Tutorial Letter 201/3/2012

Production and Operations Management

MNO2601

Semester 1 and 2

Department of Business Management

This tutorial letter contains important information about this module.

Bar code

CONTENTS

INTRODUCTION

Dear Student

This tutorial letter contains the solutions to and provides feedback on Assignments 01 and 02 for both the first and the second semesters, and details on the format of the examination paper.

2 CONTACT DETAILS OF YOUR LECTURER

Questions regarding the academic content of this module maybe presented to the primary lecturer:

Anthea Pillay

Email: pillaap@unisa.ac.za

You may refer to Tutorial Letter 101 for all other contact details.

3 FEEDBACK ON PREVIOUS EXAM

First of all, the result for the examination was fair. The overall pass rate was 54%. There were a few distinctions, as well as a few poor results (below 10%!!). Those who did poorly shared the following mistakes:

- Some students misread the question. Thus we were provided with a lot of irrelevant information which could not be awarded any marks. DO NOT PANIC: READ THE QUESTION SLOWLY AND CAREFULLY. Give yourself a few moments to decide on the information we want from you. Please be guided by the mark allocation.
- You will always have calculations to do in this module. Please remember to show all formulas, steps and calculations as marks are awarded for them.
- Sadly, many students did not study the prescribed work. Do not underestimate the time you need to prepare for the examination. Tutorial 101 and the study guide contains detailed guidelines as to what is important for this subject.
- Some students did not complete the Multiple Choice Questions on a Mark reading Sheet. PLEASE ENSURE THAT YOU USE A MARK READING SHEET FOR ALL MULTIPLE CHOICE QUESTIONS!!
- As a second year student, it is expected of you to be able to apply your textbook knowledge to a set of scenarios given. The Nov 2011 exams contained the following question:

Job design involves six key job-related elements. As the owner of a stone quarry in an area with midday temperatures of 35°C, **describe with practical examples relevant to the quarry,** how you can incorporate the **six elements of job design** when you design the jobs at your quarry. The

quarry delivers about 100 blocks per day and employs both low-skilled labourers and highly skilled stone dressers. Large machines and noisy equipment are used in the quarry.

Textbook answer:

Elements of Job design **Subtotal (6)**

1. *Ergonomic environmental design* is the conditions under which jobs are performed which will have a significant impact on people's effectiveness, comfort and safety, e.g. noise, heat and light in the workplace.

2. *Ergonomic workplace design* – the technology must be designed well, as well as the interface between people and the hardware.

3. *Task allocation* – producing goods and services involves a whole range of different tasks that must be divided between the staff.

4. *Designing job methods* – the best method that fits the job and does not unduly interfere with other tasks is usually referred to as work study. This is an element of scientific management.

5. *Designing job time* - Work measurement – calculate the time required to do the different jobs and work out optimum number of people required

6. *Motivation of staff* – used to maintain commitment and it includes empowerment, teamwork and flexible working.

Model answer:

Elements of Job design **Subtotal (6)**

1. *Ergonomic environmental design* – reduce granite dust – use water lubricated cutting machines, provide cutters with nose masks to avoid breathing in dust and earplugs to cut out noise.

2. *Ergonomic workplace design* - better designed cutting machines to cut blocks from the rock face; dressing of stones need chisels and hammers – stones at good height and on base that can swivel to have access to all the sides

3. *Task allocation* – division of labour – Employ deaf people to operate cutting machines that make a lot of noise; Stone masons to have assistants who do menial tasks, appoint chisel sharpener

4. *Designing job methods* – scientific management - Approved method of job completion – do time and motion studies; better staff selection, aptitude testing and training to choose right person for the job; standardisation of some tasks; complete dressing of blocks at the quarry or do final dressing at client's premises?

5. *Designing job time* - Work measurement – calculate the time required to do the different jobs and work out optimum number of people required; time to move blocks from quarry to dressing

site; average time to dress a cubic metre; work out standards – time allowed for rest and relaxation

6. *Motivation of staff* – to maintain commitment – empowerment, teamwork and multi-skilling flexible working hours

3 EXAMINATION GUIDELINES

Please note the following important information.

3.1 Year mark

In order to pass this module you require a final mark of 50%. You may refer to Tutorial Letter 101 for more details on the calculation of your final mark.

