

# **Supporting Health Care and Medical Physics Around the World Through Collaborative Teaching**

**Perry Sprawls, Ph.D.**  
**Sprawls Educational Foundation**  
[www.sprawls.org](http://www.sprawls.org)

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**Supporting**  
**Health Care and Medical Physics**  
**Around the World Through**  
**Collaborative Teaching**

**View This Presentation**  
**at**

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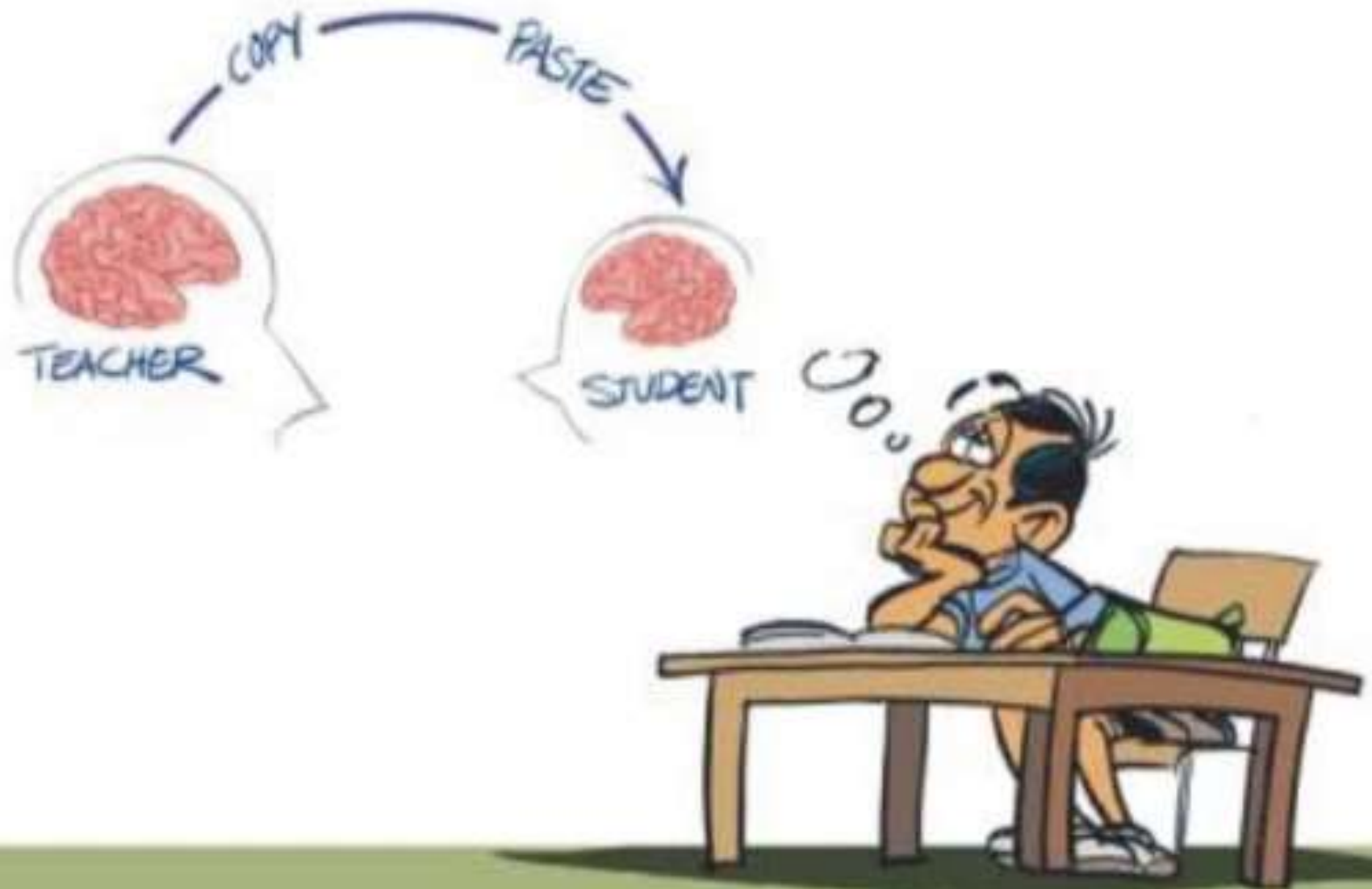
**Supporting**  
**Health Care and Medical Physics**  
**Around the World Through**  
**Collaborative Teaching**

