



FACILITATOR'S GUIDE

VERSION 1.1 (2020)



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#1 LET'S START AT THE BEGINNING

WELCOME

We're happy that you are interested in sharing the knowledge of neuroscience-informed teaching practices with other educators like yourself! This Facilitator's Guide is part of the **IlluminatED Trainers' Toolkit** and we hope it will help you deliver the **IlluminatED Workshops** and create an immersive learning experience for your learners.

This guide is designed to enable you to implement the **2 main workshops** developed during the IlluminatEd Project on the topics of:

- 1) '***A Science of Learning Primer for Educators*** – *The cognitive processes underlying student learning*' (referred to as Workshop A);
- 2) '***Designing Learning with the Science of Learning*** – *Cognitive principles applied to the design of learning*' (referred to as Workshop B).

Additional workshop materials are available for:

- 3) '***Teaching with the Science of Learning***
(referred to as Workshop C).
- 4) '***An Introduction to the Science of Learning for Students***
(referred to as Workshop D).

Our goal is to help you learn more about how the Science of Learning can be applied to education and how to support educators in applying concepts from the science of learning in their teaching practice. All materials are available on the project website: <http://www.illuminatedproject.eu/>



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IS THIS GUIDE FOR YOU?

This is a guide for anyone wanting to deliver the IlluminatED workshops to school education teachers. Whether you are an educational trainer, school teacher, or researcher, the toolkit has been built to support your delivery of the workshops. The content is geared toward secondary school teachers but is also useful for primary school teachers, and educators at vocational, higher education, and professional institutions. A background in science or neuroscience is not required as the materials provide explanations of key concepts and terms used. All that is required is a strong interest and motivation to understand the science of learning and its applications to education.

HOW TO USE THIS GUIDE

- (1) Explore the Instructional Guidelines to go through everything you need to run both workshops.
- (2) Become familiar with the Workshop Content and Tools section where you will find all the training resources necessary to prepare and implement the workshops and create a powerful learning experience for your learners.

FAQ

(1) Do I have to deliver the workshop exactly as described in the materials (e.g. learning design and script)?

No, the materials and script are examples of how to present the material. They have been improved across multiple pilot lessons. However, we understand that every teacher has their own style and the context and needs of your workshop participants may differ. You are able to adjust the materials to match your context. We do recommend that you use the pre-test and post-test so that you can gauge the effectiveness of your approach.

(2) What languages are the materials available in? Can I translate them for my workshops?

The materials are available in [English](#), [Spanish](#), [Finnish](#), [Greek](#) and [Portuguese](#). If the materials are not available in your language, then we encourage you to translate them. If you want to share your translations with other educators, contact us and we'll add it to the official toolkit resources.



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(3) Are there restrictions on how the materials can be used?

The workshop materials are licensed under the Creative Commons Attribution-ShareAlike 4.0 International ([CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/)) license which means that you are free to copy and redistribute the material in any medium or format, remix, transform, and build upon the material for any purpose, even commercially – as long as you give appropriate credit, provide a link to the license, and indicate if changes were made. Also, if you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original.

(4) Are there additional learning resources beyond the workshop materials that you can provide to support the workshops?

The IlluminatED project also offers a free [online course](#). The self-paced course features videos on the science of learning hosted by neuroscientists from the University of Helsinki. Additionally, there is an [eBooklet - Illuminated Science of Learning Concepts for Teachers](#) – available in [English](#), Spanish, Finnish, Greek, and Portuguese.

If you find errors in the materials or have suggestions on how the workshops can be improved, we'd love to hear from you (please contact: a.barroca@advancis.pt).



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#2 INSTRUCTIONAL GUIDELINES

WHY FOCUS ON NEUROSCIENCE-INFORMED TEACHING PRACTICES?

Project IlluminatED (PROJ: 2017-1-ES01-KA201-038220) is a project funded by the ERASMUS+ Programme that strives to empower school education teachers with cognitive neuroscience informed practices in an effort to facilitate more durable student learning.

We cherish educators. We believe they work very hard to do what's best for students. However, there are some gaps in teacher training that makes their jobs more difficult. One of these gaps is related to the Science of Learning.

Despite a growing consensus in the scientific community on how learning happens and the biology that underlies learning, this knowledge is not being conveyed to educators. As a result, many educators, despite their best efforts and intentions, make use of outdated teaching practices that can undermine durable learning and result in students adopting ineffective learning habits – the opposite of what educators are striving for.

We want to **empower teachers to design learning that aligns with the cognitive processes that underlie durable learning** and help teachers identify the practices that are misaligned with such processes – because misaligned practices can often result in frustrated students who struggle to pay attention, understand, remember, recall, and transfer the taught material. Through the IlluminatED workshops, teachers will better understand the importance of determining and connecting to **prior knowledge**, managing the **attention** of students, considering the bottlenecks in **working memory** such as the amount of information that can be held at one time and the duration such information can be held, and facilitating the **transfer** from working memory to long-term memory through spaced repetition and retrieval activities.

