



Effects of Combined Teaching Strategies in Evidence-Based Learning for Student Nurses and Clinical Nurses

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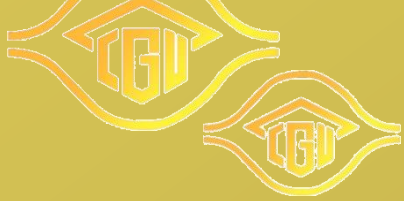
Learning Objectives

- 1: To know the differences of Evidence-Based related knowledge between the senior student nurses and clinical nurses
- 2: To know the short-term and long-term effects of combined teaching strategies for Evidence-Based Health Care in senior student nurses and clinical nurses



Expended Contents

- Describe the results of comparison for the baseline comparison of outcomes among the four groups.
- Describe the results of GEE for comparisons the collected outcomes during reseaarh period among the four groups.



Introduction

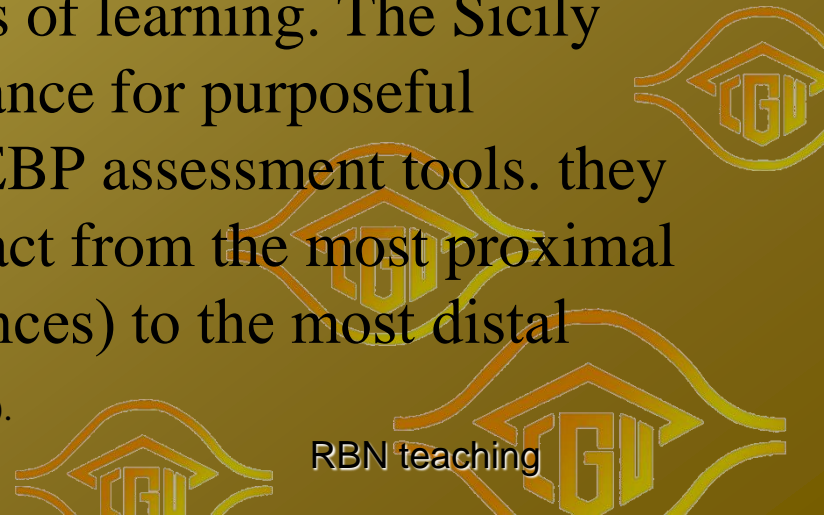
- The delivery of safe, effective nursing care requires the use of an evidence-based approach to practice (Shorten, Wallace & Crookes, 2001). Evidence Based Nursing (EBN) provides a practice with a strong application of the scientific method. This enables practice to be proceed by a process of skeptical questioning rather than by embellishment with rhetoric (Baum, 2003).
- The improvement of Computer changes the style and efficiency of learning for individuals.

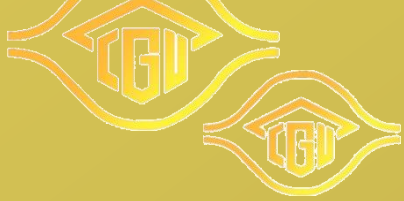




Introduction

- Teaching the steps of evidence-based practice (EBP) has become standard curriculum for health professions at both student and professional levels. Educators can assess different dimensions of EBP learning, including reaction to initial exposure to EBP, knowledge attainment, or the ability to use EBP skills to improve patient care.
- The widespread adoption of EBP into professional education requires valid and reliable measures of learning. The Sicily consensus statement provides guidance for purposeful classification and development of EBP assessment tools. they allow educators to classify the impact from the most proximal phenomenon (the learners' experiences) to the most distal (patient care outcomes) ([Tilson et al., 2011](#)).





Introduction

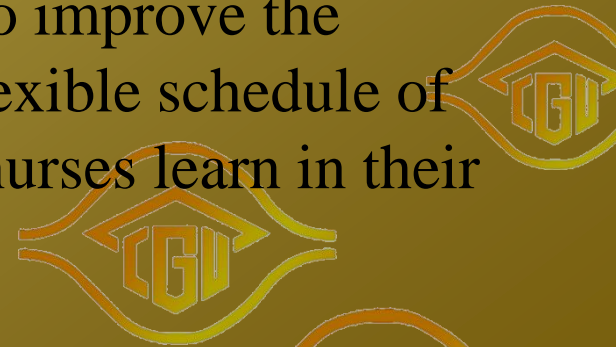
- They proposed 7 categories of assessments in EBP learning, which are:
 - 1). Reaction to the EBP educational experience;
 - 2). Attitudes about EBP;
 - 3). Self-efficacy for conducting EBP;
 - 4). Knowledge about EBP principles;
 - 5). Skills for performing EBP;
 - 6). Behavior congruent with EBP as part of patient care; and
 - 7). Benefit to Patients associated with EBP.