**The Model**

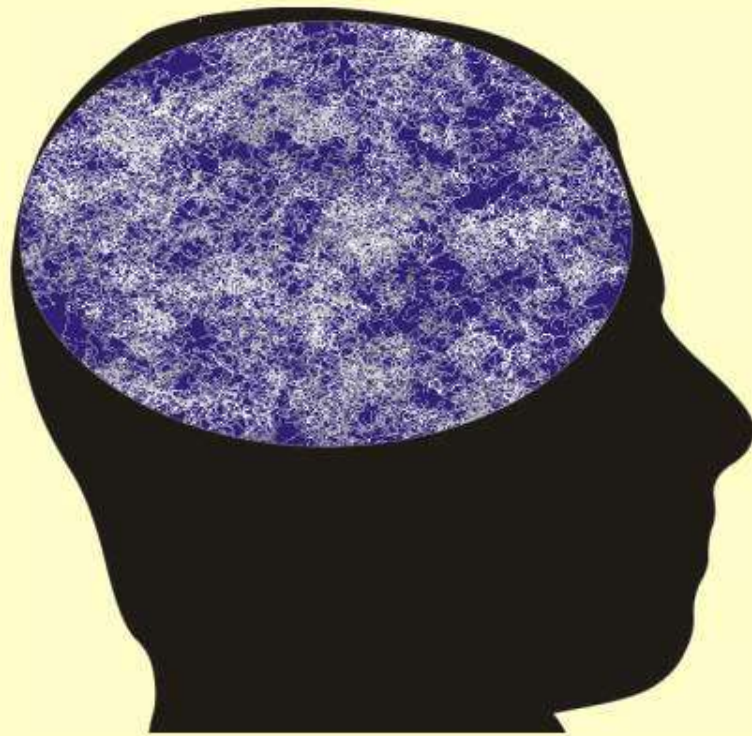
**Method**

**Results**

# Teaching Physics **Is Not**



# **Learning Medical Physics is**



**Building a Knowledge Structure  
in the Mind**

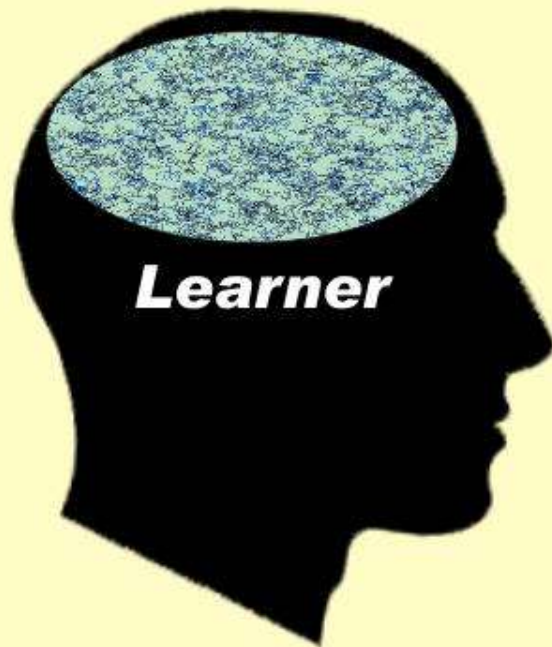
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# Teaching

**is helping someone**

**Building a Knowledge Structure in the Brain**



**Physical Universe**



***A mental representation of physical reality***

**Connect**

**Organize**

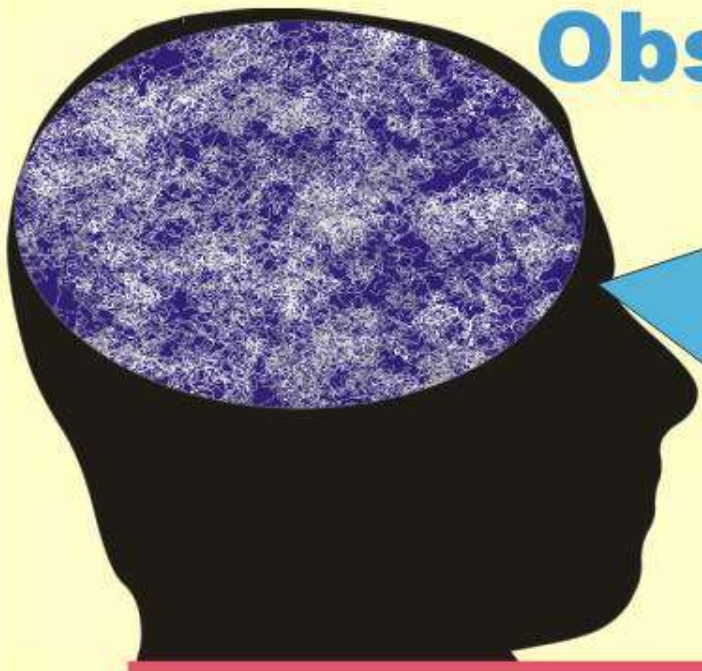
**Guide**

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# Learning Medical Physics Requires

