Welcome to the proceedings of the Second CCS Satellite Symposium on Complex Systems and Education, which was held in the course of the Conference on Complex Systems (CCS) in Cancun, Mexico, in late September of 2017. CCS is an interdisciplinary forum for scholars who share an interest in complexity theory and other dynamical perspectives. The discussion of complexity as an educational phenomenon is a relatively new development in the complexity field that has yielded some significant empirical results as well as interesting and important insights about the use of complexity theory for teaching and learning.

As complex systems science has matured as an interdisciplinary field, its paradigms and essential concepts, such as dynamical systems, sensitivity in initial conditions, chaos, stochasticity, interdependence, self-organization, phase transition, learning, evolution, networks, multiscale properties and emergence, have been widely adopted in a number of scientific disciplines, from biology to social sciences and from engineering to medicine. To this date, educational research has remained heavily reliant on conventional paradigms, which permits only a limited range of questions about education to be investigated. Meanwhile, work on complexity in education has been largely theoretical and exploratory, without having the level of conceptual and methodological specificity that is required to capture the dynamical processes hypothesized in the complex systems literature, nor does it speak to the specific gaps in our knowledge that result from the relative absence of dynamical perspectives in empirical educational research. Likewise, the key concepts of complex systems have remained mostly
排除科学教科书中。最近在复杂系统科学中取得的进展包括重要和突破性的实证工作，以研究教育过程的动态机制，并不断开发结构化、可访问的教育材料关于复杂性。

这个卫星研讨会呈现了一些在教育研究和复杂系统科学之间的交叉点的进展，从而促进了研究者之间知识的交叉繁殖，并促进了这个重要领域研究和实践的发展。

在这次卫星研讨会的八个报告中（https://mkoopmans.wixsite.com/ccs-2017-edsymposium），四篇论文被纳入这些会议论文中，其中包括由Gwen Marchand（内华达大学）和Jonathan Hilpert（乔治亚州立大学）的两篇报告被作者合并成一篇论文。这三篇贡献代表了卫星研讨会的两个主要应用领域，即（1）复杂理论对于教育研究的影响，（2）对于幼儿园及小学和中学阶段的课程和教学的应用。

Towlson等人的第一篇贡献是实用的，因为它利用了网络科学作为K-12教师的专业开发工具。21名不同学科取向和不同年级的教师参加了工作坊，其中包括一个讨论网络概念的环节和一个侧重于课程规划和将标准映射到课程模块的使用网络科学的环节。该论文分享了他们开发的课程计划信息，以及参与者对他们在工作坊中所学的评价。

Koopmans和Marchand和Hilpert的第二篇贡献从完全不同的角度提出了复杂理论的进一步增强在教育研究方法中的使用，以及在没有理论的担忧和优先事项的情况下会如何出现的问题。Koopmans的研究涉及一个从大到一个有近1000名学生的大型学校到一个有大约250名学生的较小学校的转移高中的日常出勤率。与常规的线性观点不同，复杂性理论会提出一个额外的关键问题，即是否学校的规模的缩小有稳定作用。该论文提供了如何通过统计方法来解决这个问题的方法。

Marchand和Hilpert提出的问题是，我们的优先事项随着复杂性视角的使用而变化，并且提供了复杂性方法的两个主要设计特性的概述，即在系统功能中的上下文焦点以及在时间尺度上适应性行为的发挥。该论文提供了现有复杂性教育研究的示例，以及如何代表这两个观点。

这些会议论文证明了教育复杂性领域的活力，以及其用于教学和专业发展目的，以及发展更复杂的研究设计，这些将允许研究人员更加深入地探索
dynamical underpinnings of the systemic aspects of the educational process. The insight we gain along the way can in turn be used to provide more effective feedback to practitioners and policy makers in the field and hopefully further support our attempts to address some of the major challenges with which the field is beset, such as the gap in student achievement between demographic groups, the inertia of the P-12 educational system and the need for better support for those working in the field. In addition, there is an ongoing need in the field of complexity theory for prototypical examples of complex processes, of which there are many in education, as the papers presented here vividly illustrate.

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