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Discover the leading global community of spine surgeons

# 7 Principles for AOSpine Education

## Assessment and Evaluation


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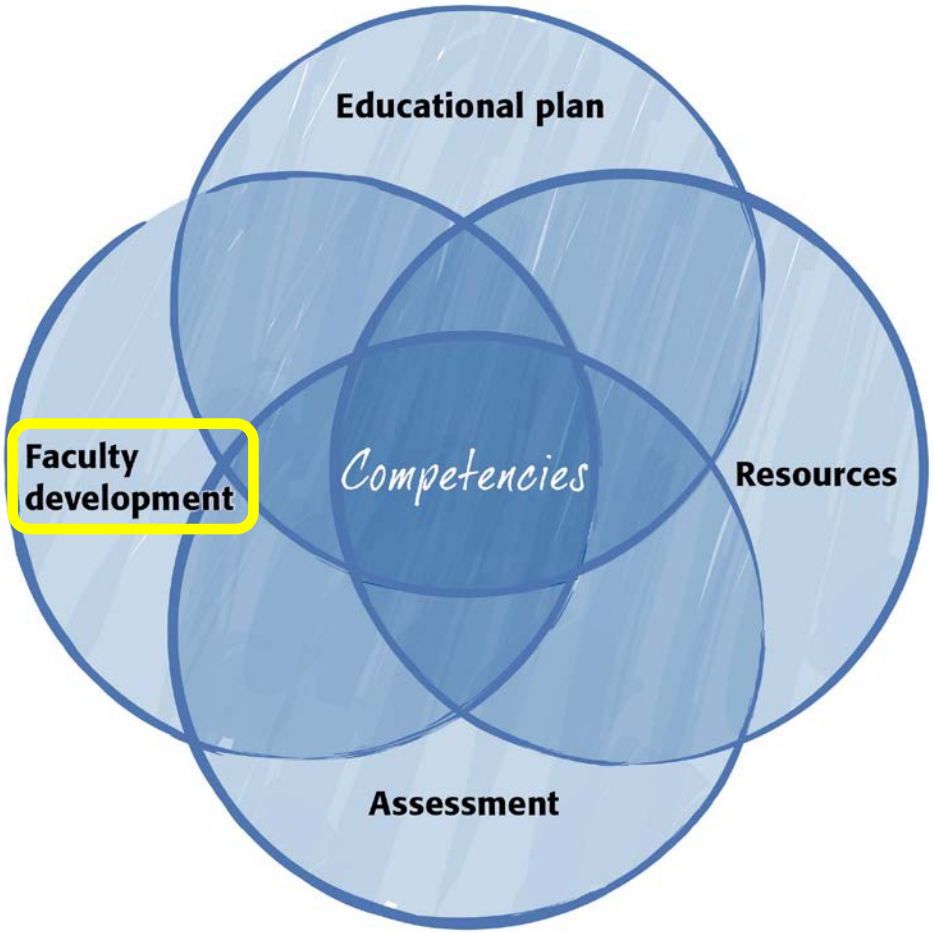
# INTRODUCTION

# Quality Education



# 7 AO Educational Principles

**Based on needs** 1

**Motivates to learn** 2

**Relevant** 3

**Interactive** 4

**Provides feedback** 5

**Promotes reflection** 6

**Leads to verifiable outcomes** 7

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Based on needs 1
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# I. ASSESSMENT

1. Based on needs
2. Motivates to learn
3. Relevant

# Continuous Assessment/Participant Learning

- **Needs assessment**: gaps in competence and performance lead to desired outcomes
- **Self-assessment:** knowing what you don't know—key to motivation
- **Formative assessment**: progress towards desired results (during practice and feedback)
- **Summative assessment**: accomplishment of desired results
- **Timing and process issues**

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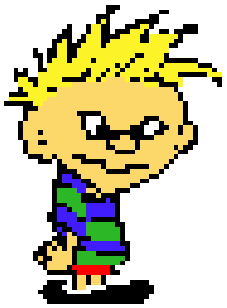
# Theoretical Concepts

