

# **NEPC REVIEW: EDUCATION SYSTEM ALIGNMENT FOR 21ST CENTURY SKILLS: FOCUS ON ASSESSMENT (THE BROOKINGS INSTITUTION, NOVEMBER 2018)**



Reviewed by:

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April 2019

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## Acknowledgements

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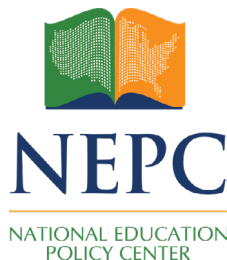
**Suggested Citation:** Shepard, L.A. (2019). *NEPC Review: “Education System Alignment for 21st Century Skills: Focus on Assessment.”* Boulder, CO: National Education Policy Center. Retrieved [date] from <http://nepc.colorado.edu/thinktank/assessment>.

Funding: This review was made possible in part by funding from the Great Lakes Center for Educational Research and Practice.



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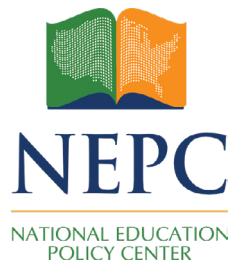
April 2019

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### Executive Summary

A recent report from the Brookings Institution makes the case for the importance of 21<sup>st</sup> century skills as goals for education systems and provides international examples. It focuses specifically on the development of new assessment methods as a primary means to help countries integrate 21<sup>st</sup> century skills – such as critical thinking, problem solving, collaboration, and communication – into curricular reforms. The report is a review of research and a policy analysis rather than an empirical study. Its main contributions are (a) the identification of *three challenges* to implementing a 21<sup>st</sup> century skills agenda, and (b) the organization of key ideas and research to possibly address those challenges.

A major limitation of the report is its presumption of a *domain-general* approach to teaching and assessment of 21<sup>st</sup> century skills. The report does not acknowledge the possibility of, nor does it consider supporting evidence for, adopting *discipline-specific* contexts for the development of 21<sup>st</sup> century capabilities. Yet extensive reviews of research from the cognitive and learning sciences explain the benefit of jointly developing deep understandings of content along with participatory and thinking competencies. Admittedly, such discipline-specific curricula and learning progressions create problems for large-scale comparative assessments that cross curricular jurisdictions. But policymakers need help addressing this dilemma explicitly: discipline-specific approaches are better for teaching and deep learning but problematic when attempting to develop large-scale international assessments, and possibly even national assessments. Policymakers should find the new report useful as an overview highlighting the importance of 21<sup>st</sup> century skills internationally, although the report's omission of discipline-specific considerations makes it less helpful as a guide for local curricular and pedagogical reforms.



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## I. Introduction

*Education system alignment for 21<sup>st</sup> century skills: Focus on assessment*<sup>1</sup> is a new report from the Brookings Institution's Optimizing Assessment for All project. The project's aim is to develop new assessment methods as a primary means to help countries reform curriculum and integrate 21<sup>st</sup> century skills into their teaching and learning. The authors' main arguments – as to why a “knowledge accumulation view” of education from the past century is no longer sufficient in an increasing technological and global society – are also endorsed by world organizations such as the United Nations, the Organization for Economic Co-operation and Development, and the World Economic Forum.

As background, the authors present findings from an analysis of education mission statements and curricular documents from 152 countries. They contrast the widespread adoption of goals such as critical thinking, problem solving, collaboration, and communication in vision and mission statements (84 percent of countries) with the smaller percentage of countries (49 percent) that have identified specific 21<sup>st</sup> century skills within their curricula or have built in learning trajectories for development of these skills over the years of schooling.

The report focuses on the development of assessments of 21<sup>st</sup> century skills but with the firm understanding that to accomplish desired reforms, assessments must be well aligned with curriculum and pedagogy. The report identifies three challenges to implementation of a 21<sup>st</sup> century skills agenda having to do with (1) the problem of construct definition, (2) the need for progressions describing how 21<sup>st</sup> century skills are developed over time, and (3) the difficulties in designing authentic assessments of complex skills. Relevant research literatures are brought to bear addressing these challenges along with a description of reform efforts in three countries – the Philippines, Australia, and Kenya.

## II. Findings and Conclusions of the Report

This report is a review of research and policy analysis rather than an empirical study. It addresses widely heralded new goals for education, which are still in rudimentary stages of development. The main contributions of the report are the identification of *three challenges* to implementing a 21<sup>st</sup> century skills agenda and organization of key ideas and research to possibly address those challenges.

