

BETTER TEACHING & LEARNING – BY DESIGN

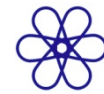
Workshop led by:

L. Dee Fink, Ph.D.

Educational Consultant in Higher Education

Author: *Creating Significant Learning Experiences*

**Boonshoft School of Medicine
Wright State University
October 25, 2012**



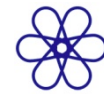
PURPOSE OF THESE 2 SESSIONS:

Presentation:

- **What is “Backward Design”?**
- **Why is it important?**

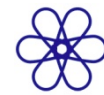
Workshop:

- **How do you do it?**



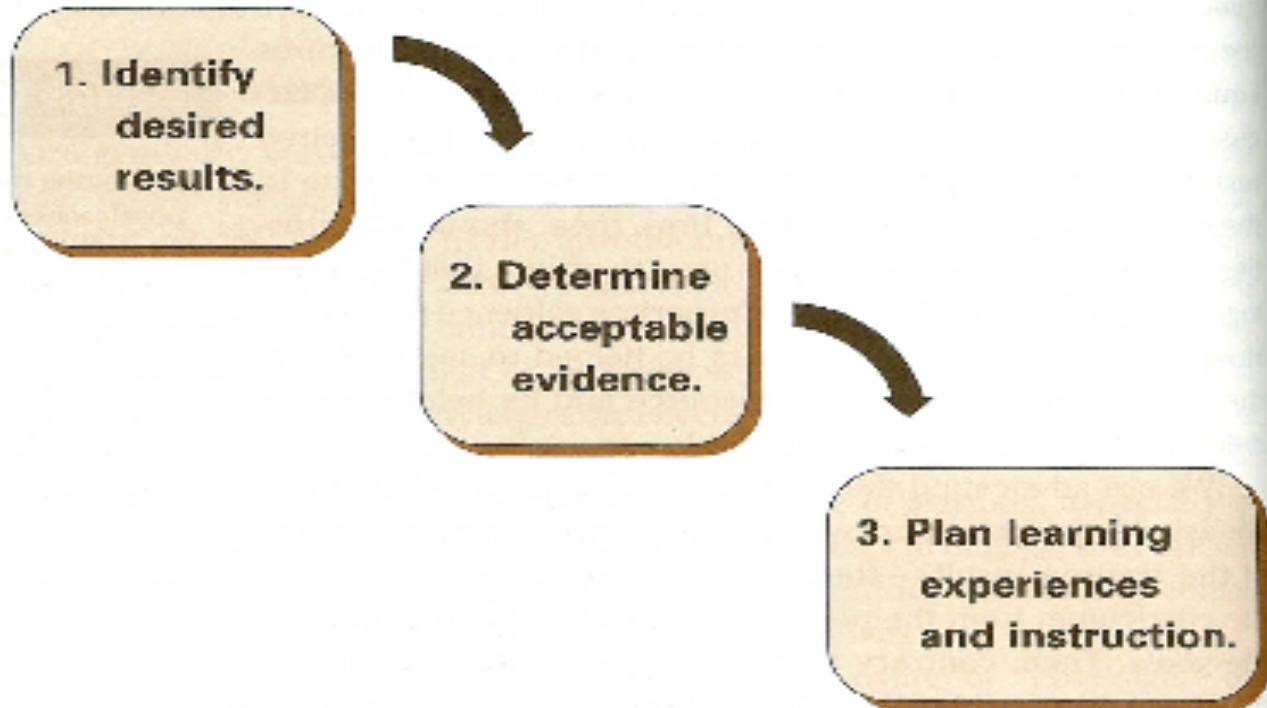
QUESTIONS FOR YOU:

1. What are some **PROBLEMS** you commonly have?
2. What do you see as possible **SOLUTIONS** to these problems?



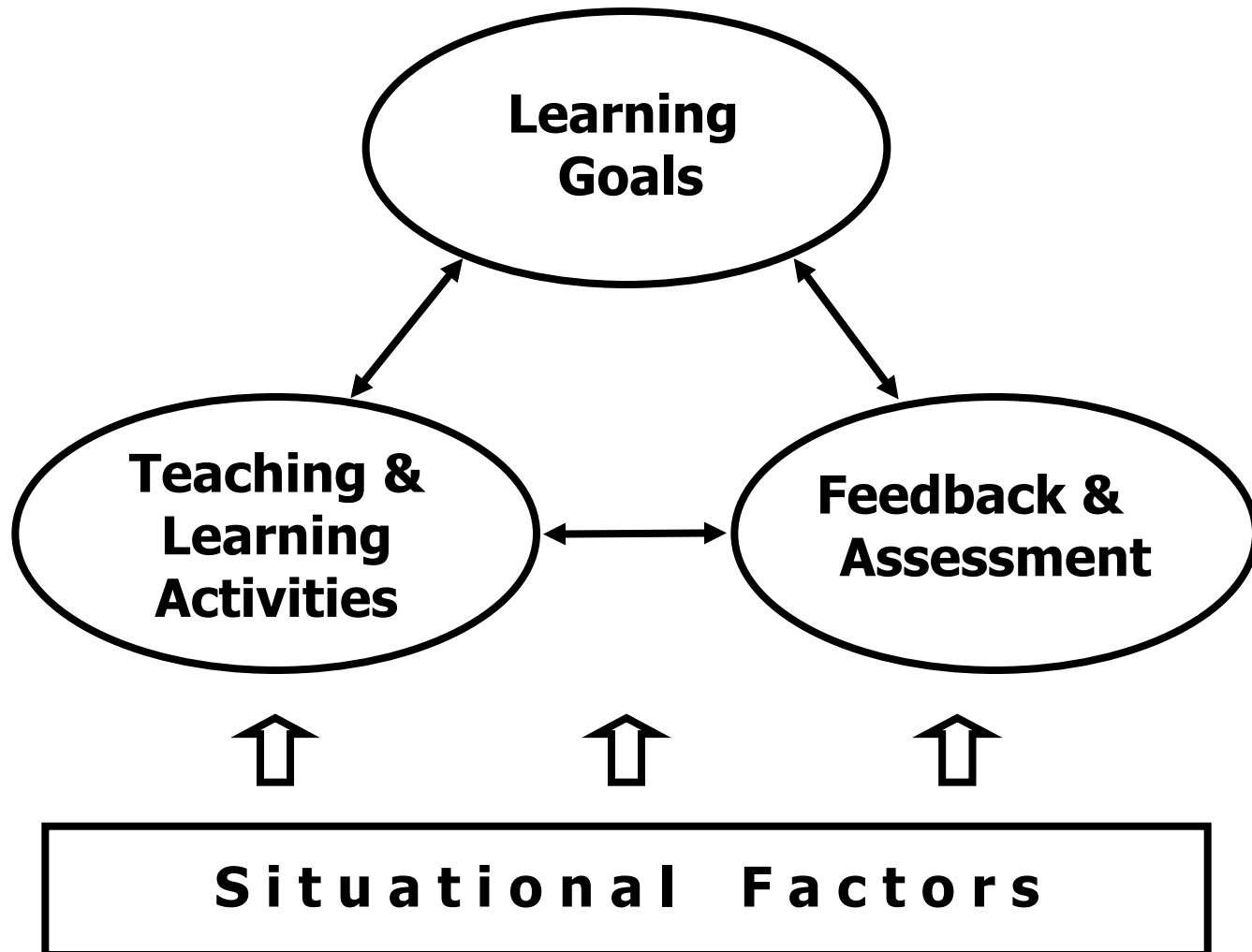
“BACKWARD DESIGN”

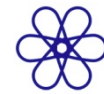
Figure 1.1
Ubd: Stages of Backward Design



Fink's Version of "Backward Design":

Key Components





3 Principles of “Backward Design”:

1. Desired Learning Outcomes:

- **What do I want students to learn – by the end of the course or unit?**

2. Assessment & Learning Activities:

- **What assessment and learning activities will they need – to learn that?**

3. Sequence:

- **How do I put these activities into a powerful, dynamic sequence?**



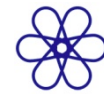
Backward Design: What Questions to ask?

- 1. Situational Factors: Any special “Situational Factors” we need to take into account?**
- 2. Learning Goals/Outcomes: What do we want students to be able to DO – by the end of the teaching unit?**
- 3. Assessment Activities: How can we monitor their progress toward this learning – *during* the unit?**
- 4. Learning Activities: What learning activities will help students achieve these Goals/Outcomes?**
- 5. Integration/Sequencing: What is the most dynamic way to build their learning – step-by-step?**



Possible “Situational Factors”:

- **Number of students in the class?**
- **What they have already studied, that this unit can/should build on?**
- **What future units/learning this unit should prepare students for?**
- **Are there any particular problems that students often have, when trying to learn this material?**