We want to support teacher understanding of the fundamental processes that underlie learning so that teachers can better evaluate their own practices and more objectively determine which innovative pedagogy and approaches best meet the learning needs of 21st century students. We hope that you also share our desire to support educators.



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WHO TO INVITE TO YOUR WORKSHOP?

Is it your first time facilitating a workshop about the Science of Learning?

You should consider starting by inviting participants you are familiar with, fellow teachers or trainers, before you venture into unfamiliar groups. This will give you the opportunity to test the materials and feel more confident when conducting the IlluminatED Workshops.

The workshops are designed for groups of around 20 participants. This will allow you to engage your learners and create a welcoming environment, where participants can share their experiences and you can deliver the content of the workshops.

Take some time to get to know your participants and understand what's important to them, what triggers their motivation and if they feel the need to explore specific topics.

WHO WILL BE PART OF YOUR FACILITATION TEAM?

Decide who is going to be part of the workshops team, for example:

- **Workshop administrator**
the person who will be in charge of general logistics, managing contacts and overall arrangements;
- **Lead facilitator**
You! Responsible for conducting the workshops, adjusting it to the learning level of participants and making connections between activities;
- **Co-facilitator**
Someone you can appoint to help you deliver the workshops and act as a time-keeper to make sure the workshop runs smoothly.

Often it is one person who must perform all of the roles above but having others to work with can be beneficial.



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WHEN SHOULD YOU ORGANIZE THE WORKSHOPS?

Set the date

The first step is to set a date that suits your schedule (and your team) and, at the same time, is convenient for the audience you wish to engage in the workshops. When setting the date, confirm the time available for the workshop as some schools and teachers may be used to shorter training sessions.

Select the venue

Do you have access to a space to hold the workshop? Do you need to look for an available space? In most cases, schools will be willing to host the workshops for you. If you would like to hold a more public session that is not for a specific school, then be sure to find a space that suits both your needs and the ones from participants. If possible find a venue with parking options or with public transports nearby.

The venue only needs to have a **projector and screen**. The workshops can be held in rooms with individual desks, but works best when small groups can sit together around a table for collaboration.

Prepare yourself

Carefully go through the workshop materials, at least one month before conducting the workshops – and again the week of the workshop. This will give you plenty of time to become familiar with the materials and better adjust your facilitation to the activities ahead.



WHEN SHOULD YOU CARRY OUT YOUR WORKSHOPS PLANNING ACTIVITIES?

30 DAYS BEFORE

- Explore the facilitator's guide to make sure you are prepared to run the workshops.
- Set a date for the workshop.
- Take care of the logistics such as the venue, catering (optional), etc.
- Prepare the promotional materials for the workshops.
- Send out the invitations to your audience.

15-30 DAYS BEFORE

- Assemble your facilitation team.
- Practice using the Slides and Script.
- Have your facilitation team go through all the provided materials to run the workshop.

1-2 DAYS BEFORE

- Print out workshop materials for participants:
 - student activity sheets,
 - activity materials,
 - attendance sheets
 - Certificates.
- If possible, have participants completed the online pre-knowledge questionnaire

DAY OF THE WORKSHOP

- Arrive early and set up the room in advance.
- Introduce yourself and the workshop and share the pre-knowledge questionnaire if not done in advance.
- Run the workshop.
- At the end, share the post-knowledge and workshop quality questionnaires.

AFTER THE WORKSHOP

- Send a follow-up to participants thanking them for their attendance.
- Resend the workshop quality questionnaires to make sure you receive all the necessary feedback.



#3 WORKSHOP CONTENT & TOOLS

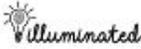
WORKSHOP MATERIALS PROVIDED

To help you conduct the IlluminatED Workshops we provide you with the following materials:

WORKSHOP A

Title	<i>A Science of Learning Primer for Educators – The cognitive processes underlying student learning.</i>
Description	The objective of workshop A is to help teachers understand the basic concepts from the Science of Learning and to enable teachers to experience innovative teaching strategies such as Spaced Learning and Pause Procedures.

Project IlluminatED Abstract

 <p>Project IlluminatED – Illuminating effective teaching strategies with the science of learning. Project IlluminatED brings together experts in the education technology, teacher development and cognitive neuroscience to support teachers in designing more effective lessons by making use of knowledge from neuroscience. Two workshops for educators are offered centered around the theme of ‘neuroscience applied to learning design’.</p> <table border="1"> <tr> <td>Workshop A A Science of Learning Primer for Educators The cognitive processes underlying student learning → Provides an overview of the science of learning in the context of student learning (e.g. cognitive theories of learning).</td> <td>Workshop B Designing Learning with the Science of Learning Cognitive principles applied to the design of learning → Highlights common learning design and teaching practices that are consistent with cognitive theories of learning</td> </tr> </table> <p>The 2-hour workshops use the science of learning to explore how durable learning happens and highlight common teaching practices that are consistent with cognitive principles of learning.</p> <p>Research The workshops are delivered at no cost in return for participation in research geared toward improving education. Research involves participants completing questionnaires prior to and after the workshops. Participants are also asked to sign consent forms to participate in the research.</p>	Workshop A A Science of Learning Primer for Educators The cognitive processes underlying student learning → Provides an overview of the science of learning in the context of student learning (e.g. cognitive theories of learning).	Workshop B Designing Learning with the Science of Learning Cognitive principles applied to the design of learning → Highlights common learning design and teaching practices that are consistent with cognitive theories of learning	<p>An abstract that gives an overview of the purpose and theme of the IlluminatED workshops.</p> <p>https://docs.google.com/document/d/10Q_j1EF8OVL0x2mCr9y5Fez9o0-cX1NAj73pxjVQGvU/edit</p>
Workshop A A Science of Learning Primer for Educators The cognitive processes underlying student learning → Provides an overview of the science of learning in the context of student learning (e.g. cognitive theories of learning).	Workshop B Designing Learning with the Science of Learning Cognitive principles applied to the design of learning → Highlights common learning design and teaching practices that are consistent with cognitive theories of learning		



