Is there a future of PBL?

Diana Dolmans, Thursday, June 27, 2019, 930-1015 hour

25th Anniversary of the Unit of Development and Research in Medical Education (UDREM)

Faculty of Medicine of the University of Geneva

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Contents

- Challenges facing traditional education
- Current instructional design principles
- How PBL fits with these principles
- PBL at Maastricht – recent developments
- Take home messages

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Cons of traditional lecture-based education

- Students have difficulties to apply what is learnt in new situation

  … transfer to practice is limited ..

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Current instructional design models/principles

- Merrill: Five first principles of instruction
- 4C/ID
- PBL
- Cognitive apprenticeship theory

Five first principles of instruction
(Merrill, 2002; 2012)

- Engage learners in professionally relevant problems
- Activation principle
- Demonstration principle
- Application principle
- Integration principle

Professionally relevant problems

- Learning is promoted when learners are engaged in professionally relevant problems

- *Learning should start from learning tasks derived from professionally relevant problems*

Activation principle

- Learning is promoted when learners activate relevant prior knowledge, to recall a structure for organizing new knowledge

- *Let students activate prior knowledge*

Demonstration principle

- Learning is promoted when learners observe a demonstration of what is to be learned; demonstrations of procedures, modeling examples

- *Demonstrate an example and explain*

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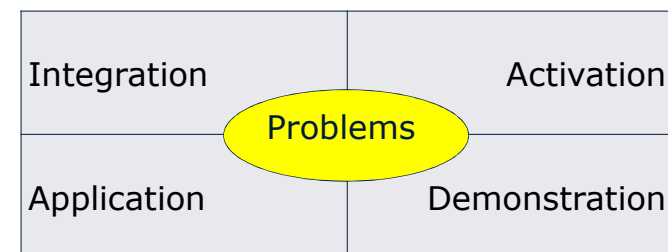
Application principle

- Learning is promoted when learners engage in the application of their newly acquired knowledge by solving problems

- *Let students apply their knowledge*

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Transfer principle

- Learning is promoted when learners are encouraged to transfer their new knowledge to various problems

- *Let students apply their knowledge to various problems/tasks; compare, contrast, articulate general principles*
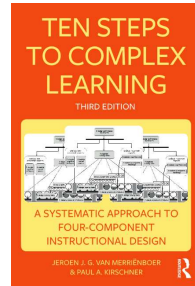
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Five first principles of instruction
(Merrill, 2002, 2012)

Integration	Activation
Application	Demonstration

Problems

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Four Component Instructional Design 4C/ID

- Learning tasks
- Supportive information
- Procedural information
- Part-task practice

TEN STEPS
TO COMPLEX
LEARNING
THIRD EDITION

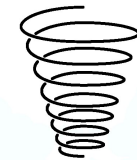A SYSTEMATIC APPROACH TO
FOUR-COMPONENT
INSTRUCTIONAL DESIGN

JEROEN J. G. VAN MERRIËNBOER
& PAUL A. KIRSCHNER

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Learning tasks

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Problems, projects, tasks, etc.

- Whole tasks, based on real life problems
- Integration of knowledge, skills, attitudes

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Learning tasks - *Variation*

- A series of learning tasks with variations

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Learning tasks – *Complexity*

- Ordered from simple to complex

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Learning tasks – *Guidance*

- Guidance and support is built into the task and decreases within each level of complexity
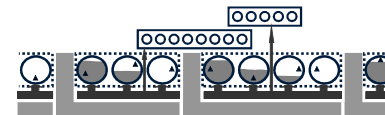
Supportive Information

- Cognitive strategies
  - How to approach tasks in the domain?
- Mental models
  - How is the domain organized?

3 Procedural Information

- Just in time "how to" instructions, about how to perform a task

4 Part-task Practice

- Repetitive practice of routine aspects that need to become fully automated

PBL – 4C/ID

- Learning tasks
  - Problems
- Supportive information
  - Sources for self-study, lectures
- Procedural information
  - Just-in-time feedback van een tutor
- Part-task practice
  - Skills training

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PBL Learning principles

- Constructive learning
- Self-directed learning
- Contextual learning
- Collaborative learning

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Constructive learning

- Learning is promoted when learners:
  - activate relevant prior knowledge
  - elaborate or generate new meaningful relations between concepts e.g. by explaining in own words

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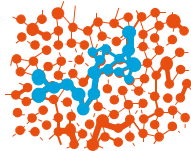
Self-directed learning

- Learning is promoted when:
  - learners play an active role in planning, monitoring and evaluating their learning

Planning — Monitoring — Evaluation

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Contextual learning

- Learning is promoted when learners:
  - engage in solving or discussing meaningful problems
  - articulate underlying principles
  - apply newly acquired knowledge to varied problems

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Collaborative learning

- Learning is promoted:
  - when learners deeply interact with each other about complex problems

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PBL and learning principles

- **Constructive learning**
  - Prior knowledge activation, ask questions, give explanations
- **Self-directed learning**
  - Generate learning issues, select resources
- **Contextual learning**
  - Discuss problems (pre- and post-discussion)
- **Collaborative learning**
  - Discussion in small groups, questioning, reasoning and discussing disagreements

