



CHAPTER 4

ANALYSIS AND RESULTS

Medical Education Programme at the Khon Kaen MEC is a three-year programme for the 4th - 6th year medical students. For the first three – year; basic science and pre-clinic of the study (the 1st-3rd year) arranged by the faculty of Medicine, at Khon Kaen University. This study does not include the cost borne by the faculty of Medicine in the first three-year. The cost analysis in this study only concern on the cost of Medical Education Programme incurred at the Khon Kaen MEC in an academic year 1998 and study forward to the next 2 – academic years, i.e. 1999, and 2000. The total number of the medical students since the Khon Kaen MEC has been established in 1995 until 1999 is 67 , it was categorized in class year as shown on Table 4.1

Table 4.1 The number of MEC's students in the academic year 1995-1999

Academic year	1995	1996	1997	1998	1999	Total
No. of enrolled students	11	13	13	16	14	67

Source : Khon Kaen Medical Education Centre.

The 4th – 6th year of medical students were analyzed on the cost calculation, the 1st –3rd were not taken into account on this analysis due to the reason as mentioned before.

To find the best alternative method for cost allocation basis and system analysis was done but this proceed somewhat sufficient to calculate accurately due to MEC's organization not being clearly defined by departments. The MEC was divided into 3 sections and 8 activities as shown on Table 4.2.

Table 4.2 MEC' Organization by Activities

Section	Activities
1. Administrative	1. General Administration
	2. Housekeeping
	3. Registry
2. Education Supporting	4. Student Affairs
	5. Library
	6. Audiovisual
3. Education	7. Education Development
	8. Curriculum Evaluation

Table 4.3 Salaries of MEC' staff in Academic year 1998

No. of personnel/employee	Basic annual salary	Increment. Fund for Dependents	School fee for Dependents	Hospitali--zation fee	Others	Annual salary
	(1)	(2)	(3)	(4)	(5)	(1+2+3+4+5)
20	2,090,880	4,200	12,944	8,847	15,000	2,131,871

Table 4.3 showed the annual salaries included fringe benefit of 20 MEC staff and employee working for the MEC, the total salary was 2,131,817 Baht.

The time allocation study of the MEC staff were done to find out the ration of time allocation (hour/week). The survey sheet distribution in labor cost was used (see the Form LC-2, Appendix IV). Then salaries of the MEC staff was calculated by multiplying the time ratio by the annual salary of each MEC staff.

**Table 4.4 Average time allocation & Salary of MEC Staff by activities
in Academic year 1998**

Activities	Hour	Ratio	Salary
1. General Administration	78	0.13	245,335
2. Housekeeping	140	0.23	434,054
3. Registry	80	0.13	245,335
4. Student Affairs	71	0.11	207,591
5. Library	80	0.13	245,335
6. Audiovisual	70	0.11	207,591
7. Education Development	52	0.08	150,975
8. Curriculum Evaluation	48	0.08	150,975
Total	619	1.00	1,887,192.00

Note: Salary of MEC Staff is not included in the instructors' salary.

Table 4.4 showed the time allocation study of personnel working in the MEC, this study assume that all of these personnel work only for MEC, as some of the personnel must work for the hospital as well.

The ratio of time allocation was used to calculate the proportion of salaries the MEC's personnel provided to the MEC's activities, it was 1,887,192 Baht.

Cost Analysis by Components

I) Fixed Cost

1.1 Salary of Instructors

To analyze how they provided their time on teaching the medical students The time allocation study was done by using FTE (Full Time Equivalent) to calculate the salaries of 63 instructors (physicians) in 6 departments of the hospital, i.e. Obstetric & Gynecology, Medicine, Pediatrics, Orthopedic Surgery, General Surgery, and Community Medicine. This study found that total annual labor cost (salary) of the 63 instructors were 17,400,708 Baht. The teaching cost was 3,186,001 Baht or about 18%

of their total salaries. The teaching fee paid by Medical Education Programme was 673,085 Baht (See more detail on discussion in Chapter 5). This showed that the cost of teaching by calculation from the proportion of the instructors' salaries was vastly different. It was higher than the actual total expenditure paid by the medical education programme. Refer to Appendix I Table B.2 for The Time allocation study (FTE) of the instructor.

The salaries of 63 physicians (instructors) were calculated by using the Full Time Equivalent (FTE) was taken into account for education development activity, so 3,186,001 Baht was added up to the staff salaries. Hence, the total labor cost salaries of Education section (3,186,001 Baht – 1,887,192 Baht) was 5,073,193 Baht in Academic year 1998.