3.2 Examination paper

The following valuable information on the examination paper should be studies carefully:

(Lecturers - Delete what is not applicable and customise/ personalise)

- The examination paper could include some of the questions which appeared in the assignments.
- A case study will be included in the examination.
- You have to be able to define and describe concepts, give examples and explain what is meant by certain concepts.
- Please read each question carefully before answering it. Take note of key words such as "list" or "discuss" and do what the question asks you to do. If you only list things when you also have to discuss them, you will only get part of the marks.
- The examination paper is set in English (and Afrikaans where applicable)
- The examination paper counts 70 marks and consists of two sections (Sections A and B).
- Previous examination papers are available on **myUnisa** and may not be supplied to students by the lecturer.
- The Examination Department will notify you of the examination date and time.
- Comprehensive details on the administration of examinations, including the criteria and dates of supplementary examinations, are available on **myUnisa** under "Examinations".

- Several resources and tips are also available on **myUnisa** to assist your with stress management and other related issues during examination periods.
- Here is a brief outline of your exam, with the mark allocation to help with your planning.

SECTION A: ANSWER ALL THE QUESTIONS

This is a multiple choice section. **[10]**

Please use the mark reading sheet provided to answer.

SECTION B: ANSWER ANY TWO (2) QUESTIONS

Various short questions which add up to 30 marks per question. **[60]**

These questions will test the entire syllabus. Please do not spot!

TOTAL: [70]

- **THIS IS NOT AN OPEN BOOK EXAMINATION**

4 FEEDBACK ON ASSIGNMENT 01

- Feedback on Assignment 01:

Assignment 01 for module MNO2601 **only** covered multiple-choice questions for topic 1 (study unit 1), topic 2 (study unit 2), topic 3 (study units 3 and 4), and topic 4 (study units 5 and 6).

You were asked to answer 15 multiple-choice questions. All the questions were of equal value and counted one mark. No negative marking was applied.

Question 1 The correct answer is **alternative 3.**

- Option (c) is incorrect because the production/operations function and not marketing is the primary contributor to all the aspects listed in the question.
- Option (d) is incorrect because although IKEA is a retailer, it also has a production/operations function which is responsible for the whole operation of the business.

Question 2 The correct answer is **alternative 2**.

Options (a), (d) and (e) are all incorrect.

- Option (a) is incorrect because there is no truth in the statement about the "position" of marketing and finance to either the left or right of the production/operations function (see also the figure 1.2 of Chapter 1 in the prescribed book).
- Option (d) is incorrect because marketing, accounting and finance are considered to be major functions in the business rather than support functions.
- Option (e) is incorrect because if the production/operations function were able to achieve "low cost" it would be regarded as a positive outcome and not a failure.

The only two correct options are thus (b) and (c).

Question 3 The correct answer is **alternative 4**.

The correct sequence of the flow of goods and/or services in the transformation process model is:

Input Transformation process Output.

Also see figure 1.3 in chapter 1 of your prescribed book.

Question 4 The correct answer is **alternative 5**.

Options (c) and (d) are incorrect.

- Option (c) is incorrect because both transforming (facilities and staff) and transformed (materials, information and customers or clients) resources are inputs which are fed into the transformation process at the start and their relative position to the term "output resources" (a term that we incidentally made up) is irrelevant.
- Option (d) is incorrect because the factory plant is a transforming rather than a transformed resource.

Options (a), (b) and (e) are all correct.

Question 5 The correct answer is **alternative 1**.

- The bakery has a great deal of variety (many types of cakes, pies and pastries baked).
- The petrol station has a high volume (many litres of petrol sold).
- The butchery has a high degree of customer/client contact (every customer/client has his/her own unique order).
- The taxi transport has a great deal of variation in demand (the demand pattern varies considerably at different times of the day and night).

Question 6 The correct answer is **alternative 1**.

Options (a), (b) and (c) are incorrect.

- Option a) is incorrect because high variety means producing a variety of products, typically in

lower volumes.

- Option b) is incorrect because customer/client contact refers to the extent to which customers/ clients are exposed to the operation and its activities.
- Option c) is incorrect because a bread bakery is an example of a low-variation operation as it would only product bread.

Question 7 The correct answer is **alternative 3**.

Options (c), (d) and (e) are incorrect.