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Cognitive Apprenticeship Theory (CAT)
(Collins et al., 1989)

- Modeling (demonstrate, explain, think aloud)
- Coaching (observe, give feedback)
- Scaffolding (gradually decrease support)
- Articulation (teacher asks questions and stimulates students to ask questions)
- Reflection (deliberately stimulate students to reflect on their strengths and weaknesses)
- Exploration (let learner set goals)

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In Sum

- Start from relevant problems
- Activate the student
- Encourage the student to self-direct
- Offer much support and guidance

In Sum

- PBL fits well with current instructional design guidelines and learning principles and is aimed at enhancing a deep approach to studying

Deep approach to studying

- A students' intention to understand content, relate and structure ideas, look for underlying principles, weighing relevant evidence and critically evaluating knowledge (Biggs et al., 2001)

DOES PBL enhance deep learning?

*Yes, in theory it does,
but in practice it is strongly dependent
on the context*

Main challenges with PBL in practice

- Poor preparation by students
- Superficial discussion
- Unequal participation by students
- Lack of deep learning

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Does PBL enhance deep learning?

PBL does seem to enhance deep learning and has little effect on surface learning

(Dolmans et al, 2016)

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BUT

- Findings are often inconsistent; i.e. a high perceived workload and assessment that is perceived as NOT rewarding deep learning hamper a deep approach

- In other words, there is a often a lack of constructive alignment (Biggs, 2011)

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Constructive alignment

- Aligning the learning environment with the intended learning outcomes; i.e. deep learning

- All elements of the learning environment should drive students towards deep learning

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Constructive alignment
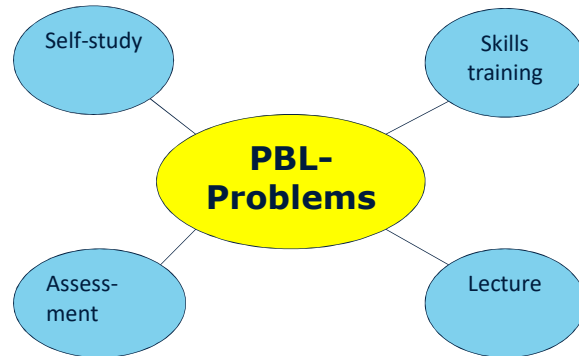
High quality PBL problems are key!

- Relate to the future profession
- Are complex, ill-defined
- Fit with students' prior knowledge
- Are ordered from simple to complex
- Fit the intended teachers' objectives
- Are the core element of a course and all other instructional activities and the assessment format are well aligned

What about PBL at Maastricht University?

- Is PBL still alive and kicking or not?
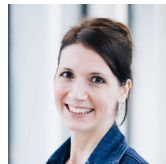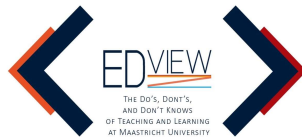
EDVIEW by Janneke Frambach

- A project about the do's, don'ts and don't knows of PBL
- To develop a shared view on UM education for the future
- Focusgroups with staff and students and a survey
- Medicine, Psy, Law, Health, Business

Findings

- High satisfaction with the choice for PBL given it fits well with current theories (4.0, scale 1-5)

*UM interprets PBL as
a constructive, collaborative, contextual
and self-directed approach to learning
with problems derived from
professional practice*

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Findings

- Low satisfaction with PBL in practice (3.4, scale 1-5)

- Two major issues:
  - Large groups
  - Non PBL examinations

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What is next?

- Focus on why not on how
- More flexibility, PBL variations, P(j)BL
- Better align the assesment
- Invest in teacher training

The current state of PBL at UM: a trend towards flexibility
It was apparent that when we currently talk about PBL at
structure. Simultaneously, a trend can be observed of defini
variations and alternatives being applied in several program
respondents would like UM to be more creative and flexible

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Innovations

- But, how to innovate PBL and assessment given the increasing number of students?

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Slide 1

Redesign of the Bachelor Medicine Maastricht

Judith Sieben, Sylvia Heeneman and Jan-Joost Rethans

Slide 2

Redesign of the bachelor

- A personalized learning curriculum
- Design Thinking
- Explore the future – design the future – experience the future

UNDER CONSTRUCTION!

Slide 3

Redesign of the bachelor

A personalized learning curriculum:

- Authentic professional learning tasks (APT)
- Learning to learn strategies
- Curriculum choices
- Mentoring and support
- Learning communities for students and teachers

Slide 4

How does it look like?

- 4 learning communities of 80 students with their own learning plaza
- Learning team coaches 6 per community
- Coach discusses with student how to achieve which learning task in which period
- Assessment anytime or assesment as and for learning

Take home messages

- Start from current instructional design and learning principles
- Organize learning starting from professionally relevant problems
- Ensure all other elements to be well aligned

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Take home message

- Avoid:
  - a one-size-fits-all approach
  - a copy-paste approach

- Adopt:
  - a PBL approach that fits to your own context
  - a flexible PBL approach
  - a re-invent approach

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Take home messages

- **Keep in mind:**
  - PBL with certain characteristics, preferably based on theory, might work in a specific context with particular goals in mind

  - Yes, there is a future of PBL as long as we continuously adapt and redesign

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change
it myself*

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Questions?

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