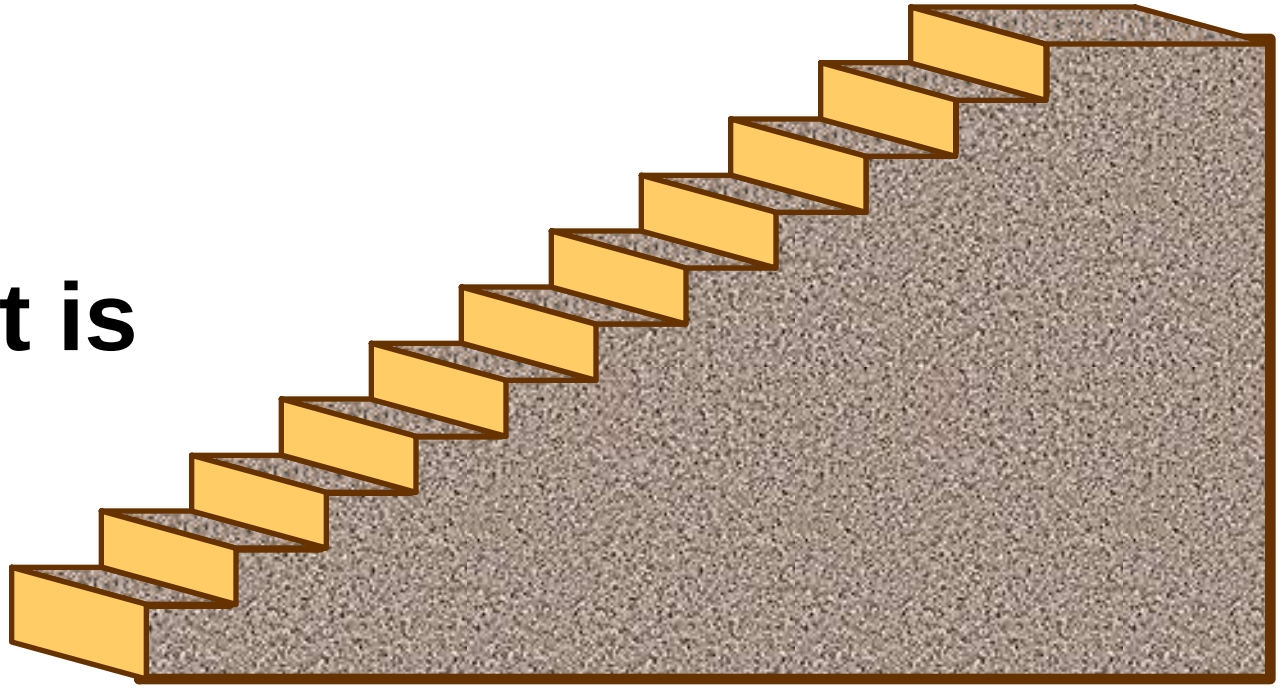
- Knowledge, competence, and performance gaps
- What is and what could or should be
- Problem and opportunity gaps
- Faculty expertise
- Link new Knowledge to previous expertise
- Prevent “I don’t know squared” syndrome
- Barriers and strategies

# NEEDS

**What ought to be**

**What is**





# It is all about the “GAP”

- The difference between What is and…
  - What ought to be
  - What could be
  - What is desired
  - What peers are doing

- As it relates to…
  - What a learner knows (knowledge)
  - What a learner is capable of performing (competence)
  - What a learner actually does in their practice (performance)

# Describing Problem/Opportunity Gaps

- Gather data from literature or surveys to verify physician performance against standards of care
- **Problem**—physicians not performing according to professional standards
- **Opportunity**—physicians performing at standards, but could be performing at higher level because of new developments

**“How are physicians performing against standards of care and do we have a problem or opportunity?”**

# Determining Causes of Gaps

- Use literature review, surveys or focus groups to understand why gap exists
- Does gap exist at least partially because physicians don't know or understand something and can it be defined in terms of knowledge, skills or attitudes?
- Is gap caused primarily by other issues such as systems problems, lack of resources, cultural differences, reimbursement issues?

**"How do we know that the gap will lend itself to an educational solution?"**

# Link new Knowledge to previous experience

- Growing reservoir of experience-basis of learning
- Connected to physical and psychological maturity
- Target of learning must be part of integrated whole-how it fits with current situation of learner

# Need to Understand what they don't know and have a *clear vision of what should be achieved*

- "I don't know squared" syndrome
- Test about what is valued—application to medical practice, not esoteric facts
- Gap between current and ideal performance is motivation for learning
  - Too large a gap= aversion to learning
  - Too small a gap= no motivation
  - Goal: Medium size gap= achievable

# Understanding their own “gaps” as a learner

- Let’s learners know what they don’t know
- Let’s learners know how their clinical performance compares to guidelines and to how their peers are performing
- Provides them with the motivation to learn (closing the gap)

# Pre-post Test of Knowledge

## Implications for faculty and course chairs

- Select most important concepts to be learned to enhance clinical performance
- Provide immediate feedback to learner and faculty
- Allow learners to compare results with peers
- Test for application of knowledge in real world setting (competence)
- Use same test items for post-test (or pick from same pool of questions)
- Use multiple choice questions to assure learner can make fine discriminations

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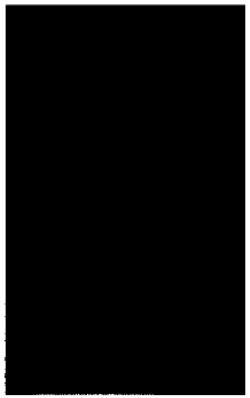
| Competency 4 | Order appropriate imaging | |
|---|---|---|
| Question 1 | Level of difficulty: Easy or difficult | Easy (precourse) |



A 76-year-old female had a minor fell on her buttocks 4 weeks ago when she missed the chair behind her. She now reports low back pain, which increases with flexion and upon standing and sitting. No neurological deficits are present. She has a history of breast cancer but has been tumor free for 8 years.