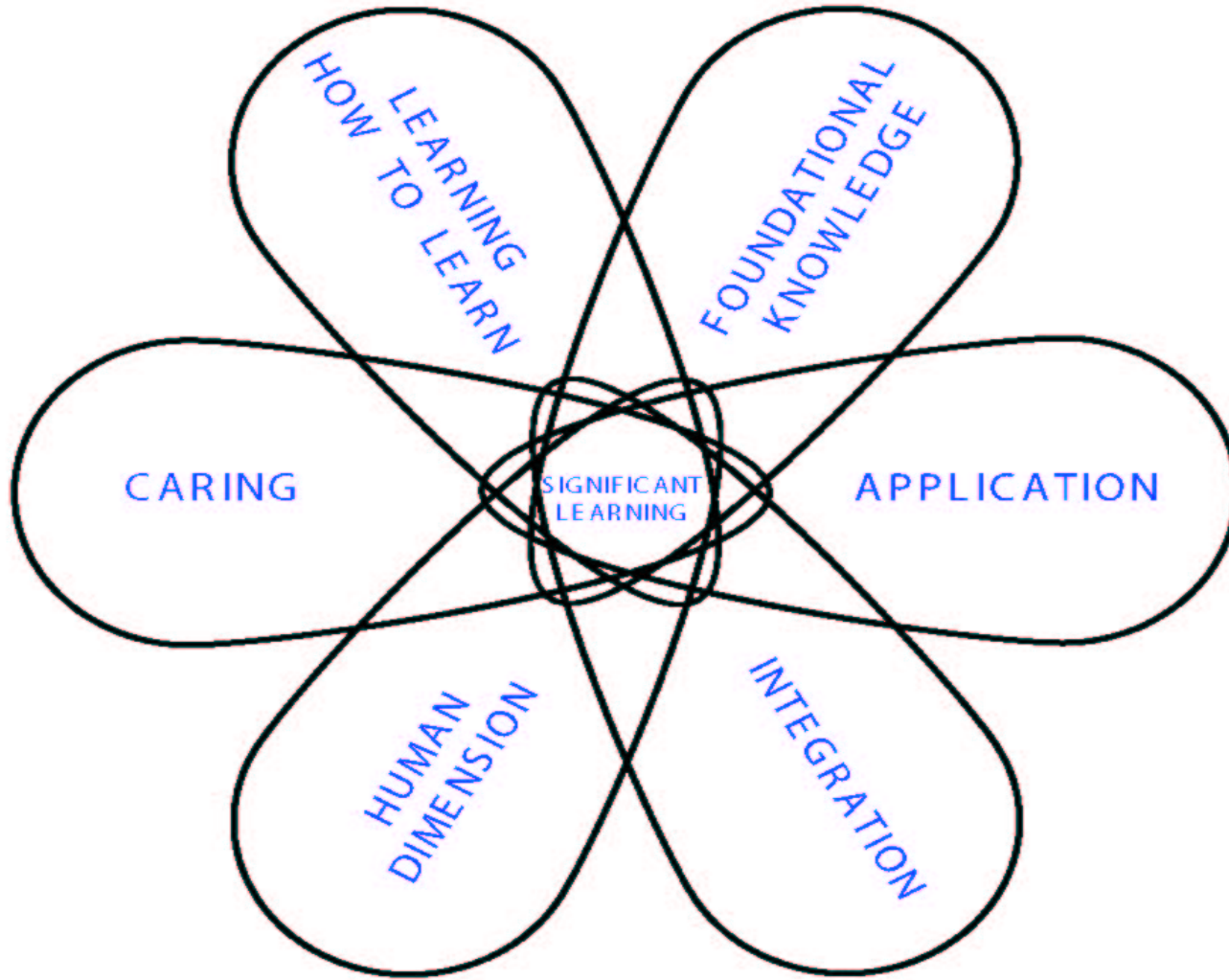
1st Principle/Task:

Identify “Desired Learning Outcomes”:

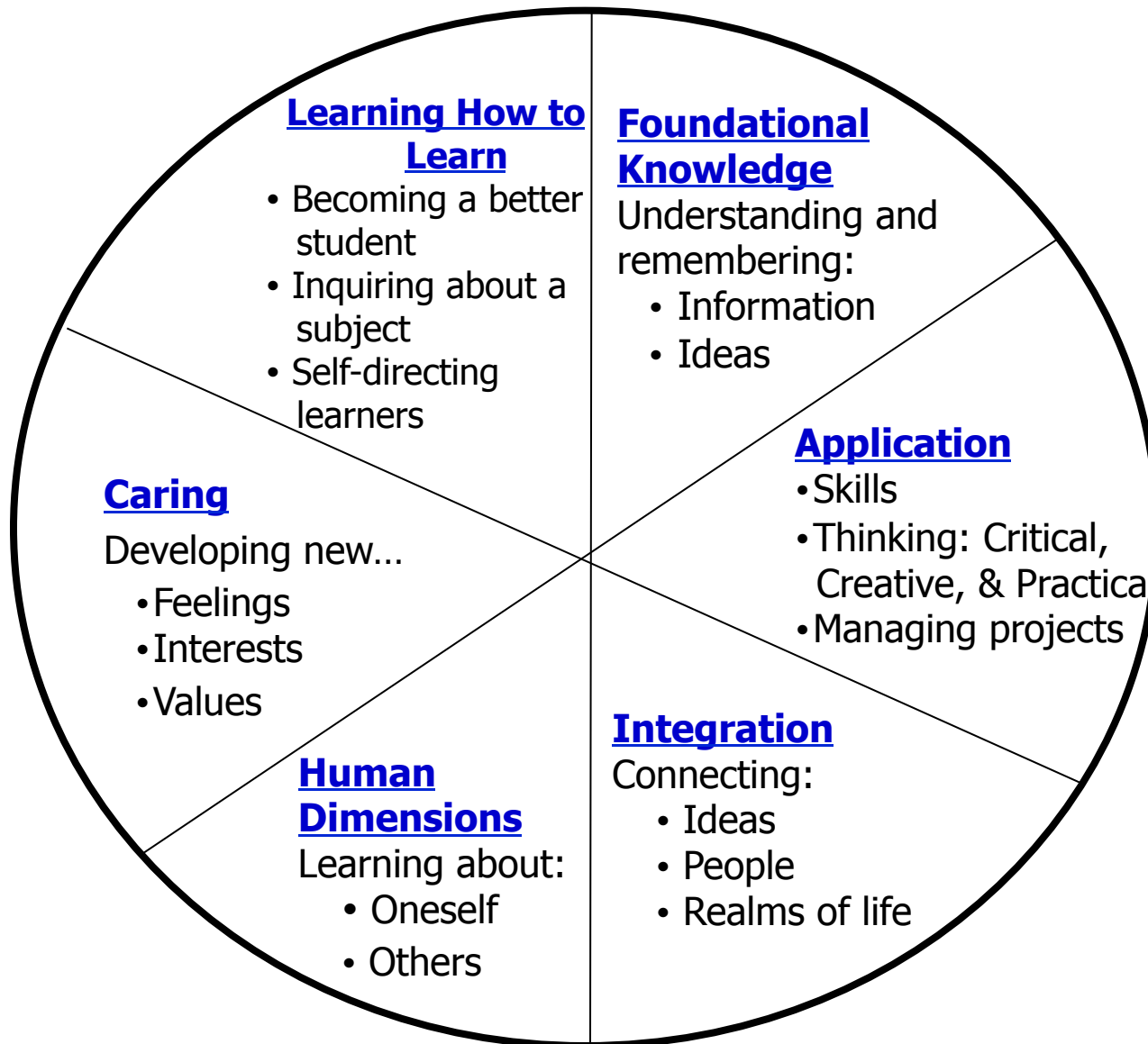
Your Options:

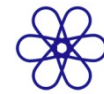
- **Can come up with them “on your own”**
- **Can borrow from another professor**
- **Can use a Taxonomy of Learning Outcomes**

Taxonomy of Significant Learning



Taxonomy of Significant Learning





**POSSIBLE LEARNING OUTCOMES, using the
Taxonomy of Significant Learning:**

“By the end of this unit, students will be able to...

- 1. Foundational Knowledge: Understand & remember the central concepts, terms, etc.**
- 2. Application: Use this knowledge to diagnose particular clinical symptoms**
- 3. Integration: Describe the interaction between this system and systems “X, Y, & Z”**



**POSSIBLE LEARNING OUTCOMES, using
the Taxonomy of Significant Learning:**

“By the end of this unit, students will be able to...

4. Human Dimension:

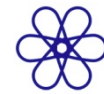
A. Self: Be confident that they can analyze health issues within this system

B. Others: Interact/work with others, on diagnosing & treating clinical symptoms

5. Caring: Value knowing about this system

6. Create a Plan for Continued Learning:

- **What else do I need/want to learn?**
- **How would I learn that?**



3 Principles of “Backward Design”:

1. Desired Learning Outcomes:

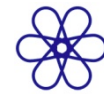
- What do I want students to learn – by the end of the unit?

2. Assessment & Learning Activities:

- **What assessment and learning activities will they need – to learn that?**

3. Sequence:

- How do I put these activities into a powerful, dynamic sequence?



2nd Principle/Task:

How can I identify/create the assessment and learning activities – that will generate such ambitious learning?

Primary Tool: 3-Column Table

3-COLUMN TABLE:

Learning Goals:

Assessment Activities:

Learning Activities:

1.		
2.		
3.		
4.		
5.		
6.		

3-COLUMN TABLE:

Learning Goals:

Assessment Activities:

Learning Activities:

1. Understand important concepts & terms		
2. Use the knowledge to diagnose clinical symptoms		
3. Interactions between this and other systems		
4. Self: Become confident Others: Work together		
5. Value knowing about this system		
6. Able to continue learning		

3-COLUMN TABLE:

Learning Goals:

Assessment Activities:

Learning Activities:

1. Understand important concepts & terms	???	???
2. Use the knowledge to diagnose clinical symptoms		
3. Interactions between this and other systems		
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5. Value knowing about this system		
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3-COLUMN TABLE:

Learning Goals:

Assessment Activities:

Learning Activities:

1. Understand important concepts & terms	???	???
2. Use the knowledge to diagnose clinical symptoms	???	???
3. Interactions between this and other systems		
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5. Value knowing about this system		
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3-COLUMN TABLE:

Learning Goals:

Assessment Activities:

Learning Activities:

1. Understand important concepts & terms	???	???
2. Use the knowledge to diagnose clinical symptoms	???	???
3. Interactions between this and other systems	???	???
4. Self: Become confident Others: Work together	???	???
5. Value knowing about this system	???	???
6. Able to continue learning	???	???

3 Principles of “Backward Design”:

1. Desired Learning Outcomes:

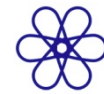
- What do I want students to learn – by the end of the unit?

2. Assessment & Learning Activities:

- What assessment and learning activities will they need – to learn that?

3. Sequence:

- **How do I put these activities into a powerful, dynamic sequence?**



INTEGRATION & SEQUENCING:

**How can we sequence all these activities
– so that:**

- **All the various kinds of learning happen?**
- **Each activity builds on previous activities and prepares learners for the next activity?**

Primary Tools: Time Schedule & “Castle-Top” Diagram

3-COLUMN TABLE:

Learning Goals:

Assessment Activities:

Learning Activities:

1.		
2.		
3.		
4.		
5.		
6.		

