

# **e-Learning Cookbook**

## **TPACK in Professional Development in Higher Education**

Nataša Brouwer, Peter J. Dekker and Jakko van der Pol

**Contributors:** Jeannette Hommes, Janneke van der Loo, Bart Rienties, Magda Ritzen,  
Anne-Petra Rozendal, Ellen Torfs, Danielle Townsend-Prevoo, Esther Vinken

**Text editor:** Willemijn Wilgenhof

The book *e-Learning Cookbook. TPACK in Professional Development in Higher Education* has been produced with the support of SURF Foundation, the Dutch organization that initiates, directs and promotes ICT innovation in higher education and research, for example by funding projects. For more information, see [www.surf.nl](http://www.surf.nl).

Amsterdam, 2013

ISBN 978 90 8964 646 0

e-ISBN 978 90 4852 312 2



This publication is licensed under Creative Commons Attribution 3.0 Netherlands license.

[www.creativecommons.org/licenses/by/3.0/nl/deed.en](http://www.creativecommons.org/licenses/by/3.0/nl/deed.en)

# Contents

<b>Preface</b> .....	<b>5</b>
<b>Introduction</b> .....	<b>7</b>
<b>Part One</b> .....	<b>9</b>
<b>Recipes for implementing TPACK</b> .....	<b>9</b>
1. Integration into the Organizational Context.....	11
2. Social Bonding.....	19
3. Degree of ‘Blendedness’ .....	25
4. Content & Assignments .....	33
5. Learning Process & Moderation .....	41
6. Tools & Technology .....	51
7. Planning & Timing the Module.....	57
8. Participants & Recruitment .....	63
9. Goals & Expectations .....	71
10. Policy.....	79
<b>Part Two</b> .....	<b>85</b>
<b>Dimensions of implementing TPACK course redesign modules, Data Collection</b> .....	<b>85</b>
1. Introduction.....	86
2. Dimensions of Implementation .....	89

<b>Part Three</b> .....	<b>93</b>
<b>TPACK course redesign professional development modules</b> .....	<b>93</b>
1. Introduction.....	94
1.1 The paradigm shift .....	96
1.2 Anchoring learning in one’s own teaching practice.....	97
1.3 ‘Teach as you preach’ principle.....	98
2. Theoretical Foundations.....	99
2.1 Social constructivism.....	99
2.2 The DA model.....	100
2.3 Bloom's Taxonomy.....	101
2.4 Constructive Alignment.....	103
2.5 Action research .....	105
3. Pedagogical Analysis.....	106
3.1. Conceptual analysis of the subject.....	106
3.2 Learning outcomes.....	114
3.3 Instructional design.....	117
4. The Effect of Professional Development .....	121
 <b>References</b> .....	 <b>125</b>

# Preface

Information and communication technology (ICT) makes it possible to bring information to everyone who wants to learn. Rapid advances in technology offer strong support for using ICT in teaching. Online education can intensify and improve students' learning process, and enables us to reach more students than by traditional means. The number of courses and modules being offered online is increasing rapidly worldwide. This is happening not only at traditional institutions for distance education, but even more so in the 'classical' institutions for higher education. Such decisions are motivated by the improved technology available for web lectures, combined with financial motivations, i.e. being able to offer courses to larger groups of students. There is a huge trend toward open massive online courses or MOOCs. Prestigious universities offer MOOCs free of charge to a mass audience, often up to hundreds of thousands of learners.

Although online education can reach more people nowadays and new and challenging learning experiences can be created with it, in the average university course the digital dimension too often remains limited to simply publishing the existing face-to-face course content online. Educational technology is often seen as an 'extra,' a luxury tool, and not as an integral and indispensable element of a university's teaching design. It is thus crucial that lecturers have and can obtain knowledge about how to design technology-enhanced teaching. Technical advances can be expected to continue in the future, and those who wish to implement educational technology in their own teaching practice must reckon on becoming lifelong learners. This fits the culture of academic teachers perfectly: they are already lifelong learners and creators of new knowledge within their discipline.

This book is based on the notion that a lecturer who uses ICT in teaching must learn how to apply his or her knowledge about content, pedagogy and technology in an integrated manner. The idea of integrating these three types of knowledge is based on the TPACK model, which stands for Technological Pedagogical Content Knowledge model (Mishra & Koehler, 2006).

The material for this book was developed in a Dutch higher education innovation project known as MARCH<sup>ET</sup> (**MA**ke Relevant **CH**oices in **ed**ucational **te**chnology, MARCH<sup>ET</sup>, 2009-2011). This project provided four practice-oriented TPACK course redesign modules for the professional development of university lecturers. The modules all had the same structure and the same instructional design. For two years during the project, the modules were organized by five collaborating Dutch institutions of higher education. The modules were online, using a virtual learning platform based on SharePoint, which was enriched by a virtual meeting space in Adobe Connect. After the project was finished, the modules were further organized at local level by each of the five Dutch institutions using their own institutional virtual learning platforms. This book is based on the lessons they learned organizing professional development modules and implementing TPACK. It is meant to help others who would like to introduce university lecturers to TPACK. We have chosen to present this book in the form of a cookbook. Cookbooks give clear, step-by-step instructions – a recipe – for creating something. They also produce an immediate result if you follow the recipe, because they provide useful guidelines, tips on how to succeed, and pitfalls to avoid. But a good cookbook should also inspire you to use your creativity to adapt recipes to your own situation, and to invent new recipes that suit your taste perfectly.