Which of the following is the most appropriate next step?

| | |
|---|---|
| Option A | CT scan |
| Option B | **MRI with or without contrast medium** |
| Option C | Bone scan |
| Option D | Flexion/extension x-ray views |
| Answer | B |
| Rationale | MRI will provide most of the information you need to determine your treatment strategy. It can show whether the fracture is still fresh (bone edema), degenerative changes that might be responsible for the low back pain, and the current status of the spinal canal. In addition, it can confirm a diagnosis of metastasis with a pathological fracture. A CT scan can show bony changes but gives less information on underlying pathology. A bone scan can confirm malignancy but is not the first imaging technique to choose for this purpose.<br>Flexion/extension x-ray views would provide no additional information. |
| Reference(s) | **Krug R, Burghardt AJ, Majumdar S, et al** (2010) High-resolution imaging techniques for the assessment of osteoporosis. *Radiol Clin North Am*; 48:601–621.<br>**Blumenkopf B, Juneau PA** (1988) Magnetic resonance imaging (MRI) of thoracolumbar fractures. *J Spinal Disord*; 1(2):144–150. |

| Reviewer comments, etc | |
|---|---|
| Name | Comment |
| | |
|  |  |

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# Identifying Barriers and Strategies

- Gather data on why physicians are not practicing at highest possible level
- Clearly describe barriers to performance
- Find examples of successful strategies to get around barriers
- Use surveys or focus groups to understand dynamics of practice setting

**“How do I understand why physicians aren’t performing at an optimal level?”**

# Data collection & Repo

- Succesful pilots in Davos 2013
→ Automated system
planned for Oct. 2014

*Before & After Event*

**Online Surveys**

**MIS Education Reporting System**

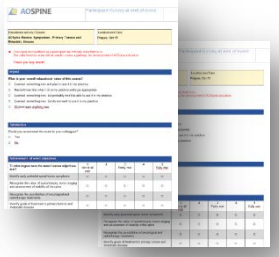
Data

**Reports**

*During Event*

**ARS**

**Paper forms**



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Stakeholders

# Implications for Faculty/Course Chairpersons

- Understand the realities of your audience
- Identify the problems the learning experience trying to solve
- Use case studies
- Facilitate pre-assessments or self-assessments of learners for faculty and chairpersons
- Allow learners to know what they don’t know
- Assure that content is not based on the business needs of grantors

# References

## 1. Based on Needs


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# Theoretical Concepts

- Learning is facilitated by motivated learners
- Motivation to learn is enhanced by feeling
  - uncomfortable—not knowing or understanding something
- Relationship between stress and learner motivation

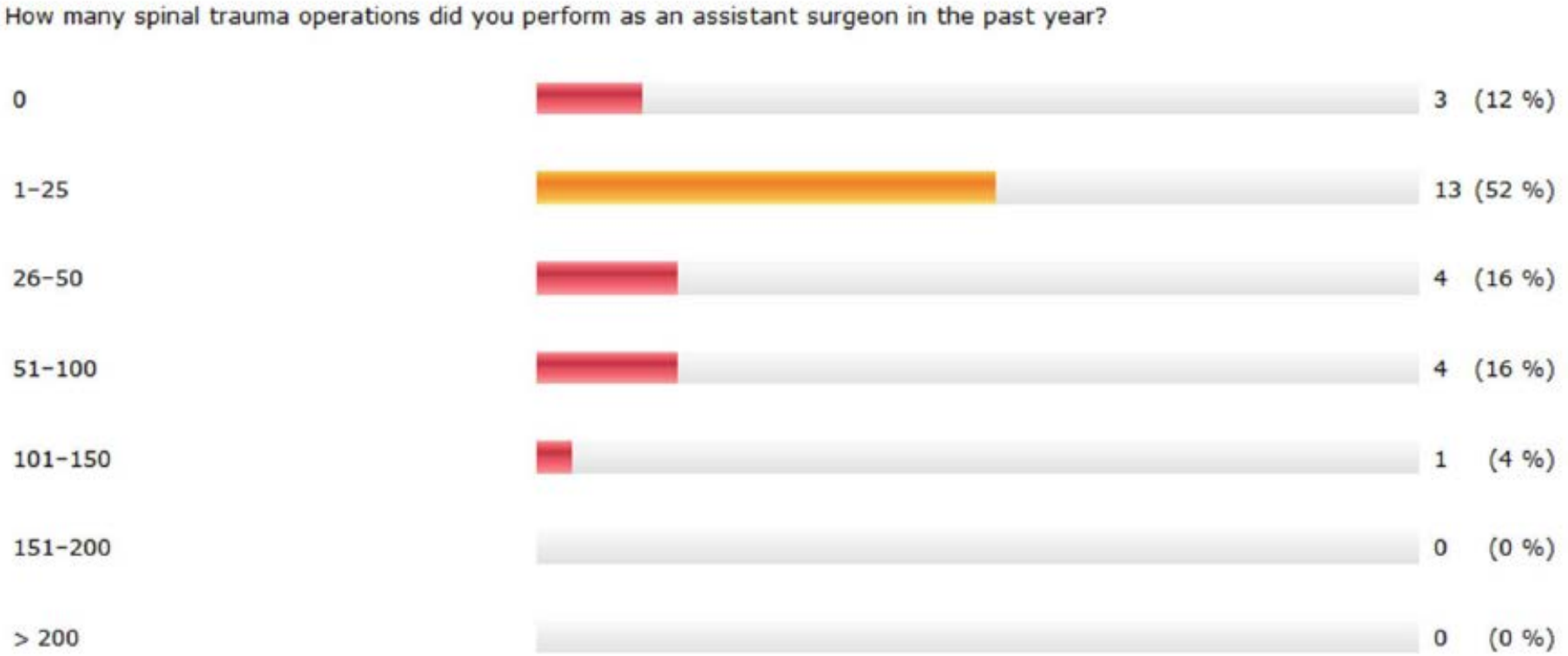
# When are you MOTIVATED to Learn?

