MODEL DEVELOPMENT OF PROBLEM-BASED LEARNING CURRICULUM MANAGEMENT FOR PUBLIC HEALTH STUDENT

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Abstract

Intoduction: Public Health Faculty of Diponegoro University had implemented problem-based learning curriculum (PBLC). Few problems appeared may be related to PBLC management that had been implemented. This research aimed to develop Problem Based Learning Curriculum Management Modell that is effective for public health student.
Methods: This study used a research and development approac (R&D). The subjects are manager, facilitators, and students. It was initiated by analyzing of the existing PBLC, PBLC modell development, and testing the modell. Testing the modell was conducted by expert and limited experiment through applied learning. The collected data would be analyzed descriptively and statistical test using analysis of variance and paired t-test at α=0,05.
Results: This research showed that the existing PBLC was not giving chance to students gaining experience in solving the real public health problem in the community. The learning modell should be implemented consist of problematization, problem investigation, problem solving, and critical reflection. Validation test and limited experiment showed that hypothetical modell of PBLC was proved effective for public health students and there was significantly difference of effectiveness compared to factual modell (p-value<0,001). Conclusion, the hypothetical modell of PBLC could increase the effectiveness in problem-based learning for public health students.

Keywords: Problem-based learning, public health student

Introduction

Recently, education quality was still low in Indonesia. This condition was indicated by indicators i.e: unable to compete in international level, many higher education institutions couldn't get high position among universities in the world, low competitiveness to get labour market. And the most important thing that the graduation was unable to be responsible person, It was not met to national educational goals (Hasbullah, 2006). Other indicator was that the Indonesian Human development Index (HDI) just reached 107th rank in the world. This level was lower compared to Malaysia (Sudibyo, 2009).

Strategis goals of national education year of 2010 -2014 (related to the higher education) were the available of educational sevice and Its quality, relevancy, had a high copetitivenes in international level, and equity in all province. While the future educational policy focused on 3 pilar: 1) quality and relevancy, 2) equity and acces, and 3) public awaweness (Hasbullah, 2006). Therefor each higher education institution alway mush increase quality in learning in othe to produce profesional graduate and had high copetitiveness spirit.

In the year of 2009, Faculty of Public Health Diponegoro University had implemented PBLC Problem-Based Learning or PBLC (Suwondo, 2009). Some problems appeared after implementing it. Based on information gathered that It was less efective. This information indicated that the

factual PBLC met some obstacles in management. For sustainablity in implementing PBLC, It was necessary developed a new modell of PBLC which will be more effective and efficient for public health students. This study aimed to create a modell of PBLC which was effective for public health students in Faculty of Public Health Diponegoro University.

Methods

This study used Research and Development approach (R&D). It was choosen because of R&D was research method that produce certain product and examine of Its effectiveness (Sugono, 2009). The design used was effective R&D (Samsudi, 2009) as folllow:

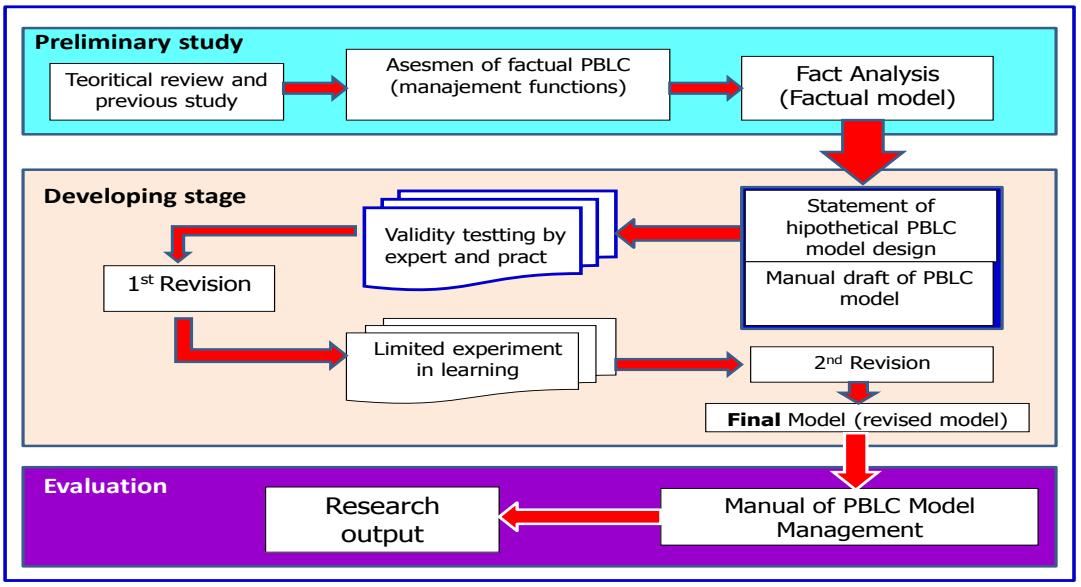

Figure 1. Effective R&D design (modification)

The subjects of this research were all component in the implementing of PBLC in Faculty Public Health Diponegoro University. They were faculty leader, PBLC management, educational staff, the students who had ever learned problem-based learning. The studied variabels were management aspect (planning, implementing, evaluation, and effectiveness of PBLC management). Sampling method was purposive sampling. Qualitative technique was used to collect data regarding with management aspect. And quantitative technique was used to collect data regarding with modell effectiveness. The collected data would be analyzed using ANOVA and Paired T-test at 0.05 level of significance.

Results and Discussion

Management of factual PBLC

The factual PBLC management was shown in Figure 2. Management of factual PBLC consist of planning, organizing, implementing, and evaluation.

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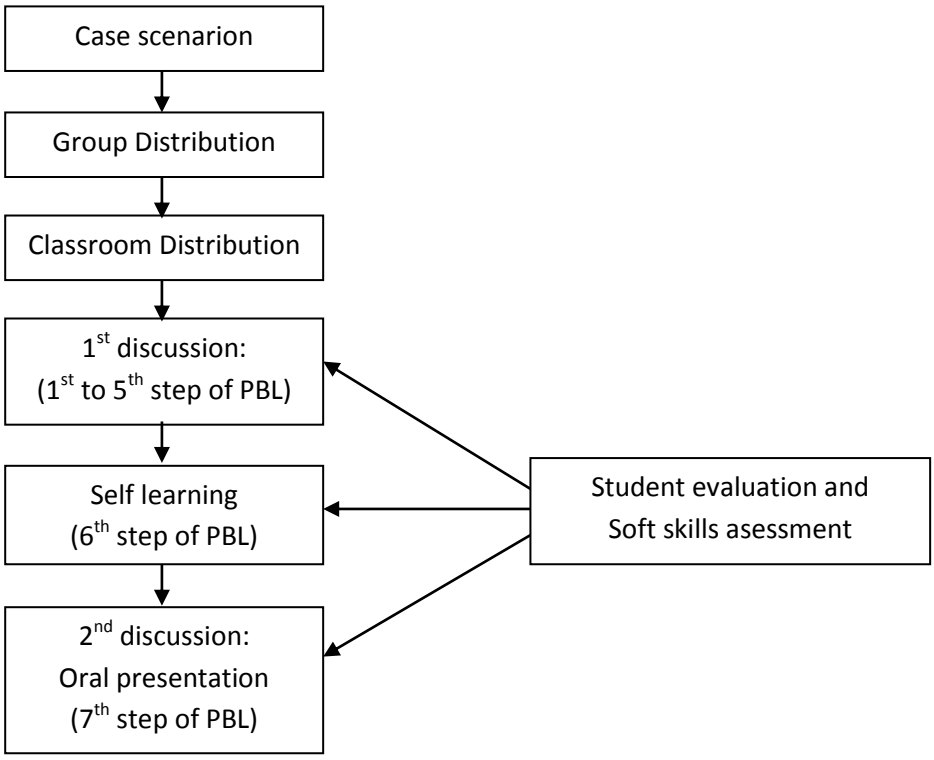

