The Effect of “a Situation-Based Simulation e-Learning Program for Nursing Students—Using Delirium as an Example

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Background

• Lave & Wenger first published in *Situated Learning*
  – illustrate their theory by observations of different apprenticeships

• Jean Lave was (and is) a social anthropologist with a strong interest in social theory, based at the University of California, Berkeley

• Etienne Wenger was a teacher who joined the Institute for Research on Learning.
Lave & Wenger Suggest

• Learning is not seen as the acquisition of knowledge by individuals so much as a process of social participation.
• The nature of the situation impacts significantly on the process.
• Approaching learning is something more than simply 'learning by doing' or experiential learning.
Situated Learning Theory (SLT)

- is “the notion of learning knowledge and skills in contexts that reflect the way they will be used in real life”.
  (Collins, 1989)
3 Core Elements in Course Design

• Apprenticeships/learning activity
• “Virtual” or “real” environment
• Place their students in an environment
  – as similar as possible to the context in which their learning will actually be used.
E-Learning in SLT

- Actual work setting
- Highly realistic or virtual surrogate of the actual work environment
- Anchoring context such as a video or multimedia program

(McLellan, 1994)
Constructive Elements of Situated Learning in Interactive Multimedia

Learner

Interactive multimedia program

Implementation
Motivation

- 14-24% prevalence rate, at admission
- 6 to 56% during hospitalization occurs one type of delirium
  - 15-53% geriatric patients
  - 70-80% older patients in ICU
- 60%, at nursing homes
- 83% of geriatric patients prior to death
Motivation

• 22-76% Mortality rate in hospitalized patients
  – One year mortality rate is 35-40%

• Health outcomes
  – Prolongs the length of stay
  – Increased cost of care in hospital
  – Increases likelihood of needs for nursing home placement
  – Functional decline and loss of independence
Under Recognition

• Under recognition is a major concern,
  – 19-87.5% of nurses have problem in accurate recognition or documenting (Inouye, 2001; Milsen, & et al, 2002, Sounder, 2000)
  – Only 20% physicians recognize and document delirium during hospitalization
  – only DSM-IV criteria precise but difficult to apply
Delirium in Nursing Education

• Delirium has been overlooked in nursing education
• Delirium is an abstract concept
• Traditional teaching strategy may not be able to fulfill the needs of Nursing students (NS)
Example

Implementation Situated Learning Theory into Geriatric Education
Purpose of the Study

• Establish an e-learning program for NS
• NS would be able to identify the elderly patients developing delirium, as the e program implemented.
Design

• A quasi-experimental design
• 2 class was randomly assigned into the experimental group (n=49) & comparison group (n=48)
Design

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>intervene</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comparison group (CG)</td>
<td>O1</td>
<td>X</td>
<td>O2</td>
</tr>
<tr>
<td>Experimental group (EG)</td>
<td>O”1</td>
<td>X”</td>
<td>O”2</td>
</tr>
</tbody>
</table>

- O1 & O”1: pretest score before the program
- O2 & O”2: posttest after the program
- X: traditional program
- X”: e program
E-program
Vignettes

• 3 subtypes of delirium were established
  – Hyperactive subtype
  – Hypoactive subtype
  – Mixed

• Normal aging

• Dementia
Applicability of the e Program

• A expert panel: 2 geriatric faculty & 3 senior clinic nurses reviewed each case in the program
• 10 students were administered prior to the study
• A focus group was conducted
• The e program was revised based on the suggestion of the expert & result of the focus group.
Statistical Analysis

- Data were coded
- SPSS 18.0 software was used
- Descriptive analysis: mean, SD, percentage
- General Estimate Equation (GEE) was used to examine the effect of the e-program (intervention)
Results

- 97 NS were recruited in the study and divided into 2 groups
- 48 in the EG; 47 in the CG
- No statistical difference between 2 groups

<table>
<thead>
<tr>
<th>Table 1. Characteristics of subjects between two groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>EG</td>
</tr>
<tr>
<td>Female 49</td>
</tr>
<tr>
<td>CG</td>
</tr>
<tr>
<td>Female 48</td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, ***p<0.001*
Results: Accuracy of Delirium

<table>
<thead>
<tr>
<th>Domain</th>
<th>Comparison group (n = 48)</th>
<th>Experimental group (n = 49)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Total</td>
<td>54.2 (10.6)</td>
<td>56.3 (21.4)</td>
</tr>
<tr>
<td>Hyper</td>
<td>76.0 (25.2)</td>
<td>69.8 (24.7)</td>
</tr>
<tr>
<td>Hypo</td>
<td>25.0 (29.2)</td>
<td>35.4 (34.1)</td>
</tr>
<tr>
<td>Dementia</td>
<td>93.8 (16.7)</td>
<td>88.5 (21.2)</td>
</tr>
<tr>
<td>NL</td>
<td>72.9 (44.9)</td>
<td>56.3 (48.0)</td>
</tr>
</tbody>
</table>

The values in cell are mean accuracy rate (standard deviation).
### Results

Table 3: The estimated parameters of GEE analysis for evaluating intervention effect.

