



THE UNIVERSITY OF THE 21ST CENTURY:
CONTENTS AND CURRICULA
YEHUDA ELKANA

Yehuda Elkana was born in Yugoslavia in 1934; after the war and a year in a concentration camp, he immigrated to Israel in 1948. He studied Physics, Mathematics and History of Science, publishing his doctoral thesis “On the Emergence of the Energy Concept” at Harvard University Press in 1968. For one year, he taught at Harvard University. 1968–93 he taught at and chaired the Department of History and Philosophy of Science at the Hebrew University. Fellow of the Center for Advanced Study in the Behavioral Sciences, 1973–74; Visiting Fellow at All Souls College, Oxford, 1977–78; 1981–91, Director of the Cohn Institute for the History and Philosophy of Science and Ideas, Tel Aviv University. 1968–93, Director of the Van Leer Jerusalem Institute. 1988/89, Fellow at the Wissenschaftskolleg zu Berlin; 1987–2006, Permanent Fellow there. He was a Member of the Academic Advisory Board of the Collegium Budapest and its Deputy Chairman; he is a corresponding member of the International Academy for the History of Science. Elkana was founding editor of *Science in Context* and has written several books and numerous articles. 1995–99 he and Helga Nowotny shared the Professur für Wissenschaftsphilosophie und Wissenschaftsforschung at the ETH Zurich. 1999–2009, President and Rector of the Central European University in Budapest. – Address: Wissenschaftskolleg zu Berlin, Wallotstraße 19, 14193 Berlin. E-mail: yehudaelkana@gmail.com

Originally, I had hoped to have with me in the Academic Year 2009/10 several Fellows who know much about the topic, and who had rich experience in their academic careers in working also on curricula and problems of higher education, in addition to being leading scholars in their own right. Unfortunately, for various personal reasons, three of them

could not come to Berlin, but luckily, Marie Farge, a leading world expert on turbulence and wavelets with no direct teaching experience, but many hours invested in deep thinking on curricular and other university issues, was able to join us at the Kolleg.

At a very early stage, I presented to my fellow Fellows my research plans and my theses and invited those interested to join me in a year-long seminar dedicated to these topics. To my pleasant surprise, fifteen Fellows joined the seminar – all eminent scholars in their fields, but most of them had spent very little time in their academic career building curricula. The spectrum included different disciplines, different nationalities and different academic backgrounds. However, the Dean of the School of Life Sciences at Arizona State University, Robert Page, and a senior professor of the same school, Manfred Laubichler, were directly involved because they were working on developing a new undergraduate curriculum for their school. Also two Indian scholars – both political scientists – the Director of the Delhi Center for the Study of Developing Societies (CSDS), Rajeev Bhargava, and a Senior Fellow there, Yogendra Yadav, took great interest, being very worried about the direction that Indian higher education was taking: the Indian Government is investing millions in establishing new universities, without having given much thought to the problem of what to teach there.

Other Fellow-participants were: Marie Farge, Maria Luisa Catoni, Galin Tihanov, Claus Pias and Adam Wilkins (another eminent biologist who had given some thought to the teaching of evolutionary theory, among other biological topics). Participants who joined the group from outside were Madhulika Banerjee, University of Delhi; Nancy Budwig from Clark University; Liviu Matei, the COO of the Central European University in Budapest; Hans Weiler, Stanford Professor and President emeritus of Viadrina; Agi Besetzky and Hannes Kloepper. Reinhart Meyer-Kalkus and Matthias Bergmann, both from Wiko, accompanied the seminar. All took a lively part in the discussions.

Yogendra Yadav proposed that we aim at publishing a Manifesto. After many discussions within the group, it was decided to work on two complementary papers: a short Manifesto, consisting of 11 bullet points with an introduction, and a longer paper, written in essay form to be published in the relevant periodical(s). Actually, from that point onwards, the work of the group consisted in preparing the two documents. (The shorter Manifest is attached at the end.)

It was decided that a website should be established inviting international discussion and criticism from all who are interested. The website will be handled by the project director, Hannes Kloepper; and through the Leuphana University of Lüneburg, a grant

proposal will be submitted to the Stiftung Mercator, Essen for this position and the expenses around it. So far, much of the technical assistance for setting up the site was provided pro-bono by ASU. A network has been created of universities that endorsed the Manifesto and expressed interest in trying out experimentally the various curricula that will be constructed relying on the principles of the Manifesto; so far the members are: Leuphana University Lüneburg, Jacobs University Bremen and Arizona State University. We have submitted various papers by way of information both to *Nature* (at their suggestion to have a letter to the editor with the Manifesto as a link) and to Science Education Forum.

An important meeting between Washington policy experts and German scholars took place at Wiko on 5–6 June. In addition to four distinguished policy experts from America, on the German side, Professor Strohschneider, the Chair of the Wissenschaftsrat; Sascha Spoun, the President of Leuphana; Helga Nowotny, the President of the European Research Council; and representatives of the Volkswagenstiftung and of the Stiftung Mercator took part.