Figure 2. Modell of factual PBLC management

Planning aspect

Planning activities was conducted by Student Centered Learning Unit (SCL Unit) in implementing PBLC consist of: (1) Problem scenario (case scenario); problem scenarion in factual PBLC was set up through discussion followed by course related staff. It was composed in simulation narative statement; (2) Facilitator management, facilitator planning was conducted through workshop which was followed by educational staff who will to be facilitator. It was done periodically for the next learning; (3) Classroom management, In implementing of PBLC, faculty had facilitatted 7 special classroom with students in capacity. Each classroom was installed some equipment i.e: LCD, Wifi internet, AC, CCTV etc; (4) Student management, student learning in a group consist of 15 to 20 persons. They pointed a leader and secretary for discussion prosess.

Organizing aspect

PBLC organizing was conducted by establishing SCL Unit which Its structure of Leader, Secretary, accounting, and class coordinator. All members of SCL Unit had each main task but they worked in team.

Implementing

Implementing PBLC was described briefly as follow: (1) Having a class in clasical; (2) Facilitator coordination; (3) Distribution of PBLC manual for students and facilitators; (4) Doing Problem-Based Learning using “Seven Jump Concept”

Evaluation

Learning assessment in PBLC was conducted by facilitator in 3 form: *paper & pencil test*, process assessment, and oral oratation. Evaluator are staff and student also evaluate th.em each other. Evaluation in PBLC emphasized process than outcome.

The effectiveness of factual PBLC

There were 6 aspects measured to asses the effectiveness of problem-based learning. They were *good teaching (GT*), *appropriate assessment* (AA), *clear goal (CG*), *generic skill (* GS), *appropriate workloading (*AW), and *independency* (IN). The results of assessment was described in table 1.

The assessment results of PBLC showed that most students stated the quality of learning in PBLC was not different if compared to other method. The students' satisfaction about learning quality of PBLC was still same as before with everage score of 2.87. This level of satisfaction was to be over all indicator of PBLC management. Although few aspect of PBLC had increased student's competencies.

Table 1. The everage score of factual PBLC effectiveness

No.	Aspect of PBLC measured	Everage score
1	*Good teaching (GT)*	2.90
2	*Appropriate Assessment (AA)*	2.82
3	*Clear goal and standart (CG)*	2.87
4	*Generic skill (GS)*	3.78
5	*Appropriate workloading (AW)*	3.46
6	*Independency (IN)*	3.03
7	*Overall satisfaction*	2.87

Good teaching (GT) aspect of factual PBLC did not indicate a good score yet (2.9). A good learning process was determined by some factors. Interaction between staf and students, the easiness in accesing learning resource were to be the main key for the dinamic of learning process in other to create a good teaching. Educational staff as facilitator had to be able to do their role in implementing PBLC. Their roles were how to motivate students for learning, give understanding to the problem, can explain well, and give feedbeck of learning achievement.

Not all facilitator did their role at maximum level in motivating students. This fact was indicated with scor of activity in motivating students (score 3.1). They did not use the available time yet to motivate the students (score 2.98). It happened because of the high load of other learning activities. So, they could not facilitate PBL process in full time.

The role of facilitator to make the PBL proces as a good teaching to be a key for the effectiveness of PBLC management. It met to Barrows (1992) who stated that tutor had two main roles in the implementing of PBLC, namely: facilitating the studeny in thinking how to solve the problem thinking critcally how to learn in order to be self directing learning. Maudsley also stated that the effectiveness of tutorial process was to be a key of the succesness for PBLC activities

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(Hung W, no year). Sometimes, facilitator had to shift their role in reconseptualizing in learning. Other role that facilitator could do haw to make learning as a good teaching was varies: 1) faclitate for students' team work, 2) the role of model, 3) give feedback, 4) give information, and 5) to force in developing profesionalism (Aguiar, 2000).

A good teaching condition was also depend on the students' anctivity and creativity. They had to be inisiator of learnig themselves, analyze and solve the problem during the learning process, and not to long as receiver of information. The student not only redetermine their role in learning but they had to change their habit in learning (Hung W, no year). The students had to argue actively over the learning process would create learning environment condusively. They also had to participate actively a long PBLC process although they felt uncomfort and concious in early step. This situation (uncomfot and uncertainness level) would decrease significantly in the of the PBLC process (Schults-Rose and Kaine, 1999).

