 2007), and provide new insights into the preferences of HCPs for learning, specifically with a focus on nutrition education.

Whilst the purpose of the study was not to identify nutrition training needs or lack of training, scarcity of education on the subject was apparent. This study shows that the e-learning resource moved some way towards addressing the unmet need by *Plugging a Gap* in their education and knowledge.

The HCPs liked the style and ease of using the resource, because it was easy to navigate, simple and interactive, but not overly challenging to use. The visual representation of the educational material using an innovative and easy to use website layout and methods such as *Chunking* to display information in a user-centric style was popular with participants – illustrated in the *Current and Live* sub-theme *Style and Ease of Use* (Becta, 2002). Reflected in the *All in One Place* sub-theme *The Right Information*, participants described how they were reassured that the information contained in the resource was what they wanted and needed and was pitched at an appropriate level for them.

The *Plugging a Gap* sub-theme *Precious Time* is a reminder that finding time for learning and CPD is a constant challenge for busy HCPs and e-learning resources can help to overcome this challenge as they can be accessed at any time. With insufficient time to discuss nutrition with patients, users felt that the resource might help address this situation, and with lack of time for training, the resource was a welcome addition to meet training needs.

It is well placed within the web infrastructure of a trusted cancer charity and this study has helped to raise awareness of their learning platform. The open access nature of the internet to information on diet and nutrition is problematic as not all web-based information sources are quality assured (Brug et al., 2005). Participants felt assured by the credibility and reliability of the resources available supported by evidence-based literature being on a trusted website. Improvements for website navigation were suggested in feedback, although overall, the range of different interactive approaches, signposting to resources and web-based tools was highly praised. Whilst some participants felt that they had some degree of basic knowledge initially, most felt that the resource had provided them with an appropriate evidence base to inform and empower them to their practice, enabling them to deliver safe, accurate and consistent advice. Set alongside the fact that students who participate in online activities are more likely to be high achievers (Davies and Graff, 2005), there is a strong potential impact for this e-learning resource.

Whilst the primary focus of the study was to obtain feedback from HCPs, a small group of service users was also invited to participate in the research evaluation. There is an expectation from funding bodies to involve service users in research as a result of increasing consumerism generally (Morrow et al., 2012; Greenhalgh et al., 2011). It has been shown that involving service users leads to research which is of higher quality, than if undertaken without service user input and increases the relevance for those for whom it is designed (INVOLVE, 2013; Cotterell et al., 2008; Staniszewska et al., 2011). In the present study the sample size of service users was appropriate to provide the depth of detail derived from their focus group discussion for the evaluation (Creswell, 2014).

Recommendations and improvements to the resource

Participants were unanimous in their view that this resource, or an adaptation of it, should be made available to cancer survivors and this was reinforced by the service user involvement. The resource could be enhanced by offering users the option of using a workbook to facilitate reflection and evaluate learning with regard to practice assessment. Further, engagement with the resource to

enhance knowledge and skills should contribute more explicitly to CPD, linking to performance review to enhance practice. It is important that the resource is maintained by the supporting website platform, to ensure its currency with relevance to the evidence base and to promote awareness and accessibility to the resource.

Conclusion

The findings of this study demonstrate the benefits of interprofessional working to develop a resource informed by the best available research and policy evidence to facilitate the translation of policy into practice through research. A robust evaluation of the resource was achieved in terms of content and delivery, and preliminary findings over the short term demonstrate positive attitudes, potential for improvements in the knowledge base and changes in professional practice. Feedback overall was positive, confirming that it was fit for a purpose – targeting gaps in knowledge, enhancing learning and helping to signpost important tools, web-based resources, academic and policy literature. On the successful completion of the research, the e-learning resource was made freely available (visit <http://learnzone.org.uk/courses/course.php?id=92>).

The value of engaging service users in the development and evaluation of educational provision was also demonstrated. Opportunities exist to develop a similar tailored resource for cancer survivors to allow them to know more about appropriate diet, nutrition and lifestyle changes to support recovery and rehabilitation. The findings of this piece of work have the potential to deliver change and impact upon professional practice. However more research is required to evaluate its impact to support or change practice and ensure a sustained engagement by embedding the resource as a part of CPD. Further work is also required to investigate the effective use of mobile tablets such as iPads in the evaluation of e-learning.

Acknowledgements

This work was made possible due to an award from NHS South West (Small Regional Innovation Fund) and the much valued support from Macmillan Cancer Support to whom we are most grateful. We also wish to acknowledge the contributions made by the focus group participants and interviewees who volunteered their time and accounts of experiences, in order that we could better understand the value of using an e-learning resource to learn about nutrition and improve clinical practice.