Week #: **Mon**

Wed

Fri

1			
2			
3			
4			
..			
..			
12			
13			
14			
15			

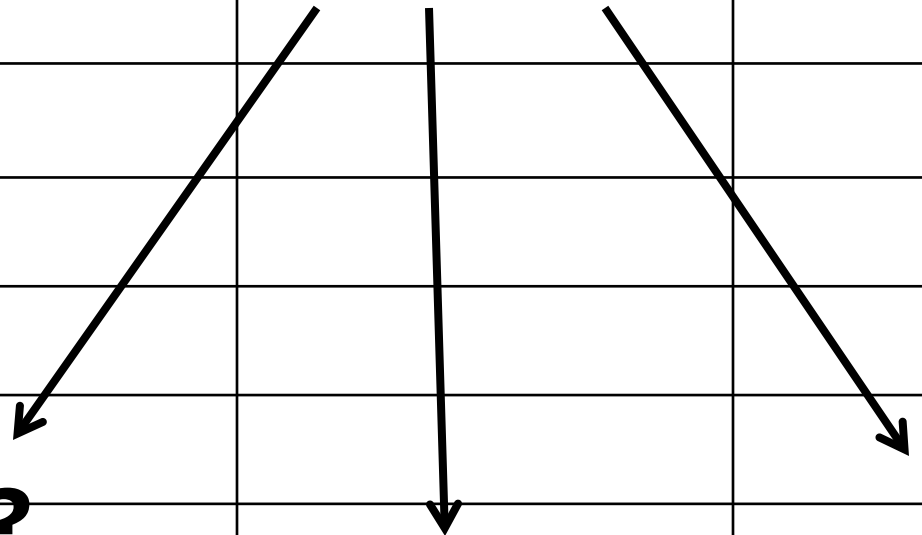
WEEKLY SCHEDULE

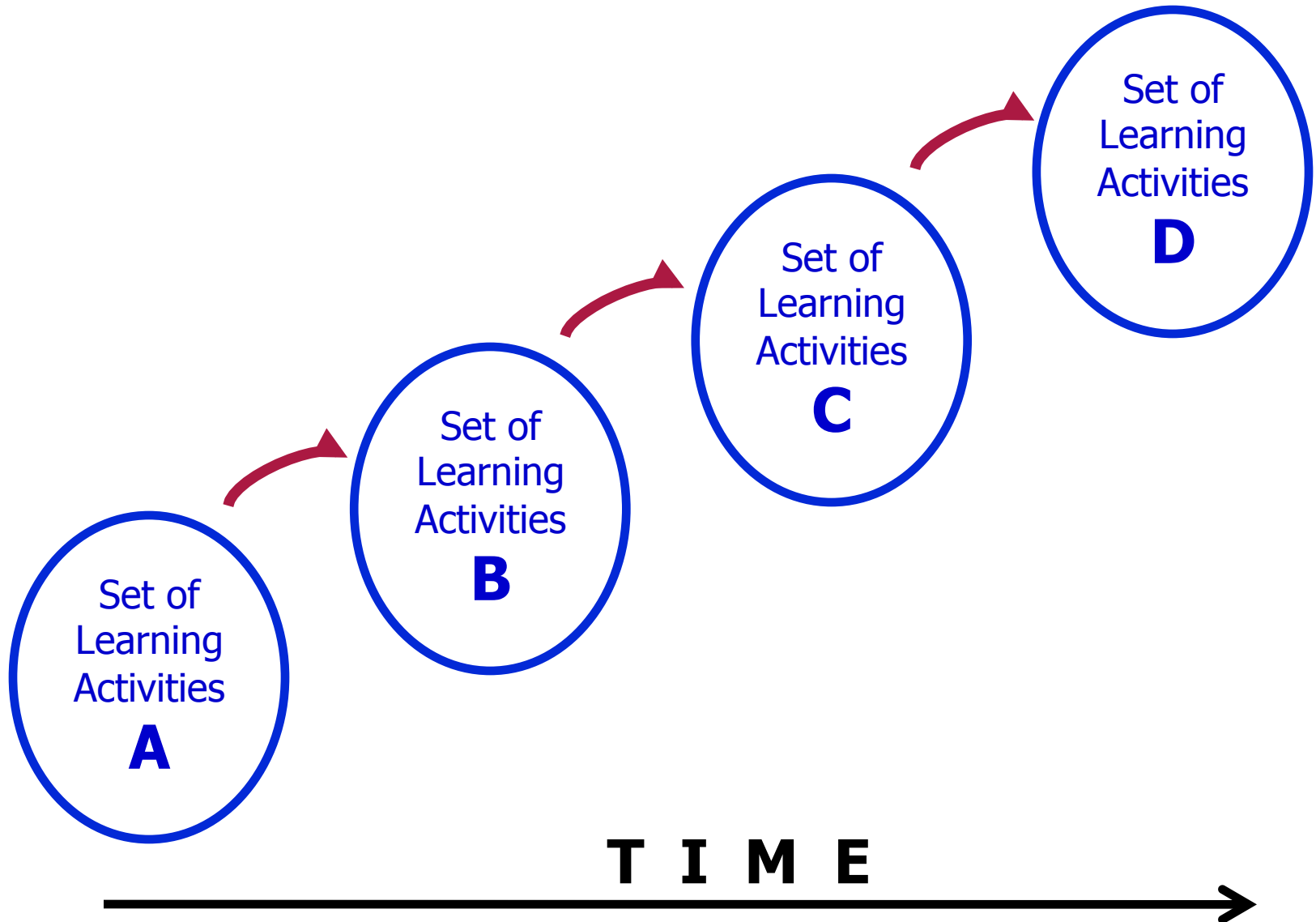
Week #: Mon

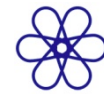
Wed

Fri

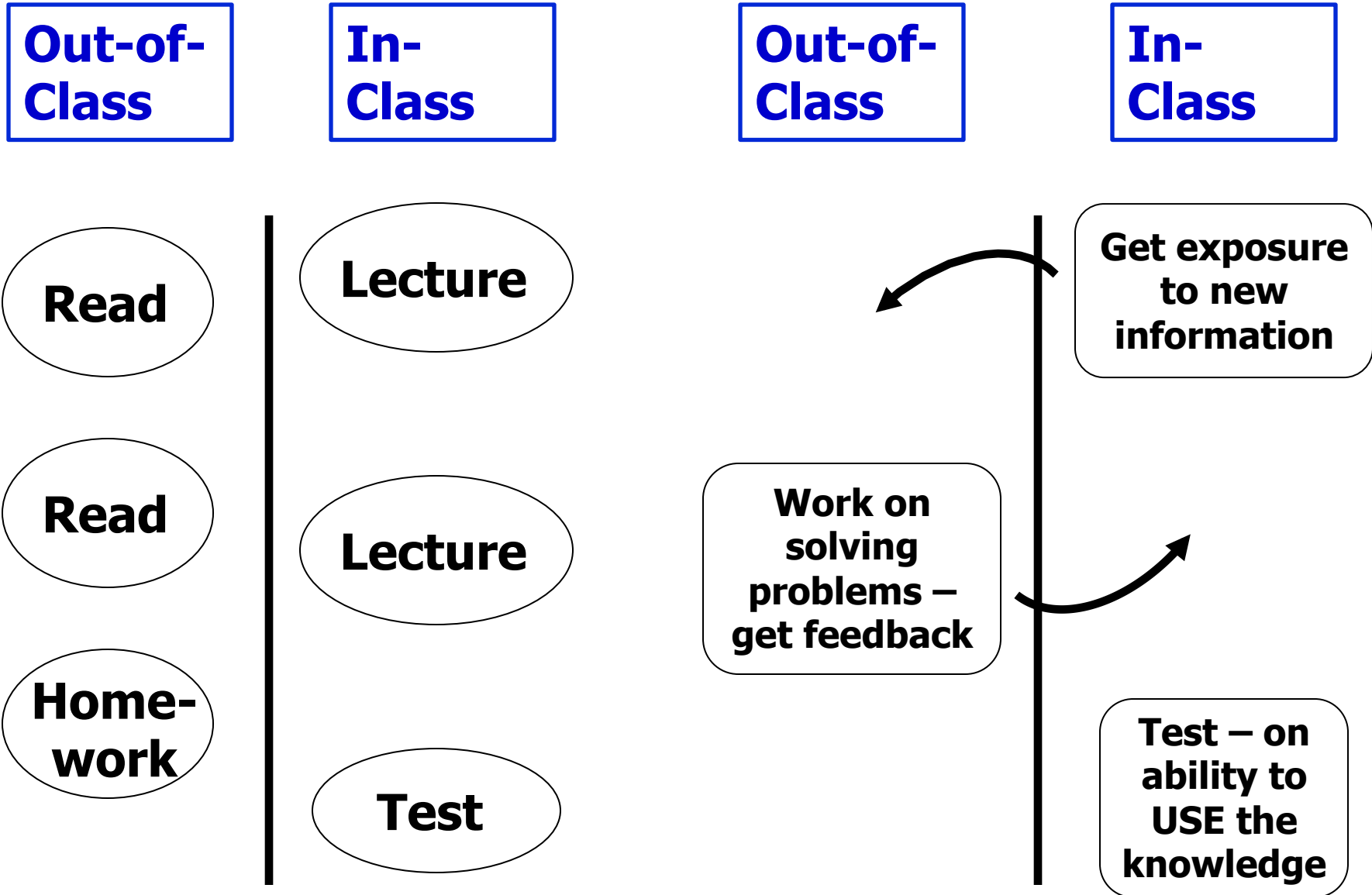
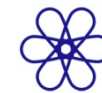
1			
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4			
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..	?	?	?
12			
13			
14			
15			







“Flipped Classroom”





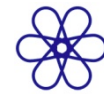
“CASTLE-TOP” DIAGRAM:
A Tool for Identifying Your
TEACHING STRATEGY

		Mon	Tues	Weds	Thurs
In-Class Activities:		?	?		Assessm't & Feedback
Out-of-Class Activities:	?		?	?	



"CASTLE-TOP" DIAGRAM:
A Tool for Identifying Your
TEACHING STRATEGY

		1 ST	2 ND	3 RD		Final
In-Class Activities:		?	?	?		Assessm't & Feedback
Out-of-Class Activities:	?			?	?	



TEACHING STRATEGY:

- A particular **COMBINATION** of learning activities...
- arranged in a particular **SEQUENCE**

Two Examples:

- Team-based learning
- Problem-based learning

TEACHING STRATEGIES

In-class:	Lecture	Lecture	Lecture	Exam
Out-of-class:		Read text	Homework exercises	Review

QUESTION:

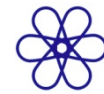
- **This strategy creates a high likelihood that most students will...**
 - 1. Be *exposed to* the content.**
 - 2. *Understand* the content.**
 - 3. Be able to *use* the content.**
 - 4. *Value* the content.**

TEACHING STRATEGIES

In-class:		Readiness Assurance Test: <ul style="list-style-type: none">• Individual• Group		Application problems (Small Groups)		Exam: <ul style="list-style-type: none">• Content• <u>Application</u> Culminating Project
Out-of-class:	Read text		Homework exercises		Review	

QUESTION:

- **This strategy creates a high likelihood that most students will...**
 - 1. Be *exposed* to the content.**
 - 2. *Understand* the content.**
 - 3. Be able to *use* the content.**
 - 4. *Value* the content.**