Issues in students' assessment of PBLC process had to be a concern. This research showed that facilitator gave score of learning achivement was relatively low (2.82). Facilitator gave asseemnet just only in a grede or sign, i.e: active, less active, and no active. This approach was felt not so suit by students. Because of students had learned hard in various activities during PBLC process. They leraned how to understand the problem initially, till syntesize of knowledge from themselves directed learning.

Unproportional assessment could lower students'motivation to increase thei knowledge and skills in the process of learning. Assessment during PBLC cyle could be conducted by students themselves (self assessment = SA), peer assessmnet (PA), and facilitator/tutor assessment (TA). What competencies had to be assessed in PBLC management consisted of two aspect: 1) skills how to discuss, 2) skills how to solve the problem.

Machado (2008) had reported his study in the using of SA, PA, and TA in PBLC process. The results showed that no significantly difference in median score between SA and PA. On the other hand, ther was significantly difference of median score between TA and SA. Machado stated that TA gave score consistenly lower compared to both SA and PA.

The use of PA also gave positive effect on student learning. It indicated that PA caused the students heard in maximum concern on tutorial process (4.06 $\pm$ 0.70) at 5 ponts of Likert Scale, and they became active in supporting group activities (4.06 $\pm$ 0.76). Overall, students satated that PA was usefull (3.79 $\pm$ 0.78, encourage their reponsiility and involvement for work group with the score of 3.94 $\pm$ 0.70 (Hodgson Y and Young R, no year).

The only one aspect of PBLC implementing in Faculty of Public Health Diponegoro University that indicated good score was generic skills (3,78). This indicated that the PBLC process had to be able increasing students' skills. Those skills include: skills in analyze and solve the problem, skills in tean work, and increase their confidence in solving the problems that they did not know before. The factual PBLC cycle was less effective although it could increase the skill in problem solving (besed on students' perception). Problem solving activities in factual PBLC was only conceptual

study. The students just only compose problem solving alternative conceptually. No chance for students to solve the real problem in the community. The concep of problem solving should be based on fact that student identificated from real world (community). Those fact was determinant factors that studennts were being studied. It was very important because of problem solving skills o one the competency that would be achieved in PBLC management. Hung W. Stated that PBLC had indicated the positive impact on students' ability in aplicating their basic knowledge science and using it to solve the real life problem in the community.

In increasing students' skills had to be oriented on the real life problem and they had to be posed the problem periodically. This concept would give chance for students to increase their skill in communication, team work (group member, community member, and related institution), and skills in problem solving. Solving the problem in the community directly would be usefull for their work in the future. It was met to the competencies belongs to public helath graduate, namely: knowledge, skills, ecperince, and attitude value (Laaser U, 2010).

The developed of PBLC management model

This PBLC management modell would be implemented clasically (indoor) and learning in the community (outdoor). It consists of three component: (1) Planning, the first step in this PBLC management was making a learning plan. It included management components especially material component (book manual, learning facilities, reference source, log book), man (student and facilitator), and problem scenario that the students would study. The main charracteristic of this modell was the use of real life problem as the topic of study. To set this scenario up was making colaboration with Health Service Center (HSC) or Health District Office (HDO); (2) Implementing, the second step was learning organizing through coordinating for all component involved in PBLC management (SCL Unit and facilitators). This activity aimed to get perception equally about task and function for staf and facilitator, how to implement PBLC cycle, assessment tasks during the process.

The important thing had to be a concern in implementing PBLC cycle was facilitators had to explain learning standards that students had to achieve in PBLC. Those standards as follow: (1) Be able to understand the essensial problem they study; (2) Be able to identify risk factors supposed related to problem in the community; (3) Be able to set the health problem solving altervatives; (3) Be able to so solve the health problem in the community directly; (4) Be able to communcate and build team work in problem solving; (5) Be able to evaluate their activities.