- When I don’t know something that I need to know to succeed
- When my colleagues know something I don’t know
- When guidelines and standards of care suggest I should know something that I do not
- When some new procedure or medication has come out that I could use to improve my performance as a surgeon, if I only understood it
- If I were on the brink of developing my own new procedure or treatment option, but lacked some important piece of information

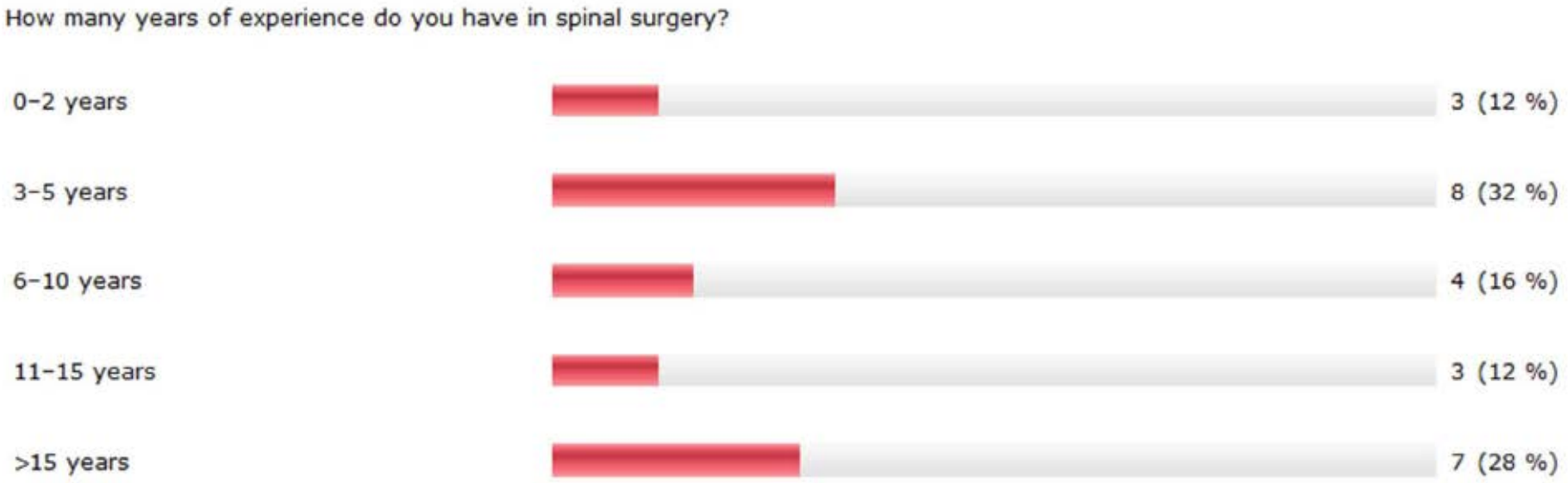
# What information was gathered before the course?

