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**PRINTeL**  
Promoting Innovative Teaching & Learning

Co-funded by the Erasmus+ Programme of the European Union



# Instructional Design for Active Learning

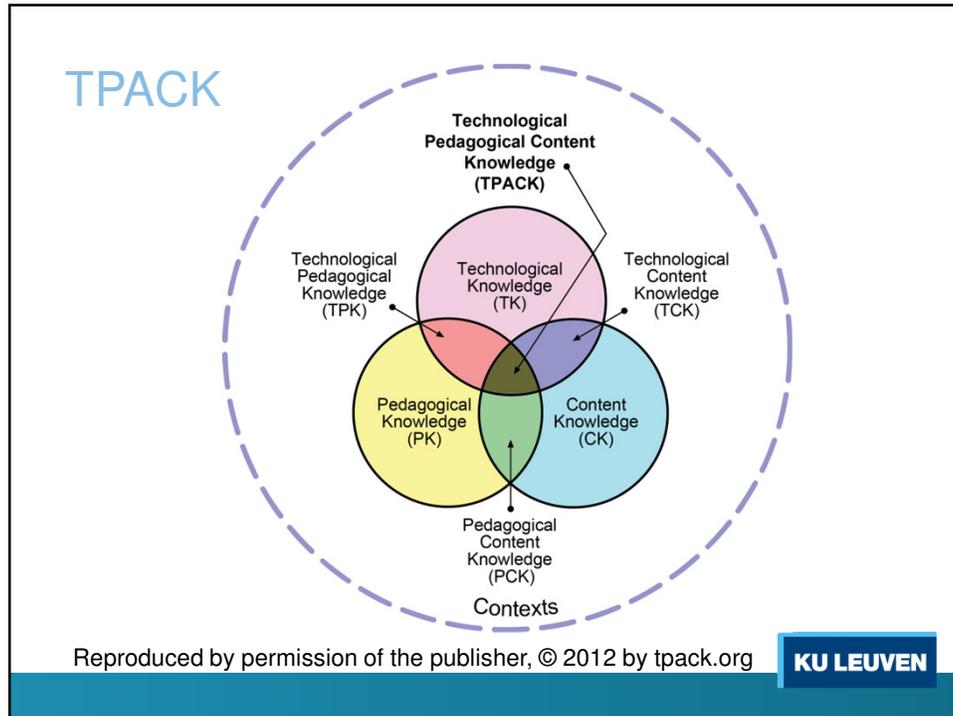
Wim Van Petegem  
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# General concept



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## TPACK explained

- **Content Knowledge (CK)** – Knowledge about the subject matter to be learned or taught.
- **Pedagogical Knowledge (PK)** – Knowledge about the processes and practices or methods of teaching and learning.
- **Technology Knowledge (TK)** – Knowledge about certain ways of thinking about, and working with technology, tools and resources.
- **Pedagogical Content Knowledge (PCK)** – Knowledge of pedagogy that is applicable to the teaching of specific content.
- **Technological Content Knowledge (TCK)** – Knowledge of the manner in which technology and content influence and constrain one another.
- **Technological Pedagogical Knowledge (TPK)** – Knowledge of how teaching and learning can change when particular technologies are used in particular ways.

## TPACK - definition

TPACK is the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones.

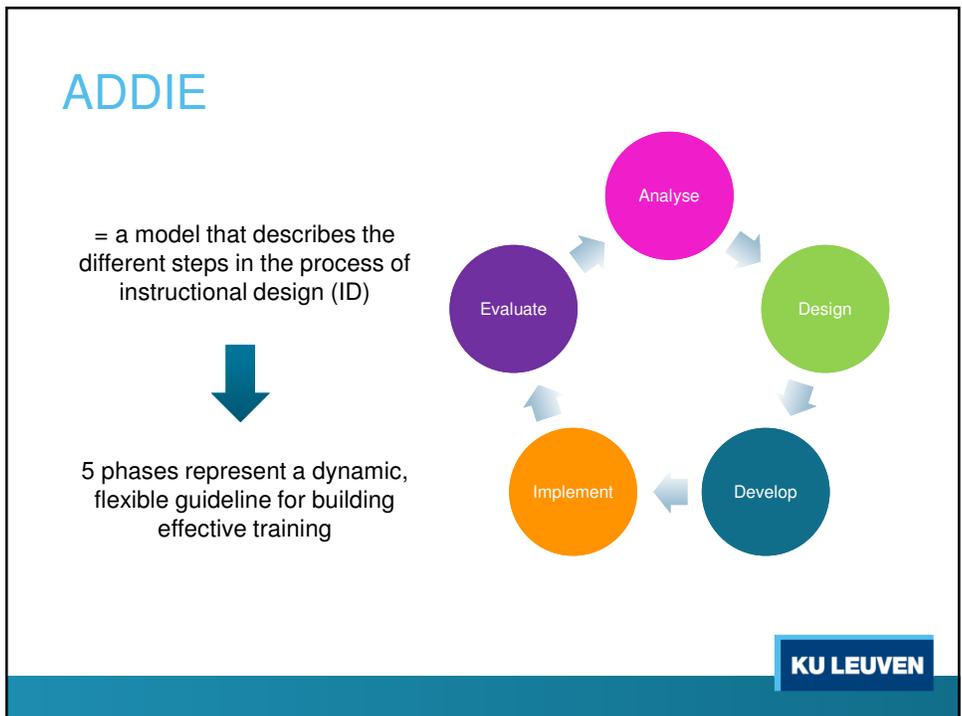
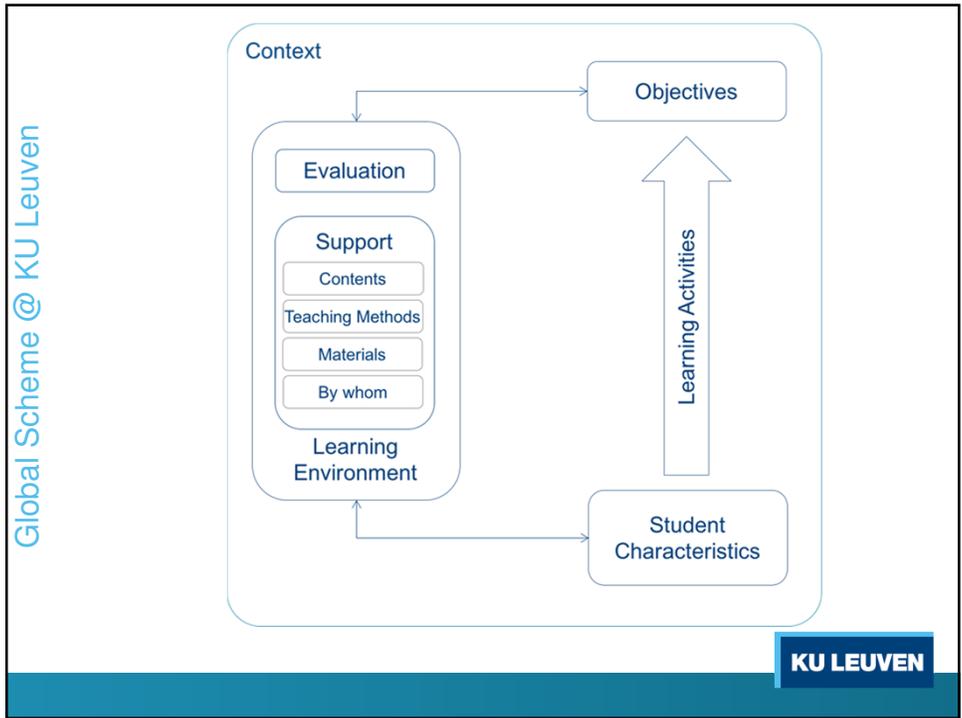
(Koehler & Mishra, 2009)