- Option (c) is incorrect because the production/operations system hierarchy has to do with the idea of many micro-operations which together make up or form a larger macro-operation.
- Option (d) is incorrect because the terms "internal customer" and "internal supplier" are used to describe micro-operations which take outputs from and give inputs to any other micro-operation. Option (e) is also incorrect because a build-up of stocks of input and output resources would be the result of buffering rather than the stocks' being significantly reduced.
- Options (a) and (b) are both correct.

Question 8 The correct answer is **alternative 4**.

- The statement about flexibility as opposed to a speed advantage in the case of keeping delivery promises is incorrect. Such an advantage would be classified as a dependability advantage.

Question 9 The correct answer is **alternative 5**.

The first four alternatives are all incorrect.

- Doing "things" on time implies dependability rather than a speed advantage (alternative 1).
- Doing "things" cheaply leads to a cost rather than a quality advantage (alternative 2).
- Being able to change "things" quickly means a flexibility rather than a dependability advantage (alternative 3).
- Doing "things" right the first time has quality rather than flexibility advantages (alternative 4).
- Doing "things" fast does have direct benefits in terms of speed, and indirectly, does lead to cost advantages because the business may respond to customer/client needs more quickly (shorter delivery and lead time).

Question 10 The correct answer is **alternative 5**.

Options (b) and (e) are incorrect.

- A broad measure of productivity for the country as a whole (option b) should be specified more precisely as the GDP (output) per capita (input).
- The competitive factors that are used in the World Competitiveness Yearbook (WCY) as published by the IMD (International Institute for Management Development) to rank different countries in the world in terms of competitiveness comprise: government efficiency; economic performance; business efficiency and infrastructure.

Options (a), (c) and (d) are all correct.

Question 11

Alternative 4 is correct because options (a), (b) and (e) are correct.

- Option (c) is incorrect because "effectiveness" refers to the degree to which the output of the production process is related, in quantitative and also qualitative terms, to the needs of the market. Taken together, "efficiency" and "utilisation" are traditional concepts used to explain what the term "productivity" entails. However, we should note that according to the NPI, the concepts of "efficiency" and "effectiveness" have been used in combination more recently to explain what micro-productivity entails (ie productivity within the individual business or enterprise).
- Option (d) is incorrect because the statement that productivity is only relevant to manufacturing enterprises is one of the frequent misconceptions about the measurement of productivity that were identified in your study guide. Measuring productivity does not necessarily mean we have to count physical units - output can also be reflected by indicating value.

Question 12

Alternative 4 is correct because options (b), (d) and (e) are incorrect.

- Option (b) is incorrect because the NPI actually argue that physical indicators measure efficiency only and not effectiveness. Also note that reference is made to value-added tax productivity measurement, which does not exist at all.
- Option (d) is incorrect because the DPA productivity management process encompasses the five sequential steps of productivity measurement → productivity diagnosis → productivity planning → productivity disclosure → productivity accountability, all steps leading and contributing to productivity improvement.
- Option (e) is also incorrect because it is not inevitable that an increase in resource price will lead to an increase in product price. It is quite possible that the higher costs of inputs could be neutralised by an increase in productivity performance.

Options (a) and (c) are correct.

Question 13

Options (a) and (e) are correct, therefore **alternative 2** is correct.

- Option (b) is incorrect because designing the new Boeing 777 the company changed direction in order to better "understand its customers' needs and then transform these into an aircraft that could best meet those needs" and achieved this by using design/build teams. Such teams work in a similar way to interactive design where the product/service design is very closely integrated into the design of the manufacturing and delivery processes.
- Option (c) is incorrect for the same reasons set out above and product/service and process design are done in conjunction with each other rather than sequentially.
- Option (d) is incorrect because while BOEING closely involved its customers right from the start of the design, the customers are seen as airlines such as British Airways, Japan Airways and Quantas rather than as the passengers themselves.

Question 14

Alternative 4 is correct.

- The practical example of a batch process (option a) would be the paint manufacturer (ii), a mass process (option b) is typically used by the beer producer (iii), an example of a service shop (option c) is the shoe repair shop (i), and the professional service (option d) word be the optometrist (iv).

Question 15

Alternative 4 is correct because options (d) and (e) are correct.

