OPEN ACCESS
Freely Available Online

JOURNAL OF HUMAN HEALTH RESEARCH
ISSN NO: 2576-9383

RESEARCH ARTICLE
DOI : 10.14302/issn. 2576-9383.jhhr-17-1811

Oncopunt, a Video-Portal to Improve Oncological Skills of Home Care Nurses: Usability, User-Experience and Added Value for Clinical Practice

Ryanne JM Lemmens[1,*], Joachim Gregoor[1], Annemie IF Spooren[1]

[1]Department of Healthcare, Centre of Expertise PXL Innovation Care, PXL University College, Hasselt, Belgium

Abstract

Homecare is very important in oncology care since cancer patients are discharged more and more earlier from the hospital and receiving ambulatory treatments. Homecare nurses have a more general broad educational background, with less specialization regarding specific care, like oncology care. The aim of this study is to develop and test a cross-platform application (named Oncopunt) for homecare nurses involved in oncology care to provide specific nurse-centred information via digital media about skill guidelines specific for oncology care. This study was set-up as a non-experimental feasibility and satisfaction study with one measurement moment to collect information about usability, user-experience and added value of Oncopunt using the System Usability Scale (SUS) and an additional questionnaire. The cross-platform application Oncopunt was build using Drupal and Vimeo and consists of a homescreen, filter/search function and watch-function (full video panel, chapter panel and FAQ). Seventeen homecare nurses completed all questionnaires. The mean SUS score was 83,8 (stdev 11,6) and Oncopunt was rated positively regarding video content, technical issues, website layout, quality of care and user satisfaction. Oncopunt is developed to provide homecare nurses specific nurse-centred information about skills specific for oncology care via digital media . It was rated good on usability, user-experiences and added value for clinical practice.

Corresponding author: Ryanne Lemmens, Department of Healthcare, PXL University College, Hasselt, Belgium, Guffenslaan 39, B-3500 Hasselt, Email: Ryanne.lemmens@pxl.be

Running title: A video-portal to improve oncology skills of homecare nurses

Keywords: Oncology Nursing, Home Care Services, e-learning, digital media, usability, user-experience, video's, application.

Received: Oct 13, 2017 **Accepted:** Dec21, 2017 **Published:** Dec 27, 2017

Editor: Jong In Kim , Wonkwang University, kji122@wku.ac.kr

Introduction

Cancer incidence and prevalence are still increasing, and mortality rate of cancer patients is decreasing caused by better diagnostics and better treatments [1]. In the last decade, cancer survival in Belgium has increased from 55% to 61% in men and from 65% to 68% in women [1]. This results in an increasing demand on oncology care. Homecare is very important since cancer patients are discharged earlier from the hospital and receiving ambulatory treatments [2, 3]. Homecare nurses have a more general broad educational background, with less specialization regarding specific oncology care. However, nowadays homecare nurses increasingly confronted with cancer patients, with an increasing diversity in treatment and caring needs [3]. Cancer patients alternate short periods of hospitalization with longer periods of homecare.

The 'Vlaamse Liga tegen kanker' (a Flemish non-governmental organisation for oncology patients) interviewed cancer patients about their experiences with homecare services. In general, they were satisfied with the homecare they received, but some problems came forward. The two most important problems were lack of time/being hurried and missing knowledge and expertise regarding specific medial-technical issues (for instance the use of a venous access port or pain pumps). In accordance with this, some homecare nurses stated to lack knowledge about specific skills necessary and having difficulties with maintaining their knowledge and skills because some skills only have to be performed occasionally [4]. If it is not possible to expand the time available for care, there is need for improvement of the quality of (the restricted) care time. The 'Vlaamse Liga tegen kanker' concluded that there is a necessity for initiatives to expand the knowledge and expertise of homecare nurses [2] . Additionally, the rapid developments in medicine and nursing necessitates continues training [5]. It is known that continuous education plays an important role in improving performance of professionals and quality of care to enable health professionals to keep their knowledge and skills up to date in order to improve care, patient outcomes and patient satisfaction. [6, 7].

In the last decades, digital opportunities have been expanded, providing opportunities to create learning environments [8, 9]. The benefits of digital learning environments are, amongst others, the learners independency of location and time, the possibility to learn at your own pace, the widespread possibilities of learning resources, teaching strategies and the possibility to a broad range of sources including, video's, audio, quizzes and economical benefits [10.] E-learning can be defined as electronically mediated communication for the purpose of constructing and confirming knowledge. In this study, situated learning will be applied, in which a specific context is provided representing daily practice [11].