# Observing

# Medical Physics Universe



## Interacting With

# Sprawls

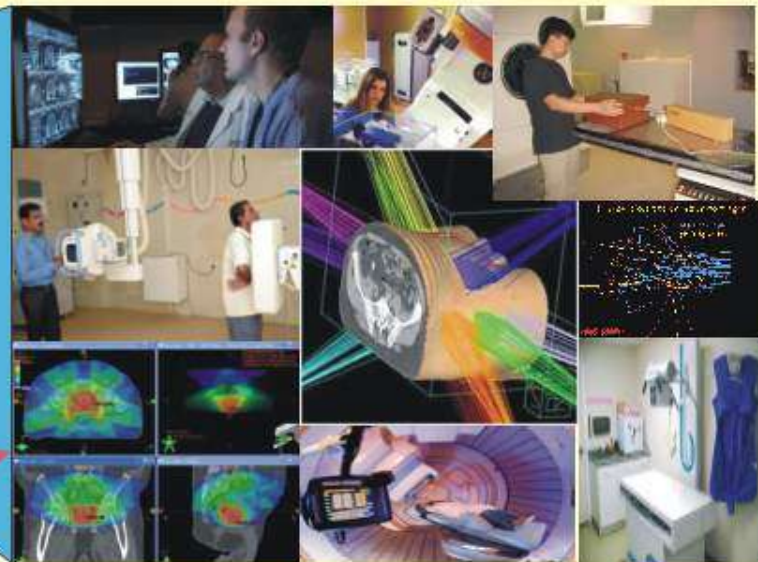
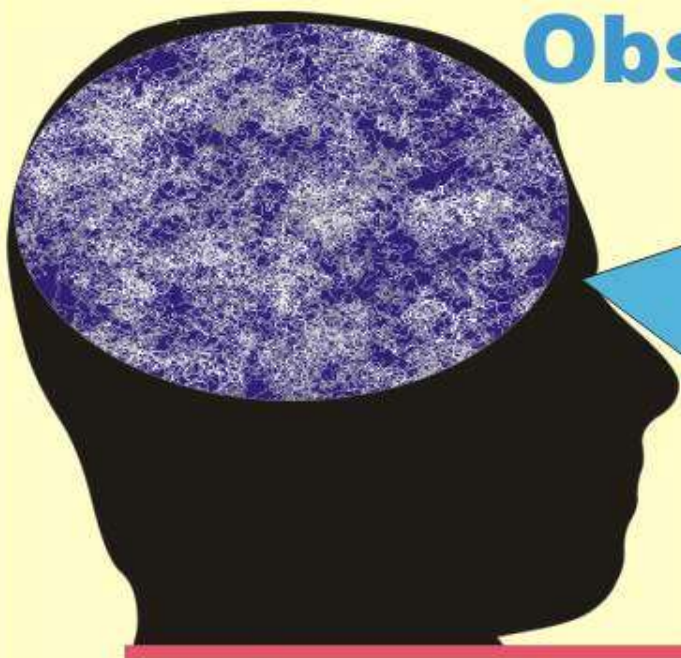


# Teaching Medical Physics



Observing

Medical Physics  
Universe



Interacting With

Is

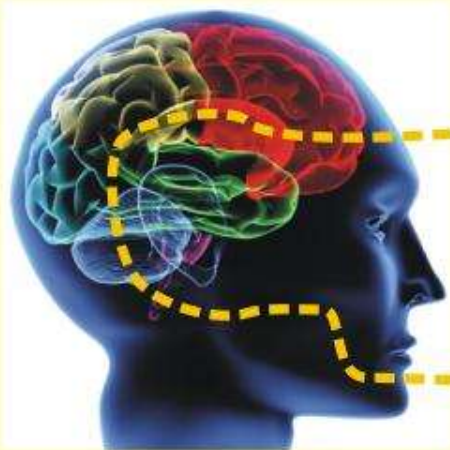
Connecting and Guiding

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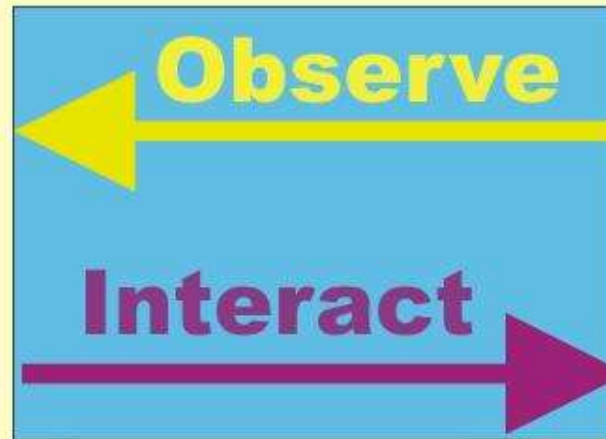