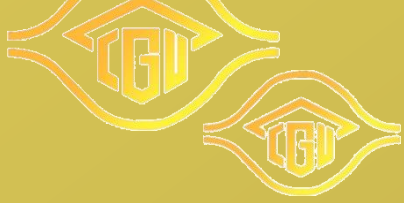




Introduction

- Professor Richard Noss (2012) mentioned that “the potential for learning is clear when we consider the technologies that are present in homes and in people’s pockets. But there is little sign that this kind of technology is being adequately exploited for teaching and learning”(p.2).
- Limited teaching materials related to nursing domain and busy clinical schedule might keep them away from actively learning of the evidence-based issues that can help to improve the quality of care as found in literature. The flexible schedule of web-assisted learning might help the busy nurses learn in their own pace.





Research Purposes

- to identify the general conditions of computer literacy and information literacy, critical thinking, Knowledge and Attitude toward Science, self-efficacy towards EBP, and knowledge, attitude and implementation towards EBP in SN and RN;
- to identify and compare the changed pattern of critical thinking, computer literacy and information literacy, self-efficacy towards EBP, and knowledge, attitude and implementation towards EBP among the SN and RN.








Methodology

- This two-year quasi-experimental study was conducted during August, 2013 to July, 2015.
- Student nurses (SN) and clinical nurses (RN) were recruited from one university and one medical center.






Sample Recruitment_SN

- Selection criteria 1). Female, 2). age \geq 21 years, 3). willing to participate into this study and receive regular follow-up for 2 years.
 - Those who selected the elective course “evidence-based health care” were treated as experimental group (n=16) whereas the rest of students at the same year were treated as control group (n=71).
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Sample Recruitment_RN

➤ Selection criteria:

- 1). Female, 2). age \geq 21 years,
 - 3). Work as nurse in study hospital \geq 3 months,
 - 4). Have personal computer and have the skill to get into web, and
 - 5). willing to participate into study and receive regular follow-up for 2 years.
- 



Sample Recruitment_RN

- ◆ Snowball technique and advertisement on bulletin board in study hospital.
- ◆ Distributed into control (n=77) and experimental (n=29) groups by personal willingness.

招募護理人員參與 學習實證相關研究

- 研究目的：驗證課室併網路教學方式教導臨床護理人員實證護理相關知能之立即與長期成效。
- 條件：年滿21歲以上；擔任臨床護理照護(含)滿三個月以上；自備個人電腦與上網設備；會使用Facebook；且願意接受定期訪談與填答問卷者。同工作單位者優先錄取。
- 方式：實驗組需定期上網學習且可接受研究團隊每週提供的面對面與網路諮詢。對照組僅接受定期問卷調查。
- 研究期間：兩年，每三個月填寫一次問卷，每次完成後贈予車馬費。
- 聯絡人：長庚大學護理學系劉雪娥教授；院內話機：413-5243；

e-mail: sarah@mail.cgu.edu.tw



Methodology

- The experimental group received classroom teaching (for SN) and web learning (for RN) at regular basis whereas the control group received regular contacts only.