References

- Ada, W., 2013. Evaluating how the computer-supported collaborative learning community fosters critical reflective practices. *Interdiscip. J. E-learning Learn. Objects* 9, 51–75.
- Adams, A., Timmins, F., 2006. Students views of integrating web-based learning technology into the nursing curriculum – a descriptive survey. *Nurse Educ. Pract.* 6 (1), 12–21.
- Anderson, A.S., Caswell Wells, M., Steele, R.J.C., MacAskill, S., 2010. It makes you feel so full of life: LiveWell, a feasibility study of a personalised lifestyle programme for colorectal cancer survivors. *Support. Care Cancer* 18 (4), 409–415.
- Atack, L., 2003. Becoming a web-based learner: registered nurses' experiences. *J. Adv. Nurs.* 44 (3), 289–297.
- Becta, 2002. *Creating Online Learning Material – A Good Practice Guide*, 2nd edition. Becta, London.
- Bradwell, P., 2009. *The Edgeless University Why Higher Education Must Embrace Technology*. Demos, London.
- Brug, J., Onema, A., Campbell, M., 2003. Past, present and future of computer-tailored nutrition education. *Am. J. Clin. Nutr.* 77, 1028S–1034S (Suppl.).
- Brug, J., Onema, A., Kroeze, W., Raat, H., 2005. The internet and nutrition education: challenges and opportunities. *Eur. J. Clin. Nutr.* 59 (Suppl. 1), S130–S139.
- Carter, M.R., Tourangeau, A.E., 2012. Staying in nursing: what factors determine whether nurses intend to remain employed? *J. Adv. Nurs.* 68, 1589–1600.
- Cohen, N.L., Carbone, E.T., Beffa-Negrini, P.A., 2011. The design, implementation, and evaluation of online credit nutrition courses: a systematic review. *J. Nutr. Educ. Behav.* 43 (2), 76–86.