# The Elements of A Highly Effective Educational Session

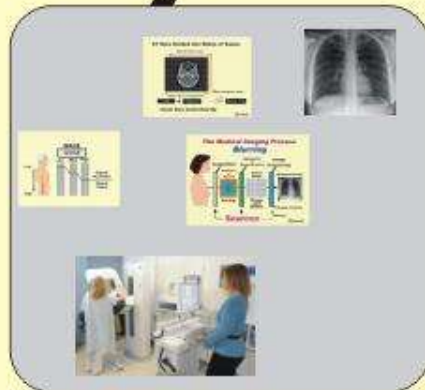
**The Brain**



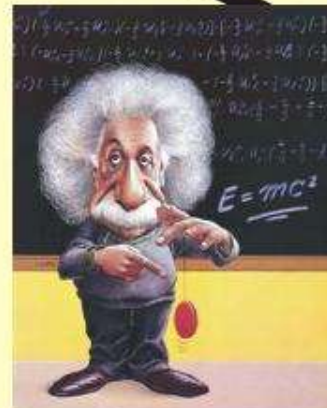
**Connection**



**The Physical Universe**  
(Physics of Medical Imaging)



**“Window”**

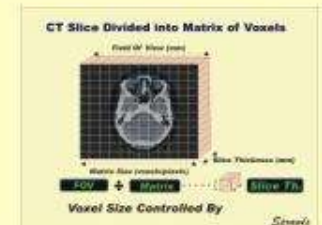


**Teacher  
/Guide**

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# The Traditional Classroom

“ A Box for Enclosing Students...”



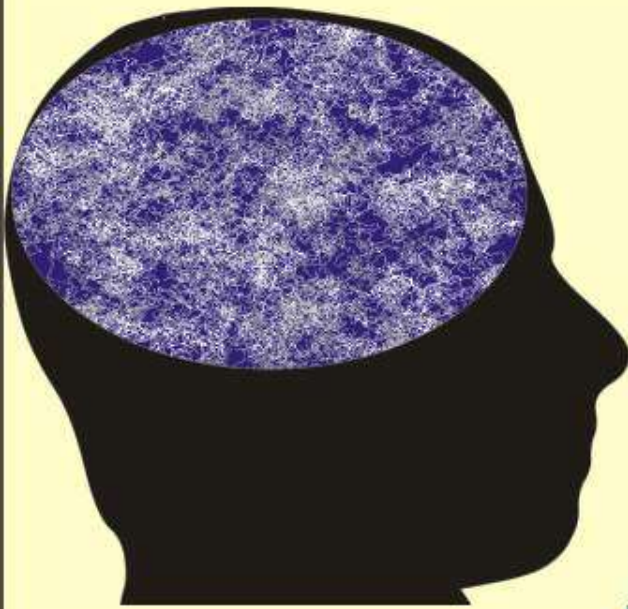
**And hiding them from the world  
about which they should learning.**



# Teaching Medical Physics

# Medical Physics Universe

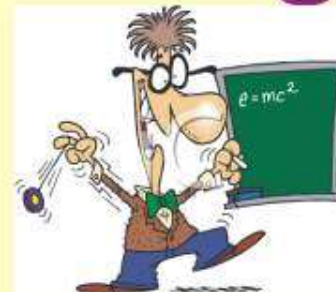
## “Window”



## Provide Window

# Guide the Learning Process

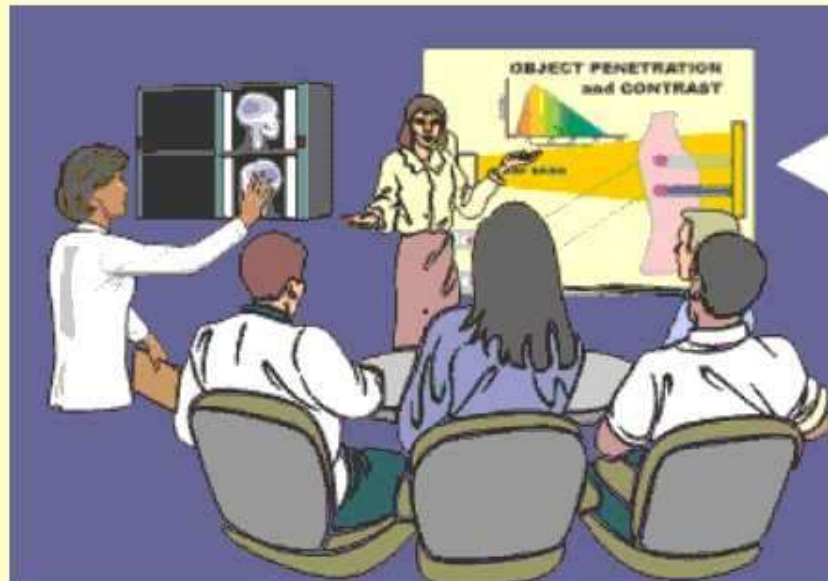
# Teacher must



## Sprawls

# Rich Classroom and Conference Learning Activities

**Learning  
Facilitator  
“Teacher”**



**Visuals**

**Representations  
of  
Reality**

**Organize and Guide the Learning Activity**  
**Share Experience and Knowledge**  
**Explain and Interpret What is Viewed**  
**Motivate and Engage Learners**

