

**MARA University of Technology**

**Teaching Tools: Digital Image Manipulation in  
Radiology (By Manipulating the kV Value with  
Constant mA)**

**Nur Haizum Suhaili**

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I seek His Blessing on His Prophet Muhammad s.a.w*

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## Table of Contents

Acknowledgement.....	ii
List of Tables.....	v
List of figures.....	vi
Abstract.....	vii
CHAPTER 1.....	1
1.1 Background Problems.....	1
1.2 PROBLEM DESCRIPTION.....	2
1.3 OBJECTIVES.....	3
1.4 SCOPE.....	3
1.5 SIGNIFICANCE OF STUDY.....	3
1.6 SUMMARY.....	3
CHAPTER 2.....	4
2.0 Introduction.....	4
2.1 Issues.....	4
2.1.1 Radiology.....	5
2.1.1.1 Computed Radiography (CR).....	5
2.1.1.2 Advantages of Computed Radiography.....	5
2.1.1.3 Image processing in Computed Radiography.....	6
2.1.1.4 Exposure factors in radiography.....	6
2.1.1.5 Quality assurance for computed radiography.....	6
2.1.2 Multimedia.....	7
2.1.2.1 Integrating multimedia in learning process.....	7
2.1.3 Design principles.....	8
2.1.4 Colour Issues.....	12
2.1.5 Platform.....	12
2.2 Summary.....	13
CHAPTER 3.....	14
3.0 Introduction.....	14
3.1 Methodology.....	15

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## ABSTRACT

There are no teaching tools to help the lecturers who teach radiology in Fakulti Sains Kesihatan to differentiate between the good and not accepted x-ray images. By integrating multimedia element in learning process, it will help to motivate the student and encourage them to participate in the learning process and improving their understanding in the subject. The system development and design is based on multimedia methodology and multimedia design principles. The findings clarify the basic criteria for multimedia interface design.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background Problems

X-rays are a form of electromagnetic radiation, just like visible light. In a health care setting, x-rays are emitted by a machine as individual “particles” (photons) that pass through the body and then get detected by a sensitive film. Structures that are dense (such as bone) will block most of the photons, and will appear white on developed film. Structures containing air will be black on film, and muscle, fat, and fluid will appear as shades of gray.

Noise is random variation in image brightness. In many cases, it reduces the image quality and is significant when the objects being imaged are small and have low contrast. Although noise gives an image a generally undesirable appearance, the most significant factor is that noise can cover and reduce the visibility of certain features within the image.

Nowadays, if the x-ray taken is not clear or contains much noise, the x-ray has to be taken once more to achieve better picture. Factors that contribute to a good x-ray are kV, mA and exposure time.