- Cook, D.A., Levinson, A.J., Garside, S., Dupras, D.M., Erwin, P.J., Montori, V.M., 2008. Internet-based learning in the health professions: a meta-analysis. *J. Am. Med. Assoc.* 300, 1181–1196.
- Cooner, T., Rainger, P., 2009. *Designing for Inquiry-based Learning: Effective Practice Planner*. University of Birmingham.
- Cotterell, P., Harlow, G., Morris, C., Beresford, P., Hanley, B., Sargeant, A., Sitzia, J., Staley, K., 2008. *Identifying the Impact of Service User Involvement on the Lives of People Affected by Cancer*. Brunel University and Macmillan Cancer Support, London.
- Cottrell, S., Donaldson, J.H., 2013. Exploring the opinions of registered nurses working in a clinical transfusion environment on the contribution of e-learning to personal learning and clinical practice: results of a small scale educational research study. *Nurse Educ. Pract.* 13 (3), 221–227.
- Creswell, J., 2014. *Research Design. Qualitative, Quantitative and Mixed Methods Approaches*, 4th ed. Sage Publications Inc, Thousand Oaks.
- Davies, J., Graff, M., 2005. Performance in e-learning: on-line participation and student grades. *Br. J. Educ. Technol.* 36 (4), 657–663.
- Davies, N., Bateup, I., Thomas, R., 2011. The role of diet and physical activity in breast, colorectal, and prostate cancer survivorship: a review of the literature. *Br. J. Cancer* 105 (1), S52–S73 (Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3251953/pdf/bjc2011423a.pdf> Accessed 20th September 2012).
- Department of Health, 1994. *Core Curriculum for Nutrition in the Education of Health Professionals*. Department of Health, London.
- Du, S., Liu, Z., Liu, S., Yin, H., Xu, G., Zhang, H., Wang, A., 2013. Web-based distance learning for nurse education: a systematic review. *Int. Nurs. Rev.* 60, 167–177.
- Ellis, R., Calvo, R.A., 2006. Discontinuities in university student experiences of learning through discussions. *Br. J. Educ. Technol.* 37 (1), 55–68.
- Ettienne-Gittens, R., Lisako, E., McKyer, J., Goodson, P., Guidry, J., Outley, C., 2012. What about health educators? Nutrition education for allied health professionals: a review of the literature. *Am. J. Health Educ.* 43 (5), 288–309.
- Greenhalgh, T., Humphrey, C., Woodard, F., 2011. *User Involvement in Health Care*. Blackwell Publishing Ltd., Chichester.
- Hayes, B., Bonner, A., Pryor, J., 2010. Factors contributing to nurse job satisfaction in the acute hospital setting: a review of recent literature. *J. Nurs. Manag.* 18 (7), 804–814.
- Hodge, A., 2008. An exploratory case study of cancer nurses' understanding and use of nutritional screening in patients diagnosed with cancer. *J. Hum. Nutr. Diet.* 21 (4), 373–406.
- INVOLVE, 2013. *Exploring the Impact of Public Involvement on the Quality of Research: Examples*. INVOLVE, Eastleigh.
- JISC, 2004. *Effective practice with e-learning. A Good Practice Guide in Designing e Learning*JISC, (Available at: <http://www.jisc.ac.uk/media/documents/publications/effectivepracticelearning.pdf> accessed 18 March 2012).
- Jones, C., Sclater, N., 2010. Learning in an age of digital networks. *Int. Preserv. News* 55, 6–10 (Available at: http://oro.open.ac.uk/24116/2/learning_in_an_age.pdf. accessed 19 September 2012).
- Kay, R., 2011. Exploring the influence of context on attitudes towards web-based learning tools (WBLTs) and learning performance. *Interdiscip. J. E-learning Learn. Objects* 7, 125–141.
- Kirkpatrick, D., 1994. *Evaluating Training Programs: The Four Levels*. Berrett-Koehle, San Francisco.
- C.Lenders, C., K.Gorman, K., H.Milch, H., A.Decker, A., N.Harvey, N., L.Stanfield, L., A.Lim-Miller, A., J.Salge-Blake, J., L.Judd, L., S.Levine, S., 2013. A novel nutrition medicine education model: the Boston University experience. *Adv. Nutr.* 4 (1), 1–7.
- Lintern, S., 2013. Exclusive: Last minute Reduction to Expected Education Budgets. *Health Serv. J.* (Available at: <http://www.hsj.co.uk/news/exclusive-last-minute-reduction-to-expected-education-budgets/5059280.article> accessed 05 August 2013).
- Lu, D.F., Lin, Z.C., Li, Y.J., 2009. Effects of a web-based course on nursing skills and knowledge learning. *J. Nurs. Educ.* 48 (2), 70–77.
- Macmillan Learn Zone, 2014. Home page. Available at: <http://learnzone.org.uk/courses/course.php?id=92> (accessed 20th March 2014).
- McCullough, F., Micklewright, A., 2011. Blended learning at masters level enables dietitians to meet the national health service agenda for improved patient care and clinical outcomes. *Conference Proceedings 6th International Conference on E-Learning*, University of British Columbia, Canada, 27–28 June 2011. Academic Conferences Ltd., Reading (Available at: <http://academic-conferences.org/icel/icel2012/icel11-proceedings.htm> accessed 12 March 2012).
- Morrow, E., Boaz, A., Brearley, S., Ross, F., 2012. *Handbook of Service User Involvement in Nursing & Healthcare Research*. Wiley-Blackwell, Chichester.
- J.L.Murphy, J.L., E.A.Girot, E.A., 2013. The importance of nutrition, diet and lifestyle advice for cancer survivors – the role of nursing staff and interprofessional workers. *J. Clin. Nutr.* 22, 1539–1549.
- Nielsen, J., 2000. *Designing Web Usability*. New Riders Publishing, Indiana.
- N.Parekh, N., U.Chandran, U., E.V.Bandera, E.V., 2012. Obesity in cancer survival. *Annu. Rev. Nutr.* 21, 311–342.
- Penny, K., 2011. Factors that influence student e-learning participation in a UK higher education institution. *Interdiscip. J. E-learning Learn. Objects* 7, 81–95.
- Pulman, A., Scammell, J., Martin, M., 2009. Enabling interprofessional education: the role of technology to enhance learning. *Nurse Educ. Today* 29 (2), 232–239.
- Pulman, A., Todres, L., Galvin, K., 2010. The carer's world: an interactive reusable learning object. *Dementia* 9 (4), 535–547.
- Pulman, A., Galvin, K., Hutchings, M., Todres, L., Quinney, A., Ellis-Hill, C., Atkins, P., 2012. Empathy and dignity through technology: using lifeworld-led multimedia to enhance learning about the head, heart and hand. *Electron. J. e-Learning* 10, 349–360.

- Richards, S., 2009. The building blocks of a healthy diet. *Pract. Nurse* 38, 12–17.
- Santerre, C.R., 2005. X-train: teaching professionals remotely. *J. Nutr.* 135, 1248–1252.
- Schardt, C.M., Garrison, J., Kochi, J.K., 2002. Distance education or classroom instruction for continuing education: who retains more knowledge? *J. Med. Libr. Assoc.* 90, 455–457.
- Schmitt, M.B., 2004. Challenges of web-based education in education nurses about evidence-based acute pain management practices for older adults. *J. Contin. Educ. Nurs.* 35, 121–127.
- Staniszewska, S., Brett, J., Mockford, C., Barber, R., 2011. The GRIPP checklist: strengthening the quality of patient and public involvement reporting in research. *J. Technol. Assess. Health Care* 27, 391–399.
- Valsamidis, S., Kontogiannis, S., 2011. E-learning platform usage analysis. *Interdiscip. J. E-learning Learn. Objects* 7, 185–204.
- Wilson, G., 2007. New skills and ways of working: faculty development for e-learning. In: Bullen, M., James, D.P. (Eds.), *Making the Transition to e-Learning: Strategies and Issues*. Ideas Group, Hersey, PA.
- World Cancer Research Fund/American Institute for Cancer Research, 2007. *Food, Nutrition, Physical Activity and the Prevention of Cancer: A Global Perspective*. AICR, Washington, DC.