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## Resource Physicist

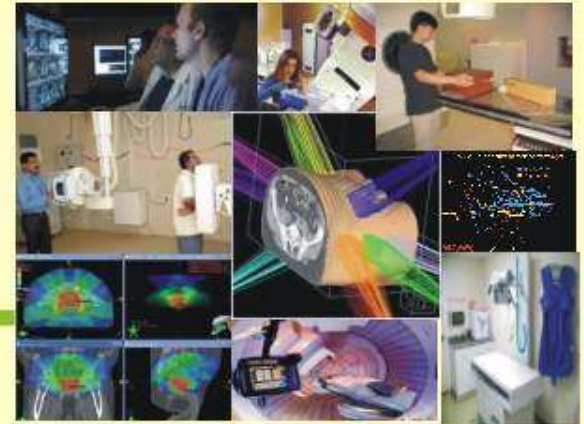


## Create visuals and related resources

## Share with the World



## Medical Physics Universe



# Local Physicist

- Organizes
- Guides
- Shares Experience
- Motivates

## Sprawls

# *The Sprawls Resources*

**Sharing the Emory Experience with the World  
With Emphasis on the Developing Countries**

**Emory**



[www.sprawls.org/resources](http://www.sprawls.org/resources)

**Open Access  
Educational Resources**



**Visuals Books Modules**

**Global Impact**



**Enhancing Radiology Education  
in Every Country of the World**



# **Sprawls**

## **Collaborative Teaching Network**

**Emory University  
&  
Sprawls Educational Foundation**



**Available in All Countries**

# The **Collaborative Teaching** Model

**Online Resources**  
Modules Books Visuals



**Enhance the performance  
of physics faculty**

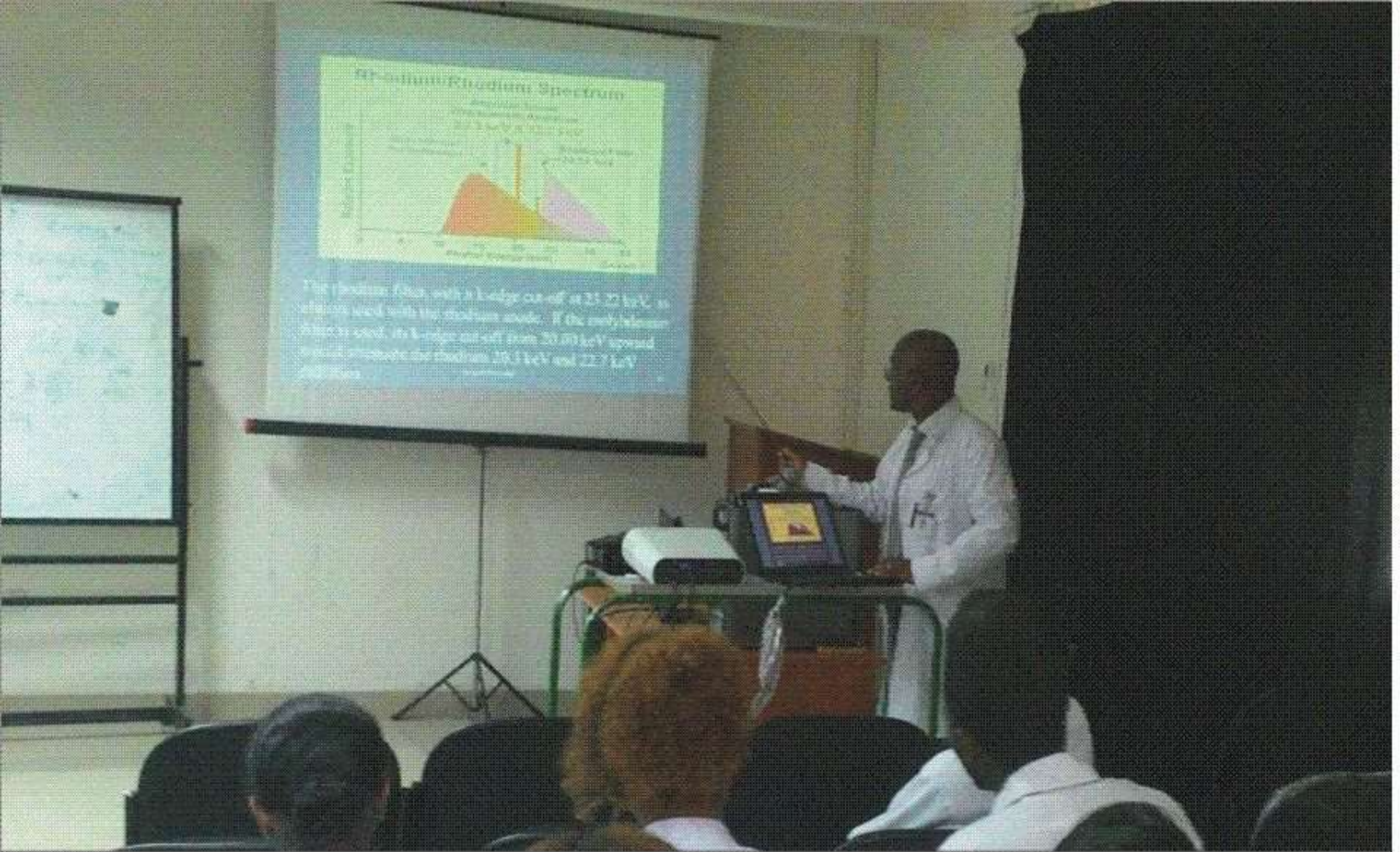


**Knowledge  
Experience  
Guidance  
Role Model**

**Local Universities**

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Seife Teferi Dellie (Ph.D)

