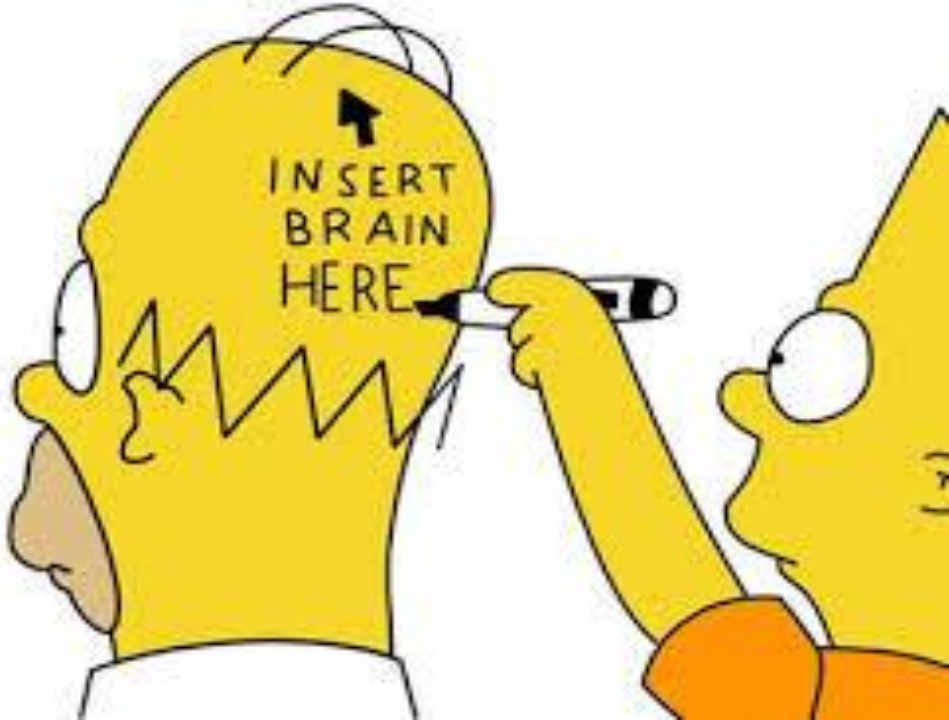
MAC3701

Applications of Management Accounting Techniques

REVISION



INTRODUCTION

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Lecturing:
MAC2602; MAC3701;
MAC4861; MAC4862

WHAT WE WILL DISCUSS…

- Schedule
- The exam paper
- UNISA Calculator policy
- The syllabus
- Final word
- References

EXAM PAPER (UNISA TUT LETTER 102/1/2014)

MARKS: **100**

TIME: **120 minutes**

1.2 minutes per mark!!

QUESTIONS: **5**

MARKS PER QUESTION: **9-30**

MARKS PER SUBQUESTION: **2-25**

Please note all the work remains examinable and that no work will be scoped out.

EXAM PAPER (UNISA TUT LETTER 102/1/2014)

- Know your formulae where applicable: no "formula sheet" will be provided.
- Some questions combine more than one topic.
- You need to study all topics.
- The weight of your exam mark is 90% of the final mark (subject to a sub-minimum of 40% in the exam).
- A final mark of 50% or more will mean that you pass the module.
- Show and clearly cross-reference **all** your workings, as this module is mainly based on principles and the markers sometimes refer to calculations to award principle marks if the final answer is incorrect.
- Time management is very important. Proper time management is critical for your success. The following are a few hints with regard to time management and other exam technique:

EXAM PAPER (UNISA TUT LETTER 102/1/2014)