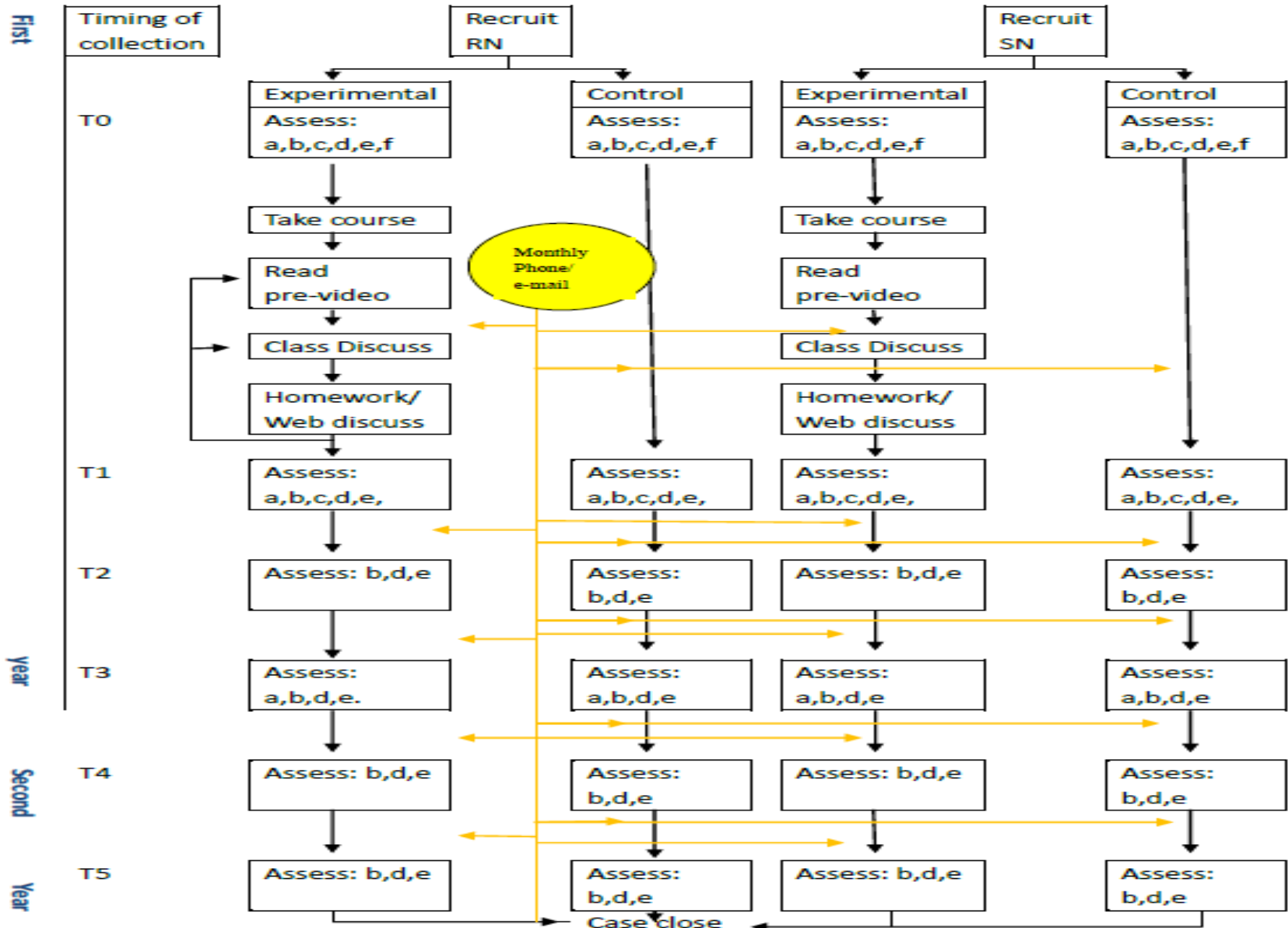


Figure 1. Flow chart of data collection

Note: a. computer and information literacy; b. CTT-II; c. Knowledge and Attitude toward Science Scale; d. The EBP beliefs scale; e. the Evidence-Based Practice Questionnaire, EBPOQ, f. personal information



Contents of the course work

Based on the suggestions from TEBMA

➤ Basic core course

- Brief introduction of EBM and question formation
- Search of evidences from literature
- Application of EBM

➤ Advanced core course

- Introduction of RCT & appraisal of example
- Introduction of Cohort study & appraisal of example
- Introduction of Case control & appraisal of example
- Introduction of systematic review and meta-analysis & appraisal of example

- Application in clinical scenario
- Advanced clinical implication



Real Topics

- Course introduction and grouping ; 36 hours for 2 credits
- Introduction of EBM, EBN, EBHC
- Forming Clinical questions
- Literature search and Levels of evidence
- Type of research design_ case control , cohort study and appraisal.
- RCT and appraisal
- Systematic review and appraisal
- EBN application in adult nursing, gynecology nursing, pediatric nursing, and geriatric nursing
- Midterm_Group report; Final_EBN competition by Clinical scenario
- Course evaluation





For the SN_experimental group

➤ Before class

- Upload the contents of ppt to e-learning system one week ahead of class

➤ In class

- Video-taped the class

➤ After class

- Editing the film and upload to e-learning system
- SN can make appointment with faculty if they want.