The aim of this study is 1) to develop a cross-platform application for homecare nurses involved in oncology care to provide specific nurse-centred information via digital media about skill guidelines specific for oncology care and 2) to investigate the usability, user-experience and added value for clinical practice of the application.

Materials and Methods

Development of the Cross-Platform Application Oncopunt

The cross-platform application was built with the objective to be as cost-effective as possible, with the necessities to 1) include an easy to use content management system, 2) have a high usability and 3) the possibility to stream HD video content. The content management system has to be able to administer the registration of new users, have a filter/search function, and restricted access. The content of the video-skills was determined using a user-centred design in collaboration with the organisation of home care nurses 'Wit-Gele Kruis'.

Testing of the Cross-Platform Application Oncopunt

This study was set up as a non-experimental feasibility and satisfaction study with one measurement moment to collect information about usability, user-experience and added value of Oncopunt.

Participants and Measurements.

Homecare organisation in Flanders were selected using the website "www.desocialekaart.be". Direction and managers of these organizations specialised in home-care were contacted to give them information about Oncopunt and ask whether their organisation was interested in using the application and thereby participating in this research project. Participating organizations spread the information to their home-care nurses. In total, 494

homecare professionals received the information about Oncopunt. After visiting the application, the home-care nurses had to register to get access to all information on the application and a login was provided for further use. After visiting Oncopunt, users received a pop-up message with the question to complete the feedback form comprising the questions described as outcome measures. The registered users who did not fulfil the feedback form received a reminder.

Outcome Measures.

The System Usability Scale (SUS) was used to investigate the usability of Oncopunt. The SUS consists of 10 questions (rated on a 5-point Likert scale) based on 3 usability criteria, i.e. effectiveness, efficiency and satisfaction. The SUS is psychometrically validated and standardized instrument. Scores were converted according the guidelines of Brooke to a 0 (negative) to 4 (positive) scale, i.e. for questions 1, 3, 5, 7 and 9, the score contribution was scale position minus 1 and for the questions 2, 4, 6, 8 and 10 the score contribution was 5 minus scale position. Total score (0-100 range) was calculated by summing al scores of the individual items and multiply the sum with 2.5. Scores were interpreted as following: <51 poor; 51-70 okay; 71-85 good; 86-90 excellent; 91-100 best imaginable [12,13].

A web-based questionnaire was developed to address the experiences regarding the specific content of Oncopunt, including open-ended questions and questions on a 5-point scale. Questions concerned demographic data, video content, technical issues, website lay out, quality of care and user satisfaction.

Results

Development of the Cross-Platform Application Oncopunt

A combination of Drupal [14] and Vimeo [15] was used to build the cross-platform application. Drupal is a free open source content management system distributed under the GNU General Public Licence [16]. The Drupal core include user account registration and maintenance, menu management, RSS feeds, taxonomy, page layout customization, and system administration. Within this project, extra modules to extend the usability of the applications such as Panels, Display Suite, and the Bootstrap Module were used. The last one will make sure that the application will be responsive and was used to enhance the usability for mobile devices like tablets and smart phones. With the use of adapted Cascade Style Sheets (CSS) we changed the design of the Drupal Bootstrap theme in function of the project. The greatest obstacle was the use of streaming video within the application, which was overcome with the use of the "Media: Vimeo"-module [17]. This module makes an easy integration with the Vimeo Streaming service, a video-sharing website which can be used to upload and stream the produced video-content. Vimeo has the possibility to narrow the domains where the video can be embedded.

To increase the usability of the application, the user has to find the content in as little clicks as possible. The userflow is built as easy as possible, figure 1 displays some screenshots from the application. First there is the homescreen (1), with the second click the filter/search function (2), and afterwards the watch-function (3).