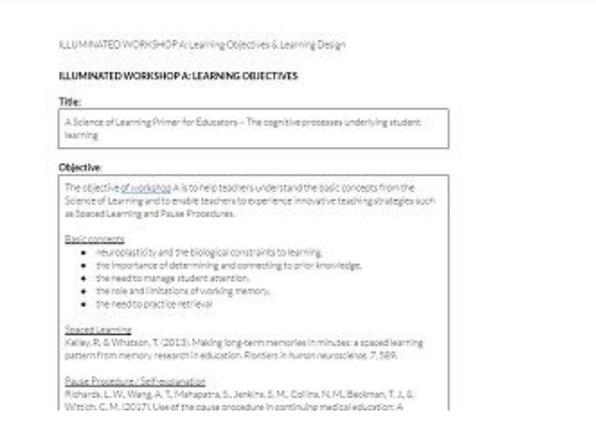
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Posters

 <p>The poster features the 'Illuminated' logo at the top, followed by the title 'ILLUMINATED TRAINERS' TOOLKIT'. Below the title, it states: 'The IlluminatED Trainers' Toolkit is a resource kit for anyone wanting to deliver the IlluminatED workshops to school education teachers.' A large, stylized brain graphic is centered on the page. Below the brain, it says: 'The main sections of the toolkit are: Two continuing professional development workshops for school education teachers and a facilitator's guide.' Two workshop descriptions are provided: 'WORKSHO A Science of Learning Primer for Educators - The cognitive processes underlying student learning Provides a basic overview of the science of learning in the context of student learning.' and 'WORKSHO B Designing Learning with the Science of Learning - Cognitive principles applied to the design of learning Highlights common learning design and teaching practices that are consistent with cognitive principles of learning.' At the bottom, it says: 'Access the toolkit for free here http://www.illuminatedproject.eu/'. Logos for Boon, University of Antwerp, Vrije Universiteit Brussel, and Metropolia are visible at the bottom.</p>	<p>Posters (white, grey) to promote the workshops.</p> <p>https://docs.google.com/presentation/d/192cDDmfTynLS7Lyfm1gIXRUH2SIjNj5FY3OARK71m70/edit#slide=id.p1</p>
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Workshop A Learning Design

 <p>The slide is titled 'ILLUMINATED WORKSHOP A: Learning Objectives & Learning Design'. It includes the following text: <ul style="list-style-type: none"> Title: A Science of Learning Primer for Educators - The cognitive processes underlying student learning. Objective: The objective of this workshop is to help teachers understand the basic concepts from the Science of Learning and to enable teachers to experience innovative teaching strategies such as Spaced Learning and Pause Procedures. Basic concepts: <ul style="list-style-type: none"> neuroplasticity and the biological constraints to learning; the importance of determining and connecting to prior knowledge; the need to manage student attention; the role and limitations of working memory; the need to practice retrieval. Spaced Learning: Kelley, R. & Whinston, T. (2013). Making long-term memories in minutes: a spaced learning pattern from memory research in education. <i>Frontiers in Human Neuroscience</i>, 7, 589. Pause Procedures / Self-regulation: Richards, L. W., Wang, A. T., Manopras, S., Jenkins, S. M., Collins, N. M., Beckman, T. J. & Witch, C. M. (2007). Use of the course procedure in continuing medical education: A </p>	<p>A learning design that provides the sequence of activities in the workshop and the suggested timing for the activities.</p> <p>https://docs.google.com/document/d/1PZIRyMelpnqn6bYq9ThV417znb1kv8lPh6z5nV8qj0/edit</p>
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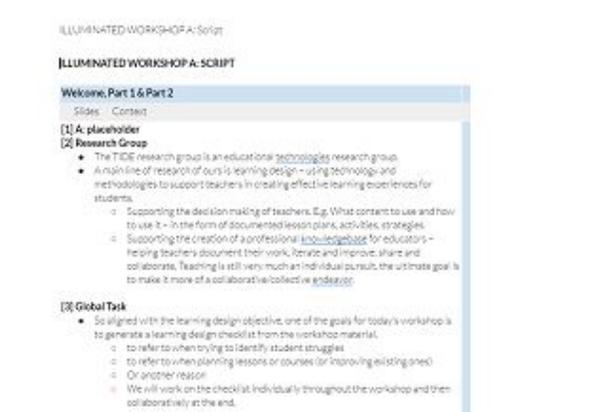
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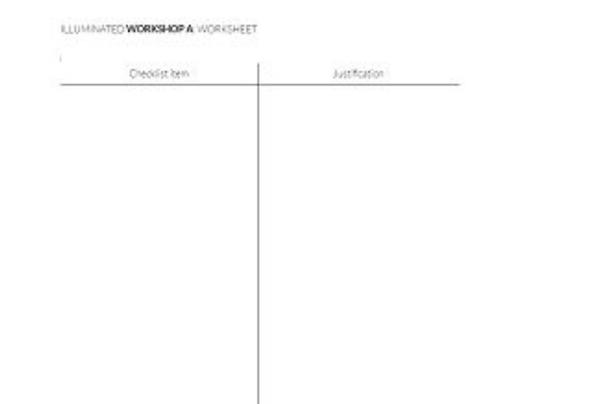
Workshop A Slides