- Know your formulae where applicable: no "formula sheet" will be provided.
- Some questions combine more than one topic.
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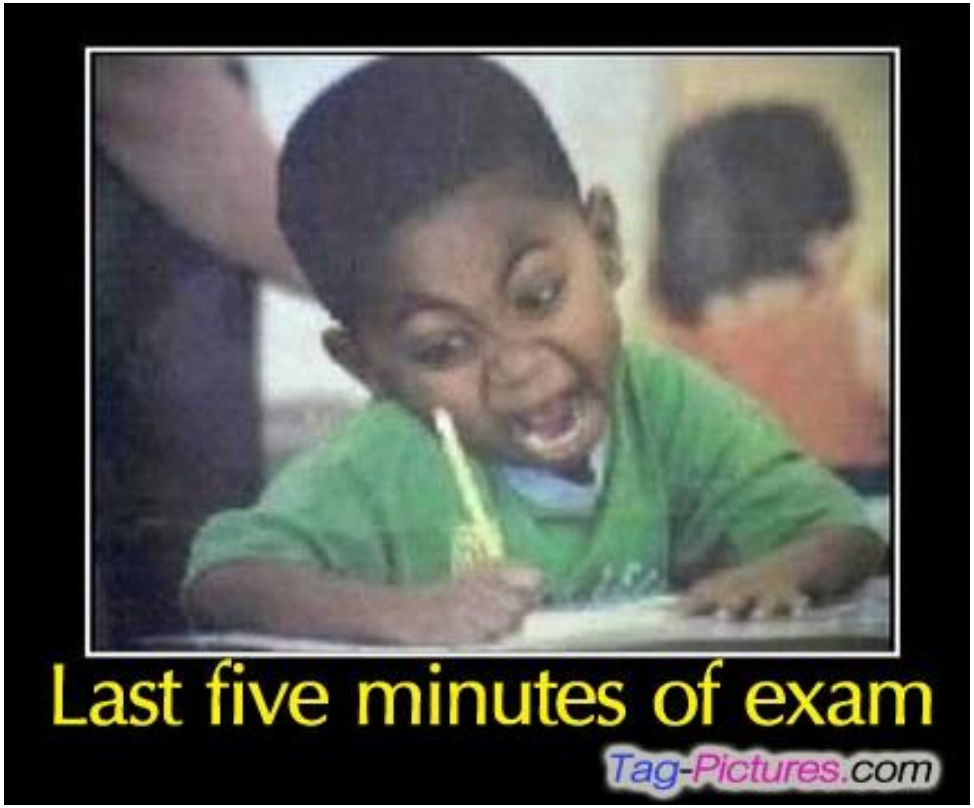
- The weight of your exam mark is 90% of the final mark (subject to a sub-minimum of 40% in the exam).
- A final mark of 50% or more will mean that you pass the module.
- Show and clearly cross-reference **all** your workings, as this module is mainly based on principles and the markers sometimes refer to calculations to award principle marks if the final answer is incorrect.
- Time management is very important. Proper time management is critical for your success. The following are a few hints with regard to time management and other exam technique:

EXAM PAPER (UNISA TUT LETTER 102/1/2014)

- On the day of the exam: Remember your watch and your non-programmable calculator.
- You will be provided with the necessary answer book in the examination venue. Make sure that you fill in your student number correctly on the front page of the answer book, but do not write your student number on every page, as this wastes precious time.
- Do not re-write the "required" of the question or write down any unnecessary headings that won't earn you any marks. Just make sure you number your answers exactly the same as in the question paper – you can answer the questions in a different order, but they have to have the same numbers as in the question paper.
- Read the question carefully (both the "given" and the "required") - while this may seem obvious, you'd be surprised to see how many students fail to actually read and understand what the question is asking of them.
- Should you use less time than available for a specific question, move to the next question. Only if you have time left after your final question, return to those questions that you haven't completed within the allocated time.

EXAM PAPER (UNISA TUT LETTER 102/1/2014)

- Do not underestimate the importance of revision and practice – be prepared for the exams. And don't let the real exam be the first exposure you get to time management!
- Apply these and other time-saving methods that you have discovered and practised!



CALCULATOR POLICY – UNISA ANNOUCEMENT (15 May 2014)

Calculator policy

Candidates may only use silent, electronic, battery-driven pocket calculators (financial calculators will be allowed) subject to the following conditions:

- Calculators must be cordless, and may not have print-out facilities or alpha keys;
- The calculator function on mobile telephones or any electronic device (i.e. laptops and/or any Smart Phone) may not be used; and
- Candidates may not share a calculator with another candidate in the examination room.

Kind Regards,
MAC3701 Lecturers

SYLLABUS – STUDY UNITS

1. PLANNING AND CONTROLLING INVENTORY
2. FURTHER ISSUES IN OVERHEAD ALLOCATIONS
3. COST ESTIMATION AND COST BEHAVIOUR
4. PROCESS COSTING
5. JOINT AND BY-PRODUCT COSTING
6. THE OPERATING BUDGET
7. STANDARD COSTING AND VARIANCE ANALYSIS
8. STANDARD COSTING: FURTHER ASPECTS
9. DIVISIONAL FINANCIAL PERFORMANCE MEASURES
10. ADVANCED DECISION-MAKING SCENARIOS
11. BASIC LINEAR PROGRAMMING
12. INTRODUCTION TO TRANSFER PRICING
13. LONG-TERM EXTERNAL PRICE SETTING
14. ADVANCED SENSITIVITY ANALYSIS

ADVANCED CONCEPTS IN COSTING SYSTEMS

ADVANCED CONCEPTS IN COSTING SYSTEMS

INTEGR. PLAN. & BUDGET.

STANDARD COSTING

PERFORMANCE MANAGEM

RELEVANT DECISION MAKING IN VARIOUS SCENARIOS

PRICING FOR INTERNAL AND EXTERNAL PURPOSES

ADV. SENS. ANALYSIS

1. PLANNING AND CONTROLLING INVENTORY

- Economic Order Quantity (EOQ)
- Quantity discounts and the EOQ
- Re-order point
- Safety stock levels

ECONOMIC ORDER QUANTITY (EOQ)

Economic Order Quantity = Optimum order size that will result in the total amount of the ordering and holding costs being minimized

$$EOQ = \sqrt{\frac{2CoD}{Ch}}$$

OR

$$EOQ = \sqrt{\frac{2DO}{H}}$$

D	=	Annual demand
Co or C	=	Cost of placing one order
Ch or H	=	Holding cost of one unit in inventory for one year