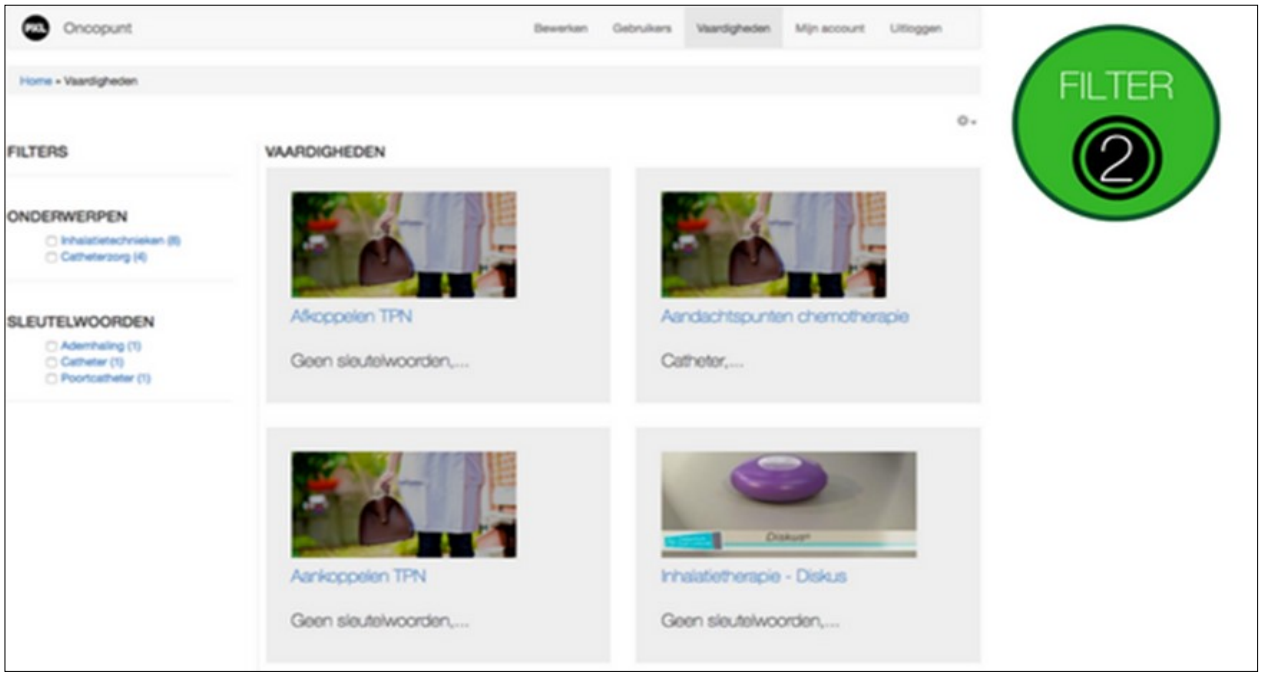
The watch-panels consists of 3 main functions (figure 1.3), i.e. the full-video-panel, the chapters panel and the FAQ-panel. The full-video panel gives the user the possibility to look at the video in its full length. The user also has all the playback-controls of the video. With the chapters-panel the user can look at the same video, but choose a chapter to focus on. Because the purpose of the video was to make digital material with the focus on a short length, it was not possible to put all the necessary content in the video. To overcome this problem a "Frequently Asked Questions" panel was introduced to give answers to more specific questions using a textual approach in contrast with the multimedia approach.

Thirteen videos were produced with the following topics: practical guidelines for chemotherapy in home care, uncoupling chemotherapy in home care, coupling total parenteral nutrition in home care, uncoupling total parenteral nutrition in home care. Mean video time was 3 minutes and 8 seconds.

An open a testlink (https://oncopunt.pxl.be/example) is created as an example to allow access for professionals who are interested and wants to familiarize with the platform.

Testing of the cross-platform application Oncopunt

Fifty-eight home-care nurses registered on Oncopunt, of which 17 completed the feedback form



