

Evaluation of Goal-Oriented Learning as a model of curriculum delivery in teaching Public Health among dental undergraduate students

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Abstract

Background: Goal-Oriented Learning (GOL) pedagogy might increase dental students' skill to achieve desired public health goal.

Purpose: The objective of this study is to assess the effectiveness of GOL system in terms of increasing knowledge retention as method of curriculum delivery in comparison to traditional lecture method and to explore the perceptions and experiences of students and tutors in regards to GOL system.

Method: The study was conducted among all the 2nd year BDS, Sapporo Dental College using Quasi-Experimental design. Intervention and control group were taught using GOL and lecture based method, respectively. SAQ type questions were used to assess the level of knowledge before and after intervention in both groups. Students and tutors perceptions and experiences were evaluated using modified course experience questionnaire and tutor response questionnaire.

Result: Level of good score and mean knowledge score differences between pre-test and post-test were more observed in GOL group. These differences found are statistically significant. Though most of the students of GOL system perceived that it contributes in developing their generic skill like improving problem solving, analytic and expression skill, majority of them reported that workload was heavy on them. Most of students were satisfied relating to tutor role, facilities available and evaluation system in GOL group. Overall satisfactions were superior in GOL groups in comparison to lecture group among both students and tutors.

Conclusion: The study showed that GOL system significantly improves knowledge retention in comparison to traditional lecture system. Moreover, majority of students and tutors gave more positive feedback regarding GOL experience and consider it superior than lecture-based system.

Key Words: Goal-oriented learning, public health, dental undergraduates

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Introduction

Public health is the branch of medical science where population or communities are in the focus of interest rather than the individual only¹. In order to achieve desired health goal and to make a public health program successful, efforts from both public health experts and communities are essential. For that reason, public health experts should have sufficient skills to involve communities actively in all kind of health program.

Like other medical professionals, dentists have important role in improving oral and general health of the population by providing preventive and curative management. Poor dentist-population ratio (0.3 per 10000 people)² is responsible for lack of availability of basic dental treatment to large proportion of the community. However, to meet up the growing dental need of the population public health approach is essential. Therefore, future dentists should have necessary public health skills, which could be achieved by appropriate learning process.

Teaching methodology has an important role in influencing learning process. Galilei said, "You can never teach something to a person, the only thing you can do is to help a person to

learn things by himself". Medical and dental education process should strive to promote the behavior of lifelong learning among the students, which ultimately facilitate independent and critical thinking skill. These type skills enable future health professionals to solve health problems of individuals and communities in real life scenario³. Therefore, a pedagogic approach is needed where students should be at the center of education and guided by setting specific learning goals. Thus, a goal oriented learning system has been proposed in this study for piloting among dental undergraduates.

Rationale

Traditional lecture-based system is type of one-way communication where tutor or lecturer delivers his presentation on a particular topic and students passively receive it. This method is used to deliver information regarding a concept or fact to a large group within a short period time. Lectures are widely used method in many institutions of the world. The main disadvantage of this pedagogy is that there is very little chance of interaction between the students themselves and the teachers. Therefore, it discourages critical thinking and participation of students in learning process¹. On the other hand, GOL pedagogy might increase dental students' skills to achieve desire public health goal by active participation of the students. However, this kind of goal oriented Public Health Education strategy has never been tried and evaluated among dental undergraduates particularly in the field of dental public health in Bangladesh. This study facilitates a platform for piloting and documenting the experience with this innovative teaching methodology.

Objective

Therefore, this study aims to assess effectiveness of GOL system as method of curriculum delivery in dental public health subject in comparison to traditional method in terms of increasing knowledge retention or knowledge score and to explore the perceptions and experiences of students and tutors in regards to implementing the GOL system.

Material and Methods

The study was conducted by using Quasi-Experimental design. Two groups were taken for the study-intervention group and control group. The study was conducted in classroom setting among whole population of 2nd year BDS (Bachelor of Dental Surgery) students of Sapporo Dental College and Hospital, Uttara, Dhaka.

This study was conducted from June 2014 to October 2014. Students who did not give consent or who were absent during the selected module of the course and who did not take part or completed all evaluation tests and questionnaire were excluded from the study.

There are four tutorial groups in 2nd year BDS course of Sapporo Dental College. One group was randomly chosen as intervention or experimental group and rest of the three groups were chosen as control group. Two subjects from the

intervention group and three subjects from the control group had been excluded because of incomplete participation into the course. The final numbers of subjects in intervention and control group were 20 and 61, respectively.

Ethical approval and permission for the research was taken from the authority of Sapporo Dental College and Hospital before conduction of the study. Each participant was informed in details about research methodology and informed written consent was taken from each respondent.

Three types of questionnaire have been used for this study. For evaluation of knowledge retention and relating capacity, knowledge assessment questionnaire were used. Short Answer Question (SAQ) was used to evaluate four aspects of knowledge, which were knowledge, understanding, application and analysis aspect. For each correct answer students were credited with score 1 and for every wrong answer students credited with 0.