For the RN_experimental group

- Create a facebook and upload the edited video of each class weekly
- Announce the contact information of PI

The image shows a Facebook profile page for a user named 劉雪娥 (Liu Xue'e). The profile cover features the text "Evidence-based Nursing" and "護理實證" (Evidence-based Nursing) in red, with "CHANG GUNG UNIVERSITY" below it. A thumbnail image of a book cover is visible on the left. The navigation bar at the bottom includes "動態時報", "關於", "朋友", "相片", and "更多".



Outcome indicators

1. Computer literacy and information literacy

- Chang (2004) developed an tool to measure the computer and information literacy of Taiwanese nurses (TNIL). Expert validity and Cronbach alpha were conducted and found that TNIL is valid and reliable
- Ho (2008) developed another tool to measure the computer and and information literacy of student nurses (SNIL). The results of Expert validity and Cronbach alpha also showed that this is valid and reliable tool
- We combined these these two tools to measure the condition of samples of this study ($\alpha=.88$).



Outcome indicators

2. Knowledge and Attitude toward Science (KASS)

- In order to measure the knowledge and attitudes towards science, KASS was developed by Vodopivec et al (2002).
- **Part 1.** attitude toward science and research. 10 positive and 10 negative items with 5-point Likert-type scale.
- **Part 2.** evaluation of knowledge. 8 multiple- choice questions about scientific research.
- Cronbach's alpha was 0.848
- Chinese version was obtained by Translation and back-translation process (alpha=.74).






Outcome indicators

3. Critical Thinking

- Chinese version of Critical thinking test II (CTT-II) was selected to measure the capability of critical thinking for the participants.
- CTT-II is developed and validated by Yeh (2005). It includes 30 items with 5 domains (induction, deduction, explanation, and appraisal) and takes 25 minutes to complete the test.
- The results of IRT model testing, discriminate validity and internal consistency show that CTT-II is a valid and reliable tool.



Outcome indicators

4. Knowledge, attitude and implementation towards EBP (EBPQ)
 - EBPQ was selected as a tool to measure the Knowledge, attitude and implementation towards EBP of participants. It has 24 items and are organized into three subscales (EBP, attitudes towards EBP and knowledge of EBP). All items were scored on a scale of 1–7, with a higher score indicating a more positive attitude the subjects have.
 - Various strategies (principal component factor analysis, Cronbach alphas) have been conducted to verify the validity and reliability of the EBPQ.
 - Chinese version was translated by Yang.
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Outcome indicators