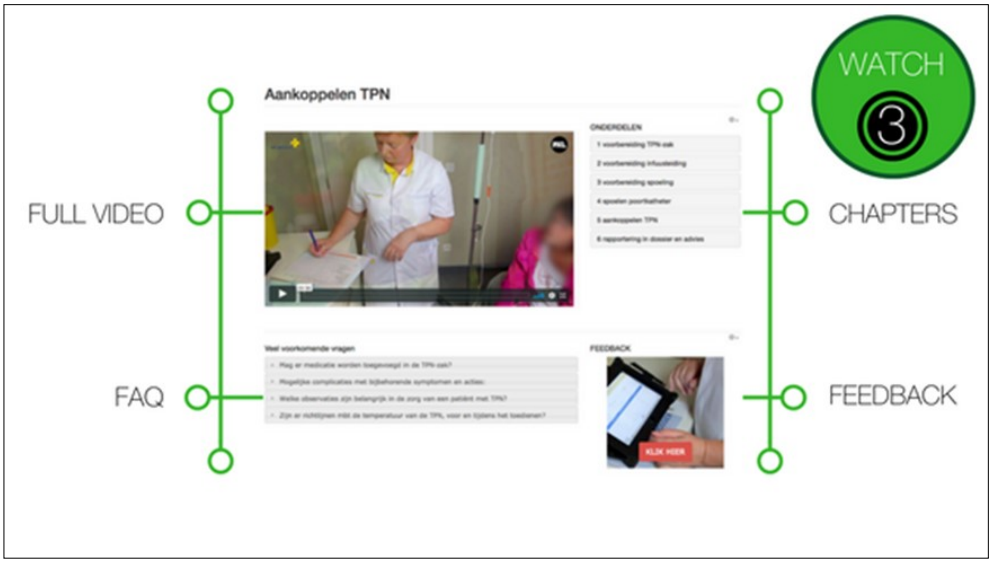


Figure 1: Screenshots of the cross-platform application: homescreen (1), the filter/search function (2), and the watch-function (3).

with the questions after visiting Oncopunt. Mean age of the participants (11 female, 6 male) was 40.6 (SD 9.73) years old.

System Usability Scale.

The mean SUS score was 83,8 (stdev 11,6) and the scores ranged between 65 and 100. Table 1 gives an overview of the proportion of the responses for the specific answering categories. Questions 2, 4, 6, 8 and 10 were reversed to calculate the total score. So an answer 'strongly disagree' (score 0) or 'disagree' (score 1) on these items indicate a positive answer. It can be seen that in general the participants were positive about Oncopunt.

Table 2 gives an overview of the results of questions regarding video content, technical issues, website layout, quality of care and user satisfaction.

Regarding video-content, the web-based questionnaire illustrated that participants were familiar with the skills explained in the video's, i.e. the skills were not new for them. The speed, language use and structure of the video's was scored positively, i.e. mean score of 4.2 (SD 0.7). Furthermore it was stated that the videos represent a realistic reproduction of the performance of the skills during their work and that all information was relevant. Additionally, some points of improvement were given regarding the content of the video's and some recommendations for additional skills to add to Oncopunt.

None of the participants experienced technical problems, including loading the videos. The lay-out of the web portal was also rated positively, i.e. well-organized, easy to find the information needed and coming up to the expectations of the participants.

With regard to quality of care, the participants confirmed to understand the skills explained in the videos and (strongly) agreed with the questions: 'Do you think you are capable of performing the skills in clinical practice after you have seen the video instruction?' and 'Do you think the quality of care will improve by using Oncopunt?'.

Concerning the user satisfaction, participants scored the video instructions and the web portal in general to be useful. Watching the video's was found to be a pleasant way to refurbish the knowledge about skills. On the question whether the user was adequately informed about the aim and content of Oncopunt and how the website should be used. 88.2% of the participants has the intention to visit the web portal again in the future and/or recommend the web portal to colleagues.

Discussion

The aim of this study is 1) to develop a cross-platform application for homecare nurses involved in oncology care to provide specific nurse-centred information via digital media about skills specific for oncology care and 2) to investigate the usability, user-experience and added value for clinical practice of the application.

Oncopunt has been built to be used by homecare nurses. It can be concluded that the usability of this cross-platform application is considered to be good (i.e. mean SUS score between 71-85). The topics and content of the videos were determined together with nurses of a homecare organisation to assure relevant topics being chosen and to confirm a nurse-centred approach. The homecare nurses who fulfilled the feedback form stated that the topics were very useful and some nurses asked for extension of the videos with topics regarding communication, psycho-social aspects and additional nursing skills. Also regarding the content, i.e. how the skills were explained, the speed of instructions, terms used etc, nurses were positive.

Regarding the technical issues of the cross-platform application, the nurses were positive. It must however be stated that one organisation of homecare nurses did not implement the platform in their daily practice because of problems with the streaming velocity on mobile devices. The mobile devices that were used had connectivity issues due to the use of a 3G network. To make optimal use of HD video streaming it is necessary to use 4G mobile internet connectivity. However, this organization used the videos during their face to face training of the nurses. The videos were also used in the education programme professional bachelor nursing.