	<p>Lesson slides (presentation) – the slides include a suggested script to help you explain the slide contents.</p> <p>https://docs.google.com/presentation/d/1nOv-RXc7DQ_n9RwasTX26_gxUVXjUI4QsyD0dnO2zQ/edit#slide=id.g33c72aa8e6_0_97</p>
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Workshop A Script

	<p>An example script, with step by step instructional guidance to help you deliver the workshop and make the best of your presentation.</p> <p>https://docs.google.com/document/d/18EmT5EwVmrekOSEBla5WPV8e8QuP4U48wDVnt-vC-lc/edit</p>
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Workshop A Worksheets

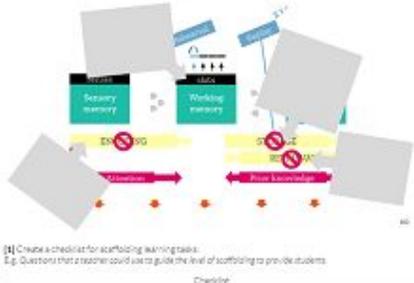
	<p>Printable worksheets for participants.</p> <p>The worksheets include a guided explanation on how to conduct spaced learning activities and selected references for the workshop.</p> <p>https://docs.google.com/document/d/1WYGbbZXsPLFGisf5KnLfaol0x4q4Y-Xrkl4Fq9un3M8/edit</p>
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Workshop A Group Activity 1

<p>ILLUMINATED WORKSHOP A: LD Group Activity</p> <p>Prior knowledge: Describe how prior knowledge affects learning.</p>  <p>[1] Create a checklist for scaffolding learning tasks. E.g. Questions that a teacher could use to guide the level of scaffolding to provide students.</p> <p>Checklist:</p>	<p>A printable sheet for group activities (activity 1)</p> <p>https://docs.google.com/document/d/1kL6G9h_Xa9wfyHfIEgU1x6ddxBI3yGE8RIJTec0qwZ4/edit</p>
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Workshop A Group Activity 2

<p>ILLUMINATED WORKSHOP A: LD Group Activity</p> <p>A checklist for identifying students struggles</p>	<p>A printable sheet for group activities (activity 2).</p> <p>https://docs.google.com/document/d/17faZywwcChPrTM_NQ9TfIMRt1QOAZrz4M5ovNPw--Bc/edit</p>
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Spaced Learning Activity

accountant	real estate agent	optician	firefighter	courier	builder
actor / actress	scientist	painter	garbage man	dentist	butcher
ambassador	spy	pharmacist	gardener	detective	carpenter
architect	surgeon	photographer	hairstylist	DJ	chef
astronomer	taxi driver	pilot	interpreter	doctor	composer
astronaut	travel agent	plumber	journalist	doorman	paramedic
author	teacher	police officer	judge	dry cleaner	barber
babysitter	veterinarian	politician	lifeguard	electrician	mathematician
baker	waiter / waitress	principal	mechanic	exterminator	bus driver

A list of words (occupations, items and actions) to be used in the [spaced learning activity](#)

It is best if these words are translated to match the language of the workshop you are delivering.

<https://docs.google.com/spreadsheets/d/1sysHAEQWggKQE5vDB84ft6ypYh5BV9uzJ4Mzw-nqSU/edit#gid=0>



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IlluminatED Workshop References