1.2 Capital depreciation cost

1.2.1 Building; the MEC constructed a new building, so to calculate the annual depreciation cost of the building the useful life 25 years according to hospital construction engineer, and the previous study of the unit of Khon Kaen Regional Hospital. Accordingly this study used some parts of hospital database, so the useful life 25 years was adopted, and the discount rate 10% was used in this study due to the fluctuation of interest rate and inflation in country. The study found that the annual cost of the building was 10,936,081.86 Baht in academic year 1998. (Refer to Appendix III Table A.1). In this study, the land was not taken into account due to the building being located inside the hospital.

1.2.2 Equipment; the cost of the equipment used by departments in academic year 1998 was 383,723.64 Baht (Refer to Table 4.9). For projection to the next two academic years; i.e. 1998, and 1999, the annual capital depreciation cost would be the same except in academic year 2000, the annual capital depreciation cost would decrease to 380,239.35 Baht due to the equipment having had the useful life of more than 5 years. For the donated items or equipment, some of which have no price recorded so the market price was used to calculate the cost of the donated items in this study.

1.2.3 Training cost (was taken into account in this study by assume that the useful life year of training is 10 years and discount rate 5%, the annual training cost was 60,880.10 Baht (Refer to Appendix III, Table A.4). The annual training cost rate was assumed constant for the next two years; academic year 1999, and 2000.

II) Variable Cost

In this study the variable cost was classified into two groups, i.e. material and non-material cost. Material cost consisting of i) Office material such as stationery, paper, whiteboard, paper cutter, file case, etc. ii) Household material, such as towel, toilet paper, pillow, brush, glass, soap, detergent, etc. iii) Teaching material, such as transparency, whiteboard, paper, whiteboard pen, etc. For non-material i.e. the security guard payment, the housekeeper payment and the teaching fee. An analysis of variable cost (Table 4.9) by activities, the study found that the material cost of library was 259,501 Baht and it was the highest cost of all MEC's activities. The audiovisual was 17,502 Baht. Due to the fact that the library and audiovisual are departments in the hospital in the same building of MEC these departments serve to the whole hospital which means that their resources were shared for the others activities in the hospital as well. To calculate the cost of material transferred from library and audiovisual to the others activities the percentage of services provided to each activity was calculated.

Table 4.5 Library user (number of visit) by types of hospital personnel categories in Academic year 1998

Categories	No. of visits	Percentage (%)
Physician	1404	13
Extern	884	9
Medical students	3,328	32
Nurses	2,132	20
Civil servant / Employee	2,496	24
Others	208	2
Total	10,452.00	100.00

This study found that the material cost of library provided to MEC was 32%, and audiovisual was 7%. Table 4.5 showed the number of visits of library user by the types of health personnel categories.

Table 4.6 Variable Cost by Activities in Academic year 1998

Activities	Variable Cost (VC) / year		Total Variable Cost (TVC)
	Material Cost	Non-material Cost	
1. General Administration	82,000.00	12,000.00	94,000.00
2. Housekeeping	65,000.00	60,000.00	125,000.00
3. Registry	5,000.00	-	5,000.00
4. Student Affairs	7,500.00	-	7,500.00
5. Library*	3565.01.01	255,936.00	259,501.01
6. Audiovisual*	17,170.07.07	332.85	17,502.92
7. Education Development	11,000.00	673,085.00	783,085.00
8. Curriculum Evaluation	12,000.00	-	12,000.00
Total	203,235.08	1,001,353.85	1,204,588.93

*Library is 32%, and Audio-visual is 7% provided for MEC.

Table 4.6 defined the variable cost by activities in Academic year 1998. For non-material cost; General Administration.- Security guard, a contract with a private company was 12,000.00 Baht / year, Housekeeper was 60,000 Baht / year. For Library and Audiovisual, due to the shared cost with the hospital, so only 32%, 7% of the material cost, they were 255,963.00 Baht and 332.85 Baht, respectively, were taken into account.