Evaluation

The las task of Unit SCL di PBLC management was to evaluate the learning process overall. Evaluation was based on the results of the assessments during PBLC cycle was going. They were conducted by SA, PA, and TA.

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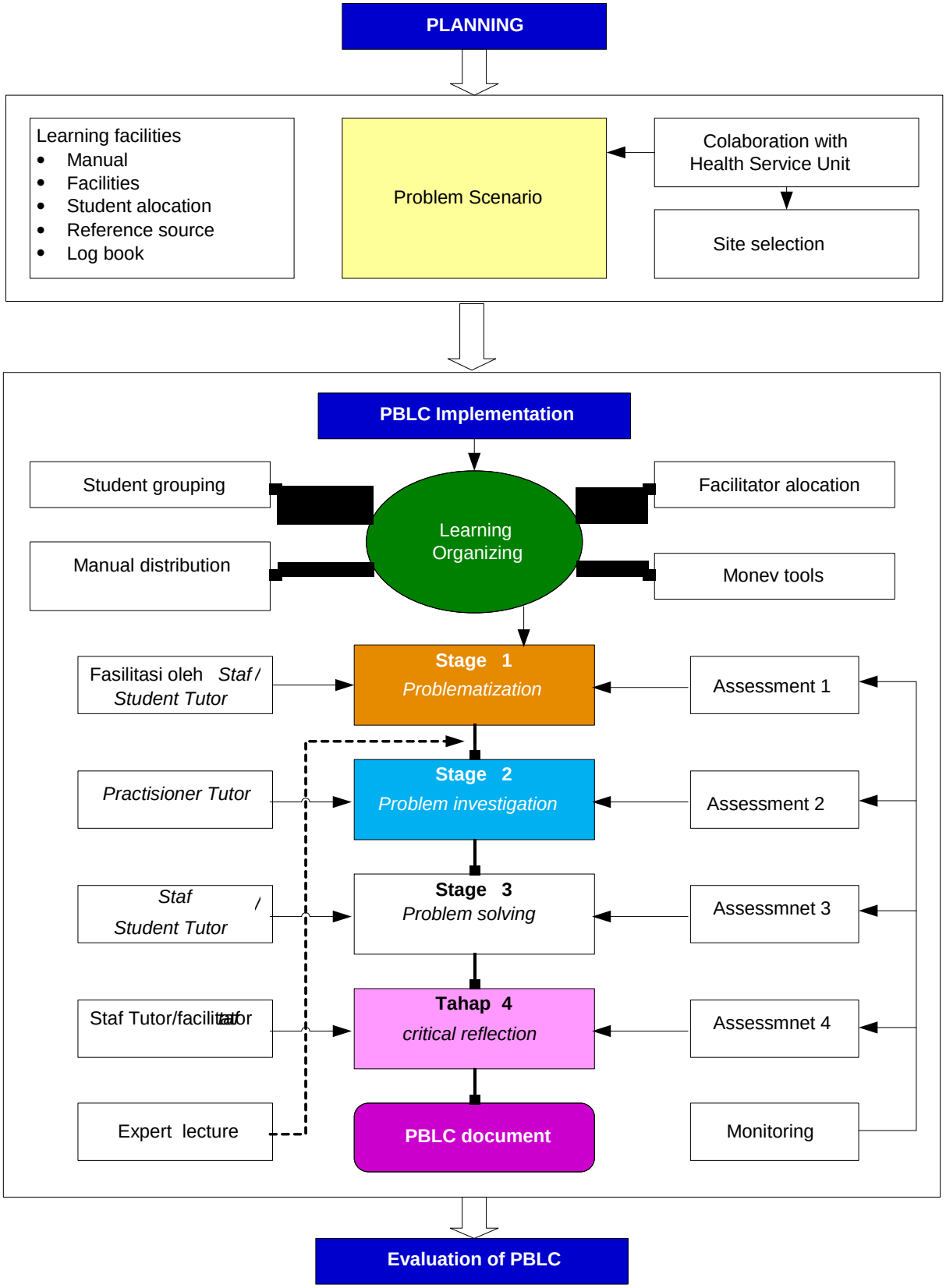