<table>
<thead>
<tr>
<th>Domain/Parameter</th>
<th>( B )</th>
<th>S.E.</th>
<th>Wald ( \chi^2 )</th>
<th>( P ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total scores</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>54.17</td>
<td>1.51</td>
<td>1280.84</td>
<td>&lt; 0.001***</td>
</tr>
<tr>
<td>Group (Experimental)(^\d)</td>
<td>12.50</td>
<td>2.59</td>
<td>23.37</td>
<td>&lt; 0.001***</td>
</tr>
<tr>
<td>Time (Posttest)(^\d)</td>
<td>2.08</td>
<td>2.93</td>
<td>0.51</td>
<td>0.477</td>
</tr>
<tr>
<td>Group (Exp.) &amp; Time (Posttest)(^\d)</td>
<td>12.12</td>
<td>4.38</td>
<td>7.67</td>
<td>0.006**</td>
</tr>
<tr>
<td><strong>Hyper delirium</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>76.04</td>
<td>3.61</td>
<td>444.86</td>
<td>&lt; 0.001***</td>
</tr>
<tr>
<td>Group (Experimental)(^\d)</td>
<td>9.67</td>
<td>4.84</td>
<td>4.00</td>
<td>0.046*</td>
</tr>
<tr>
<td>Time (Posttest)(^\d)</td>
<td>-6.25</td>
<td>3.79</td>
<td>2.72</td>
<td>0.099</td>
</tr>
<tr>
<td>Group (Exp.) &amp; Time (Posttest)(^\d)</td>
<td>15.43</td>
<td>5.51</td>
<td>7.85</td>
<td>0.005**</td>
</tr>
<tr>
<td><strong>Hypo delirium</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>25.0</td>
<td>4.17</td>
<td>36.0</td>
<td>&lt; 0.001***</td>
</tr>
<tr>
<td>Group (Experimental)(^\d)</td>
<td>4.59</td>
<td>6.17</td>
<td>0.56</td>
<td>0.456</td>
</tr>
<tr>
<td>Time (Posttest)(^\d)</td>
<td>10.42</td>
<td>4.16</td>
<td>6.28</td>
<td>0.012&amp;</td>
</tr>
<tr>
<td>Group (Exp.) &amp; Time (Posttest)(^\d)</td>
<td>22.42</td>
<td>8.16</td>
<td>6.76</td>
<td>0.009***</td>
</tr>
<tr>
<td><strong>Dementia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>93.75</td>
<td>2.39</td>
<td>154.86</td>
<td>&lt; 0.001***</td>
</tr>
<tr>
<td>Group (Experimental)(^\d)</td>
<td>-1.91</td>
<td>4.58</td>
<td>0.17</td>
<td>0.676</td>
</tr>
<tr>
<td>Time (Posttest)(^\d)</td>
<td>-5.21</td>
<td>3.03</td>
<td>2.95</td>
<td>0.086</td>
</tr>
<tr>
<td>Group (Exp.) &amp; Time (Posttest)(^\d)</td>
<td>-6.01</td>
<td>4.72</td>
<td>1.63</td>
<td>0.202</td>
</tr>
<tr>
<td><strong>Normal aging</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>72.92</td>
<td>6.41</td>
<td>129.23</td>
<td>&lt; 0.001***</td>
</tr>
<tr>
<td>Group (Experimental)(^\d)</td>
<td>8.72</td>
<td>8.47</td>
<td>1.06</td>
<td>0.303</td>
</tr>
<tr>
<td>Time (Posttest)(^\d)</td>
<td>-16.67</td>
<td>9.24</td>
<td>3.25</td>
<td>0.071</td>
</tr>
<tr>
<td>Group (Exp.) &amp; Time (Posttest)(^\d)</td>
<td>21.77</td>
<td>11.92</td>
<td>3.33</td>
<td>0.068</td>
</tr>
</tbody>
</table>

\(^\d\) Reference group: Comparison group...
\(^\d\) Reference group: Pretest...
\(^\d\) Reference group: Comparison group \& Pretest...

