Virtual Learning Spaces: Getting them right for students

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Terry Clark
Purpose

- To investigate first year nursing students’ experiences with navigating the human-computer interaction (HCI) of the Virtual Learning Spaces (VLS’s) in order to reach the learning.

- To understand the links between HCI, Cognitive Load (CL) and Digital Pedagogy in the VLS design to decrease the students mental effort in reaching the learning, optimising their time and effort on the learning.
Methodology & Methods

- Mixed methods using action research design process incorporating 3 surveys.
- Survey One: 1st year, 1st Semester Bachelor of Nursing Program, Semester One, 4 courses VLS experiences (2 nursing; 2 non-nursing).
- Survey Two: 1st year, 2nd Semester BNUR, NUR1099 VLS design only.
- Survey Three: 1st year, 2nd Semester BNUR NUR1099 VLS design adjusted according to Survey Two feedback.
Participants

- Bachelor of Nursing Program
- 1st year nursing students in their 2ND Semester
- P = 290
  - 275 blended mode
  - 15 on-line

- Selection based on:
  - Convenience
  - To provide valuable student feedback on the VLS’s designs.
Response Rates & Demographics

- Response rates:
  - Survey One: 11%
  - Survey Two: 10%
  - Survey Three: 4%

- Survey One Demographics revealed:
  - Spend 10+ hours in the VLS/week: 87%
  - Work 10+ hours/week: 81%
  - Devote 10+ hours family; caring/week: 67%
## Survey One & Two Results

<table>
<thead>
<tr>
<th>Survey One</th>
<th>Survey Two</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific questions related to:</strong> BNUR 1&lt;sup&gt;st&lt;/sup&gt; Semester VLS Courses</td>
<td><strong>Specific questions related to:</strong> BNUR 2&lt;sup&gt;nd&lt;/sup&gt; Semester VLS Course:</td>
</tr>
<tr>
<td>(4 courses)</td>
<td>NUR1099</td>
</tr>
<tr>
<td><strong>Significant results</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Likes:</strong> thinly spread across 4 areas: weekly layout(2); discussion forums</td>
<td></td>
</tr>
<tr>
<td>(1), online lectures(1), navigation buttons(1)</td>
<td></td>
</tr>
<tr>
<td><strong>Dislikes</strong></td>
<td></td>
</tr>
<tr>
<td>Lack of consistency with appearance &amp; navigation(12)</td>
<td></td>
</tr>
<tr>
<td><strong>Suggested Improvements</strong></td>
<td></td>
</tr>
<tr>
<td>A standard format for all study desks(11)</td>
<td></td>
</tr>
<tr>
<td><strong>Significant results</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Likes:</strong> layout &amp; navigation(9); weekly layout(1)</td>
<td></td>
</tr>
<tr>
<td><strong>Dislikes</strong></td>
<td></td>
</tr>
<tr>
<td>Layout &amp; navigation(9)</td>
<td></td>
</tr>
<tr>
<td><strong>Suggested Improvements</strong></td>
<td></td>
</tr>
<tr>
<td>No changes needed(4)</td>
<td></td>
</tr>
<tr>
<td>Buttons or icons for navigation(3)</td>
<td></td>
</tr>
<tr>
<td>A standard format for VLS Study Desks</td>
<td></td>
</tr>
</tbody>
</table>
7. What did you like or dislike about this Study Desk (NUR1099)?

<table>
<thead>
<tr>
<th>Responses</th>
<th>Text Analysis</th>
<th>My Categories</th>
</tr>
</thead>
</table>

**GOLD FEATURE:** Text Analysis allows you to view frequently used words and phrases, categorize responses and turn open-ended text into data you can really use. To use Text Analysis, upgrade to a GOLD or PLATINUM plan.