ECONOMIC ORDER QUANTITY (EOQ)

$$TC = \text{Ordering cost} + \text{Holding cost}$$

$$TC = \frac{DO}{Q} + \frac{QH}{2}$$

$$EOQ = \sqrt{\frac{2DO}{H}}$$

EOQ – QUANTITY DISCOUNT

Large purchases – discount

Price paid & order size will differ

Buying in bulk:

+ Saving on purchase price
+ Reduction in total ordering costs (less orders)
- Increased holding costs (higher inventory)

Compare discounts received vs. additional costs

WHEN TO PLACE THE ORDER (RE-ORDER POINT)

Lead time (days) x the daily demand

OR

Lead time (weeks) x the weekly demand

UNCERTAINTITY AND SAFETY STOCKS

Safety stock: Protect against uncertain demand, deliveries

Inventory in excess of expected use during the lead time to provide cushion against uncertainty

Re-order point =(Average rate of usage x lead time) + Safety stock

RECAP 1: ECONOMIC ORDER QUANTITY (EOQ) EXAMPLE

PR is a retailer of bicycles. The most popular children's bicycle has an annual demand of 30,000 units. Demand is predictable and spread evenly throughout the year.

The bicycles are purchased by PR for $200 each. Ordering costs are $150 per order and the annual cost of holding one bicycle in inventory is $25.

Required:

(i) Calculate the economic order quantity (EOQ) for the children's bicycle.

(2 marks)

A 120
B 600
C 424
D 100

RECAP 1: ECONOMIC ORDER QUANTITY (EOQ) EXAMPLE

$$EOQ = \sqrt{\frac{2CoD}{Ch}}$$

$$= \sqrt{\frac{2 \times 150 \times 30{,}000}{25}}$$

$$= 600 \text{ units}$$

RECAP 1: ECONOMIC ORDER QUANTITY (EOQ) EXAMPLE

PR is a retailer of bicycles. The most popular children's bicycle has an annual demand of 30,000 units. Demand is predictable and spread evenly throughout the year.

The bicycles are purchased by PR for $200 each. Ordering costs are $150 per order and the annual cost of holding one bicycle in inventory is $25.

Required:

(i) Calculate the economic order quantity (EOQ) for the children's bicycle.

(2 marks)

(ii) Calculate the total annual ordering and holding costs for the bicycle assuming the company purchases the EOQ, does not hold any buffer inventory and the lead time is zero.

(3 marks)

RECAP 2: ECONOMIC ORDER QUANTITY (EOQ) EXAMPLE

Annual demand for a raw for a raw material costing $30 per unit is 150,000 units per year. Inventory management costs for this raw material are as follows:
Ordering cost: $15 per order
Holding cost: $ 1.25 per unit per year

The supplier of this raw material has offered a bulk discount of 1% for orders of 25,000 units or more. If bulk purchase order are made regularly, it is expected that annual holding cost for this raw material will increase to $2 per unit per year

Required:

What is the total cost of inventory for the raw material when using the EOQ?

Determine whether accepting the discount offered by the supplier will minimise the total cost of the inventory for the raw material.

RECAP 2: ECONOMIC ORDER QUANTITY (EOQ) EXAMPLE

$$EOQ = \sqrt{\frac{2CoD}{Ch}}$$

$$= \sqrt{\frac{2 \times 15 \times 150{,}000}{1.25}}$$

$$= 1{,}897 \text{ units}$$

RECAP 2: ECONOMIC ORDER QUANTITY (EOQ) EXAMPLE

Total cost = Purchasing cost + Annual holding cost + annual ordering cost

= Purchases cost + (Ch x Q/2) + (Co x D/Q)
= 150,000 x $30 + ($1.25 x 1,897 / 2) + ($15 x 150,000 /1,897)
= **$4,502,372**

To obtain discount, number of orders per year:
150,000/25,000 = 6
Annual ordering cost: 6 x $15 = $90
Annual holding cost: 25,000/2 x $2 = $25,000
Purchasing cost: 150,000 x $30 x 0.99 = $4,455,000

RECAP 2: ECONOMIC ORDER QUANTITY (EOQ) EXAMPLE

Total cost: $(90 + 25,000 + 4,455,000)

= $4,480,090

Accepting the discount for bulk purchase will lower the total cost of inventory.

RECAP 3: ECONOMIC ORDER QUANTITY (EOQ) EXAMPLE

A company, which uses the EOQ inventory management model, purchases 64,000 units of raw materials per year. The purchase price of the raw material is $10 per unit. The cost of holding one unit in inventory is $1·20 per year. The cost of reordering and taking delivery is $150 per order regardless of the size of the order.

Assuming that usage is predictable and spread evenly throughout the year and that ordering and delivery are simultaneous, calculate for the raw material:

(i)

The total annual cost of holding and ordering inventory.

(3 marks)

RECAP 3: ECONOMIC ORDER QUANTITY (EOQ) EXAMPLE

Past experience has shown that the supplier of the raw material can be unreliable and that the delivery period can be between one week and three weeks. If the company wants to hold enough raw material to ensure that it never runs out, calculate for the raw material:

(ii)
The lowest inventory level at which raw material should be reordered.