5. self-efficacy towards EBP

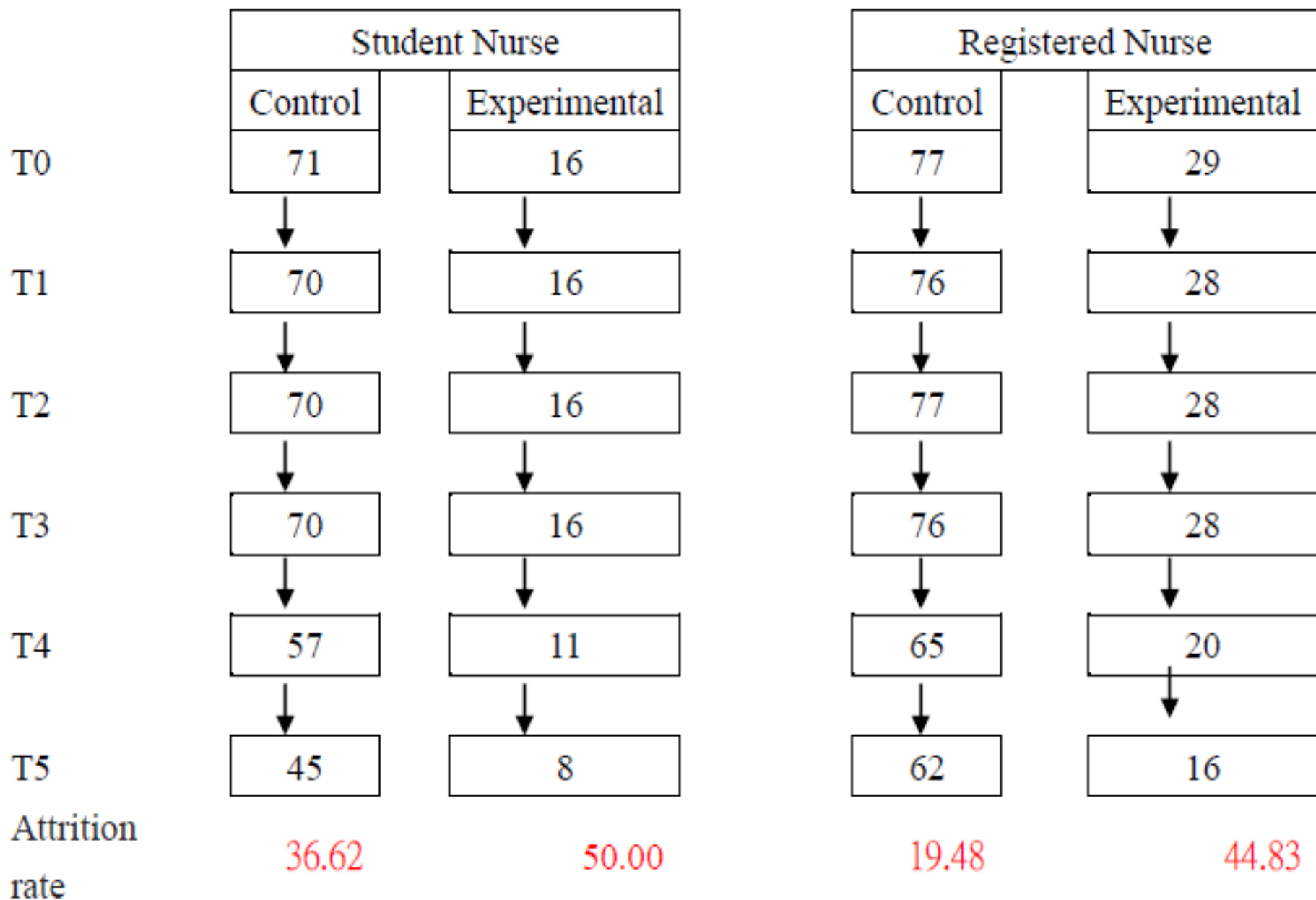
- EBP beliefs scale developed by Melnyk , Fineout-Overholt, & Mays(2008) in order to measure the personal value and ability to conduct the evidence-based practice.
- It has 16 items indicating how strongly they disagree or agree to each of the statements using a 5-point Likert scale.
- Cronbach's alpha = 0.9; and 0.87 (Spearman–Brown $r=0.87$. Face, content, construct and criterion validity have been conducted during instrument development (Melnyk et al. 2008).
- It has Chinese version already (alpha=.88).



Results and Discussion



Figure 3. Lost of follow-up at each point of assessment



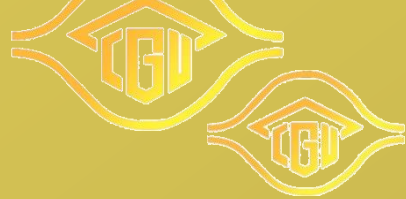


Table 1. age distribution and comparison among groups

Age	Mean	SD	Min	Max	F	p	Scheffes'
1.SN_control	22.90	1.79	22.00	33.00	42.46	<.001	1< 3 & 4
2.SN_experiental	22.63	0.50	22.00	23.00			2< 3 & 4
3.RN_control	30.74	6.29	22.00	50.00			
4.RN_experimental	31.26	6.95	22.00	49.00			





Table 2. Comparison of Outcomes at Baseline Assessment among Each Group

T0 Tool	SN_control			SN_experimental			RN_control			RN_experimental			Comparison		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	F	p	Scheffee's
Information literacy	70	136.86	10.86	16	134.00	11.44	77	126.26	13.61	29	130.48	14.74	8.80	<.001	SN_C>RN_C
Knowledge & attitude towards science	71	77.54	8.43	16	77.38	6.83	75	73.97	8.45	29	75.00	6.43	2.65	.05	NS
Critical Thinking	71	14.41	3.53	16	16.38	2.94	77	12.77	3.24	29	12.83	3.08	7.29	<.001	SN_C>RN_C ; SN_E>RN_E ; RN_C
EBPQ scale	71	108.89	22.11	16	105.63	11.45	76	101.01	18.80	29	103.69	17.04	2.05	.108	
EBP belief	70	50.39	6.81	16	51.19	8.59	77	50.48	6.95	29	51.24	8.48	.14	.938	