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## Intermezzo

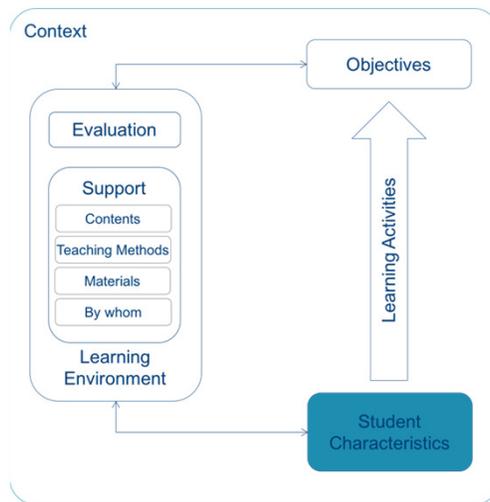


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# Analysis: Students and their characteristics

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What characteristics do students have?

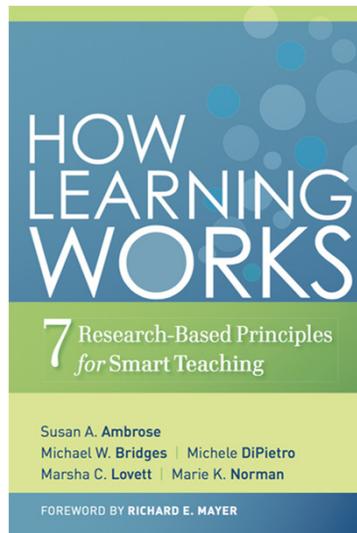
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## Student characteristics

- Prior knowledge
- Motivation
- Expectations
- Group characteristics
- Background
- Level of self regulated learning
- ...

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## How Students Learn



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# How Digital Natives Learn

www.sciedu.ca/ijhe

International Journal of Higher Education

Vol. 3, No. 1; 2014

## Theoretical Perspectives of How Digital Natives Learn

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URL: <http://dx.doi.org/10.5430/ijhe.v3n1p94>

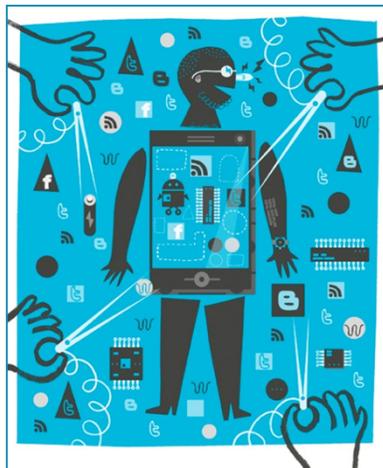
Online Published: January 22, 2014

### Abstract

Marck Prensky, an authority on teaching and learning especially with the aid of Information and Communication Technologies, has referred to 21<sup>st</sup> century children born after 1980 as 'Digital Natives'. This paper reviews literature of leaders in the field to shed some light on theoretical perspectives of how Digital Natives learn and how we can use

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# Millennium Student Characteristics

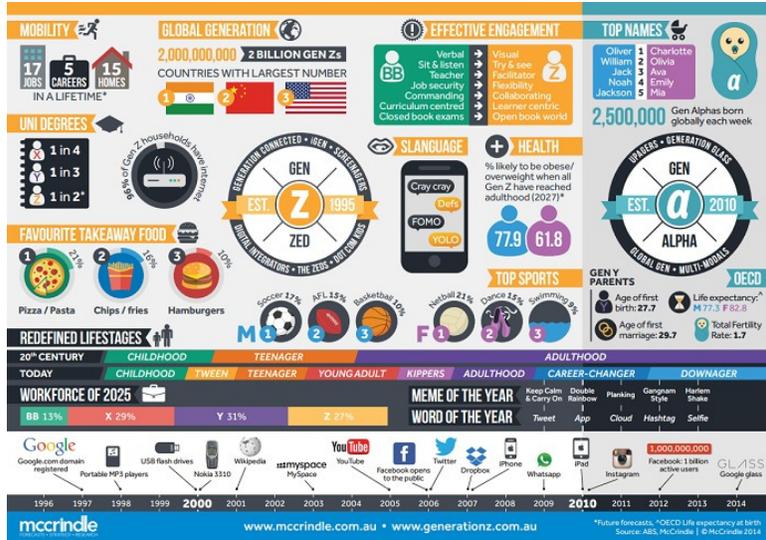


- ICT-minded
- Multitasking
- Media literate
- A-linear, a-synchronous
- Explorative, interactive
- With a positive attitude
- Target oriented
- Social, connected
- As partners with educators
- ...

Cf. *New Millennium, New Student*, M. Moonen, MSc Thesis, KU Leuven, 2012

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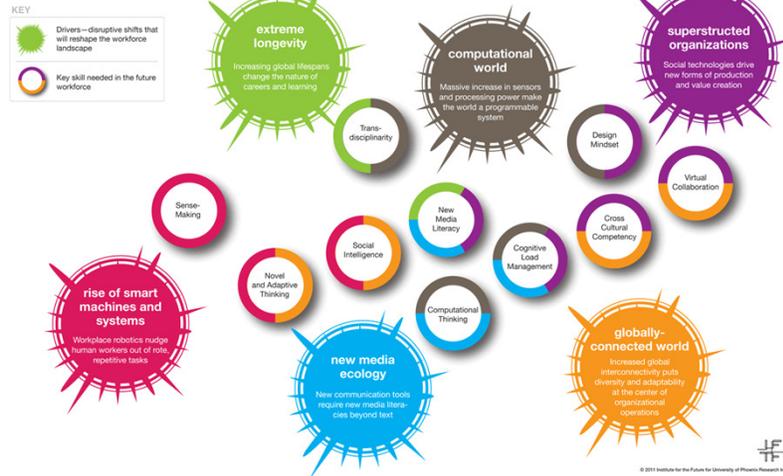
# Generation Z or α or...



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## Future Work Skills 2020

While all six drivers are important in shaping the landscape in which each skill emerges, the color-coding and placement here indicate which drivers have particular relevance to the development of each of the skills.



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## Generation Einstein



- Social
- Socially concerned
- Functional
- Loyal
- Searching for intimacy
- Pragmatic
- Media smart
- Diverse
- Self-conscious
- Self-confident
- Empathic
- Creative
- Collaborative

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## Generation Einstein (cont.)