(2 marks)

RECAP 3: ECONOMIC ORDER QUANTITY (EOQ) EXAMPLE

(i) EOQ = $\sqrt{\frac{2 \times 64{,}000 \times \$150}{\$1.20}}$

= **4,000 units**

Total cost of inventory management is:

Cost of ordering inventory + cost of holding inventory

DCo/Q + ChQ/2

= (64,000 x $150)/4,000 + ($1.20 x 4,000)/2

= $2,400 + $2,400

= **$4,800**

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RECAP 3: ECONOMIC ORDER QUANTITY (EOQ) EXAMPLE

(ii)

One week's usage = 64,000/52 = 1,231

Inventory reorder level = 3 x 1,231 = 3,693 units

RECAP 4: ECONOMIC ORDER QUANTITY (EOQ) EXAMPLE

UNISA REVISION PACK 2014:
QUESTION 6 (6 marks; 7 minutes)

Smart (Pty) Ltd is a distributor of scientific calculators amongst other products it sells. The company operates for 250 days per annum. The annual demand for the calculators is 10 000 units evenly spread throughout the year. The company maintains a safety stock of 80 calculators.

Additional information
Purchase price per unit R30
Order costs per order R200
Lead time 10 days
Cost of capital (after tax) 15%
Direct inventory holding costs R5 per year

REQUIRED:
(a) Calculate the economic order quantity for calculators. (3)
(b) Calculate the re-order point for the calculators. (3)

RECAP 4: ECONOMIC ORDER QUANTITY (EOQ) EXAMPLE

(a) Economic order quantity

$$EOQ = \sqrt{\frac{2CoD}{Ch}}$$

$$\sqrt{\frac{2 \times 200 \times 10\,000}{(R5 + R30 \times 1.15)}}$$

= 648, 8856.

= **649 Calculators (Rounding) √**

(b) Re-order point = (average rate of usage x lead time) + safety stock

= ((10 000/ 250) x 10) + 80 √√

= **480 calculators √**

2. FURTHER ISSUES IN OVERHEAD ALLOCATIONS

- Activity Based Costing (ABC)

ACTIVITY-BASED COSTING (ABC)

Reasons cost accumulation system used for decision-making:

1. Many indirect costs are relevant to decision making (the cost of support functions – procurement, handling etc.)
2. Periodically identifies potentially unprofitable products & require more details
3. Product decisions are not independent (i.e. reducing product range vs. support functions – see the "big" picture)

Assumes products consume resources in proportion to output

Traditional costing systems

Only 1 base of allocation

- Using the **traditional absorption costing approach overheads** are **allocated** to units on an **arbitrary basis** (using machine hours or labour hours or number of units manufactured).

- The use of this approach provided **accurate information** in a time when most organisations produced **only a narrow range of products** (with similar operations that consumed similar proportions of overheads).

  Overhead costs were only a very **small fraction** of total costs, **direct labour and direct material costs** accounting for the **largest proportion** of the costs.

Developed as a result of simplified production.

- With the **increase** in **non-volume-related support services** (and related overhead costs) **traditional costing** tends to allocate **too great** a proportion of overheads to **high volume products** and **too small** a proportion of overheads to **low volume products.**

- Activity based costing attempts to **overcome this problem…**

Activity based costing

More than 1 base of allocation used

- The **complexity of manufacturing** has increased which makes the **traditional absorption costing** approach **less accurate** in the costing of products.

- In **modern manufacturing systems** overheads include a lot of **non-volume related support activities**, such as: product design, quality control, production planning, ordering, production set-ups, despatching and customer services.

- **Activity based costing allocates overheads** to units **based on cost drivers** (factors which cause an increase in the cost of an activity) which results in **more accurate costing** of products.

Prime cost (direct material and labour) remain unchanged.

The total overhead does not change – only the method of allocation changes.

ACTIVITY-BASED COSTING (ABC)

