Online Problem-Based Learning Approach for Public Health Courses

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Introduction

- *International Cyber University for Health* (ICUH)

  - collaborative effort with *Asia Pacific Academic Consortium for Public Health* (APACPH)

  - To provide high quality online public health education in the Asia-Pacific region

  - One of the vision is to offer an environment that enables instruction and learning to become independent of space and time.

  - Since its official inauguration on May 3 2004, ICUH has evolved rapidly to offer PBL based courses, translation services and concurrently run a credit exchange program.

Materials and Methods

- PBL sessions were implemented in the following courses:
  - 2006 Fall semester : *Introduction to Health Informatics*, *Comparative Health Law Seminar, Leadership in Crisis and Communication in Disasters and Health Care*.
  - 2007 spring semester : *International Child Health, Systems Analysis and Design in Healthcare*

- Small Group discussion (8-10 students)
- Information resources prepared prior to the online discussion sessions
- Communications - Web conferencing, bulletin board

PBL Discussion Process

PBL Process	Description
Pre-Discussion Activities – Blackboard Function	
Case (Scenario) Presentation	A case or scenario is posted on the blackboard of online classroom one week prior to the PBL discussion session. The related questions for self-study are also presented.
Private Student Research	Students read the case and begin to find resource materials and other reference related to the case.
Intra-Discussion Activities (3~4 groups) – Meeting Room Function	
Case Recitation	A Tutor recites the case to be discussed and confirm if students understand the case correctly.
Fact Finding	A tutor leads students to source the facts, which may become debatable or significant in discussion.
Student Presentation	Each student makes a presentation on the answers for the questions and go on to the cross-over discussions amongst the group.
Possible Solution Finding	Students argue and discuss on possible solutions for the posted case study
Consensus Building	Voting process will be carried out to build consensus among students on important matters. (Voting Function)
Decision Making	Students can develop a policy through decision-making process after consensus building.
Post-Discussion Activities – Board Function	
Class Discussion	Using the board function in the online classroom, the discussion results from each discussion group are presented and further discussed among all the students in the class.
Report & Evaluation	Each student submit a separate report as well as an evaluation for each PBL session (Report Function)

Roles of participants in a PBL tutorial

All participants have role to play

Scribe

- Record points made by group
- Help group order their thoughts
- Participate in discussion
- Record resources used by group

Tutor

- Encourage all group members to participate
- Assist chair with group dynamics and keeping to time
- Check scribe keeps an accurate record
- Prevent side-tracking
- Ensure group achieves appropriate learning objectives
- Check understanding
- Assess performance

Chair

- Lead the group through the process
- Encourage all members to participate
- Maintain group dynamics
- Keep to time
- Ensure group keeps to task in hand
- Ensure scribe can keep up and is making an accurate record