Results of GEE



Table 4. Results of GEE for Information Literacy

Predictor	<i>B</i>	<i>S.E</i>	Wald χ^2	<i>p</i>
(Intercept)	136.59	1.31	10877.94	<.001
[group=4.00]	-10.33	2.02	26.07	<.001
[group=3.00]	-6.15	3.04	4.09	.04
[group=2.00]	-2.59	3.06	.71	.40
[Time=5.00]	.25	2.27	.01	.91
[Time=4.00]	.98	2.01	.24	.62
[Time=3.00]	1.85	1.66	1.25	.26
[Time=2.00]	1.86	1.49	1.56	.21
[Time=1.00]	2.14	1.49	2.07	.15
[group=4.00]	2.26	3.35	.45	.50
* [Time=5.00]				
[group=4.00]	1.60	2.83	.32	.57
* [Time=4.00]				
[group=4.00]	1.38	2.48	.31	.58
* [Time=3.00]				
[group=4.00]	-1.29	2.29	.32	.57
* [Time=2.00]				
[group=4.00]	-.67	2.12	.10	.75
* [Time=1.00]				

Table 4. Results of GEE for Information Literacy (Cont.)

Predictor	<i>B</i>	<i>S.E</i>	Wald χ^2	<i>p</i>
[group=3.00]	1.45	2.94	.24	.62
* [Time=5.00]				
[group=3.00]	2.22	3.87	.33	.57
* [Time=4.00]				
[group=3.00]	1.12	2.96	.14	.70
* [Time=3.00]				
[group=3.00]	.19	2.64	.01	.94
* [Time=2.00]				
[group=3.00]	-2.34	2.63	.79	.37
* [Time=1.00]				
[group=2.00]	-.82	5.76	.02	.89
* [Time=5.00]				
[group=2.00]	6.99	3.47	4.05	.04
* [Time=4.00]				
[group=2.00]	5.27	3.49	2.29	.13
* [Time=3.00]				
[group=2.00]	5.83	2.75	4.49	.03
* [Time=2.00]				
[group=2.00]	.49	3.15	.02	.88
* [Time=1.00]				
(scale)	205.09			

Table 5. Results of GEE for Knowledge and Attitude toward Science

Predictor	<i>B</i>	<i>S.E</i>	Wald χ^2	<i>p</i>
(Intercept)	77.54	.99	6098.01	<.001
[group=4.00]	-3.44	1.39	6.18	.01
[group=3.00]	-2.80	1.59	3.12	.08
[group=2.00]	-.16	1.93	.01	.93
[Time=5.00]	-1.43	1.36	1.10	.30
[Time=4.00]	-.52	1.20	.19	.66
[Time=3.00]	-3.08	1.17	6.92	.01
[Time=2.00]	-1.27	.95	1.77	.18
[Time=1.00]	-.30	1.09	.07	.79
[group=4.00] * [Time=5.00]	-.27	1.79	.02	.88
[group=4.00] * [Time=4.00]	-2.39	1.69	2.00	.16
[group=4.00] * [Time=3.00]	1.14	1.62	.49	.48
[group=4.00] * [Time=2.00]	-1.81	1.46	1.54	.22
[group=4.00] * [Time=1.00]	.04	1.55	.00	.98

Table 5. Results of GEE for Knowledge and Attitude toward Science (Cont.)