<p>ILLUMINATED WORKSHOP REFERENCES</p> <p>REFERENCES</p> <p>Antoni, J. W., Ferrara, C. S., Norman, K. A., & Wimber, M. (2017). Retrieval as a test route to memory consolidation. <i>Trends in cognitive sciences</i>, 21(6), 673-676.</p> <p>Arora, D., & Gobet, A. (2005). Neuroenergetics and the kinesic design of expository syntheses. <i>Nature Reviews Neuroscience</i>, 6(11), 841.</p> <p>Baddely, A. (2012). Working memory: theories, models, and controversies. <i>Annual review of psychology</i>, 63, 3-29.</p> <p>Bainchi, H. P. (1979). Maintenance of knowledge: Questions about memory we forgot to ask. <i>Journal of Experimental Psychology: General</i>, 108(2), 296.</p> <p>Balley, P., & Phang, K. (2014). Memory at Work in the Classroom: Strategies to Help Underachieving Students: Strategies to Help Underachieving Students. <i>AACD</i>.</p> <p>Banmester, R. P., & Vohs, K. D. (2007). Self-Regulation, ego depletion, and motivation: Social and personality psychology contexts. <i>Self</i>, 11(5-12).</p> <p>Balanger, H., Allaman, L., & Vigliani, R. J. (2011). Brain energy metabolism: focus on astrocyte/neuron metabolic cooperation. <i>Cell metabolism</i>, 1(4), 124-130.</p> <p>Bjork, R. A. (1988). Retrieval practice and the maintenance of knowledge: Practical aspects of memory. <i>Cognitive research and issues</i>, 1, 396-402.</p> <p>Bjork, J., & Robertson, E. H. (2013). Memory Processing: The critical role of neuronal reactivity during sleep. <i>Current Biology</i>, 23(18), R830-R839.</p> <p>Brod, G., Wierke-Bergner, H., & Shing, K. L. (2012). The influence of prior knowledge on memory: a developmental cognitive neuroscience perspective. <i>Frontiers in behavioral neuroscience</i>, 7, 129.</p>	<p>A list of references upon which the IlluminatED workshop is based upon.</p> <p>https://docs.google.com/document/d/1THZZ2l66ZDpGs2EPWl-NcMH35wvb4HY4yitEjwdGZ0/edit</p>
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Venue Information

<p>ILLUMINATED WORKSHOP: Room Setup, Equipment & Materials</p> <table border="1"> <tr> <td colspan="2">Title: <i>in Science of Learning Primer for Educators</i> <i>The cognitive processes underlying student learning</i></td> </tr> <tr> <td colspan="2">Instructor(s):</td> </tr> <tr> <td colspan="2">Contact info:</td> </tr> <tr> <td>Date:</td> <td># of Participants:</td> </tr> <tr> <td>Time:</td> <td>Duration:</td> </tr> </table> <p>Room Setup: table and seating arrangements</p> <ul style="list-style-type: none"> <input type="checkbox"/> Collaborative workspaces: tables and chairs <input type="checkbox"/> Equal sized groups 3-6 per group <input type="checkbox"/> Space for moving between tables. <p>Equipment</p> <ul style="list-style-type: none"> <input type="checkbox"/> Projector – All participants can see projection simultaneously <p>Materials</p> <ul style="list-style-type: none"> <input type="checkbox"/> 5 blank sheets of paper per participant <input type="checkbox"/> Pens and/or pencils <small>*Individual devices (e.g. computers) are not required</small> <p>Timing</p> <ul style="list-style-type: none"> <input type="checkbox"/> 2 hours but may take up to 2.5 hours if participants arrive late. 	Title: <i>in Science of Learning Primer for Educators</i> <i>The cognitive processes underlying student learning</i>		Instructor(s):		Contact info:		Date:	# of Participants:	Time:	Duration:	<p>Information for venues on how to setup the rooms for the workshops</p> <ul style="list-style-type: none"> ● Equipment & Materials - describing room setup, necessary equipment & materials, ● Timing and general requirements for participants. <p>https://docs.google.com/document/d/1ISCml7gzeY5JR63TTaAEG95QXsl77j441jAwgd8Rwds/edit</p>
Title: <i>in Science of Learning Primer for Educators</i> <i>The cognitive processes underlying student learning</i>											
Instructor(s):											
Contact info:											
Date:	# of Participants:										
Time:	Duration:										



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Certificate of Completion

<div style="text-align: center;">  <p>ILLUMINATING EFFECTIVE TEACHING STRATEGIES WITH THE SCIENCE OF LEARNING</p> <h3>CERTIFICATE OF ATTENDANCE</h3> <p>THIS IS TO CERTIFY THAT MR/MRS</p> <div style="background-color: #cccccc; width: 100%; height: 15px; margin-bottom: 5px;"></div> <p>HAS PARTICIPATED IN THE ILLUMINATED PROJECT'S WORKSHOP</p> <div style="background-color: #cccccc; width: 100%; height: 15px; margin-bottom: 5px;"></div> <p>DURANTE EL PERIODO DE (DESDE-HASTA)</p> <div style="background-color: #cccccc; width: 100%; height: 15px; margin-bottom: 5px;"></div> </div>	<p>Certificate of attendance (option 1, option 2)</p>
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Workshop B

Title	<i>Designing Learning with the Science of Learning: Applying cognitive principles to the design of learning.</i>
Description	The objective of workshop B is to help teachers identify common learning design and teaching practices that are consistent with cognitive theories of learning; and to allow teachers to experience innovative teaching practices such as peer instruction and self-explanations.

