

Chapter 1

Introduction



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There can be no doubt that rapid changes in societal and technological conditions are radically altering the agenda of higher education. Students and teachers in universities around the world face complex knowledge domains new knowledge domains and access to information in abundance; with these factors comes the need to consider how educational settings can and should accommodate these changes, along with others yet to come. These new developments have led many universities to initiate explorations of new pedagogies and modes of learning that meet the need to address the complexities of knowledge while also building a bridge to the world beyond the institution, enabling more rapid transfer of knowledge from the spheres of education and research to those of production and structures in businesses, public institutions and civil society. In recent decades, two notions have played significant parts in the transformation of universities worldwide. One strategy has been for universities to incorporate a notion of interdisciplinarity into the portfolio of educations and the way curricula are organised and delivered. This conception of higher education in terms of interdisciplinary learning is reflected in the array of undergraduate and postgraduate education programmes seeking to combine disciplines or even develop new ones. These programmes are often established based on input from stakeholders seeking new scientific and academic perspectives on major problems, and as such, interdisciplinary learning can be viewed as one way for universities to respond to the demands of such stakeholders. A second strategy adopted by universities for addressing new epistemologies and building bridges is derived from the acknowledgement that entirely new pedagogical approaches are required to face

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the challenges of today's world. One such pedagogy, which has gained ever-increasing momentum over the past four decades, is that of problem-based learning. Problem-based learning initially emerged as a response to the identified need in educational practices of building bridges between science and academia and the complexities of real-world problems. Hence, problem-based learning is often seen as a strategy for the organisation of curriculum in that it enables student-centred learning processes with an emphasis on the exemplary problem as reflecting the complex realities faced by graduates when they complete their education. Over the years, problem-based learning has come to be known as a pedagogy accommodating interdisciplinary learning, and the aim of this book is to address this perceived connection between notions of problem-based learning and interdisciplinary learning by posing the following research question:

How can we develop problem-based learning in support of interdisciplinarity and interdisciplinary learning processes in higher education?

Even though PBL is often referred to as an approach supporting interdisciplinary learning, there has thus far been little research exploring this assumption in more detail. We therefore wish to challenge this often implicit assumption that a problem-based approach to learning is by default scaffolding interdisciplinary learning processes. With this book, we wish to explore under which conditions PBL may actually enable interdisciplinary learning as well as to expose potential challenges in this area.

This edited volume consists of chapters written by researchers involved with an array of problem-based educational programmes at Aalborg University, Denmark. Aalborg University was established as a dedicated PBL university in 1974 and thus has more than 40 years of experience with PBL across all higher education domains. The contributors to the book come from all faculties of the university, bringing research and practice together to bring about a comprehensive understanding of both the theoretical underpinnings and practical implications of considering problem-based learning as an opportunity for students to navigate interdisciplinary and complex problems in their studies. Consequently, some chapters address the theorising of PBL related to interdisciplinarity, and others consider the organising, implementing and practicing of PBL and interdisciplinarity. Different perspectives, including those of students, supervisors and institutional settings, are represented. By highlighting the plurality of lenses through which interrelations of PBL and interdisciplinarity may be viewed and articulated, we wish to contribute to a more nuanced understanding of the possibilities and limitations of current pedagogies underpinning higher education and of the need to avoid limiting discussions of higher education merely to instruments and regulations. Rather, we wish to draw attention to the interwoven complexities, contexts and participants in higher education, which combined constitute the premises on which pedagogies should be built. Put more simply, the book aims to demonstrate how the success or failure of adopt-

ing a problem-based approach to enhance interdisciplinary learning and education all hinges on the way we consider subject matter and context as well as students and supervisors. Here a clarifying note on the terminology of the volume is in order, in this institutional setting the term ‘supervisor’ covers what in other PBL contexts may be termed ‘instructor’ or ‘facilitator’.

1.1 Organisation of the Book

The book is organised into two parts. Chapters in Part I are all related to theoretical and philosophical aspects of PBL and interdisciplinary learning. Chapter 2 conceptualises the notions of problem-based learning and interdisciplinary learning and highlights some key overlaps and ways of conceiving of their interrelatedness. Chapter 3 discusses the role of problem-based medical education in relation to interdisciplinary professionalism in medical education. Chapter 4 takes the reader into the realm of Techno-Anthropology as it discusses the role of problems and projects in transgressing disciplines, and Chap. 5 presents an analysis of three challenges facing new students when entering interdisciplinary and problem-based higher education. In Chap. 6, the need for supervisors to scaffold open and uncertain scientific spaces is discussed, and is identified as being particularly evident in interdisciplinary PBL projects.