We would like to thank SURF, the organization that supports ICT in higher education in the Netherlands, and the five universities that made it possible to undertake the MARCH<sup>ET</sup> project and to write this book: the University of Amsterdam, Amsterdam University of Applied Sciences, Maastricht University, UMC Utrecht and Utrecht University, and Eindhoven University of Technology.

We hope this book will help institutions and trainers organize professional development programs for university lecturers so that they can apply TPACK in their teaching practice.

Have fun making delicious TPACK redesign ‘cakes’!

Natasa Brouwer, Peter J. Dekker and Jakko van der Pol  
Amsterdam, April 2013

# Introduction

Many universities organize workshops or even a whole professional development program in which lecturers are taught how to teach and how to organize their teaching. Today, every university uses ICT in one way or another. Using educational technology is more complex than simply adding an ICT tool to a course. It should change the way we teach and also what we teach. Switching from face-to-face to blended or online teaching and learning is therefore not a self-evident enrichment. It requires teachers to adapt or even to change their course design completely. The question is: How can a lecturer acquire the knowledge necessary to design quality technology-enhanced teaching? There is no simple answer to this question. Knowing how to operate the ICT tools is not enough. Different kinds of knowledge need to be integrated to create successful technology-enhanced learning activities.

A second important question is: What is an appropriate course design for teaching lecturers how to design technology-enhanced teaching?

Do we have to change the approaches to learning when the learners are themselves teachers in their daily lives?

In confronting these challenges, the Dutch project MARCH<sup>ET</sup> (**MA**ke **R**elevant **CH**oices in **edu**cati**o**n**a**l **te**chnology, 2009-2011) developed four professional development modules to help university lecturers obtain the knowledge and skills they need to design their teaching using educational technology:

- ‘Collaborative knowledge-building’
- ‘Web 2.0 educational applications’
- ‘Measuring knowledge and understanding’
- ‘Supervising students in distance learning’

The packages of materials for the four modules developed in the MARCH<sup>ET</sup> project, including study guides and assignments, were written in English and are available to download free of charge at [www.onderwijsontwerpenmetict.nl](http://www.onderwijsontwerpenmetict.nl) (Dutch website, click on ‘Modules’ in the bar at the top of the page).

The modules teach lecturers how to use TPACK when designing their teaching. They have been designed according to the TPACK principle.

TPACK, which stands for Technological Pedagogical Content Knowledge model, was developed by Mishra & Koehler (2006) and brought about a revolution in our understanding of the quality of teaching using technology and the role of the teacher in it. Technology-enhanced course design using TPACK is like creative cooking: you need high-quality ingredients, a good basic recipe and a lot of creativity. A good TPACK course design, one that fits the lecturer's teaching style, the subject matter and the group of students, will result in a unique learning experience every time.

It is important to mention here that the universities that organized the modules and used the MARCH<sup>ET</sup> TPACK material adjusted the material in some way to fit into their situation. In this book we describe what these universities have taken into account to reach an optimal situation. Based on their experiences, we defined ten dimensions that influence the deci-

sions that must be made when organizing professional development modules for lecturers. This provided the basis for developing ten recipes, one for each dimension. The recipes are accompanied by helpful tips from 'our tasters' – people who have organized or moderated actual modules.

This book consists of three parts. They are closely related to one another, but they can be read in the order that the reader likes best. In Part One you will find the ten recipes with helpful tips from our 'tasters' on how to implement a professional development module within an educational institution. In Part Two we explain why we chose these ten recipes and not others. In Part Three we discuss the theoretical backgrounds and the structure of the TPACK professional development modules for course (re)design. We also list the competences needed to be able to design technology-enhanced teaching and learning in higher education.



# Part One

## Recipes for implementing TPACK



# 1. Integration into the Organizational Context

---

If you want lecturers to study a professional development module on using ICT in teaching (such as the MARCH<sup>ET</sup> modules, see Part Three) or even a series of modules, you need to think about the level at which to organize it. For example, the module can be organized only for lecturers working within a single faculty, for lecturers working within a single institution for higher education, or more broadly, up to the national or even the international level. Each situation has its own advantages and disadvantages.

The advantage of organizing modules on an inter-institutional level (national or international) is that it becomes possible for lecturers who teach the same subject at different universities to share what they have learned. The lecturers who teach the same discipline ‘speak the same language’. Experiences with and approaches to solving students’ learning problems will be very recognizable to them, and they will be able to share teaching materials – though

every institution for higher education has its own educational approach, of course. In general, a nationally organized module will be an important enrichment for the lecturers who attend it. On the other hand, if the professional development module is more integrated into the organizational context, it will be more successful for the organization as a whole.

If you organize the professional development module on course design at the local level, the lecturers can share thoughts about their teaching designs more naturally, since they will meet spontaneously at the coffee machine or during lunch. A module organized locally allows the institution to adapt the pedagogical learning outcomes and technological knowledge expectations to the institution’s pedagogical vision and the available technological infrastructure. For instance, the electronic learning environment that is chosen for the module itself can be the same as the learning environment used for students. The module moderator can