Predictor	<i>B</i>	<i>S.E</i>	Wald χ^2	<i>p</i>
[group=3.00]	4.23	2.41	3.08	.08
* [Time=5.00]				
[group=3.00] * [Time=4.00]	5.04	2.12	5.65	.02
[group=3.00] * [Time=3.00]	4.13	1.93	4.58	.03
[group=3.00] * [Time=2.00]	5.03	2.08	5.83	.02
[group=3.00] * [Time=1.00]	-.87	1.79	.24	.63
[group=2.00] * [Time=5.00]	.96	3.90	.06	.80
[group=2.00] * [Time=4.00]	2.71	3.11	.76	.38
[group=2.00] * [Time=3.00]	-.29	2.84	.01	.92
[group=2.00] * [Time=2.00]	1.84	1.95	.89	.34
[group=2.00] * [Time=1.00]	2.92	2.06	2.02	.16
(scale)	76.18			

Table 6.Results of GEE for Critical Thinking

Predictor	<i>B</i>	<i>S.E</i>	Wald χ^2	<i>p</i>
(Intercept)	14.41	.42	1198.56	<.001
[group=4.00]	-1.64	.56	8.75	<.001
[group=3.00]	-1.84	.68	7.40	.01
[group=2.00]	1.97	.82	5.69	.02
[Time=5.00]	-2.28	.55	17.32	<.001
[Time=4.00]	.05	.56	.01	.93
[Time=3.00]	-2.10	.48	18.85	<.001
[Time=2.00]	-1.14	.50	5.18	.02
[Time=1.00]	-.24	.44	.29	.59
[group=4.00] *	.38	.78	.23	.63
[Time=5.00]				
[group=4.00] *	-1.57	.77	4.18	.04
[Time=4.00]				
[group=4.00] *	-.50	.72	.48	.49
[Time=3.00]				
[group=4.00] *	-.84	.75	1.28	.26
[Time=2.00]				
[group=4.00] *	-1.13	.69	2.72	.10
[Time=1.00]				

Table 6.Results of GEE for Critical Thinking
(Cont.)

Predictor	<i>B</i>	<i>S.E</i>	Wald χ^2	<i>p</i>
[group=3.00] *	2.58	1.06	5.94	.01
[Time=5.00]				
[group=3.00] *	-.27	1.02	.07	.79
[Time=4.00]				
[group=3.00] *	1.24	.96	1.66	.20
[Time=3.00]				
[group=3.00] *	1.52	.95	2.57	.11
[Time=2.00]				
[group=3.00] *	.33	.64	.26	.61
[Time=1.00]				
[group=2.00] *	.77	1.31	.34	.56
[Time=5.00]				
[group=2.00] *	-2.61	1.10	5.60	.02
[Time=4.00]				
[group=2.00] *	-1.90	1.35	2.00	.16
[Time=3.00]				
[group=2.00] *	-.11	.90	.02	.90
[Time=2.00]				
[group=2.00] *	-.64	.93	.48	.49
[Time=1.00]				
(scale)	13.49			

Table 7. Results of GEE for Knowledge, Attitude and Implementation towards EBP

Predictor	<i>B</i>	<i>S.E</i>	Wald χ^2	<i>p</i>
(Intercept)	108.89	2.61	1746.94	<.001
[group=4.00]	-7.98	3.37	5.61	.02
[group=3.00]	-5.21	4.10	1.61	.20
[group=2.00]	-3.26	3.80	.74	.39
[Time=5.00]	-.88	2.88	.09	.76
[Time=4.00]	-.99	3.19	.10	.76
[Time=3.00]	2.94	2.32	1.61	.21
[Time=2.00]	2.64	2.23	1.41	.24
[Time=1.00]	-.52	1.92	.07	.79
[group=4.00]	3.41	4.41	.60	.44
* [Time=5.00]				
[group=4.00]	3.54	4.31	.67	.41
* [Time=4.00]				
[group=4.00]	-2.84	3.23	.77	.38
* [Time=3.00]				
[group=4.00]	2.69	3.40	.62	.43
* [Time=2.00]				
[group=4.00]	4.94	2.77	3.18	.07
* [Time=1.00]				

Table 7. Results of GEE for Knowledge, Attitude and Implementation towards EBP (Cont.)

Predictor	<i>B</i>	<i>S.E</i>	Wald χ^2	<i>p</i>
[group=3.00]	9.41	4.39	4.60	.03
* [Time=5.00]				
[group=3.00]	8.91	4.69	3.60	.06
* [Time=4.00]				
[group=3.00]	3.99	3.94	1.03	.31
* [Time=3.00]				
[group=3.00]	8.04	3.64	4.89	.03
* [Time=2.00]				
[group=3.00]	6.63	3.48	3.62	.06
* [Time=1.00]				
[group=2.00]	6.44	5.54	1.35	.25
* [Time=5.00]				
[group=2.00]	-3.94	9.20	.18	.67
* [Time=4.00]				
[group=2.00]	-1.07	5.66	.04	.85
* [Time=3.00]				
[group=2.00]	2.92	5.76	.26	.61
* [Time=2.00]				
[group=2.00]	2.33	4.62	.25	.61
* [Time=1.00]				
(scale)	391.29			