To explore the experience and perceptions of participating students regarding GOL system and traditional lecture based system, a Modified Course Experience Questionnaire was used. The Course Experience Questionnaire (CEQ), a standardized global index, was designed to measure quality of teaching and learning experience, which has been developed by Ramsden (1991)⁴. To evaluate the experience of students regarding GOL and traditional lecture based system a slightly modified version of CEQ was used in this study including some items of Modified Qassim University Course Experience Questionnaire. Five points Likert response scale ranging from strongly agree to strongly disagree has been used in this questionnaire^{4,5}. The number of item in this modified version of questionnaire was 29.

To explore the opinion and evaluation of the tutors regarding GOL system, a tutor response questionnaire was used. Five point Likert scale also used here^{4,5}.

Pre-test, Post- test and comprehensive knowledge assessment score were entered into the data spread sheet. Mean knowledge score (pre-test, post-test, comprehensive assessment test) were calculated for both intervention and control group separately and all together. The level of knowledge was categorized according to each study participant's score as follows: Poor score: score less than Mean-1 Standard Deviation (<Mean-1SD), Average score: score in between Mean \pm 1 Standard Deviation (Mean \pm 1SD) and Good score: score more than Mean + 1 Standard Deviation (>Mean+1SD). Cross-tabulation was done to compare the level of knowledge between intervention and control group. Chi-square test was performed. Knowledge score data were compared using Paired t-test between pre-test and post-test score in each group as well as using independent t-test between the two groups at each time points. P values were reported and it was two tailed. $P \leq 0.05$ was considered as significant. Statistical package for Social Sciences (SPSS) for Windows version 17 was used to analyze the data.

Results

Most of the intervention respondents received good scores in topic 1 and 2 in comparison to control group. On the other

hand, most of the participants of control group had good scores in topic 3 and 4 in comparison to their counter part

during pre-test evaluation. However, these differences are not statistically significant ($P > 0.05$) (Table 1).

Table 1: level of knowledge before the application of GOL and traditional lecture based system.

Topic	Group (n)	Knowledge score			P value
		Poor score (<Mean-1SD) %	Averages core (Mean±1SD) %	Good score (>Mean+1SD) %	
Topic 1 (POHC)	Intervention (20)	0	75	25	0.276
	Control (61)	9.8	73.8	16.4	
Topic 2 (DHE)	Intervention(20)	20	55	25	0.443
	Control (61)	13.1	70.5	16.4	
Topic 3 (SDHP)	Intervention(20)	0	85	15	0.072
	Control (61)	18	60.7	21.3	
Topic 4 (PEDHS)	Intervention(20)	15	65	20	0.671
	Control (61)	8.2	68.9	23	

POHC=Primary Oral Health Care

DHE=Dental Health Education

SDHP=School Dental Health Programme

PEDHS=Planning and Evaluation of Dental Health Services

However, significant majority of the respondents of intervention group had good scores in all 4 topics in comparison to control group. These differences are statistically highly significant ($P < 0.05$) (Table 2).

Table 2: level of knowledge after the application of GOL and traditional lecture based system

Topic	Group (n)	Knowledge score			P value
		Poor score (<Mean-1SD) %	Averages core (Mean±1SD) %	Good score (>Mean+1SD) %	
Topic 1	Intervention (20)	0	10	90	0.000
	Control (61)	14.8	70.5	14.8	
Topic 2	Intervention (20)	0	35	65	0.000
	Control (61)	23	65.6	11.5	
Topic 3	Intervention (20)	5	45	50	0.000
	Control (61)	14.8	78.7	6.6	
Topic 4	Intervention (20)	0	35	65	0.000
	Control (61)	14.8	82	3.3	

Table 3 shows the level of knowledge in comprehensive assessment including all 4 topics together after 1 month of the application of GOL and traditional lecture based system among intervention and control group. It was identified that a significant higher percentage of Intervention group participants had good scores in comparison to control group in comprehensive assessment. This difference is statistically highly significant ($P < 0.05$).

Table 3: Level of knowledge in comprehensive assessment after the application of GOL and traditional lecture based system.

Topic	Group (n)	Knowledge score			P value
		Poor score (<Mean-1SD) %	Averages core (Mean±1SD) %	Good score (>Mean+1SD) %	
Comprehensive Assessment	Intervention (20)	0	25	75	0.000
	Control (61)	11.5	88.5	0	

Table 4 shows the mean knowledge score differences before and after the application of GOL and traditional lecture based system among intervention and control group. Significant mean differences were observed between pre test and post-test score in case of intervention group compare to control group. These mean differences between two groups are statistically significant ($P < 0.05$).

Table 4: mean knowledge score differences before and after the application of GOL and traditional lecture based system.