B = estimated parameter; S.E. = standard error.
Results

Table 4  Response time for experimental group before and after intervention (n = 49)

<table>
<thead>
<tr>
<th>Item</th>
<th>Pretest</th>
<th>Posttest</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time_hyper</td>
<td>16.23 (10.35)</td>
<td>15.23 (16.87)</td>
<td>0.37</td>
<td>0.716</td>
</tr>
<tr>
<td>Time_hypo</td>
<td>26.26 (15.83)</td>
<td>16.62 (10.17)</td>
<td>3.92</td>
<td>0.0003</td>
</tr>
<tr>
<td>Time_dementia</td>
<td>10.26 (12.05)</td>
<td>18.74 (15.07)</td>
<td>-3.12</td>
<td>0.003</td>
</tr>
<tr>
<td>Time_normal</td>
<td>13.77 (12.25)</td>
<td>12.10 (12.68)</td>
<td>0.67</td>
<td>0.508</td>
</tr>
</tbody>
</table>

The values in cell are mean response time (standard deviation).
t = test statistics of paired-sample t-test.
Graphs

Bar Chart of Total Scores of 2 groups

Bart chart of scores of hyperactive-subtype delirium of 2 groups

Bart chart of scores of hypoactive-subtype delirium of 2 groups
Graphs

Bar chart of scores of Dementia of 2 groups

Bar chart of scores of normal aging of 2 groups
Discussion

• There no statistical difference between 2 groups (baseline)
• Participants are all female, typical characteristics of nursing students & manpower
• Working experience of students in the study are high.
  – Similar to other schools with the same program
  – Those subjects mostly are clinical nurses, but this result are even more worrisome, regarding the judgmental ability to delirium among clinic nurses
Discussion

• The experiment group does better on total scores, hyper & hypo subtypes of delirium of tests, \( p < 0.01 \)

• Therefore, the e program seemed to be more effective than the traditional teaching.

• But both groups did poor on the hypoactive delirium, initially, which is similar to other study.

• Both groups did fair well on patients with dementia & normal
  
  – Nurses are prone to ignore the "good patients", and pay more attention on patients with aggressive behavior (O’keeffe, & Lavan, 1999; Petersom, et al, 2006).
  
  – Fundamental knowledge about dementia and normal aging is included in current curriculum.
Discussion

• As the e program giving, the EG did much better than the CG, especially for the hyperactive & hypoactive delirium

• Worthwhile mentioned, both normal & dementia both cases are not well identified in this study.
  – It is possible that NS cannot distinguish the difference between normal aging, dementia, & hypoactive cases, since during hospitalization, they are mostly quiet, inactive and not involving in treatment too much.
  – The other possibility has been discussed in my previous study (Wang, & Mentes, 2006) : Chinese culture, “respect”, may jeopardize the judgmental ability of nurses to cognitive function of the elderly patients.
Discussion

• Students were able to spend less time in decision making, as the program was implemented.
  – Therefore, the program seemed to be a quite effective tool for NS, regarding making accurate judgment about delirium.
Conclusion

• The situated e learning program seemed to work well for NS.
• NS’ decision making ability regarding delirium gets better in the study.
• Each story of cases was generated within 3 minutes to reflect the reality.
• Abstract concepts may not be suitable for the traditional teaching.
• Researchers may utilize similar methodology to assist students learning abstract concepts.
• The context of nursing education regarding cognition of the elderly may need to be reexamined.
Entrance to the website

基本資料

姓名：廖先生
年齡：76
性別：男
婚姻：已婚
子女：2男-1女
語言：台語
職業：退休
廖先生75岁，独居。这一次是因为发烧不退两天了，一直有咳嗽和打寒颤情形，到门诊看病，经医师诊视，诊断为肺炎，并要求其入院治疗。
睡了一整晚後，隔天上班（窗外亮的）護士手拿針管和紗布進入病房中，要幫病人換藥，在換藥的時候，病人表情生氣並且大聲的說：“你換藥為什麼這麼大力？昨天那個男醫師換的時候都不會痛！”
問題1

李太太一直沒反應，請問您會如何處理？

- 趕快叫醫生
- 也許李太太心情不好，安慰一下她就好了
- 評估病史，記錄並持續觀察病患
問題2

當您評估病患的時候，您會收集哪些資料？

- 過去病史
- 現在病史
- 家庭與婚姻狀況
- 生命測量徵象
- 實驗室檢查
- 身體評估
Thank You