### Challenge 1: Understanding the nature of 21<sup>st</sup> century skills

Goals – such as critical thinking, innovative thinking, reasoned decision-making, communication skills, respect for the environment, and many more cited from a UNESCO study<sup>2</sup> – are widely embraced but poorly defined. Important constructs cannot be measured well if they lack a clear definition and are poorly understood. In fact, to inform the assessment developer and curriculum designer, understanding of a learning domain must go beyond mere verbal definition to include well-documented evidence of how such skills and abilities can be supported and developed. The report includes brief research-based summaries of definitions for collaboration, critical thinking, and problem solving.

### Challenge 2: Developing learning progressions of 21<sup>st</sup> century skills

In order to teach for and assess “progress” from basic to more sophisticated demonstrations of particular 21<sup>st</sup> century skills, it is necessary to document intermediate behavioral manifestations as well as culminating performances. The report provides a summary of the measurement research literature on *learning progressions*, noting that such progressions are being developed in “traditional learning domains, such as mathematics and science.”<sup>3</sup> The authors lament, however, that there are no generic examples that describe how 21<sup>st</sup> century skills are to be developed.

### Challenge 3: Designing appropriate and authentic assessment of 21<sup>st</sup> century skills

Without an adequate definition of constructs and logically and empirically developed learning progressions, it is essentially impossible to develop satisfactory measures of 21<sup>st</sup> century skills. As a possible remedy the authors propose that assessment developers focus on the concept of *authenticity* whereby real-life tasks are created that elicit as nearly as possible the same behaviors that are sought in professional practice or in the world outside of school. In measurement terms these are the ultimate criterion performances to which assessment tasks are intended to generalize and predict. The authenticity of a few well-crafted exemplars is examined using a framework proposed by Gulikers, Bastianens, and Kirschner.<sup>4</sup>

The report concludes with an analysis of 21<sup>st</sup> century skills implementation in the Philippines, Australia, and Kenya. Consistent with the idea that authentic assessments must be

aligned with other aspects of the educational system, reforms in curriculum, pedagogy, and teacher professional development are also examined.

### III. The Report's Rationale for Its Findings and Conclusions

The report uses the logic of policy analysis. An important problem is identified – i.e., the need to support nations in their efforts to incorporate the teaching of 21<sup>st</sup> skills as part of their educational systems. Then, *focusing on authentic assessments of 21<sup>st</sup> century skills* is taken up as a significant policy option. Other policy options such as curriculum development or teacher professional development are not examined. Rather, relevant research and existing implementation efforts are organized into a logical argument examining known obstacles and promising resources, if policy leaders elect to pursue assessment-led curricular reform.

### IV. The Report's Use of Research Literature

The report provides key references in support of each of its major points. International reports are cited documenting the importance of 21<sup>st</sup> century skills and the inadequacies of traditional modes of schooling for developing such skills. Existing research is summarized with appropriate citations for three of the most-studied skills: collaboration, critical thinking, and problem solving. The first author especially is a well-regarded assessment expert who has worked with Asia Pacific ministries embarked on assessment and teaching reforms. In this report, useful references are provided for two salient measurement topics: authentic assessment and learning progressions.

A major limitation of the report is its presumption of a *domain-general* approach to teaching and assessment of 21<sup>st</sup> century skills. The report does not acknowledge the possibility nor does it consider supporting evidence for adopting *discipline-specific* contexts for the development of 21<sup>st</sup> century capabilities.

The debate about whether thinking skills can best be taught using domain-general or discipline-specific approaches is not new. Early in the cognitive revolution, researchers came to realize that content-free efforts to teach reasoning and problem-solving skills improved performance only on the kinds of tasks employed in the particular experiment and did not improve performance in other cognitive domains.<sup>5</sup> The basic idea is that critical thinking has to be about something. Although it is possible to make up imaginary, IQ-test-like puzzles, developing expertise with such puzzles does not help with thinking in either academic or real-world contexts. Two recent reports of the U.S. National Academies of Sciences, Engineering, and Medicine provide extensive research syntheses pertaining to deep learning and 21<sup>st</sup> century skills.<sup>6</sup> Each discipline, such as mathematics, science, history, and literacy, has its own ways of thinking and speaking, methods of inquiry, ways of presenting evidence, and so forth. Becoming expert in a discipline requires that knowledge structures (which are more than facts) and ways of thinking develop concurrently – each enabling the other. Thus orga-

nizing for curricular reform within disciplinary structures makes it possible to pursue two significant goals at once: deepening understanding of content and at the same time allowing for extensive practice and development of 21<sup>st</sup> century competencies.