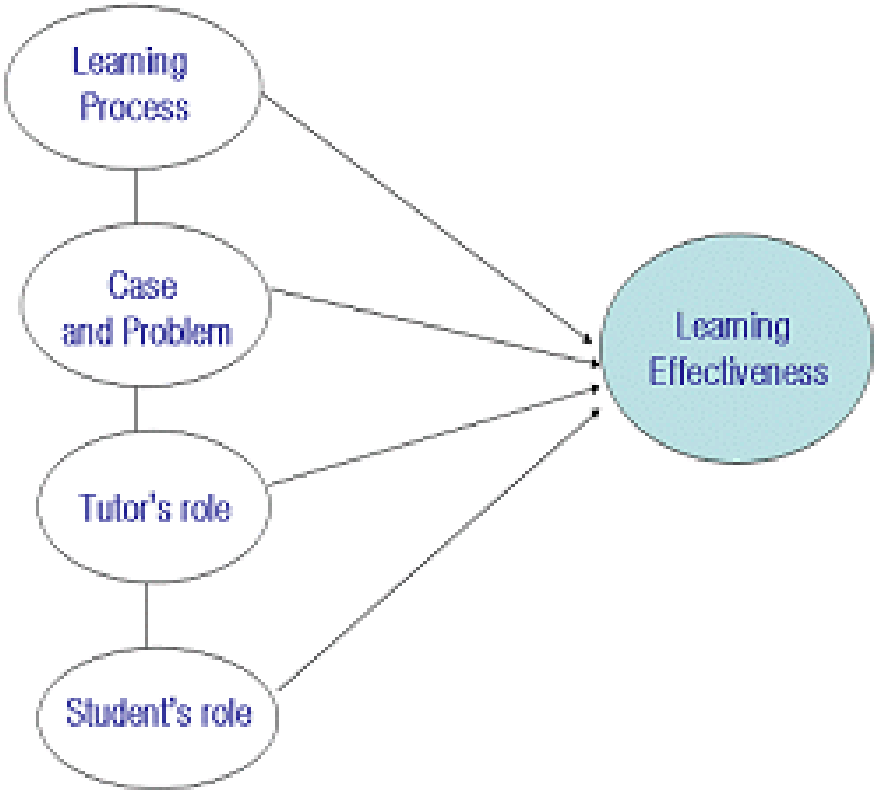
Group member

- Follow the steps of the process in sequence
- Participate in discussion
- Listen to and respect contributions of others
- Ask open questions
- Research all the learning objectives
- Share information with others

Evaluation of the effectiveness of PBL Approach

- 15 Question evaluation with a 5 point scale

- Questionnaire consisted of five sections - *Learning process, Cases & Problems, Tutor's role, Student's role, and Learning effectiveness.*



Framework of the Analysis

Results – fall, 2006

			Learning Effectiveness			
			Agree	Disagree	Chi-Square	p-Value
Learning Process	Organization of PBL Discussion	Agree	17(62.96%)	10(37.04%)	0.23	0.63
		Disagree	6(54.55%)	5(45.45%)		
	Easiness of Opinion Presentation	Agree	14(82.35%)	3(17.56%)	6.13	0.013
		Disagree	9(42.86%)	12(57.14%)		
	Helpfulness of Student Presentations	Agree	16(76.18%)	5(23.81%)	4.82	0.028
		Disagree	7(41.18%)	10(58.82%)		
Case & Problem	Relevance of PBL Case	Agree	15(93.75%)	1(6.25%)	13.75	<0.001
		Disagree	7(33.33%)	14(66.67%)		
	Hardness of Resource Search	Agree	23(71.88%)	9(23.13%)	10.92	<0.001
		Disagree	0(0.00%)	6(100.00%)		
	Appropriateness of PBL Questions	Agree	15(65.22%)	8(34.78%)	0.53	0.463
		Disagree	8(53.33%)	7(46.46%)		
Tutor's Role	Inducement of Student Participation	Agree	17(77.27%)	5(22.73%)	6.13	0.013
		Disagree	6(37.50%)	10(62.50%)		
	Positive Feedbacks	Agree	14(87.50%)	2(12.50%)	8.41	0.003
		Disagree	9(40.91%)	13(59.09%)		
	Appropriate Intervention	Agree	15(78.95%)	4(21.05%)	5.39	0.02
		Disagree	8(42.11%)	11(57.89%)		
Student's Role	Activeness of Participation	Agree	18(78.26%)	5(21.74%)	7.67	0.005
		Disagree	5(33.33%)	11(66.67%)		
	Sufficient Preparation	Agree	20(74.07%)	7(25.93%)	7.16	0.007
		Disagree	3(27.27%)	8(72.73%)		
	Understanding of Student Presentations	Agree	20(71.43%)	8(28.57%)	5.29	0.021
		Disagree	3(30.00%)	7(70.00%)		

Results - Determinant of Learning Effectiveness by Multiple Regression Analysis

		Beta-Coefficient	t	p-Value
Learning Process	Organization of PBL Discussion	-0.27092	-1.85	0.0767
	Easiness of Opinion Presentation	0.22872	1.78	0.0874
	Helpfulness of Student Presentations	0.09444	0.63	0.5331
Case and Problem	Relevance of PBL Case	0.55622	3.21	0.0038
	Hardness of Resource Search	0.06482	0.56	0.5808
	Appropriateness of PBL Questions	0.13569	0.99	0.3313
Tutor's Role	Inducement of Student Participation	0.0892	0.51	0.6116
	Positive Feedbacks	0.16278	1.16	0.2587
	Appropriate Intervention	-0.27616	-1.47	0.1556
Student's Role	Activeness of Participation	-0.18422	-1.13	0.268
	Sufficient Preparation	0.10595	0.72	0.4761
	Understanding of Student Presentations	0.36701	2.28	0.0318
Model Fitness	F statistic			6.22
	P-value			<0.0001
	R square			0.7567