Many literature exists regarding the effects of e-learning programs, but studies implementing or evaluating platforms such as Oncopunt are limited. A study of Tsai et. al. developed a computer-assisted multimedia training course for intravenous injections and evaluated its effect on knowledge and self-perceived

Table 1: System Usability Scale (SUS) item responses

	Strongly disagree		Neutral		Strongly agree
	0	1	2	3	4
I think that I would like to use this system frequently		5.9%	17.6%	41.2%	35.3%
I found the system unnecessarily complex ***(R)***	58.8%	35.3%	5.9%		
I thought the system was easy to use		5.9%	5.9%	47.1%	41.2%
I think that I would need the support of a technical person to be able to use this system ***(R)***	82.4%	17.6%			
I found the various functions in this system were well integrated			23.5%	47.1%	29.4%
I thought there was too much inconsistency in this system ***(R)***	58.8%	41.2%			
I would imagine that most people would learn to use this system very quickly			29.4%	35.3%	35.3%
I found the system very cumbersome to use ***(R)***	70.6%	29.4%			
I felt very confident using the system	5.9%		23.5%	41.2%	29.4%
I needed to learn a lot of things before I could get going with this system ***(R)***	58.8%	41.2%			

(R) Values of responses to these items should be reversed when converted to the total score

Table 2: Overview of the mean scores (SD) of questions regarding video content, technical issues, website layout, quality of care and user satisfaction. Scores ranged from (1 totally disagree to 5 totally agree).

Video content	**Mean score (SD)**
Have you learned new things?	2.7 (1.4)
Have you learned things which you already knew but had forgotten about, or no longer knew exactly how to do them?	3.1 (1.3)
The speed/pace of instructions in the videos was good/pleasant to follow?	4.2 (0.7)
The language used in of the videos was clear	4.2 (0.7)
Was the sequencing of the video segments logical?	4.2 (0.6)
The videos gave a good representation of how the skills should be performed in clinical practice	4.1 (0.8)
The videos contain relevant information only	3.9 (0.9)
Technical issues	
I have not experienced any technical problems	4.0 (1.0)
Loading the videos went fast	4.2 (0.8)
Website layout	
The website is well-organized	4.1 (0.7)
I can find the information I am searching for easily on the website.	4.0 (0.7)
The website has met my expectations	3.9 (0.7)
Quality of care	
After watching the videos, I understand how the skills have to be performed	4.3 (0.6)
Do you think you are capable of performing the skills in clinical practice after watching the videos?	4.2 (0.9)
Do you think the quality of care improved after using Oncopunt?	4.3 (0.6)
User satisfaction	
The video instructions are useful	4.2 (0.6)
The website Oncopunt is useful	4.1 (0.6)
Watching videos is a pleasant way of updating my knowledge and skills	4.4 (0.7)
I am sufficiently informed in advance about the aims and content of Oncopunt and how to use the website	3.5 (1.1)
Would you visit Oncopunt again in the future?	4.4 (0.7)
Would you recommend Oncopount to colleagues?	4.3 (0.7)

performance [18]. The nurses in the study of Tsai et. al. were positive about the online learning programme, which is in accordance with the positive results of the current study. But, despite an improvement in knowledge, Tsai et. al. did not find improvements in self -perceived performance. In our study however, the nurses all stated that their quality of care improved after using Oncopunt. This is in agreement with a study of Öztürk et. al. in which the effects of web-based education on students' urinary catheterization knowledge and skills was investigated [19]. Students in the web-based group scored similar regarding knowledge, but higher regarding skills compared to the control group. It must however be stated that the web-based group received the training in addition to the class-room training of the control group. In our study, no control group was included.

A limitation of this study is the low response rate of home care nurses to use Oncopunt on the one hand, but also to complete the feedback form on the other hand. This can be explained in several ways, first of all, only a fraction of the homecare nurses take care of oncology patients. And secondly, because of the pressure of work, homecare nurses do not have the time to fill in the feedback form. Furthermore it is possible that some nurses are not familiar with the use of a computer and digital learning methods.