- Option (a) is incorrect because speed and competitiveness are not specifically included as industrial design principles followed by BRAUN.
- Option (b) is incorrect because the design principle of truthfulness does not allow (even as a last resort) any attempts to play on people's emotions and weaknesses.
- Option (c) is also incorrect because BRAUN's design principles do not focus primarily on aesthetic properties; BRAUN is in fact quite determined that its designs go beyond them.

Your number of correct answers x 1 = mark out of 15

5 FEEDBACK ON ASSIGNMENT 02

♦ Feedback on Assignment 02:

Assignment 02 for module MNO2601 **only** covered multiple-choice questions for topic 5 (study unit 7), topic 6 (study unit 8), topic 7 (study unit 9), topic 8 (study units 10 and 11), topic 9 (study unit 12) and topic 10 (study units 13 and 14).

You were asked to answer 15 multiple-choice questions. All the questions were of equal value and counted one mark. No negative marking was applied.

Question 1

Options (a), (c) and (d) are correct, therefore **alternative 2** is correct. Option (b) is incorrect because the total supply network includes both the first, second and other tier suppliers and customers. Option (e) is incorrect because the design of the production/operations network does not specifically include the product/service design with the process design, although these two activities naturally will and ought to overlap each other.

Question 2

Alternative 5 is correct because options (b), (c) and (d) are incorrect. Option (b) is incorrect because the determining factor for locating the company in Shanghai was the ready availability of skilled labour and its experience in the textiles industry rather than the great potential of the large new market. Option (c) is incorrect because no mention is made of the Japanese method of "Chu-zan" (a term which we incidentally made up), and furthermore the telling factor for the Japanese companies was the quality and cost of labour in the UK rather than their training potential for increasing productivity. Option (d) is also incorrect because capacity leading strategies do not guarantee sufficient demand for products in order to operate at optimum level - rather they guarantee that there will always be sufficient capacity to meet the demand. Options (a) and (e) are correct.

Question 3

Options (b) and(c) are incorrect, therefore **alternative 4** is correct. Option (b) is incorrect because the product rather than the process layout type involves locating the transforming resources along the sequence of the process or flow lines. Option (c) is incorrect because in the process layout the transformed resources move between the transforming resources rather than in the fixed-position layout. Fixed-position layouts are typically used where the materials or people being transformed are either too large or too delicate or would object to being moved. Options (a), (d) and (e) are correct.

Question 4

Options (a) and (c) are correct, therefore **alternative 5** is correct. Option (b) is incorrect because the company adopted a process rather than a product layout whereby similar products such as the packaged foods and vegetables were placed together. Option (d) is incorrect because the description of a fixed-position layout cannot be associated with the airport (the passengers or transformed resources that are the recipients of the processing are not stationary but rather move to the airport to be "processed"). The layout type used in the airport is more like a cell layout where a product layout is used (ie passport control) in some places and a process layout (ie shopping areas) in others. Option (e) is also incorrect because the basic process type in manufacturing and service provision determines the dominant layout type rather than the other way around.

Question 5

Alternative 3 is correct because options (a), (c) and (d) are all incorrect. Option (a) is incorrect because the issue of who is responsible for supervising the execution of the task is not an element of job design as depicted in figure 9.2 on page 305 of your prescribed book. Option (c) is incorrect because the division of labour would increase rather than decrease the monotony of the work. Option (d) is also incorrect because work measurement rather than method study concentrates on determining the time it takes to

carry out a specific task (note that work measurement is not concerned with speeding up the time it takes to complete a task - this is done by applying the techniques of method study - nor does it focus on the average worker but on a qualified worker at a defined level of performance). Options (b) and (e) are correct.

Question 6

Alternative 1 is correct. All the other alternatives of matches contain incorrect combinations either in description (alternatives 2 [should be a cell layout], 3 [should be a process layout]) and 5 [incorrect name as to the basic layout type], advantage (alternative 4 [the advantage is attributable to a process and not product layout] or disadvantage.

Question 7

Alternative 2 is correct because options (c) and (d) are incorrect. Option (c) is incorrect because the constraints placed upon the planning and control task are not due to an infinite but rather a finite supply of resources which has to meet unlimited rather than a limited demand. Option (d) is incorrect because long-term planning (and not long-term control) has more potential to influence decisions and is thus more important than long-term control. Similarly, short-term control is more important than short-term planning. Alternatives (a), (b) and (e) are all correct.