Workshop B Learning Design

	<p>A learning design that provides the sequence of activities in the workshop and the suggested timing for the activities.</p> <p>Workshop B: Designing Learning with the Science of Learning: Applying cognitive principles to the design of learning.</p> <p>https://docs.google.com/document/d/1Q7X0zCY4tV8HGh5WMMuZF18rRkyhZfS9Xa43yHaePVYI/edit</p>
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Workshop B Slides

	<p>Lesson slides (presentation) – the slides include a suggested script to help you explain the slide contents.</p> <p>Each slide includes a suggested script to help you explain the slide contents.</p> <p>https://docs.google.com/presentation/d/1D7nEJDI-RtoEQTuvSVrzkBkqrSEmtbS8s5XfsBpGurGs/edit#slide=id.g590cb62a76_0_388</p>
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Workshop B Script

<p>ILLUMINATED WORKSHOP B: Script</p> <p>ILLUMINATED WORKSHOP A: SCRIPT</p> <p>Part 1</p> <p>Sides: Welcome & Review</p> <p>[1] A: placeholder</p> <p>[2] Title Slide</p> <ul style="list-style-type: none"> Today's workshop is "Designing Learning with the Science of Learning" Designing learning involves making decisions such as: <ul style="list-style-type: none"> What content to include in a course When to schedule such content across lessons and within lessons What type of learning activities to use The goal of today's workshop is to introduce strategies to support such decisions – strategies that are consistent with the science of how students learn and strategies that are supported by empirical evidence (e.g. by published research studies). <p>[3] Quote: Learning is a process</p> <ul style="list-style-type: none"> The key concept to remind ourselves is that "learning is not an event, but rather a process that unfolds over time." This relates to durable learning. This message is important not just for us as educators but also to convey to students – so students don't get the impression that learning is an event. Can you think of why students may hold the misconception that learning is an event rather than a process that unfolds over time? <ul style="list-style-type: none"> How do we often measure student learning? <ul style="list-style-type: none"> Do we use single measures (e.g. a unit test) or recurring measures (e.g. with a chance to continually take and improve on test results)? How do we schedule learning? 	<p>An example script, with step by step instructional guidance to help you deliver the workshop and make the best of your presentation.</p> <p>https://docs.google.com/document/d/12pQ47GtWMBDrNva2ZMejTY-PIC6g8038QDy883U4H7Y/edit</p>
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Workshop B Worksheets

<p>ILLUMINATED WORKSHOP B: WORKSHEET</p> <p>Scheduling Learning:</p> <p>WQ1 Which teaching approach do you think is more commonly used? Why?</p> <table border="1"> <tr> <td> <p>Massed Teach the material in massed blocks. For example, in the same week, month or trimester. Then move on to subsequent topics.</p>  </td> <td> <p>Distributed Spread the teaching of material across weeks, months, and trimesters. This involves covering more than one topic at a time.</p>  </td> </tr> </table> <p>WQ2 Explain which scheduling approach empirical studies have found to be more effective. You have 90 minutes to teach a unit on human biology. A format A test will be given a couple hours after the unit has been completed. Select the system that is likely to lead to better results on a subsequent test in the same class.</p> <table border="1"> <tr> <td> <p>Massed Teach the material for 90 minutes on the day of the test.</p> </td> <td> <p>Distributed Teach the material for 90 minutes in three consecutive days that span the test.</p> </td> </tr> </table>	<p>Massed Teach the material in massed blocks. For example, in the same week, month or trimester. Then move on to subsequent topics.</p> 	<p>Distributed Spread the teaching of material across weeks, months, and trimesters. This involves covering more than one topic at a time.</p> 	<p>Massed Teach the material for 90 minutes on the day of the test.</p>	<p>Distributed Teach the material for 90 minutes in three consecutive days that span the test.</p>	<p>Printable worksheets for participants for Workshop B.</p> <p>Includes key references for Workshop B.</p> <p>https://docs.google.com/document/d/12EsOQhNfa0pWQSQtb3dVDo4YI8h9nAHclYGG0DzVJNc/edit</p>
<p>Massed Teach the material in massed blocks. For example, in the same week, month or trimester. Then move on to subsequent topics.</p> 	<p>Distributed Spread the teaching of material across weeks, months, and trimesters. This involves covering more than one topic at a time.</p> 				
<p>Massed Teach the material for 90 minutes on the day of the test.</p>	<p>Distributed Teach the material for 90 minutes in three consecutive days that span the test.</p>				



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Workshop B Group Activity Sheet

ILLUMINATED WORKSHOP B GROUP ACTIVITY SHEET [H] 1 + 2 + 3 Activity sheet Learning objective (unlike learning)		
3 day later	2 week later	6 months later

Printable [group activity sheets](#) for Workshop B.

<https://docs.google.com/document/d/1E9A5TCXT9-qXM3sajg5pC5M7oPCQQir0y8lqcbZTwlg/edit>

Attendance Sheet

Project Illuminated Workshop	Date:
Full Name	Signature

An easy to edit [attendance sheet](#), to help you keep track of participants and organise your workshop.