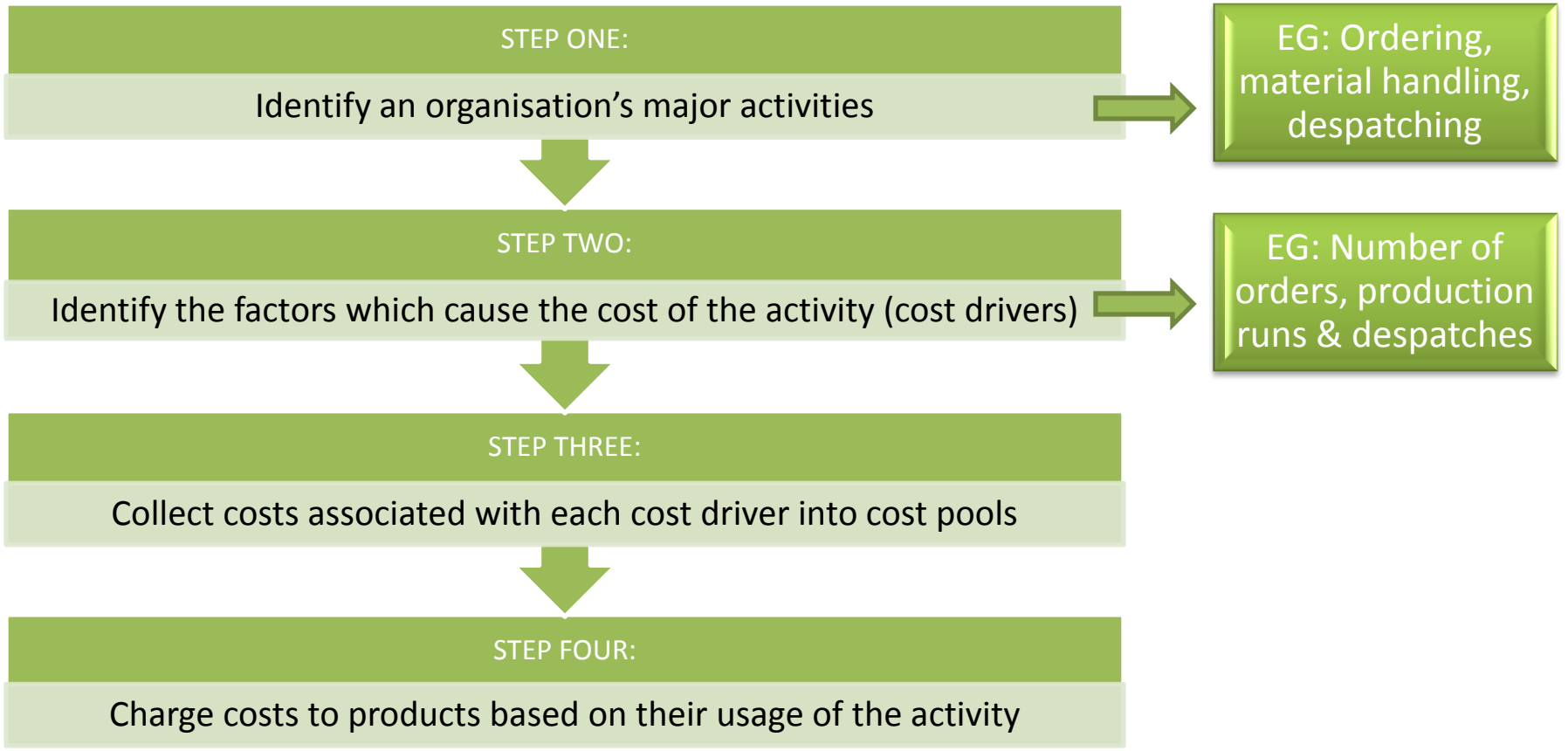
Activity based costing works on the premise that **costs** should be **allocated** on the **basis** that **activities lead to costs**.

If you know which product that activity relates to, that activity cost may be allocated to that product.

More relevant activity based allocation method can be determined.

It is a cost allocation method which initially traces or **allocates costs to activities such as machine usage, inspections and production setups.**

An ABC system operates as follows:



Benefits of ABC

- **The complexity of manufacturing has increased,** with wider product ranges, shorter product life cycles and complex production processes. **ABC recognises this complexity with its multiple cost drivers.**

- **ABC results in more fair allocation of overhead costs** to products.

- ABC facilitates a **good understanding of what drives overhead costs**.

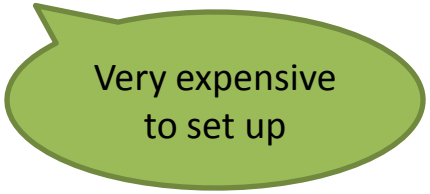
- **Better information available for decision making** in:
  - pricing of products
  - improving the product range by discontinuing old products & promoting new ones
  - assists in the costing of new products

- Provides management with a clear picture of the **contribution made by different products.**

Limitations of ABC

It has been suggested by critics that **activity based costing has some flaws** :

- **No real evidence** that ABC **improves** company **profits.**
- **Selection of cost drivers is difficult** and in some instances have little relevance to the activity.
- Costs such as rent, rates, depreciation, power & insurance still have to be apportioned.
- **ABC assumes a single cost driver within a cost pool** fully explains the cost behaviour of that pool.
- **Lack of understanding** by management.
- A **large amount** of **information** is **required** and the **collection** of this information can become **expensive**. The **cost** of implementing and maintaining ABC system **can exceed the benefits** of improved accuracy.
- **Systems and software** need to be **updated.**



Businesses that can successfully introduce ABC

- A highly competitive market

- A diversity of products, processes & customers

- Significant overheads not easily assigned to individual products

Businesses that would not benefit from ABC

- Monopolistic companies

- Single product companies

- Any organisation where the bulk of costs are direct material and direct labour

ACTIVITY-BASED COSTING (ABC) - EXAMPLE

A company produces two products, X and Y. The production of these products requires four overhead activities - power, maintenance, quality control and setup.

The following budgeted costs for these activities are to be allocated to products X and Y.