Their values:

- Authenticity
- Respect
- Self-development
- Togetherness
- Conviviality
- Happiness

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## Learner characteristics

### Exercise:

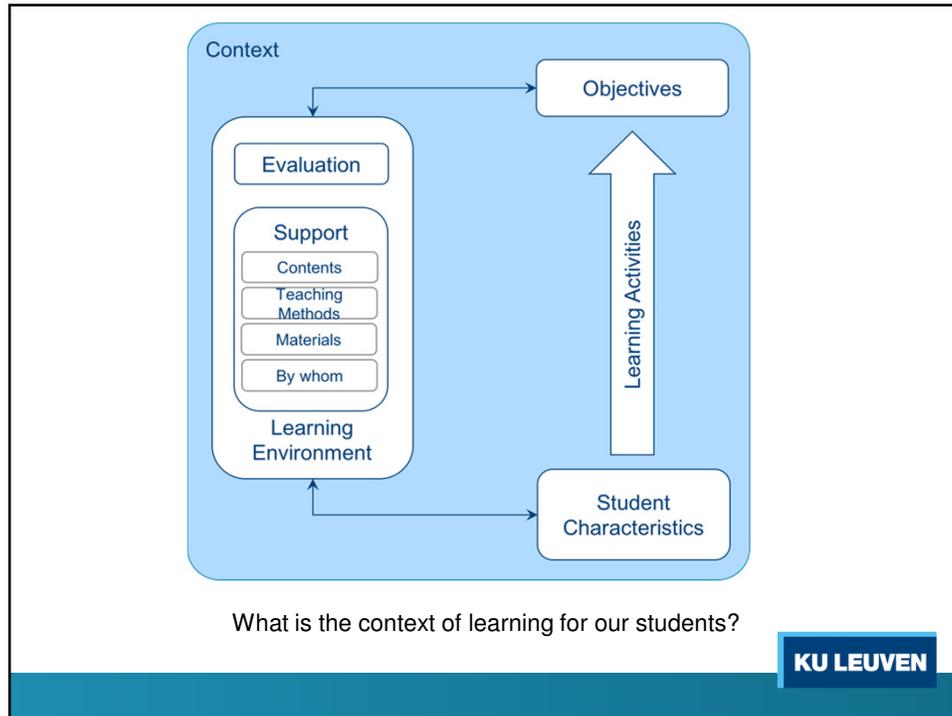
- Describe yourself as a learner in five key words (or wordings), e.g. 'I learn best when...', 'I cannot learn without...', 'I am a ... learner', 'Learning for me means...'
- Picture yourself as a learner in one image, cartoon, photo,...
- Explain the words and the picture to your neighbour, and vice versa
- Discuss with your neighbour:
  - Which characteristics do you have in common?
  - What are striking differences?
- Make a class picture

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## Analysis: Context



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## Context - definition

### context

*/ˈkɒntɛkst/*

*noun*

the circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood.

"the proposals need to be considered in the context of new European directives"

*synonyms:* circumstances, conditions, **surroundings**, factors, state of affairs; **More**

- the parts of something written or spoken that immediately precede and follow a word or passage and clarify its meaning.

"skilled readers use context to construct meaning from words as they are read"

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## Context

- Accessibility
- Mobility
- Size of the group
- Infrastructure
- Culture
- Resistance
- ....

## Accessibility



## Mobility



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## Class size



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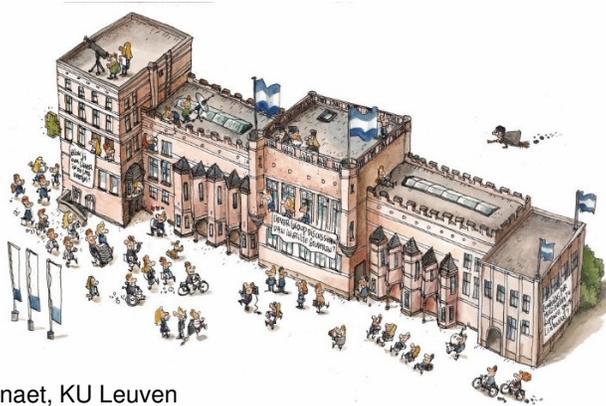
## Infrastructure: class rooms



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## Infrastructure: Learning centers



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<http://bib.kuleuven.be/agora>

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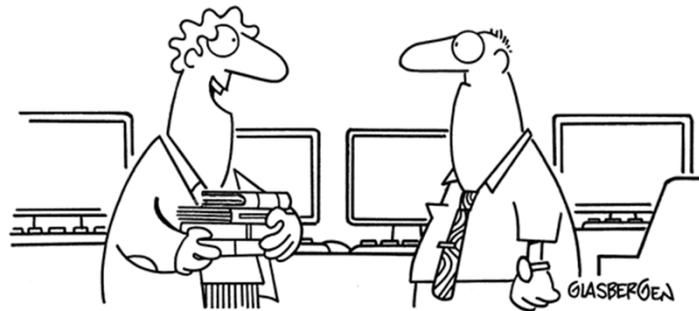
## Learning culture



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## Teacher resistance to technology

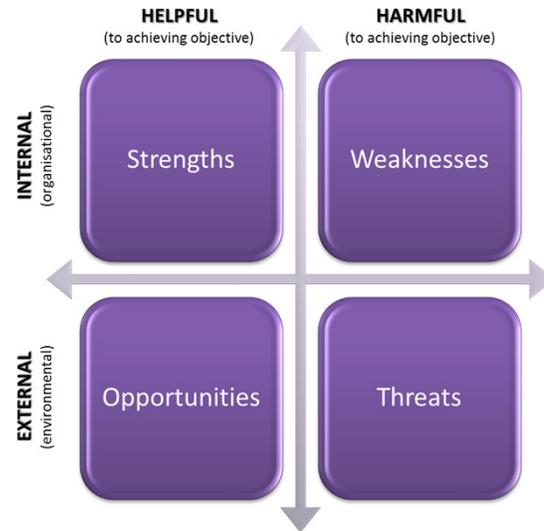
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www.glasbergen.com



"I'm taking an innovative approach to teaching this semester. I'm using books!"

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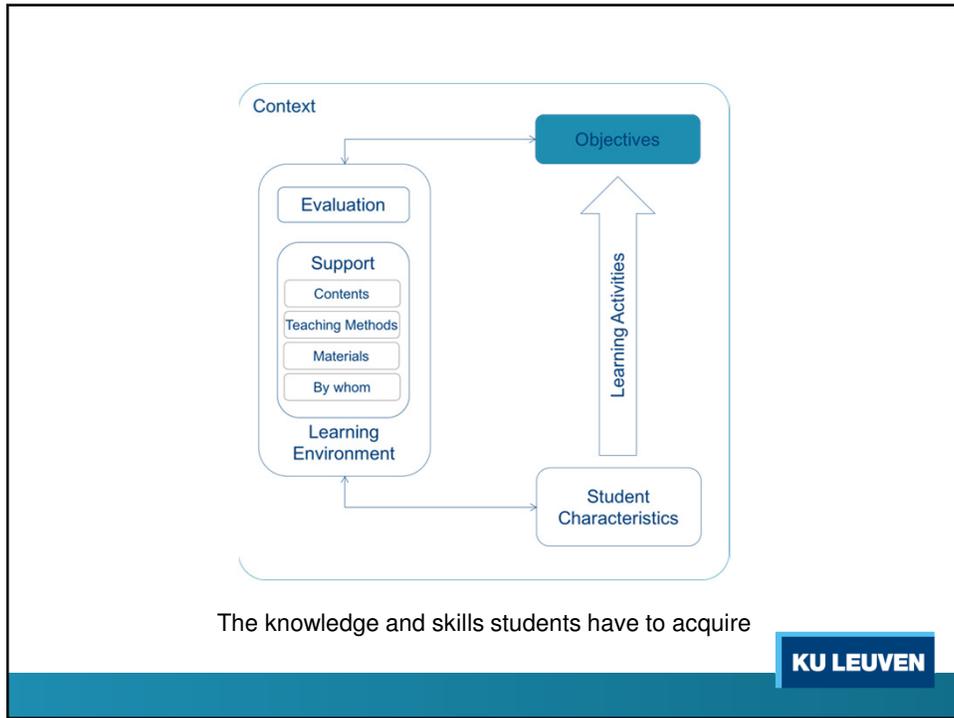
## Make a SWOT-analysis of your own (learning) context



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## Analysis: Learning Objectives

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## Learning objectives: why?