Assistant Professor of Medical Physics

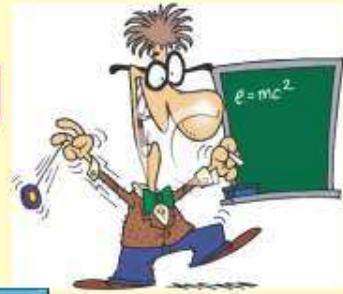
RaySafe Radiation Protection Service Provider Addis Ababa University College of Health Sciences

TASGeneral Hospital Department of Radiology Addis Ababa, Ethiopia





# **Collaborative Teaching with**



## **Web-Based Resources**



**Enhancing the performance  
of medical physics teachers**

**Enriches learning activities  
for students/residents**

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# **Sprawls Collaborative Teaching Network**

**Emory University  
&  
Sprawls Educational Foundation**



**Available in All Countries**



# Sprawls

## Collaborative Teaching Network





# My Value...

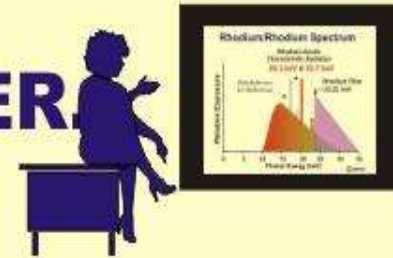
**Technology is a Tool  
it is not  
The Teacher**



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# The Values We Hold

**The PHYSICIST is the TEACHER**



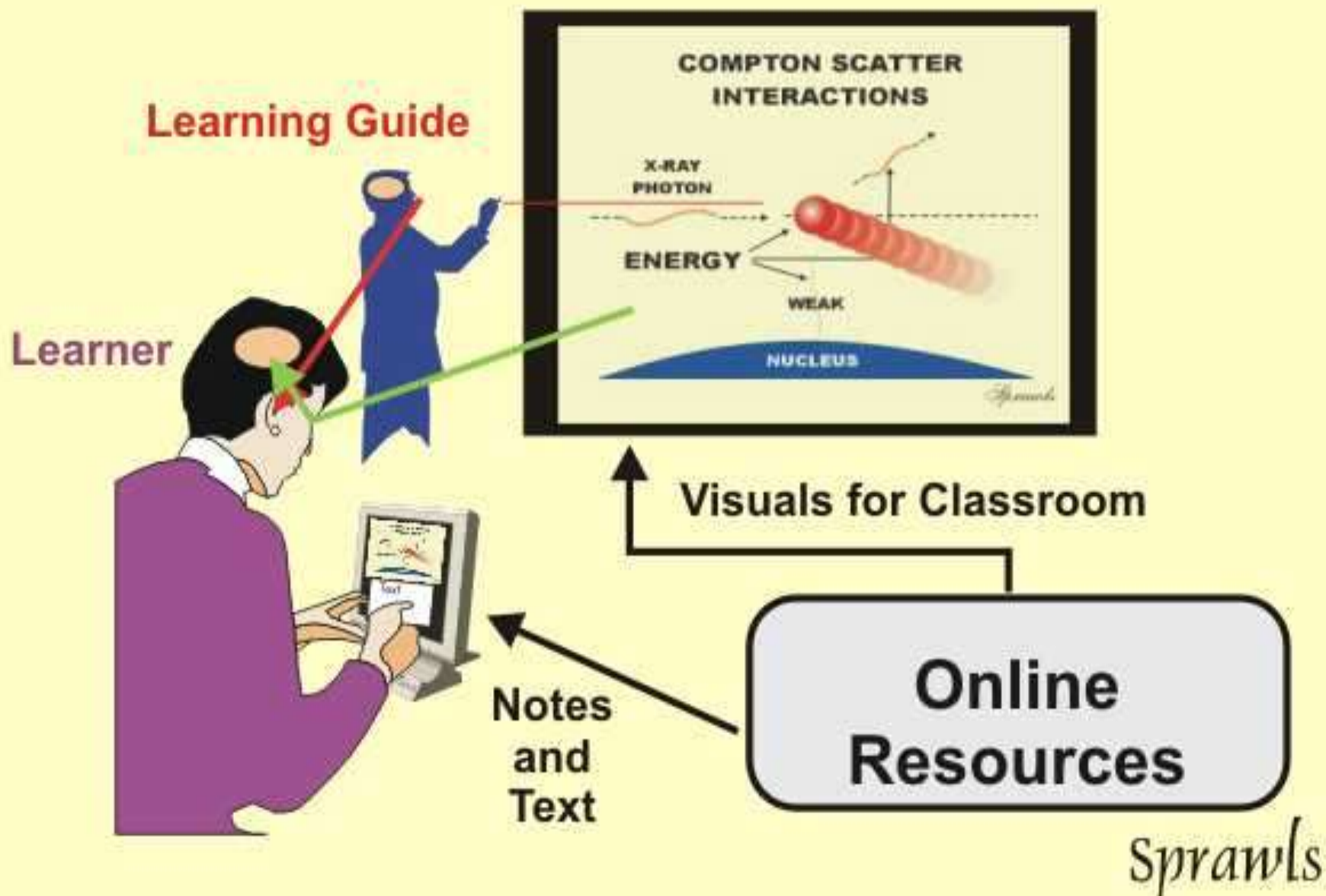
**TECHNOLOGY is the TOOL that can be used for effective and efficient teaching.**