	Overhead costs R
Power	360 000
Maintenance	105 000
Quality control	51 000
Setup	84 000
Total	600 000

The overhead activities must be analysed to determine how the costs of these activities are incurred in order to apply activity based costing. In other words, the cost drivers for each activity must be identified. In this example the cost drivers are:

	Cost Driver
Power	Kilowatt-hours
Maintenance	Machine hours
Quality control	Number of inspections
Setup	Number of setups

ACTIVITY-BASED COSTING (ABC) - EXAMPLE

The amounts of the cost drivers for each product are as follows:

	Kilowatt-hours	Machine hours	Number of inspections	Number of Production Setups
Product X	800 000	10 000	400	48
Product Y	3 200 000	40 000	600	72
	4 000 000	50 000	1 000	120

The overhead rates for each overhead activity are as follows:

Power 360 000 ÷ 4 000 000 = R0,09 per kilowatt-hour

Maintenance 105 000 ÷ 50 000 = R2,10 per machine hour

Quality control 51 000 ÷ 1 000 = R51,00 per inspection

Setup 84 000 ÷ 120 = R700,00 per setup

ACTIVITY-BASED COSTING (ABC) - EXAMPLE

The overhead costs would be allocated to the products as follows:

		Product X R	Product Y R
Power	800 000 x 0,09	72 000	
	3 200 000 x 0,09		288 000
Maintenance	10 000 x 2,10	21 000	
	40 000 x 2,10		84 000
Quality control	400 x 51,00	20 400	
	600 x 51,00		30 600
Setups	48 x 700,00	33 600	
	72 x 700,00		50 400
		147 000	453 000

RECAP 1: ACTIVITY-BASED COSTING (ABC)

RS has recently introduced an activity based costing system. RS manufactures two products, details of which are given below:

The budgeted annual costs for two activities are as follows:

	Product R	Product S
Budgeted production per annum (units)	80,000	60,000
Batch size (units)	100	50
Machine set-ups per batch	3	3
Processing time per unit (minutes)	3	5

Machine set-up $180,000
Processing $108,000

1. The budgeted processing cost per unit of Product R is:

A $0.20
B $0.51
C $0.60
D $0.45

(2 marks)

RECAP 2: ACTIVITY-BASED COSTING (ABC)

RS has recently introduced an activity based costing system. RS manufactures two products, details of which are given below:

The budgeted annual costs for two activities are as follows:

	Product R	Product S
Budgeted production per annum (units)	80,000	60,000
Batch size (units)	100	50
Machine set-ups per batch	3	3
Processing time per unit (minutes)	3	5

Machine set-up $180,000
Processing $108,000

2. The budgeted machine set-up cost per unit of Product S is:

A $150
B $1.80
C $1.50
D $30

(2 marks)

RECAP 3: ABC - EXAM QUESTIONS

A healthcare company specialises in hip, knee and shoulder replacement operations, known as surgical procedures. As well as providing these surgical procedures the company offers pre operation and post operation in-patient care, in a fully equipped hospital, for those patients who will be undergoing the surgical procedures.

Surgeons are paid a fixed fee for each surgical procedure they perform and an additional amount for any follow-up consultations. Post procedure follow-up consultations are only undertaken if there are any complications in relation to the surgical procedure. There is no additional fee charged to patients for any follow up consultations. All other staff are paid annual salaries.

The company's existing costing system uses a single overhead rate, based on revenue, to charge the costs of support activities to the procedures. Concern has been raised about the inaccuracy of procedure costs and the company's accountant has initiated a project to implement an activity-based costing (ABC) system.

The project team has collected the following data on each of the procedures.

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RECAP 3: ABC - EXAM QUESTIONS

Procedure Information	Hip	Knee	Shoulder
Fee charged to patients per procedure	$8,000	$10,000	$6,000
Number of procedures per annum	600	800	400
Average time per procedure (hours)	2.0	1.2	1.5
Number of procedures per theatre session	2	1	4
In-patient days per procedure	3	2	1
Surgeon's fee per procedure	$1,200	$1,800	$1,500
% of procedures with complications	8%	5%	10%
Surgeon's fee per follow up consultation	$300	$300	$300
Cost of medical supplies per procedure	$400	$200	$300

RECAP 3: ABC - EXAM QUESTIONS

The project team has obtained the following information about the support activities.

Activity	**Cost Driver**	**Overheads ($000)**
Theatre preparation for each session	Number of theatre preparations	864
Operating theatre usage	Procedure time	1,449
Nursing and ancillary services	In-patient days	5,428
Administration	Sales revenue	1,216
Other overheads	Number of procedures	923

Nov_2010_Q3.a-c

RECAP 3: ABC - EXAM QUESTIONS

Required:

(a) **Calculate** the profit per procedure for each of the three procedures, using the current basis for charging the costs of support activities to procedures.
(5 marks)

(b) **Calculate** the profit per procedure for each of the three procedures using activity-based costing.
(13 marks)

RECAP 3: ABC - EXAM QUESTIONS

(a)		***Hip***	***Knee***	***Shoulder***
		$	***$***	***$***
Fee charged to patient		8,000	10,000	6,000
Surgeon's fee		(1,200)	(1,800)	(1,500)
Fee for follow-up consultations		(24)	(15)	(30)
Medical supplies		(400)	(200)	(300)
Overhead cost	(W1)	(5,200)	(6,500)	(3,900)
Profit per procedure		1,176	1,485	270