**What is the Value of Course-Specific Learning Goals?**

*By Beth Simon and Jared Taylor*  
The authors examined student and faculty opinions regarding the use of detailed learning goals in three courses. Students reported the use of learning goals to be very positive, aiding them with studying, in lectures, and in determining the important material to learn. Likewise, faculty indicated that using learning goals was a positive experience, especially for communicating course material to students and other faculty and for creating course assessments.

Simon, B. and Taylor, J., Journal of College Science Teaching, 2009, pp. 52-57

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## Learning objectives: why?

### ✓ Learners

“Students expressed relief and gratitude at being given **clear direction** as to how to **focus** their efforts, most notably in the lectures, and also in organising their studying, reviewing, and preparing for exams.”

*Simon, B. & Taylor, J., 2009*

### ✓ Teachers

“The most common point made by the instructors was that learning goals enhanced **communication**, both with students and other faculty members... The instructors mentioned that the learning goals streamlined the process of writing exam questions and improved **assessment**.”

*Simon, B. & Taylor, J., 2009*

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## Learning objectives: an example

Research in literature.  
?

The learner is able to critically select information from the internet in order to analyse research questions in the domain of French literature.

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## Learning objectives: an example

The student is able to critically select information from the internet in order to analyse research questions in the domain of French literature.

From a learner's perspective

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## Learning objectives: an example

The student is able to critically **select** information from the internet in order to **analyse** research questions in the domain of French literature.

From a learner's perspective

With active verbs to indicate learner activity

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## Learning objectives: an example

The student is able to critically **select** information from the internet in order to **analyse** research questions **in the domain of French literature**.

From a learner's perspective

With active verbs to indicate learner activity

Specific

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## Learning objectives: exercise

- Would you improve the following objectives?
- How?
- Why?

“Students will be taught various decision-making models”

“Students will appreciate the ethical responsibilities of lawyers”

“Students will learn about research proposals”

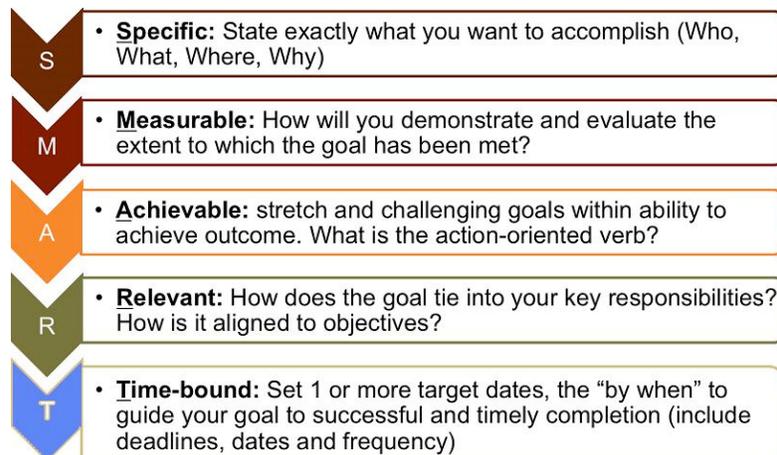
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## Learning objectives: good & bad examples

Before – broad and ambiguous	After – direct, measurable and achievable <i>By the end of the semester, successful students will be able to:</i>
<p>Students will become familiar with plant and animal species in Southern Ontario</p> <ul style="list-style-type: none"> <li>Level of achievement/sophistication expected unclear</li> </ul>	<p>Identify and describe 15 common plant and animal species found in the Carolinian Forest Region through field study and the development of an identification guide</p>
<p>Students will critique works of art</p> <ul style="list-style-type: none"> <li>Additional detail required</li> </ul>	<p>Critique contemporary works of art based on an appropriate set of criteria through studio critiques and an independent essay</p>
<p>Students will be taught various decision-making models</p> <ul style="list-style-type: none"> <li>Teacher-centred, level of sophistication expected unclear</li> </ul>	<p>Apply appropriate decision-making models in business and marketing through participation in a collaborative group project</p>
<p>Students will appreciate the ethical responsibilities of social scientists</p> <ul style="list-style-type: none"> <li>Too broad, unclear how this can be measured</li> </ul>	<p>Assess the ethical implications of research in the social sciences through in-class discussion and an independent written report</p>
<p>Students will learn about research proposals</p> <ul style="list-style-type: none"> <li>Ambiguous, level of sophistication expected unclear</li> </ul>	<p>Develop and present a research proposal (including appropriate research methods and a review of literature) on a relevant topic in primary or secondary education, through an independent presentation and written report</p>

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## Learning objectives: SMART formulation



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#bitesizePD

## Bloom's Digital Taxonomy



Bloom's taxonomy	Bloom's modified taxonomy	Bloom's extended digital taxonomy	Functional Levels	Activities with digital tools	
		Sharing	Publicly sharing, publishing, broadcasting	Contributing to open social networks, publishing, broadcasting, networking	Higher Order Thinking Skills ↑
Evaluation	Creating	Creating	Designing, constructing, planning, producing, inventing, devising, making	Programming, filming, animating, blogging, video blogging, mixing, re-mixing, wiki-ing, videocasting, podcasting, directing	
Synthesis	Evaluating	Evaluating	Checking, hypothesising, critiquing, experimenting, judging, testing, detecting, monitoring	Blog commenting, reviewing, posting, moderating, collaborating, refactoring, testing	
Analysis	Analyzing	Conceptualizing	Comparing, organising, deconstructing, attributing, outlining, finding, structuring, integrating	Hacking, mashing, linking, validating, reverse engineering, cracking	
Application	Applying	Applying	Implementing, carrying out, using, executing	Running, loading, playing, operating, uploading, sharing with group, editing	
Comprehension	Understanding	Connecting	Interpreting, summarizing, inferring, paraphrasing, classifying, comparing, explaining, exemplifying	Boolean searches, advanced searches, blog journaling, tweeting, categorizing, tagging, commenting, annotating, subscribing	
Knowledge	Remembering	Doing	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding	Bullet pointing, highlighting, bookmarking, group networking, shared bookmarking, searching	Lower Order Thinking Skills ↓