**Technology should be used to enhance human performance of both learners (residents, students, etc.) And teachers**

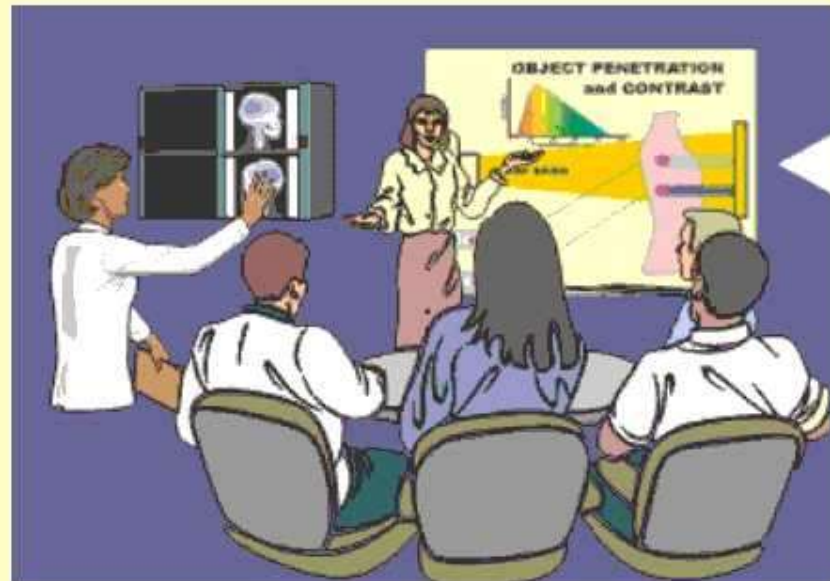




# Technology Enhanced Learning



# Rich Classroom and Conference Learning Activities



## Visuals

Representations  
of  
Reality

## Learning Facilitator “Teacher”

**Organize and Guide the Learning Activity**  
**Share Experience and Knowledge**  
**Explain and Interpret What is Viewed**  
**Motivate and Engage Learners**

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**Windows to the World of  
Medical Imaging Physics**

**Visuals**

for

**Effective and Efficient  
Medical Imaging Physics Education  
Provided by the  
Sprawls Educational Foundation**




**Window**



**Medical Physics Educator**

**Organizes  
Guides  
Shares Experience  
Motivates  
Role Model**





**Windows to the World of  
Medical Imaging Physics**

**Visuals**  
for  
**Effective and Efficient  
Medical Imaging Physics Education**  
Provided by the  
**Sprawls Educational Foundation**

## Medical Image Quality Characteristics

The visuals provided here are designed to be used in classes and other learning activities that introduce the learners/students to the overall characteristics of medical images. The individual characteristics will be covered in more detail in other sections.

Related Online Module: <http://www.sprawls.org/resources/IMGCHAR/module/>

LEFT CLICK on an image to view in full size. Then RIGHT CLICK to copy image to your computer file.

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### THE MEDICAL IMAGE



*A Window Into The Human Body*

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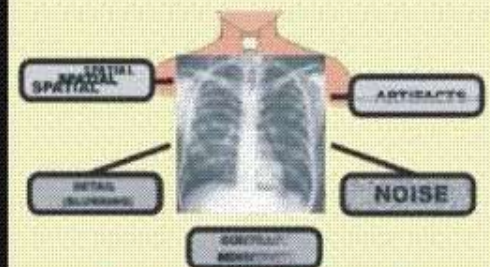
### IMAGE QUALITY



**VISIBILITY**  
of  
**Anatomy and Signs of Pathology**

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### IMAGE QUALITY CHARACTERISTICS



**THAT AFFECT VISIBILITY**

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### Medical Image Quality Characteristics