Results – spring, 2007

			Learning Effectiveness			
			Agree	Disagree	Chi-Square	p-Value
Learning Process	Organization of PBL Discussion	Agree	6(75.00%)	2(25.00%)	2.65	0.102
		Disagree	5(58.33%)	8(41.67%)		
	Easiness of Opinion Presentation	Agree	6(60.00%)	4(40.00%)	0.44	0.275
		Disagree	5(45.45%)	6(54.55%)		
	Helpfulness of Student Presentations	Agree	4(80.00%)	1(20.00%)	2.0	0.001
		Disagree	7(43.75%)	9(56.25%)		
Case & Problem	Relevance of PBL Case	Agree	8(80.00%)	2(20.00%)	5.83	0.021
		Disagree	3(72.73%)	8(27.27%)		
	Hardness of Resource Search	Agree	3(100.00%)	0(00.00%)	3.18	0.124
		Disagree	8(44.44%)	10(55.56%)		
	Appropriateness of PBL Questions	Agree	4(80.00%)	1(20.00%)	2.0	0.162
		Disagree	7(43.75%)	9(56.25%)		
Tutor's Role	Inducement of Student Participation	Agree	8(80.00%)	2(20.00%)	5.83	0.021
		Disagree	3(27.27%)	872.73%)		
	Positive Feedbacks	Agree	9(69.23%)	4(30.77%)	3.88	0.056
		Disagree	2(25.00%)	6(75.00%)		
	Appropriate Intervention	Agree	6(66.67%)	3(33.33%)	1.28	0.188
		Disagree	5(41.67%)	7(58.33%)		
Student's Role	Activeness of Participation	Agree	8(57.14%)	6(42.86%)	0.38	0.298
		Disagree	3(42.68%)	4(57.14%)		
	Sufficient Preparation	Agree	9(60.00%)	6(40.00%)	1.22	0.212
		Disagree	2(33.33%)	4(66.67%)		
	Understanding of Student Presentations	Agree	2(50.00%)	2(50.00%)	0.01	0.413
		Disagree	9(52.94%)	8(47.06%)		

Results - Determinant of Learning Effectiveness by Multiple Regression Analysis

		Beta-Coefficient	t-Value	**p-Value**
Learning Process	Organization of PBL Discussion	0.57127	1.65	0.1372
	Easiness of Opinion Presentation	-0.78203	1.78	0.0874
	Helpfulness of Student Presentations	0.48189	2.24	0.055
Case and Problem	Relevance of PBL Case	-0.05527	-0.16	0.8772
	Hardness of Resource Search	0.09136	0.38	0.7173
	Appropriateness of PBL Questions	0.05885	0.29	0.7823
Tutor's Role	Inducement of Student Participation	0.52365	1.86	0.1003
	Positive Feedbacks	0.25371	0.97	0.3583
	Appropriate Intervention	-0.08361	-0.43	0.6807
Student's Role	Activeness of Participation	-0.36739	-0.90	0.3948
	Sufficient Preparation	0.77727	2.14	0.0644
	Understanding of Student Presentations	-0.09173	-0.32	0.7571
Model Fitness	F statistic			5.78
	P-value			0.0094
	R square			0.8967

Discussion & Conclusion

- Evaluations portrayed successful implementation of PBL method with high satisfaction response from students.
- The use of web-based method appears to be a potentially feasible problem-based learning modality for the graduate public health course.
- Efficient PBL learning environment is highly dependent on the function and the participant group. The presence of a tutor well versed in facilitating a PBL discussion group than being a subject matter expert is vital.
- The results of the study will be used to make future design and technology medications to the tutorials as part of an ongoing development process.

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