Table 8. Results of GEE for Self-Efficacy towards EBP

Predictor	<i>B</i>	<i>S.E</i>	Wald χ^2	<i>p</i>
(Intercept)	50.47	.81	3884.18	<.001
[group=4.00]	.01	1.13	.00	.99
[group=3.00]	1.01	1.76	.33	.57
[group=2.00]	.71	2.23	.10	.75
[Time=5.00]	1.36	1.43	.90	.34
[Time=4.00]	2.20	1.03	4.54	.03
[Time=3.00]	3.59	1.03	12.07	<.001
[Time=2.00]	2.13	.99	4.64	.03
[Time=1.00]	1.04	.96	1.19	.28
[group=4.00]	2.84	1.80	2.49	.11
* [Time=5.00]				
[group=4.00]	1.64	1.46	1.27	.26
* [Time=4.00]				
[group=4.00]	-1.57	1.37	1.30	.25
* [Time=3.00]				
[group=4.00]	1.23	1.49	.69	.41
* [Time=2.00]				
[group=4.00]	1.28	1.22	1.10	.29
* [Time=1.00]				

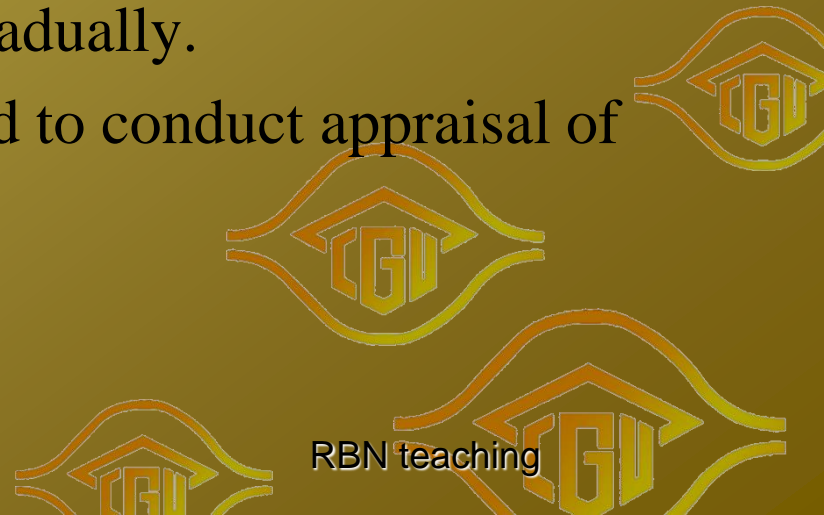
Table 8. Results of GEE for Self-Efficacy towards EBP (Cont.)

Predictor	<i>B</i>	<i>S.E</i>	Wald χ^2	<i>p</i>
[group=3.00]	4.76	1.96	5.86	.02
* [Time=5.00]				
[group=3.00]	2.41	1.59	2.31	.13
* [Time=4.00]				
[group=3.00]	1.88	1.56	1.46	.23
* [Time=3.00]				
[group=3.00]	3.38	1.59	4.49	.03
* [Time=2.00]				
[group=3.00]	2.57	1.60	2.59	.11
* [Time=1.00]				
[group=2.00]	-.82	3.23	.06	.80
* [Time=5.00]				
[group=2.00]	.23	2.82	.01	.93
* [Time=4.00]				
[group=2.00]	2.41	2.89	.70	.40
* [Time=3.00]				
[group=2.00]	1.87	3.01	.39	.53
* [Time=2.00]				
[group=2.00]	3.58	2.56	1.95	.16
* [Time=1.00]				
(scale)	55.67			



Conclusion

- Learning has immediate effects with limited long-term effects in general.
- Attrition rate is a big problem. Regular phone call and e-mail is not enough to keep subjects in longitudinal design
- After graduation, the students nurses did not want to participate into this study even they promised in the beginning. In addition, EBP is not required in clinics, so the positive responses towards EBP declined gradually.
- RN preferred to watch video instead to conduct appraisal of the Clinical scenario.





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