Topic	Group (n)	Knowledge score			
		Pre-test score Mean (Standard deviation)	Post-test score Mean (Standard deviation)	Mean difference Between pre and post test within group	Significance (2 tailed)
Topic 1	Intervention (20)	1.9 (0.78)	8.1 (1.88)	-6.20	0.000
	Control (61)	1.7 (1.11)	4.2 (2.01)	-2.54	0.000
Topic 2	Intervention(20)	2.1 (1.88)	11.95 (1.63)	-9.85	0.000
	Control (61)	2.1 (1.58)	7.7 (2.87)	-5.60	0.000
Topic 3	Intervention (20)	4.1 (0.96)	9.1 (2.51)	-5.00	0.000
	Control (61)	4.01 (1.91)	6.2 (2.02)	-2.27	0.000
Topic 4	Intervention (20)	2.3 (1.52)	12.4 (2.37)	-10.10	0.000
	Control (61)	2.3(1.31)	5.72 (2.62)	-3.39	0.000

Table 5 shows the mean knowledge score differences between intervention and control group before and after the application of GOL and traditional lecture based system. Mean differences between two groups before the application of intervention were negligible. However, the differences are not statistically significant. On the other hand, mean differences were increased between groups following intervention of GOL and traditional system, which are highly statistically significant. Higher mean score were observed in all 4 tests among intervention group in comparison to control group.

Table 5: mean knowledge score differences between intervention and control group before and after the application of GOL and traditional lecture based system.

Topic	Group (n)	Group(n)		Mean difference Between two groups	Significance (2 tailed)
		Control group Mean (SD)	Intervention group Mean (SD)		
Topic 1	Pre-test score	1.9 (0.78)	1.7(1.11)	0.195	0.471
	Post-test score	4.2 (2.01)	8.1(1.88)	3.85	0.000
Topic 2	Pre-test score	2.1 (1.58)	2.1(1.88)	-0.014	0.973
	Post-test score	7.7 (2.87)	11.95(1.63)	4.22	0.000
Topic 3	Pre-test score	4.01 (1.91)	4.1(0.96)	0.08	0.852
	Post-test score	6.2 (2.02)	9.1(2.51)	2.80	0.000
Topic 4	Pre-test score	2.3 (1.31)	2.3(1.52)	-0.027	0.937
	Post-test score	5.72 (2.62)	12.4(2.37)	6.67	0.000

All the students of intervention group reported that GOL system developed their problem solving, generic and expression skills. Most of them were satisfied about tutor role and evaluation method, assignment given and group dynamics during GOL course. However, majority of the intervention group participants agreed that the workload was too heavy on them. Most of the respondents in both groups were satisfied with the facilities and quality of the course. However, intervention group member were more satisfied in comparison to control group.

All the tutors agreed that students' expression skills and

understanding regarding subject were improved after GOL session. Finally, most of the tutors agreed that GOL system is better than traditional system.

Discussion

Goal-oriented learning (GOL) approach was evaluated in this study to see whether this pedagogy improve learner's skills and satisfaction during study of dental public health. GOL system adopted the approach of problem-based learning, therefore, it is an active learning process for the students where teachers act as facilitators. On the other hand, the more commonly used method of instruction is lecture

based teaching that encourages passive learning where students try to memorize concepts instead of critically analyze and apply it in real life scenario⁶.

Four aspects of knowledge such as knowledge information related to concept and understanding, analysis and application of the concept had been evaluated between both GOL and traditional lecture based group. This study found that level of good score and mean knowledge score were significantly increased in GOL group in comparison to lecture group in post intervention evaluation. Similar findings were also observed in other studies^{7,8,9,10}. Moreover, it may be due to fact that PBL method increase retention of knowledge¹¹.

Like PBL method, GOL method fostered intrinsic motivation among students, helped them to understand, analyze and research the targeted concept through critical thinking process and ultimately guide them in action in applying the concept to address a public health issue by working together as a team^{5,12}. This study also shows that most of the students agreed that GOL system improved their different cognitive skill like analytic and expression skills, problem solving skills, tackling unfamiliar problems, enhance working capability as a team member and planning of their own work. Shamsan (2009) also found similar findings among medical undergraduate in Saudi Arabia⁵. Furthermore, tutors in this study also agreed that GOL course improved the analytic and expression skills among students.

Majority of respondent from intervention group and tutor reported that GOL system had made the students more goal oriented and they had the clear idea of where they were approaching as expected. However, GOL group reported that workload was heavy on them. Similar observations also have been seen among medical undergraduates⁵.

Unlike another PBL study in a medical school of Saudi Arabia⁵, most of the GOL group participants reported in this study that tutors motivated them to self directed learning and hard working in making the subjects interesting. GOL system participants were also satisfied with the facilities available, tutor role and the evaluation system in this study.

Overall, both the students and the tutors were satisfied regarding learning experience with GOL system and most of them agreed that GOL system is superior than traditional lectured based system. This findings are consistent with findings of others study regarding PBL^{5,13}.

Conclusion and Recommendations

The outcomes of this study reflects that GOL system is more effective teaching method in comparison to traditional lecture based system in terms of increasing knowledge retention and skill in teaching public health to dental undergraduates. Moreover, the majority of the students and tutors reported that GOL system was superior to traditional system in regards to satisfying learning experience.

Therefore, this study could be useful in teaching dental public health among dental undergraduates. However, more studies are needed to scale up this strategy to other discipline of dentistry.

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