- Demographic and practice profile data
  - Current position, years of experience, number of cases
- Information on motivation to learn
  - Present and Desired ability for each competency
  - Gap scores for each competency
    - Competencies with low or high levels of motivation

# Key demographic and practice profile data



# Key demographic and practice profile data



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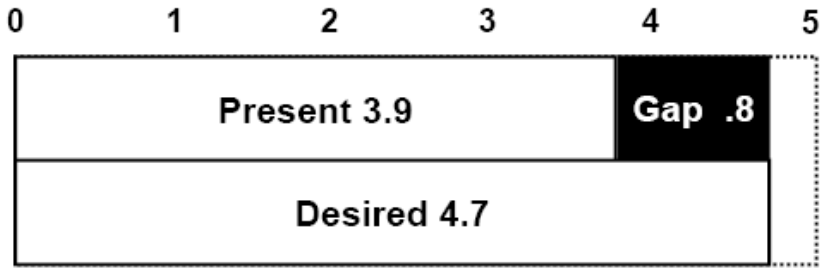
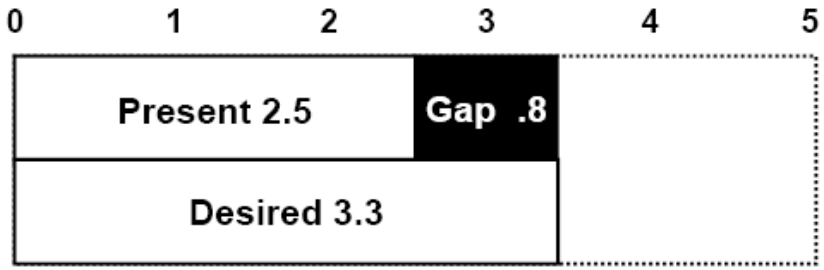
Gap = desired level of ability minus present level

**< 1** **1 to 2.5** **> 2.5**

## 2 possible reasons for low motivation




→ **Participants think that they know the topic already**




→ **Participants have little interest in the topic (low desired level)**

# Implications for Faculty/Course Chairs

- Learners need to know what they don’t know
- Show learners comparative data of colleagues or standards of care
- Base planning of learning experience on solving competency/performance issues of learners
- Start the planning with the end in mind

# References

## 2. Motivates to Learn


- Fox R. and Miner C., Motivation and the Facilitation of Change, Learning, and Participation in Educational Programs for Health Professionals. *Journal of Continuing Education in the Health Professions Volume 19, Number 3, Summer 1999*
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# Theoretical Concepts

- Content needs to be relevant to practice realities of learners
- Hierarchy of outcomes for learning experiences
- Faculty, learners and content needs to be aligned