Follow-up consultations working:
Hip - $300 per consultation x 8% = $24
Knee - $300 per consultation x 5% = $15
Shoulder - $300 per consultation x 10% = $30

RECAP 3: ABC - EXAM QUESTIONS

W1 Overhead cost workings:

	Hip	*Knee*	*Shoulder*	*Total*
	$	*$*	*$*	*$*
Sales revenue				
	$8,000 x 600 =	$10,000 x 800 =	$6,000 x 400 =	
	$4,800,000	$8,000,000	$2,400,000	**$15,200,000**
Overheads				**$9,880,000**
Overheads / sales revenue				**65%**
Cost per procedure				
	$8,000 x 65%	$10,000 x 65%	$6,000 x 65%	
	$5,200	$6,500	$3,900	

RECAP 3: ABC - EXAM QUESTIONS

(b) Activity	Cost Driver	Overheads $000	No. of cost drivers	Cost per driver $
Theatre preparation for each session	Number of theatre preparations	864	(600/2 + 800/1 + 400/4) = 1,200	$720 per theatre preparation
Operating theatre usage	Procedure time	1,449	(600 x 2hrs) + (800 x 1.2hrs) + (400 x 1.5hrs) = 2,760	$525 per hour
Nursing and ancillary services	In-patient days	5,428	(600 x 3) + (800 x 2) +(400 x 1) = 3,800	$1,428 per day
Administration	Sales revenue	1,216	15,200,000	$0.08 per $ sales revenue
Other overheads	Number of procedures	923	(600 + 800 + 400) = 1,800	$513 per procedure

Nov_2010_Q3.a-c

RECAP 3: ABC - EXAM QUESTIONS

Overhead cost per procedure	**Hip**	**Knee**	**Shoulder**
Theatre preparation for each session	$720/2 = $360	$720/1 = $720	$720/4 = $180
Operating theatre usage	($525 x 2) = $1,050	($525 x 1.2) =$630	($525 x 1.5) = $788
Nursing and ancillary services	($1,428 x 3) =$4,284	($1,428 x 2) =$2,856	($1,428 x 1) =$1,428
Administration	(8,000 x $0.08) = $640	(10,000 x $0.08) = $800	(6,000 x$ 0.08) = $480
Other overheads	$513	$513	$513
Total overhead cost per procedure	$6,847	$5,519	$3,389

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RECAP 3: ABC - EXAM QUESTIONS

	Hip	Knee	Shoulder
	$	$	$
Profit per procedure per (a) above	1,176	1,485	270
Add back overhead cost per (a) above	5,200	6,500	3,900
Less overhead cost using ABC	(6,847)	(5,519)	(3,389)
Profit per procedure using ABC	**(471)**	**2,466**	**781**

Nov_2010_Q3.a-c

RECAP 4: ABC - EXAM QUESTIONS

UNISA REVISION PACK 2014:
QUESTION 7 (13,5 marks; 16 minutes)

Split (Pty) Ltd is a manufacturer of three products: Wing, Zing and Xeng. The same activities are needed in the production process for production of the respective products. The budgeted production is 2 000 of Wing, 2 500 of Zing and 3 000 of Xeng. The selling price per unit is R55 for Wing, R70 for Zing and R58 for Xeng. The variable cost per unit is R1, 85 for Wing, R2, 62 for Zing and R3, 58 for Xeng.

The company uses activity based costing.

The total budgeted fixed manufacturing overheads are as follows:

Material acquisition	R100 000
Material handling	R50 000
Machine setups	R80 000
Machine maintenance	R110 000
Indirect labour	R60 000
	R400 000

The above overhead items each represent an activity. Machine maintenance is required after a number of operating hours.

RECAP 4: ABC - EXAM QUESTIONS

UNISA REVISION PACK 2014:
QUESTION 7 (13,5 marks; 16 minutes)

The analysis of the cost driver volumes is as follows:

		Product		
Cost driver	Wing	Zing	Xeng	
Machine set ups	1	3	2	= 6
Machine hours	2	3	4	= 9
Indirect labour hours	3	4	6	= 13
Material movements	2	1	3	= 6
Number of orders	3	5	2	= 10

REQUIRED:
(a) Indicate the cost driver of each of the activities. (2.5)
(b) Calculate the profit per unit of each product using the activity based costing approach. Round all amounts to two decimals. (11)

RECAP 4: ABC - EXAM QUESTIONS

UNISA REVISION PACK 2014:
QUESTION 7 (13,5 marks; 16 minutes)

(a) COST DRIVERS

Manufacturing overhead	**Cost drivers**
Material acquisition	Number of orders ^
Material handling	Material movements ^
Machine setups	Machine setups ^
Machine maintenance	Machine hours ^
Indirect labour	Indirect labour hours ^

