

BOOK REVIEWS

Cosmopolitics I, by Isabelle Stengers, translated by Robert Bononno, Minneapolis, University of Minnesota Press, 2010, 312 pp., \$25.00 (paperback), ISBN 978-0-8166-5687-5

Cosmopolitics II, by Isabelle Stengers, translated by Robert Bononno, Minneapolis, University of Minnesota Press, 2011, 472 pp., \$25.00 (paperback), ISBN 978-0-8166-5689-9

Cosmopolitics I and II are, on the face of it, about science, predominantly physics. So why review them in an education journal and in an issue devoted to creativity? The answer is that these books are more than they appear and are about much more than their scientific content. In these texts the author leads the reader on a journey of creativity and learning that goes well beyond the science, history and philosophy that form the apparent content. While education is formally addressed in only a few paragraphs of the six hundred and seventy seven pages that comprise these two volumes, there is pedagogy afoot in every paragraph. Chapter I on 'Scientific passions' opens with the questions: 'How do the sciences force us to conceive of the world? What do they teach us about the possibilities of understanding it?' (1).

The themes of teaching and understanding are still to the fore seven books and 48 chapters later as Isabelle Stengers draws this episode in her transformative agenda to a close. In the opening sentence of the last chapter, 'The final challenge', she clarifies her project as follows: 'At the start of *Cosmopolitics*, I said that my project was to bring into existence the question of an ecology of practices, not as a solution but as a learning process, the creation of new ways...' (407).

The processes of learning and creation and her development of what she calls 'an ecology of practices', through what she terms a 'Cosmopolitics', are all central to education and to the theme of creativity within learning (37, 363). She aims at the professions that Freud labelled impossible, education, healing and government.

Yet her work is not explicitly about any of this. Her content is science, history of science and philosophy of science; these are her areas of expertise. However the patterns she weaves and the processes she utilises facilitate the creation of insight and the development of understanding, and the reader is transformed by the very process of engaging with her work.

The work is clearly about science, success and failure, how science operates, how it transforms and develops through history, how different sciences coexist, and how they relate with other practices. The books are heavy in physics, but also discuss, mathematics, chemistry, biology, sociology, psychology, psychiatry and others. The sameness and difference across these disciplines is explored and compared with more technical practices. The relationships between experimental, laboratory, theoretical, mathematical, field, human, and social sciences are explored and compared with other modern and non-modern practices, including analytical and speculative philosophy. In all of this her goal is to construct the possibility of an ecology of practices that might contribute to a *Cosmopolitics*.

To engage with Stengers' project it is not necessary to be familiar with her previous writing on science. This writing is extensive and in French, though a small number of her key works are now translated into English, for example *Power and invention: Situating science* (1997) and *The invention of modern science* (2000). However for educators who work with science and scientists, familiarity with her modelling of science brings additional richness. Stengers' modeling focuses on 'events' and consequent 'singularities', in contrast with traditional modelling where theory is constructed from abstraction and generalisation. In her modelling singular events bring 'factishes' (e.g., neutrinos) into existence and the scientist rewrites the past in terms of these as new discoveries. Scientific writing is thus ahistorical in nature and a view of the scientist as discoverer facilitates an objectification of the process. Successful science is based on singular events that are accepted for a collaborative rewriting of history. Stengers' modelling requires both closed and open behaviours from scientists, who strongly identify with the current version of history but simultaneously are open to radically alternative versions. For the individual scientist rewriting history based on singular events is a high risk process that requires individual and group skill as well as conservative and revolutionary characteristics.

Stengers uses the sciences, their history and philosophy as the stage on which she develops her cosmopolitical concept. Her modelling of science and its development are central to her arguments. She methodically and in detail takes the reader through key scientific developments from Galileo's time to the present. She develops a model of disciplines, including sciences, as practices that are constrained. Constraints are described in terms of requirements and obligations that determine the type of practice and the values that operate. This modelling differentiates modes of operation and facilitates the possibility of diverse practices operating together in an ecological fashion. Her approach dissolves the traditional boundaries that exclude and thus she can include practices and ways of operating that go beyond traditional science making an ecological approach feasible.