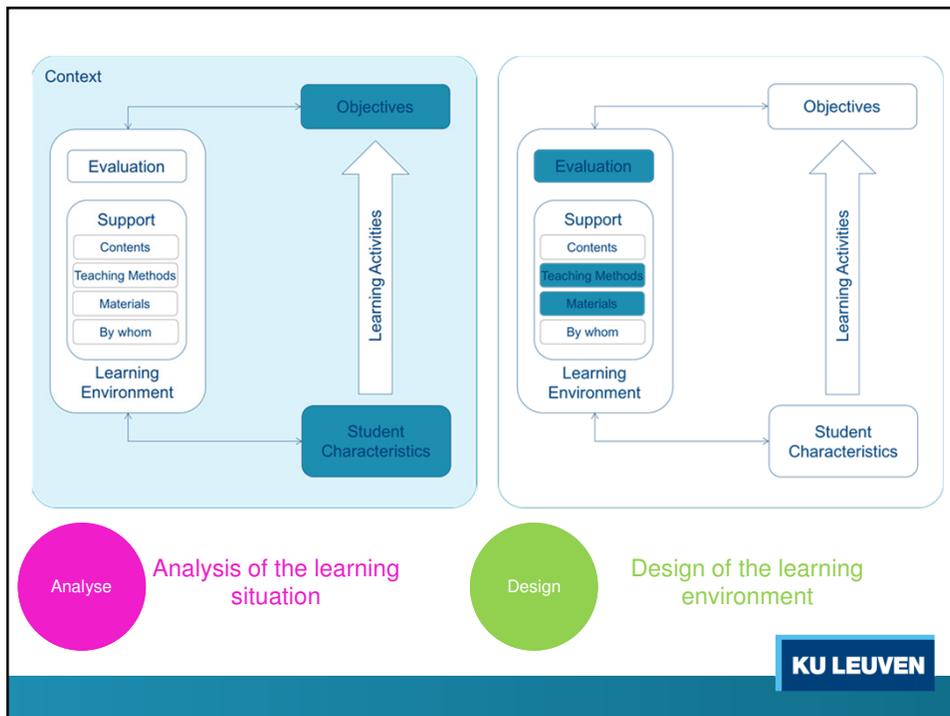
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## Learning objectives: exercise

- Imagine yourself as a trainer for this training
- Individual work:
  - Write down 2 learning objectives for this training
- Group work (4-6 members in a group):
  - Select three learning objectives for this training
  - Discuss and improve these learning objectives
- Plenary presentation

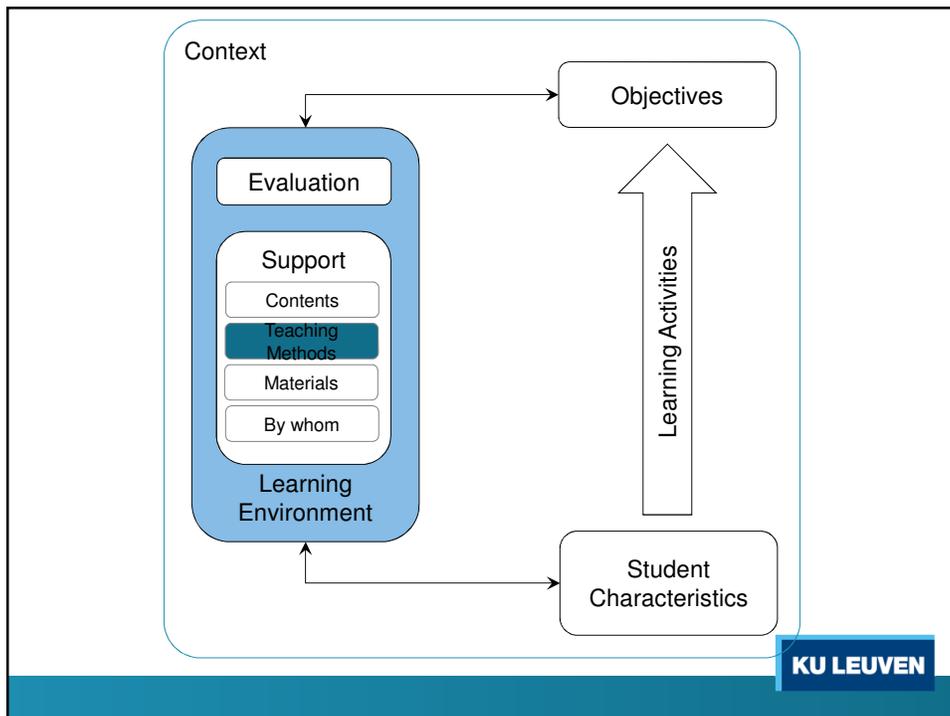
And now

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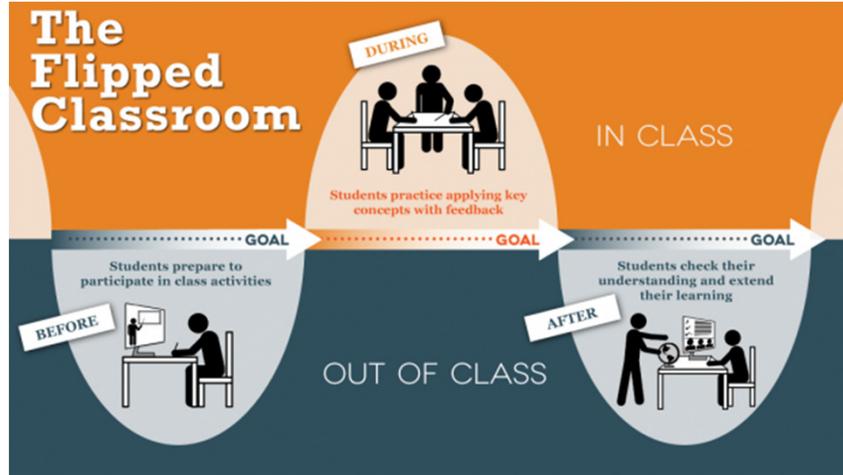
# Design: Teaching methods (and learning activities)

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# The Flipped Classroom



<https://facultyinnovate.utexas.edu/teaching/strategies/flipping>

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## Quick Start Guide: Flipped Classroom

The University of Texas at Austin  
Faculty Innovation Center

### "Flipping" Your Class

#### Overview

"Flipping" the class reverses the traditional class setup: students acquire basic content outside of class, and then work together in class on application-oriented activities. Whether you want to flip one class session or an entire course, the following questions will help guide you through the essentials.

Curate (Borrow or buy existing materials)	Create (Build your own materials)
--	--------------------------------------

**Where to Start:**

- What topics within your course have you noticed students struggling to understand in the past?
- What misconceptions are common within your field?

**UT Instructors are using:**

- Homework problems with a classroom response system
- Train-based Learning
- Peer Instruction
- Case studies ... for large and small classes.

**Evidence-based Practices**

- Create 3-5 video segments lasting 3-5 minutes
- Check for understanding
- Peer teaching activities for doing one-class work

**Student Perspective**

- Jimmy Waldman, UT student, shares his experience in his CHEM 3600 Chemistry class: [www.utexas.edu/news/2012/11/19/innovate-education/chemistry-education/](http://www.utexas.edu/news/2012/11/19/innovate-education/chemistry-education/)

**F** Figure out where "flipping" makes the most sense for your course

Which topics within a unit would be better served if students were given the opportunities during class to actively apply their knowledge and skills?

**L** Look for in-class activities requiring students to apply what they are learning

What activities have you developed that are currently tucked through during class due to time constraints? What homework questions could be tackled during class?