Part II focuses on practicing interdisciplinarity in problem-based higher education. Chapter 8 explores how the construction of problems in interdisciplinary PBL projects can be seen from the perspectives of multicultural groups; this is followed by an examination of group processes in interdisciplinary PBL projects in Chap. 9. In Chap. 10, the authors take a closer look at how students are positioned and position themselves in the complex transdisciplinary PBL project, and in Chap. 11 the focus turns to student practices in interdisciplinary PBL.

The research presented in both parts was conducted at Aalborg University, Denmark; however, the issues covered illuminate more general issues in PBL and interdisciplinarity relevant to any higher education institution considering or already implementing the approach. In order to bring the research presented into a broader context, we invited Professor Lisa Lattuca of Michigan State University and Dr Terry Barrett of University College Dublin to contribute a reflective chapter concluding each part. In Chap. 7, Lisa Lattuca reflects on Part I as she discusses how students and supervisors in PBL can be seen as participants in an interdisciplinary learning community. Concluding Part II, Terry Barret discusses the new contributions to understanding the characteristics of PBL emerging from the chapters and reflects on the implications for PBL practice strategies.

1.2 Writing a Book on Problem-Based Learning Was a Problem-Based Project

The empirical work and the theoretical considerations and reflections developed throughout the book were produced by a dedicated group of education researchers qualified for the job by their many years of research experience and daily practice with PBL in interdisciplinary education settings. This is a community of researchers with a shared interest in exploring new insights into the impact and implications of the complexity of the pedagogical philosophy and practice of PBL. The process of making the book has itself followed many of the steps of a process of problem-based learning. First of all, we considered the theme of the book as an ill-defined problem, which needed to be examined and further explored. These explorations were defined and determined by the contributing authors when discussing preliminary outlines of the various chapters. During the initial phases we all learned more about what interdisciplinary PBL could encompass, as well as how various educational programmes and different research perspectives could yield new and diverse insights into problem-based learning, which are often taken for granted at Aalborg University given its long history of PBL.

From our discussions, it became apparent that the notion of interdisciplinarity is nearly impossible to pinpoint when considered as a premise for pedagogy in higher education, and for this reason, the idea of bringing together researchers with diverse interests in education in general, and PBL and interdisciplinarity in particular, seemed relevant. Thus, the group of researchers from Aalborg University contributing to this book are spread across research groups, departments and faculties.

Furthermore, as we wished to explore the concepts of interdisciplinarity and their meanings in relation to learning and PBL, the group of researchers were at liberty to work with the conceptual framework relevant for their research. This resulted in the various chapters drawing on different sources of inspiration for thinking and working with interdisciplinary learning. However, we acknowledge the complexity and the contested nature of the terms and concepts used and we therefore wish to refer interested readers to e.g. the chapter by Thompson Klein (2010) 'A taxonomy of interdisciplinarity' as well as Latucca et al. (2004) 'Does interdisciplinarity promote learning? Theoretical support and researchable questions'.

For the creation of the book and the writing process, we were keen to create the framework for an interactive and iterative process for all involved to make sure that all were part of and were supported through the process, and that all knew and understood the idea, scope and content of the book as a whole. Consequently, all contributors met regularly to discuss each chapter and to receive constructive feedback from peers.

On a final note, it is important for us to reiterate our hopes for this book. Through the diversity of the chapters that follow, we wish to open a debate on interdisciplinary learning in higher education. Our proposition is that problem-based learning is a well-suited pedagogy that has the potential to create conducive and inclusive learning spaces where students and supervisors can meet and explore

interdisciplinary problems and interdisciplinary settings. However, as is evident from the chapters, these learning spaces are not open by default. For the advantages of problem-based learning to be fully realised in interdisciplinary education, there are a multitude of factors and processes that must be considered and scaffolded, from ensuring adequate competencies of both students and supervisors to setting the scene for multicultural groups, while dealing with uncertain and sometimes wicked problems in the process.

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