Figure 3. Hypothetical modell of PBLC

The effectiveness of hypothetical model

The assessment of effectiveness was conducted through validation test) by expert and practisioner) and limited experiment test in real learning: (1) Validation test, There were three

aspects examined in this PBLC management: 1) learning management, 2) effetiveness of process, and 3) effectiveness of PBLC mangement model. Validation test wass assesssed by educational expert and practitioner who had implemented PBLC. The results as follow:

Table 2. The results of validation test

No.	Aspects	Score				Everage
		Expert 1	Expert 2	Pract 1	Pract 2	
1	*Learning management*	3.70	4.14	5.00	4.75	4.3525
2	*Good Teaching (GT)*	4.50	4.33	4.33	4.16	4.3300
3	*Appropriate Assessment (AA)*	5.00	4.33	5.00	4.66	4.7475
4	*Clear Goal and Standart (CG)*	4.00	4.00	4.50	4.50	4.2500
5	*Generic Skill (GS)*	4.16	4.16	4.66	5.00	4.4950
6	*Aprropriate Workloading (AW)*	4.00	4.25	4.25	4.50	4.2500
7	*Independency (IN)*	4.00	4.00	4.60	4.00	4.1500
8	Keefektifan model	3.67	4.00	4.33	4.67	4.1675
	Rerata	4.1287	4.1512	4.5837	4.6550	4.3796

Nb: score in Likert scale (1 to 5)

Table 2 derscribed the various score based on PBLC assessment result. Both expert and practitioner gave score with everage of 4.3796 (range: 4.1287 – 4.6550). It mean that all expert and practitioner were agree with this PBLC management model that consists of planning, organizing, and controlling (moitoring and evaluating).

Practitioners gave higher score relatively compared to experts. To know the difference score between experts and practitioners, It was tested using analysis of variance at 0.05 level of significance. The results as follow:

Table 3. The result of one way anova test

Assessor	Penilai	Mean difference	p-value
Expert 1	Expert 2	-0.0225	0.888
	Practitioner 1	-0.4550(*)	0.008
	Practitioner 2	-0.4013(*)	0.017
Expert 2	Practitioner 1	-0.4325(*)	0.011
	Practitioner 2	-0.3788(*)	0.024
Practitioner 1	Practitioner 2	0.0537	0.737

* Mean significant at α .05

Staatistical test above indicated that there was not significant difference of score mean between expert 1 and expert 2 (p-value=0.888) and also between practitioner 1 and practitioner 2 (p-value=0.737). But, there was significant difference of score mean between expert 1 and practitioner 1 (*p-value* = 0.008), It was also between expert 1 and practitioner 2 (p-value=0.017). This result also showed that there was significant difference between expert 2 and practitioner 1 (p-value=0.011), and also between expert 2 and prarctitioner 2 (p=value=0.024)

The results of validation test both by experts and practitioners was high enough with everage 4.3796. All experts and practitioner gave score more than 4.0 for those three aspect of PBLC management. It could be understood that based on their assessment, the hypothetical PBLC

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management model had met the principles of management in implementing. So, using this management model, the learning would go on effectively and It was possible implemented for public health student.

There was an interesting thing of validation test than the score given by practitioners was higher compared to experts. Although there was not diffeence between both expert and practitioner, But, there was a signifificant difference between expert and practitioner. Researcher argued that beside management consideration, practitioner also considered the demand and availability of resouces for PBLC implementation. They also gave coment that this model was suit to be implemented for public healt student.

PBLC management model requires a lot of facilitators, so if there is a problem with the number of facilitators, alternative solutions may be the recruitment of senior students to participate as a student tutor. Senior student (ever attended PBLC cycle activities) can be utilized as a facilitator because they have the knowledge, skills, and experience with problem-based learning. The specific characteristics according to the facilitators needed in PBLC. The effectiveness of the PBLC facilitation skills require the ability to observe, learning strategies, and motor skills (Sadaf S, 2009).