While the authors did not explain why they prefer a domain-general approach, I can think of two possibilities. They might fear that staying within traditional subject matter domains would make it more difficult to achieve the necessary transformation of curricular goals and instructional methods. They might also be aware of the difficulties of transfer of 21<sup>st</sup> century skills across disciplines. While neither of these problems has an easy solution, they are the very problems that most need to be clarified and addressed, because they are actually more tractable than trying to teach general, content-free capabilities in a deep and sustained way.

Organizing curricular reforms within disciplinary domains also makes sense on practical grounds as well as having the research warrant cited above. In the United States in the 1990s, a response to mathematics education reforms in some schools was to teach “problem solving” on Fridays, leaving the rote and procedural conception of mathematics unchanged on the other four days. Because we know that teaching for critical thinking, communication, collaboration, and metacognitive competencies takes extensive time,<sup>7</sup> it is inefficient to imagine carving up the school day and weeks to make separate times for all of the traditional subjects plus an array of 21<sup>st</sup> century skills. In addition, more will be accomplished if the current teacher workforce is supported to teach in deeper ways rather than trying to recruit a new cadre of teachers who are expert in particular 21<sup>st</sup> century skills. Interestingly, in the three countries selected as examples –The Philippines, Australia, and Kenya – the authors note that all three followed a “common approach of embedding skills in subject matter or key learning areas,”<sup>8</sup> but they do not comment further.

*Just because domain-general assessment frameworks are necessary for international comparisons does not mean they are best for supporting teaching and learning.*

If integration of disciplinary expertise and 21<sup>st</sup> century skills is taken seriously, then new issues arise for the development of assessments. Learning progressions continue to be an attractive tool for conceptualizing and assessing the *joint* development of knowledge structures, disciplinary inquiry practices, and 21<sup>st</sup> century competencies. However, these progressions will be specific to the particular intersections selected by a country, state, or individual school. In the example given, if one school in the State of Victoria decides to embed critical and creative thinking in its history curriculum and another in its science curriculum, then it would not be fair to administer state-level assessments designed for either specific learning progression to the opposite school.

The authors make the case for the use of learning progressions for both horizontal alignment, among curriculum, instruction, and assessment, and vertical alignment between classroom- and policy-level assessments. However, vertical alignment will not work across levels, if different jurisdictions within a country or state are making different curricular decisions.<sup>9</sup> Indeed, the need for large-scale, cross-jurisdiction, comparative assessments to remain as curriculum-neutral as possible explains why international assessments such as PISA must be much more generic in their attempts to represent important constructs. However, just because domain-general assessment frameworks are necessary for international comparisons does not mean they are best for supporting teaching and learning.



## **V. Review of the Report's Methods**

The report's methods involve reviews of relevant research literatures and summaries from other policy reports. In addition, policy documents from ministry of education websites are accessed to create three national case studies. The reviews and summaries are carried out at an appropriate level of detail to inform policymakers and members of the general public. As noted above, the report is very well done up to a point but suffers from one blind spot: It leaves out cognitive and learning sciences research that speaks to the benefits of developing 21<sup>st</sup> century skills within the contexts of disciplinary learning.

## **VI. Review of the Validity of the Findings and Conclusions**

The report's summary regarding the importance of 21<sup>st</sup> century skills to ministries of education around the globe is well founded. Brief research summaries for three skill areas – collaboration, critical thinking, and problem solving – do a good job of illustrating definitional understandings to date as well as the challenges of what remains to be done before such competencies can be meaningfully integrated into curriculum, pedagogy, and assessment. Summaries of measurement research on learning progressions and authentic assessments help to concretize the complex development work that will be required to develop cross-age-group learning progressions and authentic assessments for even one 21<sup>st</sup> century skill domain. The report findings are valid and complete so long as the reader understands that the summaries and framing are written from a domain-general perspective. For example, the research literature on how critical thinking, problem solving, evaluating evidence-based arguments, systems thinking, and complex communication are developed in mathematics<sup>10</sup> is not considered.

## **VII. Usefulness of the Report for Guidance of Policy and Practice**

The report is very useful if the reader understands that it tells one side of the story. It provides a well-framed overview for policy leaders who wish to implement a domain-general approach to teaching and assessment of 21<sup>st</sup> century skills. It does not, however, explain that there is a choice between domain-general and discipline-specific approaches to curricular reform. Nor does it help policymakers consider the dilemma that discipline-specific approaches are better for teaching and deep learning but problematic when attempting to develop large-scale comparative assessments that will cross curricular jurisdictions.<sup>11</sup>



## Notes and References

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