Table 4.7 The Total Annual Capital (depreciation) Cost in Academic year 1998

Activities	Equipment	Building	Total Annual Capital Cost
1. General Administration	142,600.90	213,988.35	366,370.44
2. Housekeeping	-	8,354.26	14,964.96
3. Registry	-	11,934.65	14,964.96
4. Student Affairs	-	9,215,940.12	9,004,630.23
5. Library	71,991.98	558,541.83	1,024,121.33
6. Audiovisual	21,920.26	150,376.65	296,312.28
7. Education Development	147,210.50	776,946.00	1,733,252.80
8. Curriculum Evaluation	-	-	-
Total	383,723.64	10,936,081.86	11,319,805.64

Table 4.8 Cost Components of Medical Education Programme by Activities in Academic year 1998

Unit : Baht

Activities	Fixed cost (FC)			Variable cost (VC)		Total Cost (TC) TFC+TVC
	Capital Depreciation Cost	Labor Cost (Salaries)	Training Cost	Material Cost	Non-material Cost	
1. General Administration	356,589.25	245,335.00	-	82,000.00	12,000.00	695,924.25
2. Housekeeping	8,354.26	434,054.00	-	65,000.00	60,000.00	567,408.26
3. Registry	11,934.65	245,335.00	-	5,000.00	-	262,269.65
4. Student Affairs	9,215,940.12	207,591.00	-	7,500.00	-	9,431,031.12
5. Library	630,533.81	245,335.00	-	3,565.01	255,936.00	1,135,369.82
6. Audiovisual	172,296.91	207,591.00	-	17,170.07	332.85.00	397,390.83
7. Education Development	924,156.50	(Staff) 150,975.00 (Instructor) 3,186,001.00	60,880.10	11,000.00	673,085.00	1,669,121.60 3,186,001.00
8. Curriculum Evaluation	-	150,975.00	-	12,000.00	-	162,975.00
Total	11,319,805.50	4,922,217.00	60,880.10	203,235.08	1,001,353.85	17,507,491.53
Percentage	64.66 %	28.11 %	0.35 %	1.16 %	5.72 %	100.00 %

Table 4.8 showed the material cost by activity categories. This study found that Fixed cost - the Capital depreciation cost was 11,319,805.64 Baht (58.37%), Labor cost (MEC staff and instructors' salaries) was 6,809,410.00 Baht (35.12%). The Fixed cost is higher in this study due to new investment of the building and equipment. For more details of the material cost calculation see on Appendix III Table D.

Table 4.9 Cost components of Medical Education Programme in Academic year 1998 and the Projection in academic year 1999, and 2000

	Academic year		
	1998	1999	2000
No. of students (Q)	11	(11+13) = 24	(11+13+13) =37
Fixed Cost (FC)			
Capital depreciated cost	11,319,805.50	11,319,805.50	11,316,258.21
Instructors' salaries	3,186,001.00	3,225,371.00	3,302,306.00
Personnel's salaries	1,887,192.00	1,924,204.39	1,959,470.75
Training cost	60,880.10	60,880.10	60,880.10
Total Fixed Cost (TFC)	16,453,878.60	16,530,260.99	16,638,915.06
Average Fixed Cost –AFC (TFC/Q)	1,495,807.15	688,760.87	449,700.41
Variable Cost (VC)*			
Material cost	203,235.08		
Non – material cost	1,001,353.85		
Total Variable Cost (TVC)	1,204,588.93	2,628,194.03	4,051,799.13
Average Variable Cost (AVC)	109,508.08		
Total Cost- TC (TFC + TVC)	17,658,467.53	19,158,455.20	20,690,714.19
Number of students (Q)	11	24	37
Average Total Cost (ATC) =AFC + AVC	1,605,315.23	798,268.96	559,208.49

* Variable cost of academic year 1999 and 2000 based on variable cost in 1998, assume that average variable cost (AVC) of the programme is no difference in the different class year; that AVC not change, due to not fully utilized at the first academic year (1998).

From Table 4.9, To calculate the Average total cost of academic year 1998 and project forward to academic year 1999 and 2000. The costs were defined as Fixed cost and Variable cost. The Fixed cost is the capital depreciation cost, the salaries of personnel and instructor and the training cost. The Variable cost is the material cost (material cost + non – material cost).

In an academic year 1998, the number of 4th year medical students was 11 in the MEC. During academic year 1999, the 4th year student moved up to the 5th year, so the number of medical students in an academic year 1999 is the 4th and the 5th year (11+13), 24. For the academic year 2000, the number of medical students will be the 4th, the 5th, and the 6th year (11+13+13), 27. This number of the medical students is based on the assumption that there is no drop-out or students who have to repeat the programme.

As the academic year 1998, the MEC has only one class (4th year) medical students this study of the fixed costs and variable costs are based on the cost data of the academic year 1998.

This study found that the average total (unit) cost of the Medical Education Programme (in the academic year of 2000) would be about 559,208.49 Baht, which average variable cost (AVC) was only 109,508.08 Baht. This figure showed that, the unit cost of the Medical Education Programme was nearly twofold of the subsidy by the government, but if considered the average variable cost (AVC), the subsidy by the government was nearly threefold of the average total cost of Medical Education Programme.