The Wissenschaftskolleg, according to its policy, supports its Fellows, but takes no responsibility for the contents of the product. I convened several times the heads of Israeli universities, and a major workshop was held at the end of May in Jerusalem, sponsored by the Van Leer Jerusalem Institute and the Israel Democracy Institute. The Planning and Budget Committee of Israeli Higher Education, in the person of its Director, Manuel Trachtenberg, also participated and it will fund the project in part in Israel. The Rector of the Hebrew University of Jerusalem, Menahem Ben-Sasson, has invited me to house the project under its aegis, and in all probability it will serve as a venue for trying out curricula, thus joining the network. If this works out – and it now looks like it will – I will spend half of my time in Jerusalem and half in Berlin.

In Berlin, my base will be at Wiko in my capacity as Senior Adviser to the Rector, but I am also affiliated with Department I of the Max Planck Institute for the History of Science, Berlin working on Higher Education in an age of Globalization. I have also been invited as a part-time Guest Professor both at Leuphana University Lüneburg and at Jacobs University Bremen. In January 2011, a workshop dedicated to these same topics will be held in Delhi, under the auspices of the CSDS.

In the Academic Year 2010/11 I will announce a seminar at Wiko, and if there will be interested Fellows, we will again work the whole year. All in all, it seems that the time is

ripe for introducing major changes in the curricula of undergraduate education worldwide.

Principles for Rethinking Undergraduate Curricula for the 21st Century: A Manifesto

The current crisis of the university is intellectual. It is a crisis of purpose, focus and content, rooted in fundamental confusion about all three. As a consequence, curricula are largely separate from research, subjects are taught in disciplinary isolation, knowledge is conflated with information and is more often than not presented as static rather than dynamic. Furthermore, universities are largely reactive rather than providing clear forward-looking visions and critical perspectives. The crisis is all the more visible today, as the pace of social, intellectual and technological change inside and outside the universities is increasingly out of step. While universities worldwide are undergoing many, often radical, structural transformations, ranging from the Bologna Process in Europe and the Exzellenzinitiative in Germany to the rapid expansion of universities in India and China, the accelerating decline of public investments in universities in the United States and elsewhere and an ever-growing demand for university access everywhere, much less attention has been paid to university curricula. But for the university as a community of scholars and students, the curriculum is its central function and the key to its internal renewal. Universities are embedded in multiple institutional, economic, financial, political and research networks. All of these generate pressures and constraints as well as opportunities. The curriculum, however, is the core domain of the university itself.

Here we present a set of eleven overlapping principles designed to inform an international dialogue and to guide an experimental process of redesigning university undergraduate curricula worldwide. There can be no standard formula for implementation of these principles given the huge diversity of institutional structures and cultural differences amongst universities, but these principles, we believe, provide the foundational concepts for what needs to be done.

- As a central guideline, teach disciplines rigorously in introductory courses together with a set of parallel seminars devoted to complex real life problems that transcend disciplinary boundaries.

- Teach knowledge in its social, cultural and political contexts. Teach not just the factual subject matter, but also highlight the challenges, open questions and uncertainties of each discipline.
- Create awareness of the great problems humanity is facing (hunger, poverty, public health, sustainability, climate change, water resources, security etc.) and show that no single discipline can adequately address any of them.
- Use these challenges to demonstrate and rigorously practice interdisciplinarity, avoiding the dangers of interdisciplinary dilettantism.
- Treat knowledge historically and examine critically how it is generated, acquired and used. Emphasize that different cultures have their own traditions and different ways of knowing. Do not treat knowledge as static and embedded in a fixed canon.
- Provide all students with a fundamental understanding of the basics of the natural and social sciences and the humanities. Emphasize and illustrate the connections between these traditions of knowledge.
- Engage with the world's complexity and messiness. This applies to the sciences as much as to the social, political and cultural dimensions of the world. This will contribute to the education of concerned citizens.
- Emphasize a broad and inclusive evolutionary mode of thinking in all areas of the curriculum.
- Familiarize students with non-linear phenomena in all areas of knowledge.
- Fuse theory and analytic rigor with practice and the application of knowledge to real-world problems.
- Rethink the implications of modern communication and information technologies for education and the architecture of the university.

Curricular changes of this magnitude and significance both require and produce changes in the structural arrangements and institutional profiles of universities. This is true for matters of governance, leadership and finance, as well as for systems of institutional rewards, assessment and incentives; it is bound to have implications for the recruitment and evaluation of both professors and students, as well as for the allocation of resources and the institutional practice of accountability. The experimental process of curriculum reform we hope to stimulate by offering these guiding principles will thus require the collaboration of scholars and educators willing to transform their scholarly and

educational practices and of administrators willing to support experimentation and to provide the necessary structural conditions for it to succeed.

These principles are the conclusion of deliberations by a working group of scholars who met at the Wissenschaftskolleg zu Berlin during the academic year 2009/10. Participants represented diverse disciplines (from the natural and social sciences and the humanities), geographical origins (Europe, North America and India) and career stages (from former university presidents to students). They invite their colleagues around the world to join in this effort of re-thinking and re-shaping teaching and learning for the university of the future.