For the future, some healthcare organisations are interested to use Oncopunt in their organisations and asked for expansion of the content of Oncopunt. The design and set up of Oncopunt can also be applied for other themes and purposes. For instance as can be seen on 'http://edx.pxl.be/' a webportal with learning material about media knowledge. Furthermore, it would be very interesting to investigate the opportunities to make the video's more interactive, for example through the use of 360 degrees video's in which the nurse can decide on which part/location in the video they want to focus on. This new technology gives the users the possibility to adjust the viewing angle to the specific needs of the user. It also gives the possibility to make a learning path within the 360° Video. Further technology exploration is necessary.

Conclusions

Oncopunt, a cross-platform application for homecare nurses in oncology care was developed. It provides specific nurse-centred information via digital media about skills specific for oncology care.

It can be concluded that the usability of this cross-platform application is considered to be good. User experiences are positive and indicate an added value for clinical practice. In future, it should be explored how the implementation of the platform in the clinical field can be increased. Furthermore, additional content with regard to oncological content as well as content to other patient groups and technical aspects should be elaborated to provide a more comprehensive platform for homecare nurses.

Acknowledgements

We would like to thank all organisations and home care nurses who participated in this study.

Conflicting Interests

We have no conflicting interests to declare.

References

1. *Belgian Cancer Registry.*; Available from: http://www.kankerregister.org/.
2. Bommel, W., *Een kritische blik op het kankerbeleid*. 2004, Vlaamse Liga tegen kanker: Brussel.
3. Van Gerpen, R., (1998) Homecare nurses face unique challenges in caring for patients with cancer. ONS News. 13(2): p. 1, 4-5.
4. Van Hooste, M. and L. Van Loo, *Knelpunten in de curatieve oncologische thuisverpleging* in *Bachelor Na Bachelor in de Oncologische Zorg*. 2011, Katholieke Hogeschool Kempen Turnhout.
5. Arving, C., B. Wadensten, and B. Johansson, (2014) Registered nurses' thoughts on blended learning in a postgraduate course in cancer care--content analyses of web surveys and a focus group interview. J Cancer Educ. 29(2): p. 278-83.
6. Moreira, I.C., et al., (2015) Development and assessment of an e-learning course on breast imaging for radiographers: a stratified randomized controlled trial. J Med Internet Res. 17(1): p. e3.
7. Wyatt, D., (2007) How do participants of a post registration oncology nursing course perceive that the course influences their practice?--A descriptive survey. Eur J Oncol Nurs. 11(2): p. 168-78.
8. Cant, R.P. and S.J. Cooper, (2014) Simulation in the Internet age: the place of web-based simulation in

nursing education. An integrative review. Nurse Educ Today. 34(12): p. 1435-42.

9. Means, B., Toyae Y., Murphy R., Bakia K., Jones K., (2009). Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies. US Department Of Education. Washington, D.C., Retrieved from https://eric.ed.gov/?id=ED505824
10. Aggarwal, R., Gupte, N., Kass, N., Taylor, H., Ali, J., & Bhan, A. et al. (2011). A Comparison of Online versus On-site Training in Health Research Methodology: A Randomized Study. BMC Medical Education. 17 (11):37doi:10.1186/1472-6920-11-37
11. Feng, J.Y., et al., (2013) Systematic review of effectiveness of situated e-learning on medical and nursing education. Worldviews Evid Based Nurs. 10 (3): p. 174-83.
12. Brooke J. (1996) SUS-A quick and dirty usability scale. Usability evaluation in industry;189 (194): p 4 -7.
13. Bangor, A., P. Kortum, and J. Miller, (2009) Determining what individual SUS scores mean: adding an adjective rating scale. Journal od Usability Studies. 4(3): p. 114-123.
14. *Drupal website*. Available from: http://drupal.com/.
15. *Vimeo* Available from: http://vimeo.com.
16. *GNU General Public Licence* Available from: https://www.gnu.org/licenses/gpl.html.
17. *Media Vimeo Module Drupal*. Available from: https://www.drupal.org/project/media_vimeo.
18. Tsai, S.L., et al., (2004) Evaluation of computer-assisted multimedia instruction in intravenous injection. Int J Nurs Stud. 41(2): p. 191-8.
19. 1Ozturk, D. and L. Dinc, (2014) Effect of web-based education on nursing students' urinary catheterization knowledge and skills. Nurse Educ Today. 34(5): p. 802-8.