**I** Identify the content students will engage to prepare for class

What existing resources would supply students with the information needed and how would you check their understanding?

**P** Prepare students for the unique roles everyone will have during class

What expectations and procedures need to be communicated to students regarding how they prepare for class and engage during class?

What learning outcomes need to be refined or introduced to target higher order use of knowledge and skill?

What activity could be designed that would appropriately challenge students to apply concepts and engage them in the types of thinking common in your field?

What essential content do students need to acquire before class that would be best served by producing your own videos (3-5 segments lasting 3-5 minutes each)?

What additional tools or techniques would help you in your role as a "cognitive coach" where you develop and challenge students to engage in ways of thinking within your field?

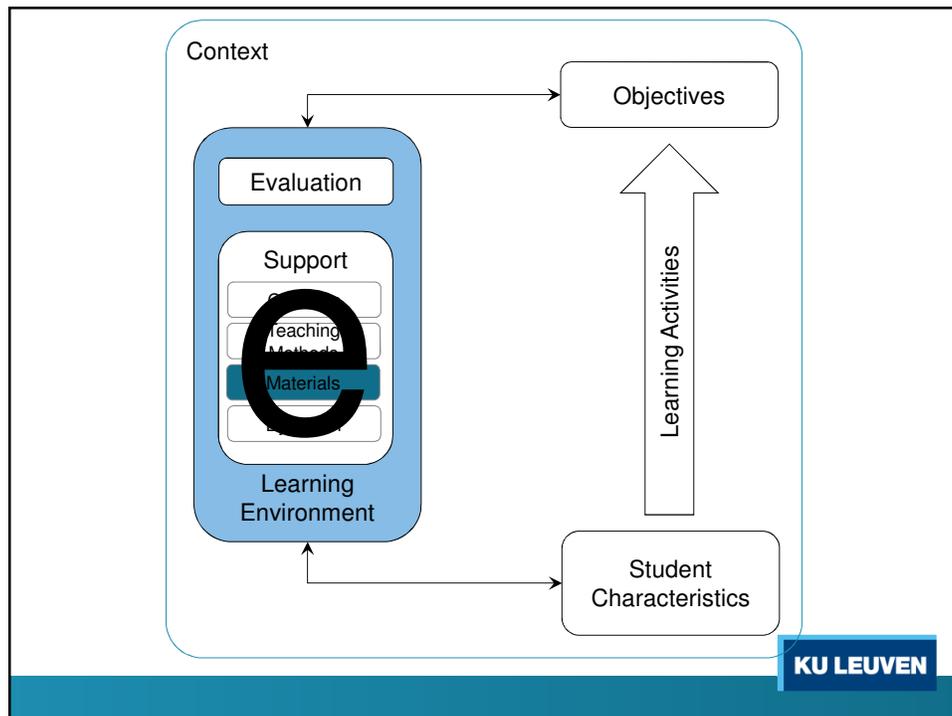
Transforming a course takes both time and commitment, so starting with a single class session by focusing on what and how students are learning at that scale often works well. Flipping is an iterative process, so as you implement these practices, reflect on what works well and what needs to be modified.



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# Design: Learning tools and materials

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# Top Tools for Learning

TOP TOOLS FOR LEARNING 2016

Here are the 2016 Top 200 Tools for Learning list compiled by Jane Hart of the Centre for Learning & Performance Technologies. How are all these tools being used for learning? Take a look at the Best of Breed 2016 list where I categorise the different tools, or the 3 sub-lists Top 100 Tools for Personal Learning 2016, Top 100 Tools for Workplace Learning 2016 and the Top 100 Tools for Education 2016. To get an overview of how the tools in these 3 Top 100 lists fit into the Top 200 list, see the Comparison View. Analysis of this year's list appears beneath the list.

1. YouTube
2. Google Search
3. Twitter
4. PowerPoint
5. Google Docs/Drive
6. Facebook
7. Skype
8. LinkedIn
9. WordPress
10. Dropbox
11. Wikipedia
12. Yammer
13. WhatsApp
14. Prezi
15. Kahoot
16. Word
17. Evernote
51. EasyGenerator
52. Khan Academy
53. Quizlet
54. Digo
55. Socrative
56. Blogger
57. Carva
58. iPad & Apps
59. Sway
60. Google Scholar
61. Udutu
62. Adobe Connect
63. iTunes & iTunesU
64. Keynote
65. Firefox
66. Zoom
67. Canvas
101. Pixabay
102. Confluence
103. OneDrive
104. MindManager
105. FutureLearn
106. XMind
107. Adobe Illustrator
108. Desire2Learn (D2L)
109. Jing
110. Nearpod
111. Wordle
112. Wix
113. Branchtrack
114. eXe
115. Animoto
116. Adobe Premiere
117. LibreOffice
151. Notability
152. Delicious
153. aNewSpring
154. Bing
155. Kaltura
156. Moovly
157. Explandio
158. Zetings
159. ILIAS
160. Remind
161. WeVideo
162. Showbie
163. PlayPosit
164. Codecademy
165. Periscope
166. Vriideo
167. Claro

[\(http://c4lpt.co.uk/top100tools/top-200-tools-for-learning/\)](http://c4lpt.co.uk/top100tools/top-200-tools-for-learning/)

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# Selecting the proper learning tool



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## Selection of proper tools

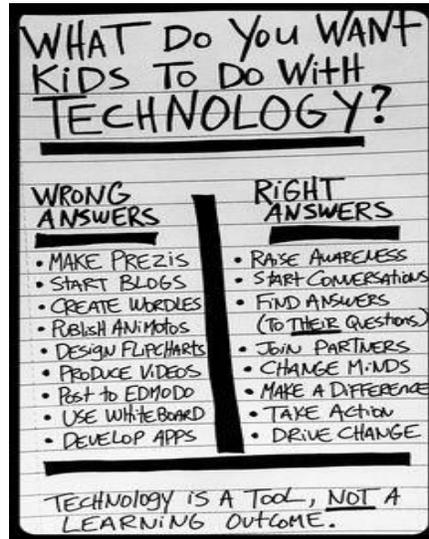


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## Learning tools: for what purpose?

Learning activities	Teaching method	Media/tools
<b>Instruction:</b> T presents, S listen	Lecture Demo	Audio/video recordings Screencasting Webcolleges Video communication
<b>Interaction:</b> T interacts / communicates, S communicate with each other	Brainstorm Discussion Debate Role play	Mindmapping Forum Weblog Edugames Virtual world Videocommunication
<b>Collaboration:</b> T guides / coaches S work together	Project Group work	Virtual classroom Collaborative workspace Social media ePortfolio

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## Selection of the appropriate medium



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## Exercise

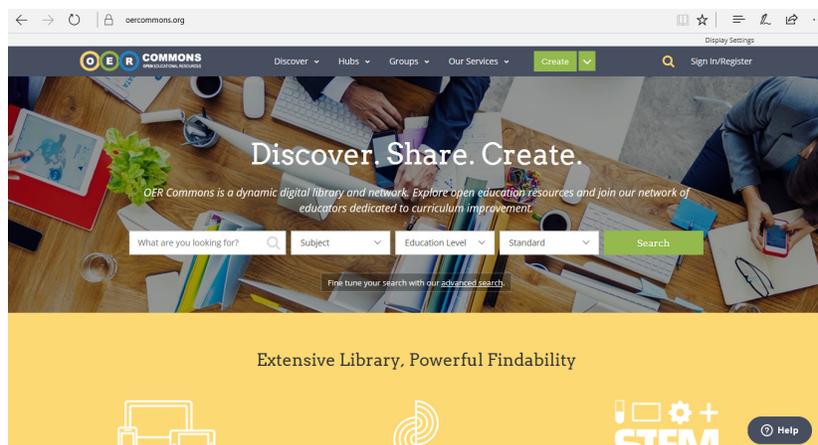
Imagine you need to prepare a chocolate cake, and you don't know how.