(b) Profit per unit

Product	Wing	Zing	Xeng
Selling	R55, 00	R70, 00	R58, 00√
Variable cost per unit	R1.85	R2.62	R3.58 √
Cost per unit **[W1]**	R49, 15	R61, 38	R49, 42√
Profit per unit	R4, 00	R6, 00	R5, 00 √

RECAP 4: ABC - EXAM QUESTIONS

UNISA REVISION PACK 2014:

QUESTION 7 (13,5 marks; 16 minutes)

Cost per unit

Material acquisition	(R100 000/ 10)	= R10 000 per order
Material handling	(R50 000/ 6)	= R8 333,33 per movement
Machine setups	(R80 000/ 6)	= R13 333,33 per setup
Machine maintenance	(R110 000/ 9)	= R12 222,22 per machine hour
Indirect labour	(R60 000/ 13)	= R4 615,38 per labour hour

Product	**Wing**	**Zing**	**Xeng**
Material acquisition (3 X R10 000) (5 X R10 000) (2 X R10 000)	R30 000	R50 000	R20 000 √
Material handling (2 X R8 333, 33) (1 X R8 333, 33) (3 X R8 333, 33)	R16 667	R8 333	R25 000 √
Machine set ups (1 x R13 333, 33) (3 x R13 333, 33) (2 x R13 333, 33)	R13 333	R40 000	R26 667 √
Machine maintenance (2 X R12 222, 22) (3 X R12 222, 22) (4 X R12 222, 22)	R24 444	R36 667	R48 889 √
Indirect labour (3 X R4 615, 38) (4 X R4 615, 38) (6 X R4 615, 38)	R13 846	R18 462	R27 692 √

RECAP 4: ABC - EXAM QUESTIONS

UNISA REVISION PACK 2014:
QUESTION 7 (13,5 marks; 16 minutes)

Product	**Wing**	**Zing**	**Xeng**
Total	**R98 290**	**R153 462**	**R148 248√**
Units	2 000	2 500	3 000
Cost per unit	**R49, 15**	**R61, 38**	**R49, 42 √**

- Learning curve

LEARNING CURVE

When a new product or process is developed, learning takes place. As the total output increases, the time required to produce each additional unit/batch decreases. The effect of this learning on output is often depicted by a learning curve. A learning curve is a graphical expression of the decrease in the average time required to produce each unit as cumulative output increases. The time taken to learn a job has a nonlinear (curve) effect on costs. This information enables management to calculate cost changes as the process matures.

Each time cumulative production is doubled, the average time taken to produce each unit of cumulative production is estimated to be a certain percentage of the average time per unit of the previous cumulative production

LEARNING CURVE THEORY – EXAMPLE

$$\text{Learning curve} = \frac{\text{Cumulative average time per unit}}{\text{Previous cumulative average time per unit}} \times \frac{100\ \%}{1}$$

LEARNING CURVE THEORY

This is used to measure how the incremental cost per unit of output continues to fall for each extra unit produced.

$Y = aX^b$

b	=	learning coefficient: Log of learning rate/Log of 2
a	=	Time required to produce the first unit of output
X	=	Cumulative number of units
Y	=	Cumulative average number per unit to produce X units

LEARNING CURVE THEORY

- Job – fairly repetitive in nature. Worker become more confident and knowledgeable about the work as experienced is gained, to become more efficient – work more quickly
- Made largely by labour effort rather than by a highly mechanised process
- Brand new or relatively short-lived product
- Complex and made in small quantities for special orders

LEARNING CURVE THEORY

Suppose for an example, that an 80% learning curve applies to production of item ABC. To date (the end of June) 230 units of ABC have been produced. Budgeted production for July is 55 units

The time taken to produce the very first unit of ABC, in January, was 120 hours.

Required:
Calculate the budgeted total labour time for July.

LEARNING CURVE THEORY

To solve problem, we need to calculate three things:

1. The cumulative total labour time need so far to produce 230 units of ABC

2. The cumulative total labour time need to produce 285 units of ABC, that is adding on the extra 55 units for July

3. The extra time need to produce 55 units of ABC in July, as the difference between (2) and (1).

LEARNING CURVE THEORY

1. The cumulative total labour time need so far to produce 230 units of ABC:

$Y = aX^b$

a = 120hrs

X = 230 and

b = log0.8/log2

= -0.322

$Y = (120) \times (230^{-0.322})$

= 20.83

So when X = 230 units, the cumulative average time per unit is 20.83 hours

LEARNING CURVE THEORY

2. The cumulative total labour time need to produce 285 units of ABC, that is adding on the extra 55 units for July

Now we do the same calculation for X = 285:

$Y = aX^b$

a = 120hrs

X = 285 and

b = log0.8/log2

= -0.322

$Y = (120) \times (285^{-0.322})$

$= 19.44$

So when X = 285 units, the cumulative average time per unit is 19.44 hours

LEARNING CURVE THEORY

3. The extra time need to produce 55 units of ABC in July, as the difference between (2) and (1).

Cumulative units	Average time per unit	Total hours
230	20.83 hours	4,791 hours
285	19.44 hours	5,540 hours
Incremental time for 55 units		**749 hours**