Limited experimental test

Limited experiments carried out through the study to determine the effectiveness of management models PBLC development results at the operational level. Assessment conducted experiments based on students perceptions of the effectiveness of implementation factual PBLC and a hypothetical PBLC. Assessment results as in Table 4.

Table 4. The effectiveness value of the learning aspects of the experimental results of management models PBLC Development results

Aspect of learning	n	Min	Max	Mean	Std. Dev
Aspect of *Good Teaching* factual model	20	2.500	3.900	2.99500	0.354631
Aspect of *Good Teaching* development result model	20	3.600	4.700	4.16000	0.305045
Aspect of *Appropriate Assessment* factual model	20	1.667	4.333	3.05000	0.727585
Aspect of *Appropriate Assessmnet* development result model	20	3.333	5.000	4.32080	0.516195
Aspect of *Clear Goal* factual model	20	2.000	3.750	2.76250	0.522362
Aspect of *Clear Goal* development result model	20	3.250	5.000	4.15000	0.439797
Aspect of *Generic Skill* factual model	20	1.750	4.000	2.58225	0.566079
Aspect of *Generic Skill* development result model	20	3.625	5.000	4.38930	0.450918
Aspect of *Appropriate Workloading* factual model	20	2.143	3.714	2.58015	0.367115
Aspect of *Appropriate Workloading* development result model	20	3.429	4.857	4.14270	0.439666
Aspect of *Independency* factual model	20	1.800	3.600	2.68000	0.504297
Aspect of *Independency* development result model	20	3.400	5.000	4.20000	0.550598
Aspek *Overall satisfaction* factual model	20	2.185	3.243	2.79295	0.273040
Aspect of *Overall satisfaction* development result model	20	3.767	4.689	4.27330	0.348672

The data in Table 4 show that the average value of the learning effectiveness of the experimental results of PBLC hypothetical management models increased in all aspects. The mean value for the effectiveness of its previous PBLC 2.79295, while the PBLC hypothetical management model increased to 4.27330. The mean value for the effectiveness of all aspects on hypothetical models is above 4 (measurement scale of 1 to 5).

What is the difference between the mean value of the effectiveness of management modell modell PBLC factual hypothetical PBLC management differ significantly, then the statistical test performed by paired t-test at significance level 0.05. Results of statistical analysis as shown in Table 5.

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Table 5. The results of the analysis of the mean difference test between the value of the learning aspects of the management of PBC factual modell modell PBLC hypothetical management

Aspects	Mean difference	*t-value*	*p-value*
Aspect of *Good Teaching* factual model – Aspect of *Good Teaching* development result model	1.165000	11.347	0.000
Aspect of *Appropriate Assessment* factual model – Aspect of *Appropriate Assessment* development result model	1.270800	5.832	0.000
Aspect of *Clear Goal* factual model – Aspect of *Clear Goal* development result model	1.387500	8.275	0.000
Aspect of *Generic Skill* factual model – Aspect of *Generic Skill* development result model	1.807050	9.227	0.000
Aspect of *Appropriate Workloading* factual model – Aspect of *Appropriate Workloading* development result model	1.562550	12.229	0.000
Aspect of *Independency* factual model – Aspect of *Independency* development result model	1.520000	7.888	0.000
Aspect of *Overall Satisfaction* factual model – Aspect of *Overall Satisfaction* development result model	1.480350	13.279	0.000

The data in the table shows that the different test results for all aspects of the obtained p-value less than 0.001. This means that there are significant differences between the mean value of the effectiveness of factual model and development result model. The results of this analysis indicate that the model-developed management PBLC able to significantly improve the effectiveness of problem-based learning for students of public health. The result of the experiment is limited by the learning management PBLC hypothetical model showed an increase in the value of effectiveness in all aspects of learning. The results of this study showed that the average value of the experimental results of the effectiveness of the learning PBLC hypothetical management model increase compared to the model of factual. The mean value for PBLC factual effectiveness of 2.79295, being the PBLC hypothetical management model by 4.27330. The mean value of the effectiveness of all PBLC hypothetical management models is above 4 (measurement scale of 1 to 5).