Question 8

Options (c), (d) and (e) are incorrect; therefore **alternative 4** is correct choice. Option (c) is incorrect because in "make-to-stock" operations the throughput time, P, will always be greater (and not smaller) than the demand time, D. Option (d) is incorrect because the scheduling activity in the planning and control task in operations deals with setting up timetables showing at what time or on what dates jobs should start and when they should end. The sequencing activity must, however, must determine which tasks must be performed before (or have priority over) others. Option (e) is incorrect because the hospital does not follow a "first-in-first-out" sequencing priority system at all. Rather, as patients arrive, medical staff quickly sort and classify them to determine which category of urgency each patient fits into. Then a suitable schedule for the various treatments (and patients) is worked out - in other words, very serious cases or illnesses are treated first.

Question 9

Alternative 3 is correct because options (b) and (d) are incorrect. Option (b) is incorrect because the total capacity is 2 500 cars per day (500 cars x 10 hours per day ÷ 2 hours [average length of stay]). Option (d) is incorrect because the difference between utilisation and efficiency does not lie in the measurement of actual output but rather in their expression in terms of capacity (design capacity in the case of "utilisation" and effective capacity in the case of "efficiency" - also see fig 11.7 on p 387 in your prescribed book).

Options (a), (c) and (e) are all correct.

Question 10

Options (b), (d) and (e) are incorrect; therefore **alternative 3** is correct. Option (b) is incorrect because the company should not follow a level capacity plan (which keeps personnel in the employ of the company regardless of the demand for their services) if the telesales staff are used only during the peak period from November to March each year. Note that in some cases highly trained personnel might be kept on regardless of the demand for the company's products or services. This could be because of the scarcity or uniqueness of their particular skills. However, in the case of Eurocamp, trained permanent staff are moved on to telesales to supplement part-time staff rather than the other way around. Option (d) is incorrect because the company rather follows a level capacity plan during the first two phases of production and only reverts to an increase or decrease in its production rate, depending on the weather patterns, in the final phase of its production. Option (e) is also incorrect because although the chocolate factory does find itself in an "oversupply" situation at 120 cumulative days, the description of such a position is incorrect (more rather than less is produced compared with the volume of demand). Options (a) and (c) are correct.

Question 11

Alternative 5 is correct because options (b), (c) and (d) are correct. Option (a) is incorrect because material requirements planning systems are used in dependent rather than independent demand conditions. Option (e) is incorrect because the "internal working" or functioning of the MRP system is not described correctly. The master production schedule (not the MRP system) must be analysed to ensure that the weekly loadings on each work centre are realistic.

Question 12

Alternative 2 is correct. Should the quantity of sales orders in week 5 be 9 (thus an increase of 5 units), the quantity of the "available to promise" in the same week, week 5, will be 2 units (thus a decrease of 5 units). However, such an increase would have no effect on the quantity of the "available to promise" in week 7. This quantity remains 11 units.

Question 13

Options (c) and (d) are incorrect; therefore **alternative 4** is correct. Option (c) is incorrect because the decision about the place to order (ie where to place the order) is not specifically included in the scope of the decisions that production/operations managers need to be involved in managing the inventory system. Option (d) is incorrect because the

EOQ is not a rand value (monetary figure of R91) but a quantity only (91 units). Options (a), (b) and (e) are all correct.

Question 14

Options (a), (b) and (c) are incorrect; therefore **alternative 1** is correct. Option (a) is incorrect because pipeline inventory is not the same as buffer or safety inventory for which the description is given. Instead it exists because material cannot be transported instantaneously between the point of supply and the point of demand. Option (b) is incorrect because the whole purpose or philosophy of the M&S approach is to restock items that sell quickly and to avoid stock-outs. Option (c) is incorrect because the optimum time between orders is approximately every half month (0,55 month). Options (d) and (e) are correct.

Question 15

Alternative 1 is correct because none of the options listed are incorrect.

7 CONCLUDING REMARKS

We trust that you found the feedback and information given valuable. Do not hestitate to contact us if you have any questions regarding the assignments, the feedback or the examination provided in this tutorial letter.

We wish you all the best with your examinations.

Ms Anthea Pillay

Lecturer: Operations Management