You can choose from 4 different instructional materials:

- 1) An instructional video (online)
  - 2) A cook book (on paper)
  - 3) A cartoon (either online or on paper)
  - 4) A podcast (online, downloaded on your smartphone)
- What do you think are the differences, advantages and disadvantages between these instructional materials?
  - Which one would you prefer?

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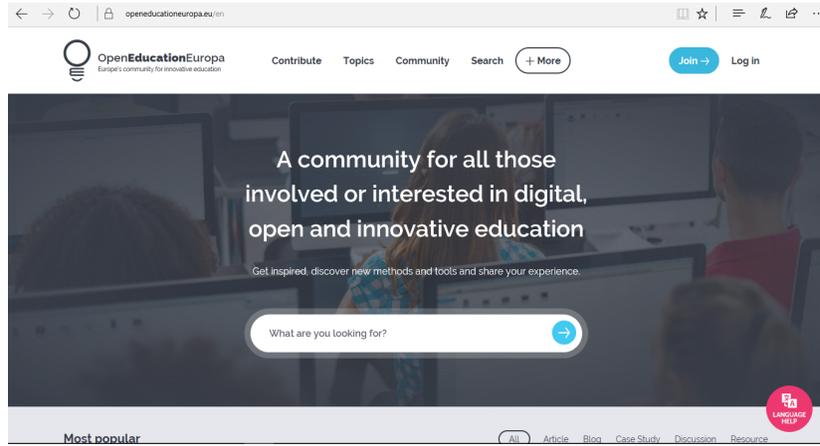
## Learning resources: OER



<https://www.oercommons.org/>

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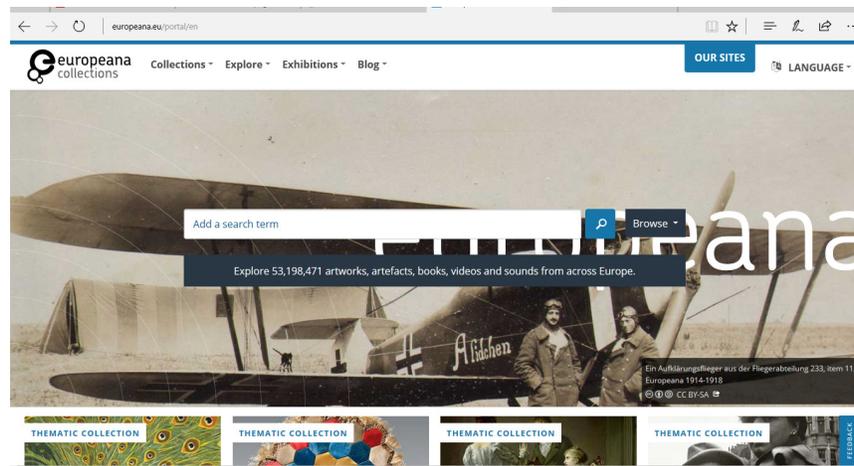
## Learning resources: OER



<https://www.openeducationeuropa.eu/en>

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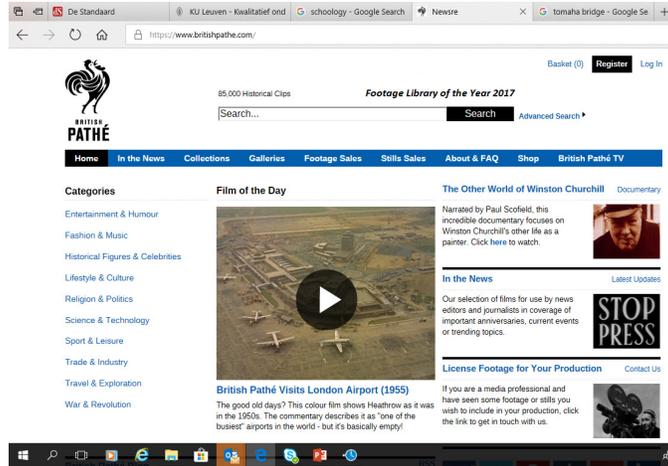
## Europeana



<http://www.europeana.eu/portal/en>

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# British Pathé

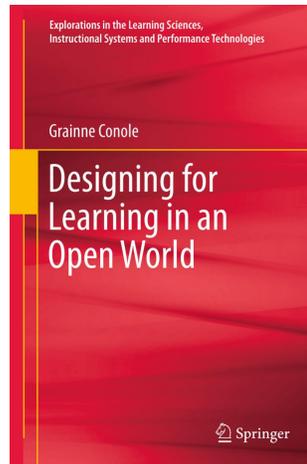


<https://www.britishpathe.com/>

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# Designing for Learning in an Open World

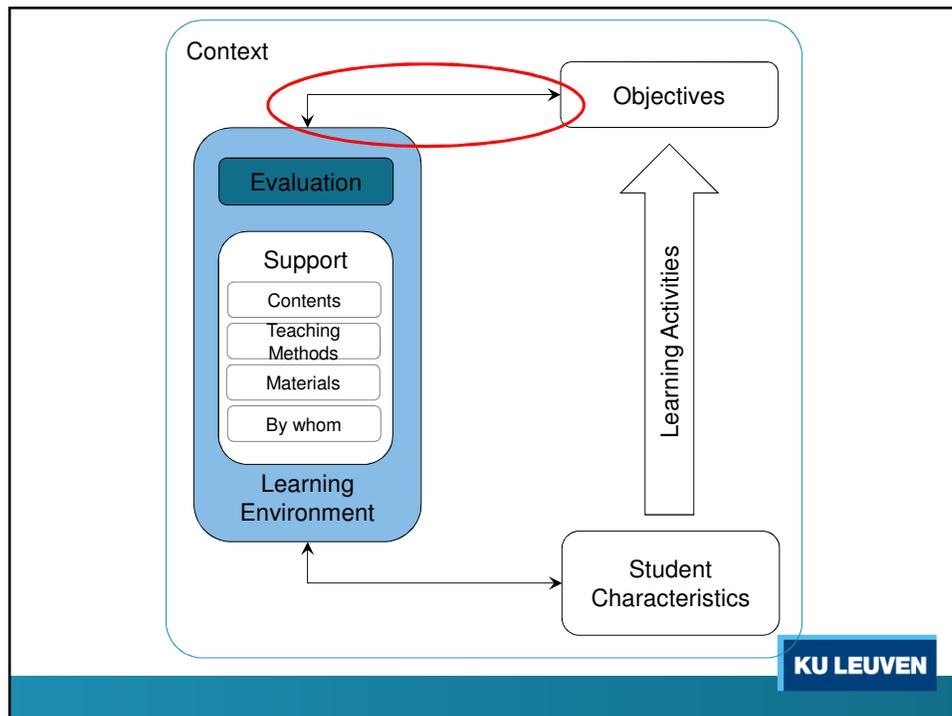
Designing for Learning in an Open World proposes new, innovative learning pathways, created to empower learners to blend formal educational offerings with free resources and services. The new approach and new pathways suggested by the author force readers to rethink the entire instructional design process, enabling both teachers and learners to take into account a blended learning context, now the norm in our modern educational environment.