The results of the analysis of different test with paired t-test on the mean value of the effectiveness of the factual management model and hypothetical management model obtained p-value <0.001. This may imply that there is a difference (increase efficacy score) was significantly between factual models with hypothetical PBLC management model. Increasing in effectiveness can occur as a result of the development of management model PBLC. Students' responses on the implementation of the management model PBLC hypothetical show that students find it easier in the implementation PBLC learn more hypothetical because the topic clearly and cycle stages PBLC simpler and easier to understand. Ease in understanding the stages of the PBLC cycle felt not only by students but also demonstrated from the results of the validation test by experts. For

example, the use of certain types of diseases as a real life problem gives students easy to understand the problem (in the problematization stage).

Assessment of learning outcomes of the easiest is to provide a test that is indicated by a value. However, it can not describe the actual performance of the results of a study. The most pragmatic approach in the evaluation of adult education is to focus on students' perceptions of their experiences during the learning program, and this approach has been widely used in various studies. The most realistic indicators to measure the success of adult learning programs is the perception held by students on their own learning or *the students' own perception of their learning* (Sybille K. Lechner, 2001).

The aspect of *appropriate assessment* in this PBLC management model to obtain a high value (up to 5). Assessment of learning in this hypothetical model using 3 assessors (*self assessment, peer assessment, dan tutor assessment*) with different weights. The concept of assessment in this model observe the principles of justice, so that the validator says with the sort of assessment is appropriate for problem-based learning. The assessment was conducted more emphasis on the process of learning activities undertaken by students during the running cycle PBLC, rather than on the achievement of knowledge. This is consistent with the suggestion that the teaching model based on learning focus problem is not the acquisition of declarative knowledge. Assessment and evaluation techniques appropriate to the problem based learning model is to assess the students' work produced is the result of their investigation, as observed above discussion capabilities, the ability to use prior knowledge, the ability to formulate problems, ability to work in groups, and observation of student participation in action in solving real problems (Trianto, 2007).

Students also gain new experiences on the implementation of management modell PBLC hypothetical. Students stated that the modell hypothetical Cycle PBLC able to provide insights to participants in PBLC hypothetical PBLC because not only learn theory but also discover facts on the ground (the community). This activity gives students an opportunity to match the cause of the disease based on the theory and the fact that there is in the community. Participants also felt hypothetical cycle PBLC not suppose to solve problems but can intervene based on real facts found in the community.

Closing

This research concluded that the developed PBLC management model was effective for public helath student (score 4.1675). It consist of management function: planning, organizing, and evaluation. Learning was conducted indoor and outdor activities with four steps, namely *problematization, problem investigation, problem solving,* dan *critical reflection.* Paired T-test showed that the n*ew model of PBLC was more effective compared to factual model (p-value<0.05). It was hoped that the developed PBLC management model caould increase the effectivity of learning for public health student.*

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Prof. Dr. Fathur Rokhman M.Hum,	**Rudatin Windraswara ST, MSc,**
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KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
UNIVERSITAS DIPONEGORO
FAKULTAS KESEHATAN MASYARAKAT
Jl. Prof. Soedarto, SH – Tembalang, Semarang Selatan, Kode Pos 50239 Telp. 7460044

SURAT TUGAS

Nomor :4402/UN7.3.9/KP/2014

Pimpinan Fakultas Kesehatan Masyarakat Universitas Diponegoro menugaskan kepada:

Nama	: Dr. Nurjazuli, SKM, M. Kes
NIP	: 196308121995121001
Golongan/Pangkat	: IV A/Lektor Kepala

Untuk Mengikuti The 1st International Seminar on Public Health Education 2014 sebagai Pembicara (Oral Presentation) ,pada hari Selasa, tanggal 2 September 2014, bertempat di Grand Candi Hotel Semarang.

Demikian surat tugas ini dibuat agar dilaksanakan dengan sebaik-baiknya, dan memberikan laporan setelah kegiatan tersebut dilaksanakan.

Semarang, 08 AUG 2014
Dekan,

Dra. V.G. Tinuk Istiarti, M.Kes
NIP. 195210171988032001