<https://docs.google.com/spreadsheets/d/1MJ9FhQJlZQwJwV5huHuLOIalF0FEgNeo0eBlkvoidfM/edit#gid=0>



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Certificate of Completion

<div style="text-align: center;">  <p>ILLUMINATING EFFECTIVE TEACHING STRATEGIES WITH THE SCIENCE OF LEARNING</p> <p>CERTIFICATE OF ATTENDANCE</p> <p>THIS IS TO CERTIFY THAT MR/MRS</p> <p>_____</p> <p>HAS PARTICIPATED IN THE ILLUMINATED PROJECT'S WORKSHOP</p> <p>_____</p> <p>DURANTE EL PERIODO DE (DESDE-HASTA)</p> <p>_____</p> </div>	<p>Certificate of attendance (option 1, option 2)</p>
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Workshop C	Workshop D
<i>Teaching with the Science of Learning</i>	<i>An Introduction to the Science of Learning <u>for Students</u></i>
<p>Workshop C combines concepts from Workshop A and B – and is recommended if there is only time to hold one workshop for teachers. The objective of Workshop C is to introduce basic cognitive principles of learning and provide evidence-based teaching practices that align with the introduced cognitive principles.</p>	<p>The Illuminated Workshop for Students introduces basic cognitive principles of learning and evidence-based learning practices/strategies that align with the introduced cognitive principles. The goal of the workshop is to make students aware of efficient learning strategies and to pique their interest into learning more about learning.</p>
<ul style="list-style-type: none"> ● A learning design that provides the sequence of activities in the workshop and the suggested timing for the activities. ● Lesson slides (presentation) – the slides include a suggested script to help you explain the slide contents. ● A list of words (occupations, items and actions) to be used in the spaced learning activity ● Pre-knowledge measure to conduct prior to the workshop. ● Post-knowledge measure to conduct a day or more after the workshop. ● Online reflection tasks to be completed in the workshop (task 1, task 2) ● Review of concepts survey to be completed during the workshop ● Lesson feedback survey <p><i>*Remember to make a copy of the files you plan to use</i></p>	<ul style="list-style-type: none"> ● A learning design that provides the sequence of activities in the workshop and the suggested timing for the activities. ● Lesson slides (presentation) – the slides include a suggested script to help you explain the slide contents. ● A list of words (occupations, items and actions) to be used in the spaced learning activity ● Pre-knowledge measure to conduct prior to the workshop. ● Post-knowledge measure to conduct a day or more after the workshop. ● Online reflection tasks to be completed in the workshop (task1, task 2) ● Review of concepts survey to be completed during the workshop ● Lesson feedback survey <p><i>*Remember to make a copy of the files you plan to use</i></p>



#4 SOME THINGS WORTH KNOWING

ABOUT THE CONTENT

Note that our understanding of how learning happens in the brain is still incomplete and is complex to understand. The field of the science of learning is a dynamic field that is advancing quickly as new technologies are developed. Yet, significant progress has been made and this progress has motivated the IlluminatED project.

The IlluminatED workshops have been created by a transdisciplinary team that are passionate about education. The team includes experts in neuroscience, pedagogy, and educational technology.

The IlluminatED team:

- Universitat Pompeu Fabra
- University of Helsinki
- Metropolia University of Applied Sciences
- University of Western Macedonia
- Advancis Business Services Lda.
- Boon Lda.

REFINING THE CONTENT

The workshops and materials provided should be used as guides. We understand that each facilitator may need to make adjustments to match their method of teaching and the context of their audience. Over the course of the Illuminated Project we ran many pilots of the workshop and updated the material based on participant and facilitator feedback:

- Run over 26 workshops
- Delivered workshops in Finland, Spain, Portugal, Greece, and Egypt

If you find errors in the materials or have suggestions on how the workshops can be improved, we'd love to hear from you (please contact: a.barroca@advancis.pt).



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PARTICIPANT FEEDBACK

Survey results from initial workshops run in Barcelona, Spain:

*SOL = Science of Learning

Overall workshop

- ❖ 94.23% agreed or totally agreed that ... **workshop was useful** for educators
- ❖ 73.08% agreed or totally agreed that ... **it is clear how to apply** the workshop to teaching
- ❖ 95.24% agreed or totally agreed that ... **workshop was worth their time**

Workshop Instructional Design/Content

- ❖ 19.05% agreed or totally agreed that ... **the content was too general to be useful**
- ❖ 92.31% agreed or totally agreed that ... **drawing memory diagram was helpful**
- ❖ 92.31% agreed or totally agreed that ... **worksheets were helpful**

Science of Learning

- ❖ 83.33% agreed or totally agreed that ... **SOL should be required formation for teachers**
- ❖ 90.32% agreed or totally agreed that ... **necessary to understand SOL prior to learning teaching strategies**
- ❖ 38.71% agreed or totally agreed that ... **they are confident in their SOL knowledge**
- ❖ 32.26% agreed or totally agreed that ... **their teaching practice is aligned with SOL**

Future formation

- ❖ 59.18% interested or very interested ... **SOL homework**
- ❖ 65.31% interested or very interested ... **SOL Newsletter**
- ❖ 67.35% interested or very interested ... **SOL MOOC**
- ❖ 79.59% interested or very interested ... **SOL Workshops**
- ❖ 89.80% interested or very interested ... **SOL & Learning Design Workshops**

Survey results from teach-the-teacher workshops:

Workshop A (Strong Points)

- It's short and to the point and tries to raise questions about our teaching and life too.
- It gives the right information on how to maintain long term memory
- It helps to understand the process of learning so teachers can be aware of its limitations and find better ways to teach. It makes me think about all the facts that we are missing when a teacher tries to do a lesson, so I think I will try to at least consider them if I do a class.