OVERVIEW OF WHOLE PROCESS



Learning **IMAGINED** ----->----->-----> **Learning ACHIEVED**

Learning Goals
1. Xxx
2. Xxx
3. Xxx
4. Xxx
5. Xxx
6. xxx

1

4

2

3

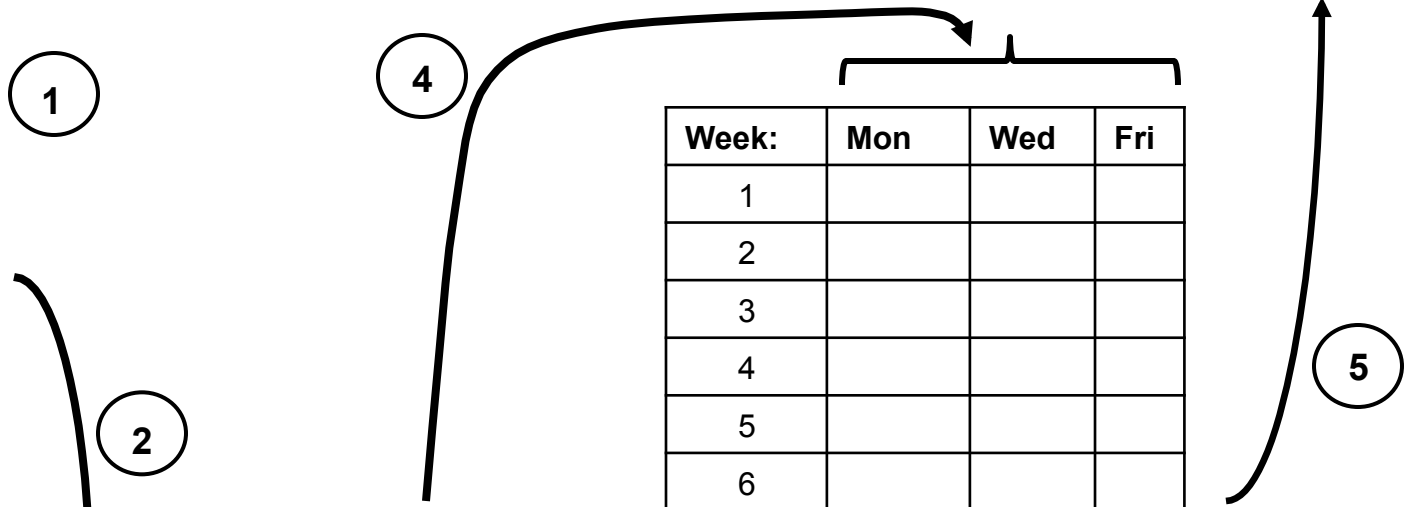
Learning Goals	Ass'm't Activ.	Learning Activ.
1. Xxx	→	→
2. Xxx	→	→
3. Xxx	→	→
4. Xxx	→	→
5. Xxx	→	→
6. Xxx	→	→

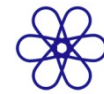
3-Column Table

Week:	Mon	Wed	Fri
1			
2			
3			
4			
5			
6			
7			
8			
9			
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12			
13			
14			
15			

Weekly Schedule

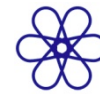
5





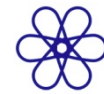
WHAT DOES IT LOOK LIKE?

- **Bill Weeks, University of Missouri at Rolla**
- **Course: Coding in Computer Science**
- **Small class (18 students), traditional time structure (M-W-F)**
- **Initially: Lecture + homework**
- **Results: Students overwhelmed by complexity of the math – frustration – apathy – low course evaluations**



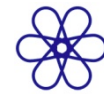
Changes Made:

- 1. Completely re-wrote his **learning goals**:** (examples)
 - For a given communication channel, students will be able to compute the maximum rate of reliable transmission
 - Students will learn how to work effectively in a group setting.
 - Students will be able to direct their own learning in relation to understanding, designing, and evaluating new codes.
- 2. New **teaching strategy**: Used TBL**
- 3. Used **reflective writing**: Learning portfolios**
- 4. Oral presentations**
- 5. Had students re-submit their homework**



RESULTS:

- **Students did the readings, and did as well as before on exams of Foundational Knowledge.**
- **TEACHER:** "...drastic improvement in student morale...They worked harder – and reported enjoying it more."
- **STUDENTS:**
 - ...an interesting learning experience I will never forget...provided me with knowledge to carry out independent study.
 - I enjoyed this course to the fullest...course was entertaining and at the same time enlightening.



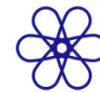
TEACHER'S REACTION:

- **“Teaching such an excited group of students was an unforgettable experience.**
- **It made my job seem worthwhile and very fulfilling.**
- **I will be feeding off that student excitement for years.”**



HOW WELL DOES “IT” WORK?