Science, its history and philosophy is the content of these volumes. But the learning and creativity is at another level and it is here that the work is relevant to educators. These volumes mark the creation of a transformative educational event, the readers cannot help but engage in this transformation as they share a journey, with the author, through stories of science and arrive with a remarkably changed outlook on the possibilities for how learning, healing and government might operate within a Cosmopolitics.

Stengers claims that the sciences are about bringing something new into existence. That possibility of creation is also her purpose in this work. In this she is singularly successful. Her writings represent a significantly creative practice and her inventions take the reader on a journey of learning and transformation that most educationalists could only dream of for their students. Cosmopolitics as a creation is an event of historical significance.

This work was first published in French in 1997; this English edition is a translation of the updated two-volume French edition published in 2003.

References

- Stengers, I. 1997. *Power and invention: Situating science*. Trans. P. Bains. Minneapolis: University of Minnesota Press.
- Stengers, I. 2000. *The invention of modern science*. Trans. D.W. Smith. Minneapolis: University of Minnesota Press.

Tim Higgins
National University of Ireland, Galway
tim.higgins@nuigalway.ie

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<http://dx.doi.org/10.1080/14748460.2012.691286>

Structure and improvisation in creative teaching, by Keith Sawyer, Cambridge, Cambridge University Press, 2011, 320 pp., £21.99 (paperback), ISBN-13: 9780-5217-4632-8

The creativity agenda puts risk-taking and improvisation processes at the core of any creative teaching and learning group experiences within educational contexts. However, the increasingly normative and accountable educational systems seem to constrain such creative approaches as they do not allow room for failure, experimentation, imagination and improvisation within classrooms.

Over the last 10 years, Keith Sawyer has developed a strong interest in the relationship between creativity, group collaboration and improvisation processes. To Swayer, creativity emerges throughout collaborative processes that find the right work balance between structure and improvisation.

His earlier book – *Group creativity* (2003) – previously explored the emergence of creativity within performing improvisational group ensembles, such as jazz and theatre. Such performances are concrete examples of collaborative places in which the right balance is struck between structure and improvisation, enabling the emergence of creativity. A subsequent book called *Group genius* (2007) deepened the exploration of creativity within collaborative settings, in an analysis that can be applied to educational group contexts such as classrooms.

Throughout his new book *Structure and improvisation in creative teaching* (2011), Sawyer takes a step further as he develops concrete examples and techniques of how improvisation processes used within performance arts settings – whether jazz, theatre or dance can be used to improve creative teaching within the educational context. As Sawyer states, the ultimate aim of the book is to ‘develop a new theory of professional pedagogical practice’ and ‘this volume is a step in that direction’ (2011, 13).

The title of the introductory chapter raises one fundamental question: ‘What makes good teachers great?’ (2011, 1). In his opinion, the solution lies in the ‘Artful balance between structure and improvisation’ (2011, 1). He sees teaching as an ‘improvisational activity’ (2011, 2) in which the teacher has to find the right balance between teaching improvisation and structure in order to enable creativity within his classroom. Sawyer uses once more the metaphor he developed of ‘disciplined improvisation’ (2004) in order to describe creative teaching that ‘occurs within broad structures and frameworks’ (2004, 13) and where the teacher is able to apply his or her expertise in an improvisational practice (2011, 9). In other words, the teacher is able to use routines activities, structures, lessons plans, curriculum in a flexible manner according to the classroom context.

Along these lines, grounded in a constructivist stance, the book is divided in three parts around three themes: teacher paradox, learning paradox and curriculum paradox. They represent the paradoxes that teachers must constantly negotiate within every educational setting to develop their creative teaching. To address the teacher paradox, the teacher has