Showing 25 text responses

<table>
<thead>
<tr>
<th>Text</th>
<th>Date/Time</th>
<th>View Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>I like that is set out week by week.</td>
<td>31/8/2012 7:33 PM</td>
<td>View Responses</td>
</tr>
<tr>
<td>Having things set out week by week is good. Its simple and clear.</td>
<td>31/8/2012 2:42 PM</td>
<td>View Responses</td>
</tr>
<tr>
<td>Sometimes the links are not easily accessible. Some downloads take a long time and it's inconvenient for students with limited study time. eg. mums and workers</td>
<td>29/8/2012 9:54 PM</td>
<td>View Responses</td>
</tr>
<tr>
<td>The 1099 study desk was set out really well compared some other subjects, boxes were a good idea.</td>
<td>29/8/2012 2:22 PM</td>
<td>View Responses</td>
</tr>
<tr>
<td>I like the overall layout of the study desk - particularly the obvious placement of the assessment details. I like the idea of ticking the boxes once I have completed a learning task.</td>
<td>28/8/2012 9:45 AM</td>
<td>View Responses</td>
</tr>
<tr>
<td>I like the way it's set out - very neat and ordered and easy to navigate.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8. What, if anything, would you like to see changed?

**GOLD FEATURE:** Text Analysis allows you to view frequently used words and phrases, categorize responses and turn open-ended text into data you can really use. To use Text Analysis, upgrade to a GOLD or PLATINUM plan.

Showing 23 text responses

- Having external forums separate to on campus, to avoid confusion.
  31/8/2012 2:42 PM  View Responses

- Perhaps some of the materials can be pre-printed and bought from the bookstore? Instead of lining up to use printers and computers?
  29/8/2012 9:54 PM  View Responses

- The assessment 2 is too large, I would like to see assessment 1 larger so assessment 2 could be smaller
  29/8/2012 3:26 PM  View Responses

- Some of the links to the readings could have been better.
  29/8/2012 2:22 PM  View Responses

- Perhaps have each new weekly learning tasks automatically placed at the top on the Sunday of that week (under the assessment details) for that week and have the remaining weeks’ learning tasks bumped down (still accessible but not causing a lot of scrolling to get to the week’s materials).
  28/8/2012 9:45 AM  View Responses

answered question 23

skipped question 5
Survey Three Results

- Response Rate Low = 4%
## Response Summary

### PAGE: NUR1099 STUDY DESK SURVEY STAGE 3

<table>
<thead>
<tr>
<th>Question</th>
<th>Difficulty Options</th>
<th>Rating</th>
<th>Rating Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ease of Navigation – logging in, finding your way around, locating things (for example weekly study guides, course content, assessments).</td>
<td>Difficult Many problems Many problems</td>
<td>Easy Average Count</td>
<td>66.7% (8) 4.58 12</td>
</tr>
<tr>
<td></td>
<td>Difficult Some problems Some problems</td>
<td>Easy</td>
<td>Count</td>
</tr>
<tr>
<td></td>
<td>Difficult A few minor problems A few minor problems</td>
<td>Easy</td>
<td>Count</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Difficulty Options</th>
<th>Rating</th>
<th>Rating Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Ease of reading content – eg clarity, font size of text, diagrams &amp; pictures documents.</td>
<td>Difficult Many problems Many problems</td>
<td>Easy Average Count</td>
<td>50.0% (6) 4.33 12</td>
</tr>
<tr>
<td></td>
<td>Difficult Some problems Some problems</td>
<td>Easy</td>
<td>Count</td>
</tr>
<tr>
<td></td>
<td>Difficult A few minor problems A few minor problems</td>
<td>Easy</td>
<td>Count</td>
</tr>
</tbody>
</table>
### 3. Ease of communication – with your lecturers and other students:

<table>
<thead>
<tr>
<th>Difficulty</th>
<th>Many problems</th>
<th>Some problems</th>
<th>A few minor problems</th>
<th>Easy</th>
<th>Rating Average</th>
<th>Rating Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>58.3% (7)</td>
<td>41.7% (5)</td>
<td>4.42</td>
</tr>
</tbody>
</table>

- **Answered question**: 12
- **Skipped question**: 0

### 4. Ease of interacting with the content (e.g., clarity of instructions, wiki's, discussion forums, on-line quizzes):

<table>
<thead>
<tr>
<th>Difficulty</th>
<th>Many problems</th>
<th>Some problems</th>
<th>A few minor problems</th>
<th>Easy</th>
<th>Rating Average</th>
<th>Rating Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>0.0% (0)</td>
<td>16.7% (2)</td>
<td>8.3% (1)</td>
<td>41.7% (5)</td>
<td>4.00</td>
<td>12</td>
</tr>
</tbody>
</table>

- **Answered question**: 12
- **Skipped question**: 0
5. Changes have been made from suggestions made from the Stage 2 (week 4 survey). Can you please comment on whether these changes have improved your Study Desk experience or not.