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# Design: Evaluation / assessment

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## What is it about?



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## What is the difference between...

### Formative

- During the course
- Process
- Giving feedback

### Summative

- Final evaluation
- Product
- Giving a score

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Challenge: Let a thousand flowers bloom...



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Danger: The tail wags the dog...



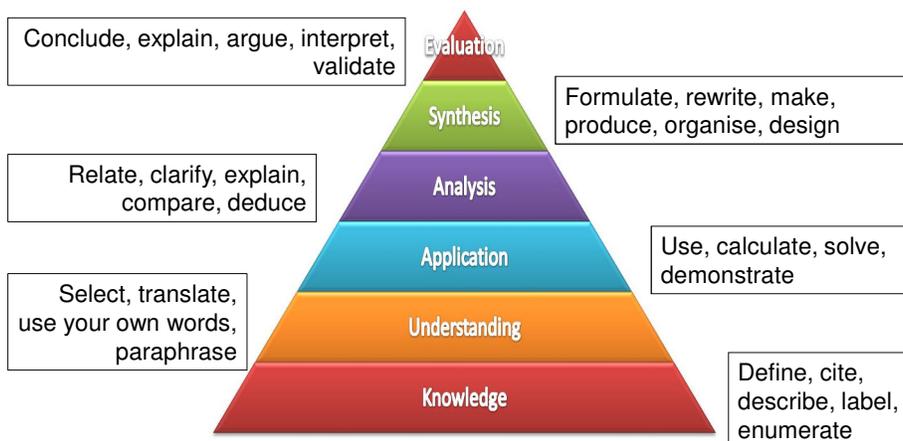
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## Important characteristics of evaluation



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## Alignment with learning objectives



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## Evaluation methods

### WHO?

- Tutor/instructor assessment
- Peer assessment
- Self assessment (reflection)

### HOW?

- Oral / written
- Open book
- Take home exam
- Paper
- Presentation
- Exercises
- Report
- ...

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## Online evaluation methods

### Automated feedback

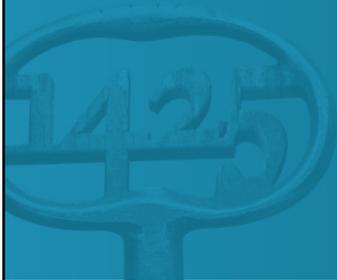
- Multiple choice test

### Self-evaluation/peer-evaluation/instructor evaluation

- Participation on discussion board
- Blogs for essay questions
- Outputs like mind maps, glossary tasks, powerpoint (or prezi), video,... put online
- E-Portfolio

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Develop



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At work...



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## Production of (instructional) video

The screenshot shows the website [www.kuleuven.be/onderwijs/onderwijsbeleid/limel/helpplatform](http://www.kuleuven.be/onderwijs/onderwijsbeleid/limel/helpplatform). The page is titled "WELKOM OP HET HELPPATFORM VAN LIMEL!" and "MAAK ZELF ONDERWIJSVIDEO'S". It features three main sections: "JE VIDEO VOORBEREIDEN", "JE VIDEO MAKEN", and "JE VIDEO AFWERKEN". Each section includes a video thumbnail and a list of links for further information.

- JE VIDEO VOORBEREIDEN**
  - > [DIY concepten](#)
  - > [Schrijf een scenario](#)
  - > [Praktische en juridische aspecten](#)
- JE VIDEO MAKEN**
  - > [Aan de slag met opnamemateriaal](#)
  - > [Screenscasts](#)
- JE VIDEO AFWERKEN**
  - > [Video monteren](#)
  - > [Video verspreiden](#)

<http://www.kuleuven.be/onderwijs/onderwijsbeleid/limel/helpplatform>

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## Production of (instructional) video

The screenshot shows the website [www.bbc.co.uk/academy](http://www.bbc.co.uk/academy). The page features a navigation bar with "News", "Sport", "Weather", "Shop", "Earth", "Travel", "Capital", "Culture", and "More". The main content area has a large banner with the text "Discover, Learn, Grow" and "Training and development designed to support the BBC and the wider industry to inform, educate and entertain." Below the banner is a search bar labeled "Search BBC Academy".

<http://www.bbc.co.uk/academy>

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## AVLM-training @ Leuven



## Student participation



# Implement



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## Either face-to-face



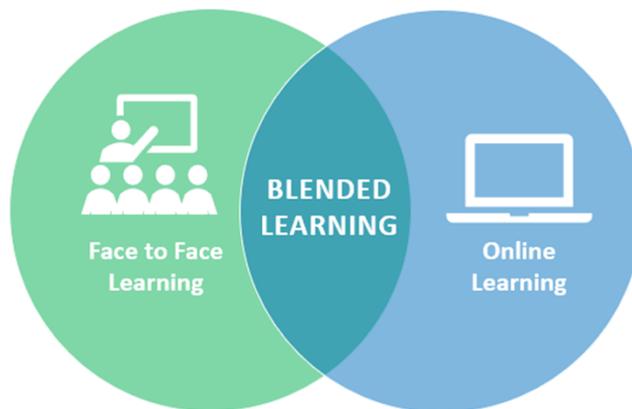
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Or just online



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Or blended...

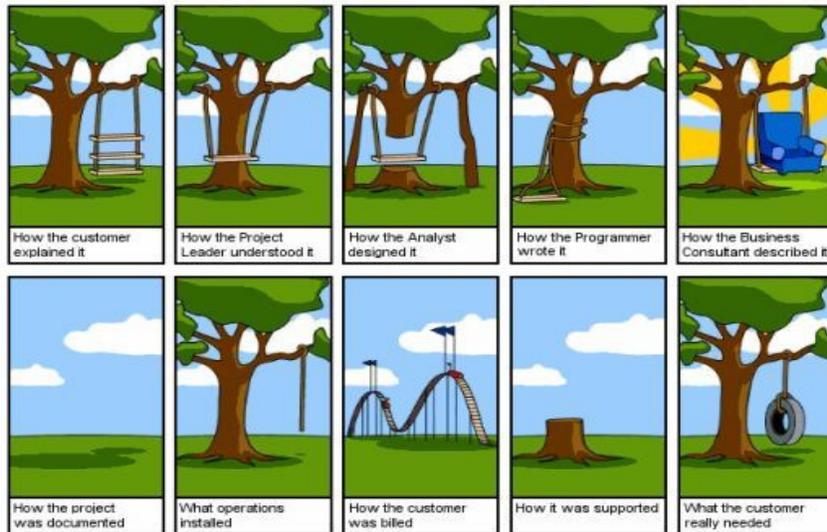


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# Evaluate

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## What could happen



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## Action research



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## Questions? Suggestions?



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## Info

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