# Theoretical Foundations

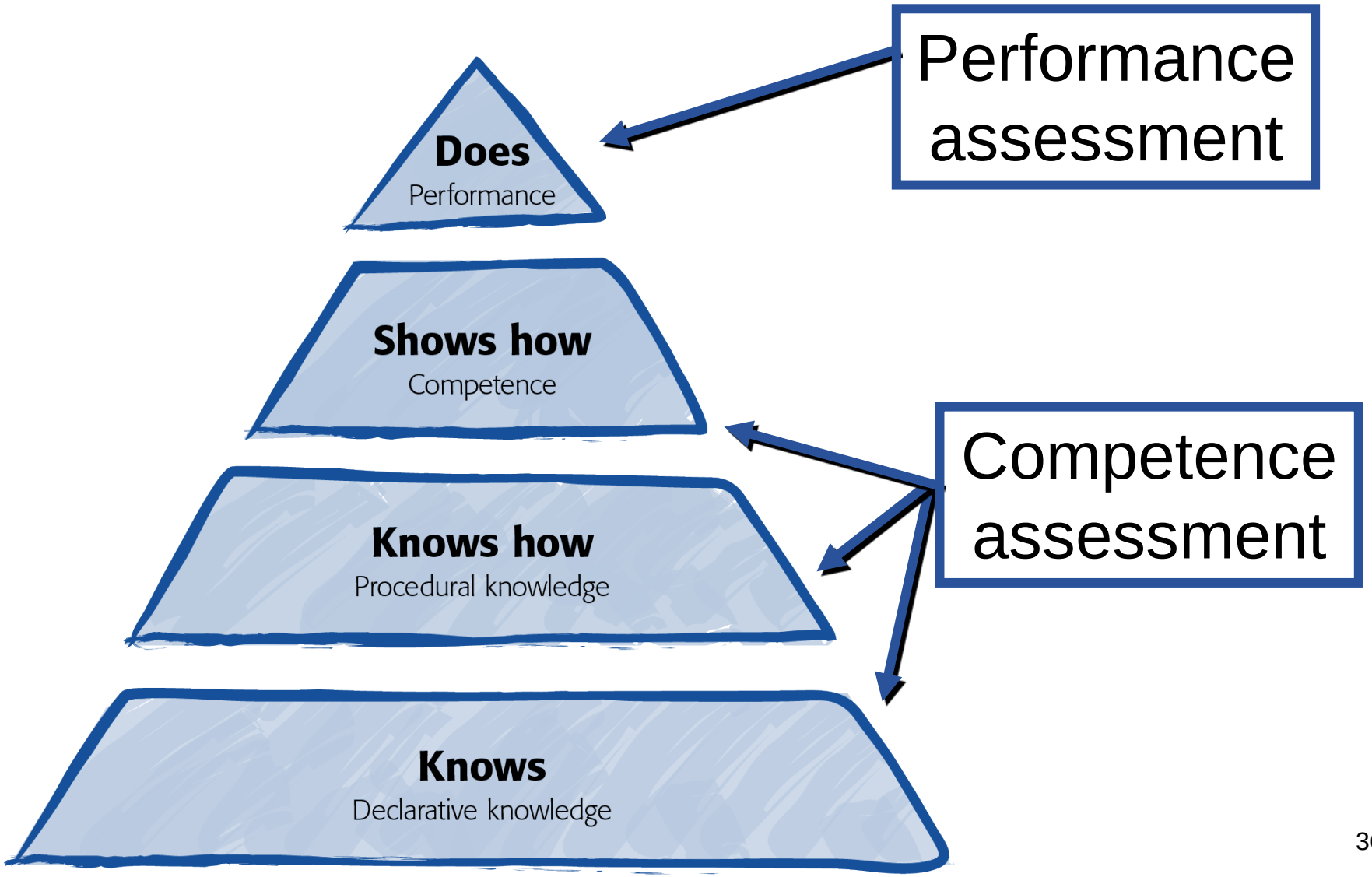
## Adult Learning Theory

- ***Pedagogy***: Teacher-centered learning for children
- ***Andragogy:*** Self-directed learning for adults
- ***Fluid intelligence***: making new neural connections without any base (children)
- ***Crystallized intelligence***: new learning grows like crystals on existing knowledge

## Address *practical problems* with useful and *immediate Applications*

- Have problem orientation; need immediate application
- Affected by current situational role
- Relevance of information to practice of medicine is critical

# Clinical Assessment of Practice (Miller)



# Selection of Faculty

- Content expertise
- Political decisions—maximize value
- Faculty preference for certain formats need to match what is needed to meet objectives

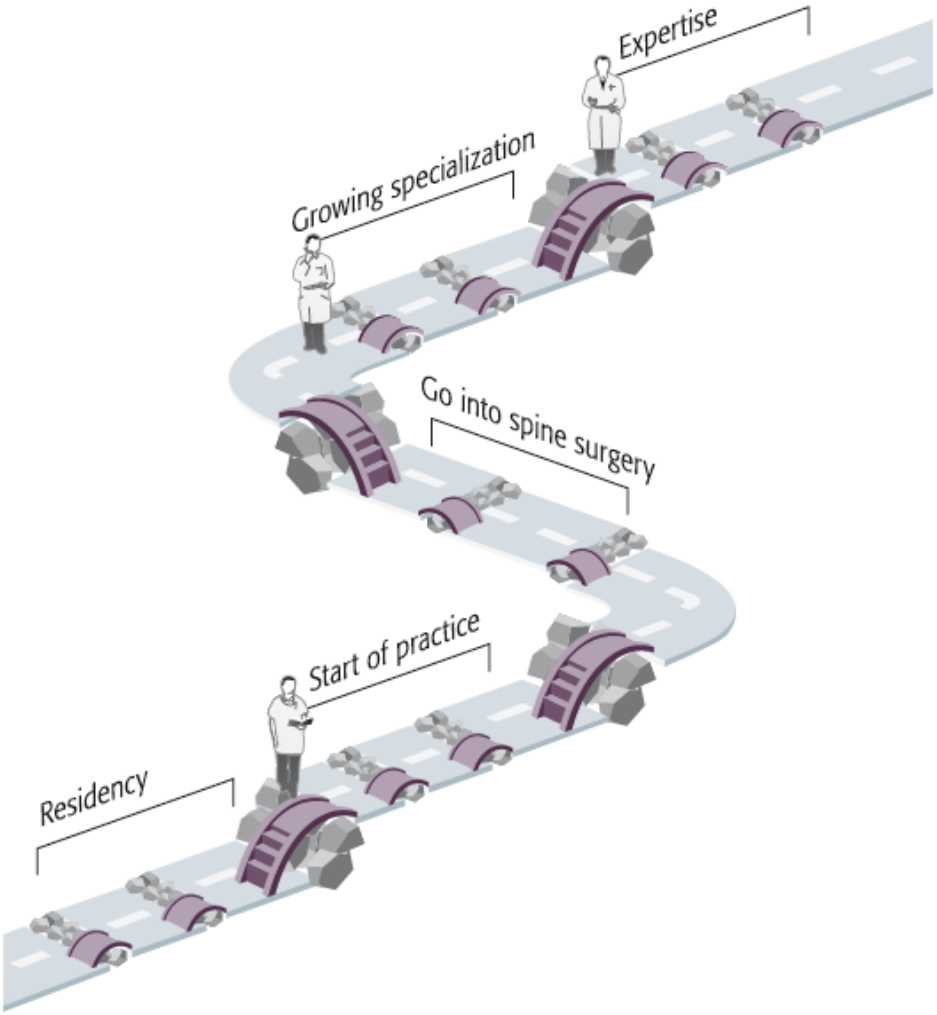
# Target Audience Learners

- Understanding the learners' work environment
- Perceived needs—self assessment
- Team care—team learning
- Translational learning—in the workflow of the physician
- Sub groupings

# Content

- **Use the competency-based curriculum**

# Stage 1A: Identify the target audience




**Levels**

**Masters**

Learners with > 10 years of spine surgery experience.