- Yes, changes have been useful, helped to speed things up. 19/9/2012 7:54 PM
- Changes made have improved visual appeal as well as ease of navigation. 16/9/2012 7:30 PM
- Yes, helpful. 14/9/2012 8:22 PM
- Pretty good. 14/9/2012 1:22 PM
- The new buttons for navigating to each week's materials has helped a lot. 12/9/2012 4:10 PM
- They've improved my experience, definitely. I'm very happy with them. 11/9/2012 5:04 PM
6. What further changes, if any, would you like to see?

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Showing 7 text responses

would be nice to have answers to online quizzes after marks released to assess where we have gone wrong and as a revision aid.
19/9/2012 7:54 PM  View Responses

It would be a positive change if directions for activities and communication of expectations were more clarified. This is not so much a layout factor, all in all I'm happy with the new page look. I'm not sure however where all the course readings went. As of a few days ago, they were not found in the course reading (direct) link to the left of the course page.
16/9/2012 7:30 PM  View Responses

changes implemented for other subjects
14/9/2012 8:22 PM  View Responses

Greater clarity on what is expected for the assignment.
12/9/2012 4:10 PM  View Responses

I can't think of any.
11/9/2012 5:04 PM  View Responses
Study Conclusions

- Respondents preferred consistent VLS screen design and structured navigation schema for the explicit and considered placement of course learning material, social learning tools and associated activities to support ease of navigation.

- Revealed a need for further investigation and validation in relation to effective HCI, CL & DP for the VLS design.

- The need for a method/tool to reliably assess VLS’s.
Discussion – Design principles

- VLS design based on pedagogical best practice principles. For eg:
  - Backward design
  - Bloom’s taxonomy
  - Gardner’s multiple intelligences
  - Social constructivism
  - Situated learning
  - Laurillard’s theory of conversations
  - Salmon’s 5 stage model
  - TPCK Framework and context
5 stage model (Salmon 2011)

1. **Access and motivation**
   - Setting up system and accessing
   - Welcoming and encouraging

2. **Online socialisation**
   - Sending and receiving messages
   - Familiarising and providing bridges between cultural, social and learning environments

3. **Information exchange**
   - Searching, personalising software
   - Facilitating tasks and supporting use of learning materials

4. **Knowledge construction**
   - Conferencing
   - Facilitating process

5. **Development**
   - Providing links outside closed conferences
   - Supporting, responding

Legend:
- E-Moderating
- Technical support
Discussion – Cognitive Load & HCI

Cognitive Load
- Reaching the learning = extraneous cognitive load
- Actual learning = germane cognitive load
- Ways of working = intrinsic cognitive load

HCI
- Usability: Reflection on screen artefact
- Utility: Reflection on efficiency of interaction
- Functionality: Reflection on outcome v’s motive
- Usefulness: value
Discussion

Reducing extraneous cognitive load

- Human Computer Interaction (HCI) and Digital Pedagogy are equally important parts of VLS design.

- Cognitive Load (CL) also needs to be considered as user fatigue can set in before the learning is reached.

- Focus in this study was on the extraneous CL and its relationship to HCI and Digital Pedagogy.

- To reduce extraneous CL (mental effort to reach the learning), thereby optimising student effort on learning (Germane CL).
Conclusions

- Respondents are busy people who want:
  - Clear & consistent VLS design
  - Uniform icons, buttons & terminology
  - Minimised navigation within VLS

- Students are busy juggling:
  - Study
  - Work
  - Personal Life

Therefore ‘Getting the VLS Just Right’ is paramount to support their effort on the actual learning.
Future Research

- Focusing on thoughtful HCI, Digital Pedagogy considerations to reduce Extraneous and Intrinsic cognitive load in order to optimise the learning (Germane cognitive load).

- To validate a tool that optimises student learning in the VLS called **Reedy’s Virtual Learning Optimiser**
Alice: “Would you tell me, please, which way I ought to go from here?”
The Cheshire Cat: “That depends a good deal on where you want to get to.”

Alice: “I don't much care where.”
The Cheshire Cat: “Then it doesn't much matter which way you go.”

Alice: “...So long as I get somewhere.”
The Cheshire Cat: “Oh, you're sure to do that, if only you walk long enough.”