Patient



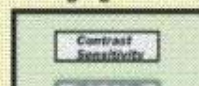
**It's all about  
VISIBILITY**

Displayed Image

CONTRAST

### What Determines Visibility?

Imaging Process



Visibility



**Characteristics of Objects in the Body  
That Affect Visibility**





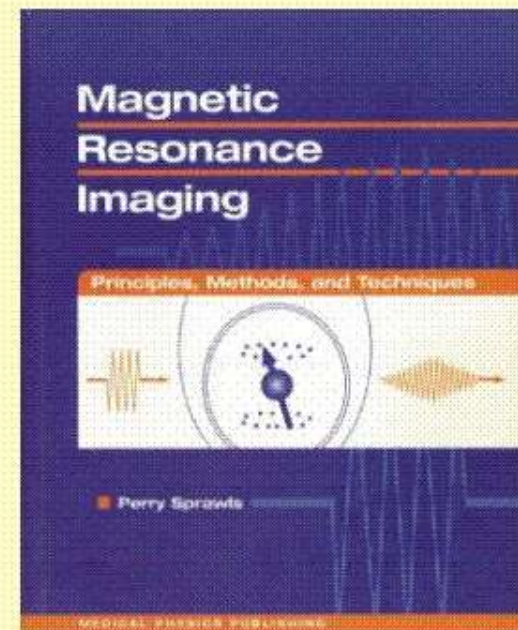
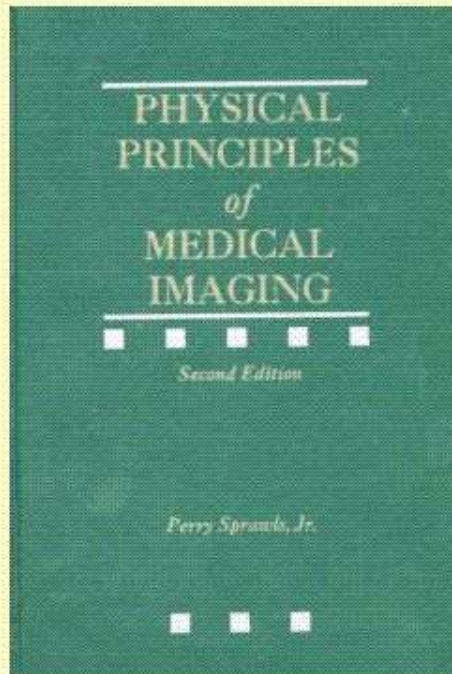
[www.sprawls.org/resources](http://www.sprawls.org/resources)

**SPRAWLS EDUCATIONAL FOUNDATION**

Open Resources  
for  
Learning and Teaching



**The Physical Principles of Medical Imaging**



**Online Textbooks**

**SPRAWLS EDUCATIONAL FOUNDATION**

Open Resources

for

Learning and Teaching

**The Physical Principles of Medical Imaging**



[How to Use This Resource](#)

[Table of Contents and List of Topics](#)

# **Mammography Physics and Technology**

## **for effective clinical imaging**

Perry Sprawls, Ph.D.

Outline

Mind Map

Learning Objectives

Visuals for Discussion

Text Reference

To step through module, [CLICK HERE.](#)

To go to a specific topic click on it below

<a href="#">Imaging Objectives</a>	<a href="#">Rhodium Anode</a>	<a href="#">Blurring and Visibility of Detail</a>
<a href="#">Visibility of Pathology</a>	<a href="#">KV Values for Mammography</a>	<a href="#">Focal Spot Blurring</a>
<a href="#">Image Quality Characteristics</a>	<a href="#">Scattered Radiation and Contrast</a>	<a href="#">Receptor Blurring</a>
<a href="#">Not a Perfect Image</a>	<a href="#">Image Exposure Histogram</a>	<a href="#">Composite Blurring</a>
<a href="#">Mammography Technology</a>	<a href="#">Receptor &amp; Display Systems</a>	<a href="#">Magnification Mammography</a>
<a href="#">Imaging Technique Factors</a>	<a href="#">Film Contrast Transfer</a>	<a href="#">Mean Glandular Dose</a>
<a href="#">Contrast Sensitivity</a>	<a href="#">Film Contrast Factors</a>	
<a href="#">Physical Contrast Compared</a>	<a href="#">Film Design for Mammography</a>	
<a href="#">Factors Affecting Contrast Sensitivity</a>	<a href="#">Controlling Receptor (Film) Exposure</a>	
<a href="#">X-Ray Penetration and Contrast</a>	<a href="#">Film Processing</a>	
<a href="#">Optimum X-Ray Spectrum</a>	<a href="#">Variations in Receptor Sensitivity</a>	
<a href="#">Effect of Breast Size</a>	<a href="#">Film Viewing Conditions</a>	



**Supporting**  
**Health Care and Medical Physics**  
**Around the World Through**  
**Collaborative Teaching**

**The Model**

**Method**

**Results**



# Sprawls

## Collaborative Teaching Network





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