- **Study by Carl Wieman, winner of Nobel Prize in Physics**
- **Study reported in *Science* (May 13, 2011)**



Recent Study by Carl Wieman:

1. What they did

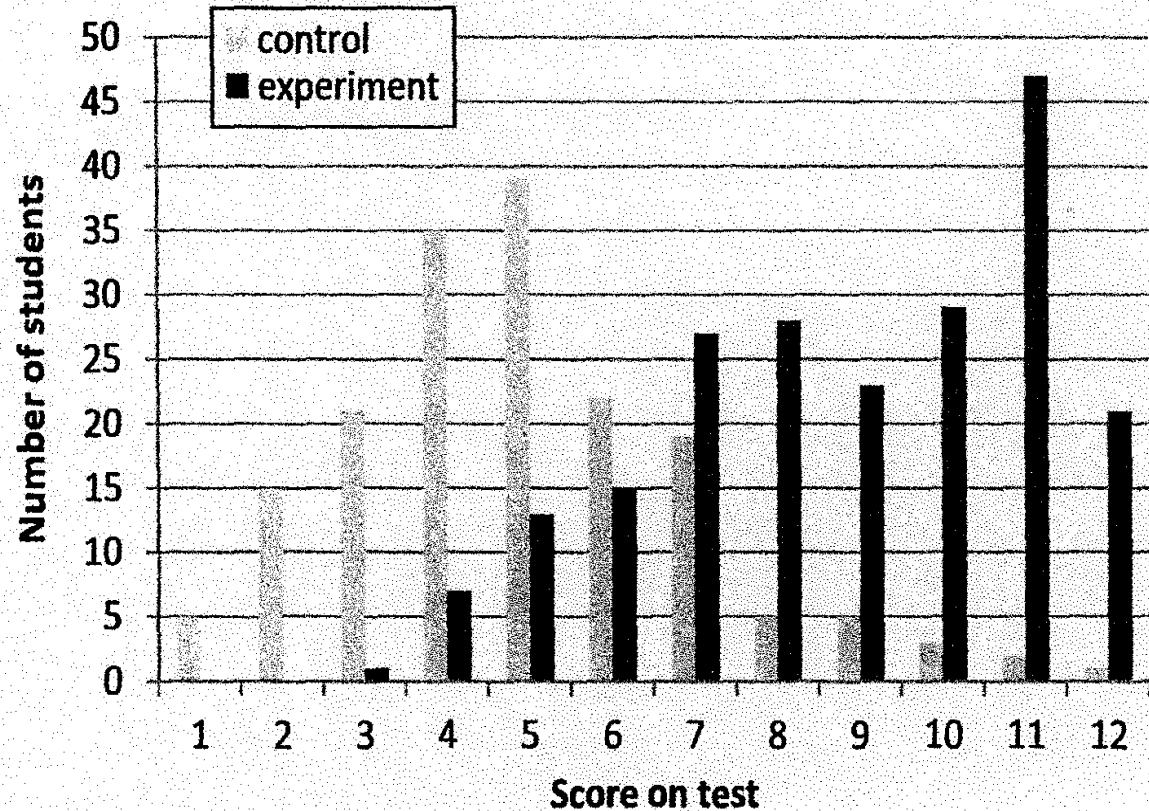
- 2 large sections of a physics class
- Only changed the course design for 1 week
- Change: Students worked problems in class
 - in groups – immediate feedback

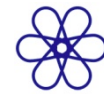
2. What happened when they did that?

- Attendance: Before - 57% **After - 75%**
- Student engagement: Before - 45% **After -85%**
- Student learning? **Doubled!**



Test scores by students in 2 sections, at end of 1 week of instruction on this topic:

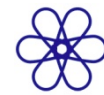




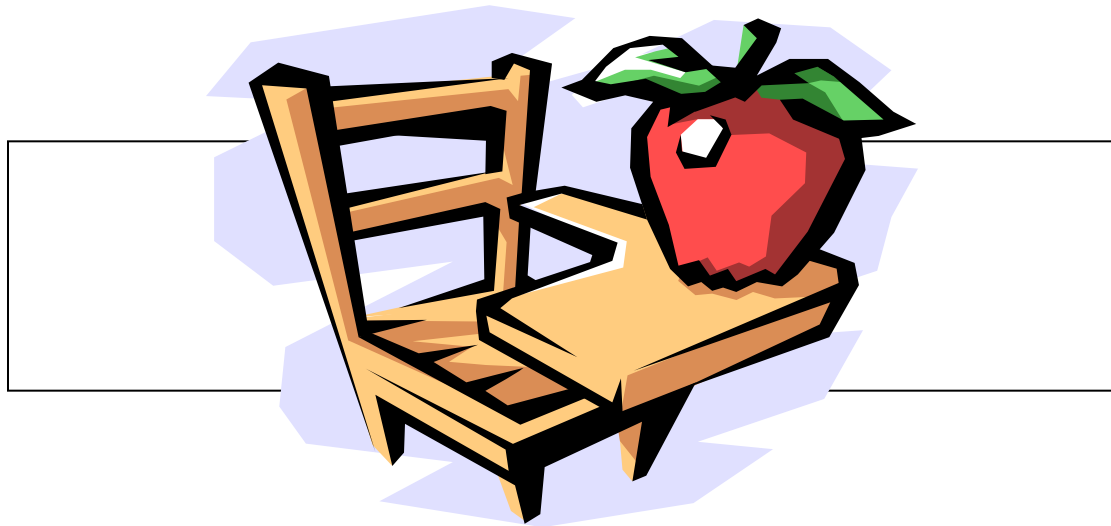
DISCUSSION:

What comments or questions do you have about...

- **What “Backward Design” is?**
- **Why it is important?**



THE END!



Higher Education:

Let's make it all that it can be and needs to be!