**Advanced**

Learners with 3–10 years of spine surgery experience, who are aiming to improve their knowledge or specialization in spinal disorders or specific techniques.

**Core curriculum**

Learners with < 3 years of spine surgery experience or surgeons undergoing training in a new technique or procedure.

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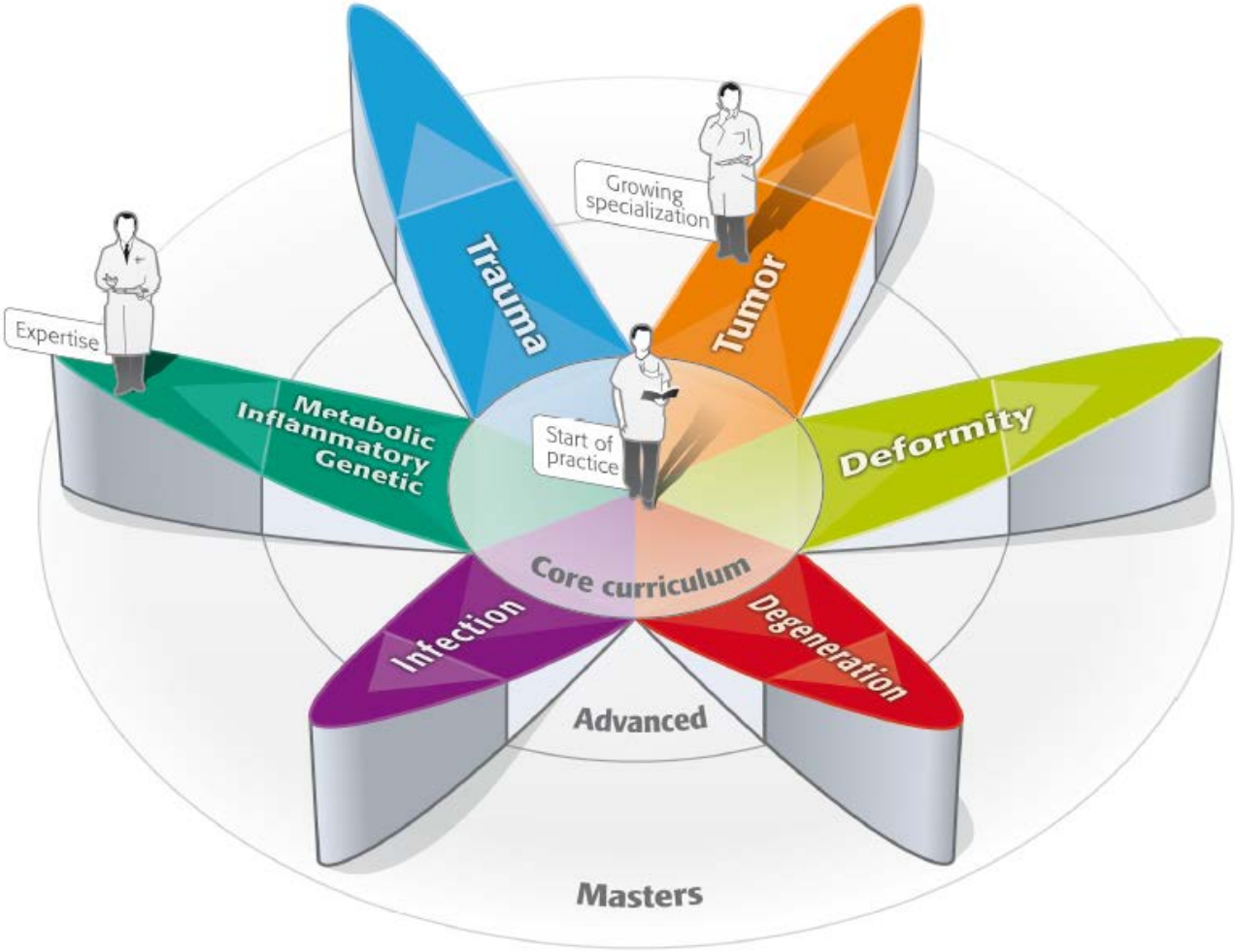
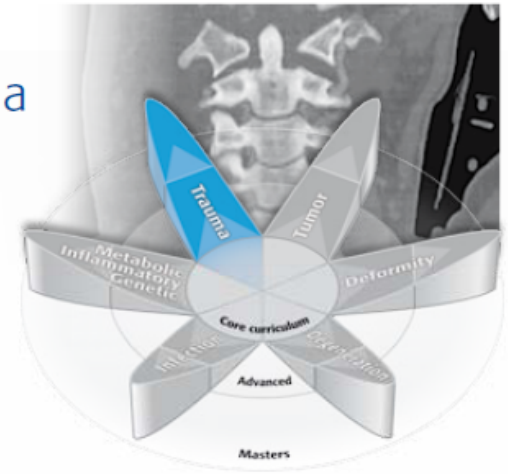
# Stage 1B: Select the pathology(ies) to be covered