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- Learn of long memory, the importance of 10 minutes on the classroom, learn about how sensory memory, short memory and long memory works
- It is very well-prepared and organized. The topic is very interesting. There are lots of concepts but the way in that they are explained makes easy to understand and process all the information.
- Putting together evidence-based mechanisms of learning
- Well structured and presented information
- Dynamic workshop approach
- Learning is not a single test, it is process
- Workshop went well, there were enough theory and activities. For me as a finnish teacher there was not very much new, but it is good to have training in english 😊
- You provided concrete examples and also scientific proof backing up the theory presented. I think all teachers are (different levels of course) interested in the science behind learning. Strong point was to make us notice the effect of repetition with the exercises.
- Well thought of structure for the session and model of brain. Seems to contain knowledge that is applicable to my teaching. Concise and clear presentation material. Idea of applying the concept also on a course where the concept is introduced is good.

Workshop A (Weak Points)

- Too much information in so little time
- I didn't find any, maybe in the breaks sometimes it was little messy so you don't know where to sit, but it was not a big issue at least in my opinion
- I don't remember weak points on the science of learning workshop
- I would like to know how I can apply the theory explained in my class.
- Maybe too many breaks.
- I might need a stronger evidence of the 'why' of the 3x2 approach
- The pace for the last part of the workshop was a bit fast. Maybe a bit more time to discuss the findings and learn also from each others -> lot of knowledge in the group attending. Also a pre-task or document to read before attending would be interesting to give more time to the deepen the knowledge in the workshop.
- At times the pace was too fast for making notes. Repetition was good, but sometimes I felt it did not help in keeping in mind the whole model.
- few concrete examples of how making memory more permanent
- too fast the slides, I prefer you pause and talk about each slide and ask questions and are interactive at the moment. Preferably slow presentation with discussion at each slide than many fast-through without the discussion.



Workshop B (Strong Points)

- Graphs of results from different learning experiences
- I think the session is well structured so is easy to follow it. I also like the dynamic (including breaks) . I think clue concepts and the final review are helpful too.
- The activities explored with the partners helped us to understand how teaching;
- The explanation of strategies to do in classroom;
- The explanation of the importance the active forgetting.
- You get to know research results that you want to use when you plan your lessons.
- The pace of the workshop was much more suitable today as yesterday. Also I really liked the questions, where you need to choose between the scenarios -> makes you really reflect and make those connections in our memory in action!
- Motivation, Fun, Remembering, Based on research
- I like the simple learning topics we were learning and the workshop design. Good job! 🙌
- It gives you practical tips and strategies that you can apply on your teaching. It's very useful to see examples of scientific studies supporting the ideas explained during the workshop (the studies are well explained and are easy to understand).
- Solid structure, enough repetition, informative slides supporting well the instruction.
- It's scientific in a way that reassures us that there is such a thing as a recipe for improved learning since every brain can benefit from this knowledge and consequently every student. It proved nice solutions and suggestions on where to focus our lesson planning. Gave us a lot to think and get out of the teaching box.
- Empirical evidence (studies) of benefits from the given teaching approaches
- Dynamic workshop approach
- Reinforcement activities
- The treatment of the idea of active forgetting

Workshop B (Weak Points)

- We need more time to discuss the different opinions
- Don't have enough time to practice
- At least for me, some questions from the worksheet were not so clear. Especially the number 8, as there's a little confusing how the question is done and then the two explanations.
- I don't remember any weaknesses
- Lack of time to plan how to implement in your own subject, so teachers of the same subject could work together instead of random partners
- I think that this day was overall stronger than the first. Still, 2h is quite short. Not a weakness of the workshop itself though.
- New information in a short time
- It was a little bit of a pity that the part applying the learned to your own teaching design was left out of the schedule. It could have been a useful exercise. Being lazy, it may be possible that I would not be coming back to it later.
- Evidence for the power of peer instruction was not overwhelmingly convincing: it worked for person X => so it much work for others (or maybe I just missed the evidence)



- Whenever practical information comes up we usually tend to worry about our limitations. Time, planning, mixed ability ,etc. I think we could use a practical detailed example of lesson planning through our new knowledge in order to feel a bit more confident in using all that we've learned
- Not on the workshop, but on applying it.
- Difficulty to figure out how to implement certain approaches, i.e 1+1+1, given the way curricula is developed at the class/subject programmed/class hours given and distributed for the subject...
- I think 1+1+1 approach, when combining multiple contents distributed in the same approach, may create confusion to students and increases difficulty to perform teaching given that flexibility on teaching compared to what you planned is often necessary.