# Competencies & learning outcomes

## AOSpine Curriculum—Spinal trauma

AOSpine learning activities for spinal trauma focus on addressing common and critical patient problems. The competencies below are a guiding framework for the design and delivery of all our learning activities. Specific learning outcomes for each activity must be defined according to the needs of the participants.




| Competencies | Key learning outcomes |
|---|---|
| 1. Resuscitate the patient according to ATLS® guidelines | • Maintain the patient's oxygenat<br>• Administer IV fluids to the patie<br>• Maintain normotension in the p<br>• Identify all other injuries<br>• Prioritize the patient's injuries |
| 2. Immobilize the spine in a patient with a suspected spinal injury beginning at the scene of injury and during the assessment process | • Identify potentially unstable spi<br>• Recognize that the unconscious<br>• Recognize that any movement<br>• Perform spinal immobilization<br>• Maintain immobilization during |
| 3. Examine the patient | • Assess the patient's motor scor<br>• Assess the patient's ASIA/Frank<br>• Perform a complete neurologica<br>• Assess the patient for secondar<br>• Identify spinal cord shock<br>• Consider the prognostic import<br>• Serially re-examine the patient |

- Competencies and key learning outcomes guide course chairs and faculty in the development and delivery of content
- Specific learning outcomes must be created by the chair/faculty for each specific course/activity based on the needs of the participants

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# Step 1C: Select the competencies (48) to be covered for the pathology(ies) & focus on the audience needs

## Degeneration

1. **Analyze the patient history and physical examination findings**
2. **Use** appropriate **diagnostic tools**
3. **Use evidence-based decision making** when recommending operative and nonoperative interventio
4. **Use appropriate nonoperative treatments**
5. **Select and perform appropriate surgical procedu** for specific indications
6. **Prevent/manage operative and postoperative complications**
7. **Use outcome measures** to assess the effectiveness of each intervention

## Tumor

1. **Recognize the possibility of spinal tumor** in a patient presenting with common symptoms of spinal pathology
2. **Establish a diagnosis based on histological verification** and plan appropriate treatment
3. **Optimize the physical condition of the patient** before treatment
4. **Recognize** the presence or possibility of **spinal ins**
5. **Rec** ben
6. **Per**
7. **Ant**

## Deformity

1. **Analyze the history** and physical examination of the patient presenting with spinal deformity
2. **Order and interpret appropriate imaging** to assess spinal balance, flexibility, and spinal cord anomalies
3. **Assess the patient**
4. **Use evidence-based decision making** when recommending operative and nonoperative interventions
5. **Safely perform appropriate surgical procedures**
6. **Manage** intraoperative and postoperative **complications**
7. **Use outcome measures** to assess the effectiveness of interventions

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# Step 1D: Select the key learning outcomes (173) that should be covered for each competency

## (thus providing guidance to faculty for each activity)

| Competencies | Key learning outcomes |
|---|---|
| 1. Analyze the patient history and physical examination findings | • Assess the patient's pain<br>• Assess the patient's disability and quality of life<br>• Assess the patient's psychosocial situation and its relevance<br>• Assess relevant comorbidities<br>• Recognize abnormal findings in the history, including 'red flags'<br>• Perform a comprehensive clinical examination<br>• Exclude non-spine pathologies |
| 2. Use appropriate diagnostic tools | • Order appropriate imaging studies based on the history and physical examination findings<br>• Use additional diagnostic tools if indicated<br>• Critically evaluate the use of invasive tests<br>• Recognize the limitations of each diagnostic tool<br>• Correlate the diagnostic test results with the clinical findings |
| 3. Use evidence-based decision making when recommending operative and nonoperative interventions | • Critically review the benefits and risks of each operative and nonoperative intervention<br>• Select operative and nonoperative interventions based on the best available evidence and on the natural history<br>• Consider the patient's treatment preferences and expectations<br>• Consider the psychosocial, cultural, and ethical implications of the recommended treatment |

# Focus on clinical problems

- Summarizing information contained in recent research publications
- Comparing personal performance with peers
- Information about personal outcomes with patients and comparing to standards of care
- Seeking colleague resources
- Tools to help integrate into practice

# Implications for Faculty/Course Chairpersons

- Faculty need to understand practice realities of learners
- Content selected based on how it relates to identified gaps
- Focus on clinical problems and knowledge that can be used in practice
- Focus on answers to clinical problems

# References

## 3. Relevant


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