**Project: Build Virtual Learning at National Scale**

Goal: As part of the Administration's Open Data initiatives, harness new techniques in Big Data and learning analytics to help students learn core academic subjects such as math and science.

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**Background**

Today, many U.S. students fail to graduate from high school or are not college- or career-ready even if they complete high school. According to one recent international assessment, U.S. students ranked 30th in math and 23rd in science. Although technology is not a "silver bullet" for improving our educational system, the United States should increase investments in new, technology-enabled approaches for improving student learning outcomes.

As outlined in a recent Department of Education report, now is the opportunity to build a new infrastructure for learning. Because of the move from face-to-face to online and blended learning, we have the opportunity to make education a data-rich domain (i.e., capturing student interaction with online material) as opposed to a data-poor domain (i.e., report card once a semester). There is a combination of technologies and approaches (e.g., predictive data analytics, feedback loops, visualization, rapid A/B testing) that could lead to:

- Online courses that get better the more students use them – the same way that the Amazon Recommender system gets better the more people use it. (This is one of the Grand Challenges in the President's Innovation Strategy).

- A revolution in the way education research gets done – because of the ability to conduct "Internet-scale experimentation" in an online course that is being taken by 100,000 or more students.

- Delivery of personalized and adaptive instruction that builds on students' interests, prior knowledge, and misconceptions.

- Effective innovations that can be brought to scale with increased access and democratization of education, with a focus on learning outcomes possible in a changing technological world.

- Ability to predict which students are at greatest risk of dropping out or failing a course, and intervening earlier.

A combination of these different technologies would allow us to more rapidly discover better ways to enable students to understand important concepts in such core academic subjects as mathematics and science. The Virtual Learning at National Scale project

would develop potential cyber infrastructure, such as a national virtual learning laboratory.

This would involve integrating: (a) online and blended learning environments that a large number of students (e.g., 100,000 or more) are participating in and that can demonstrate effectiveness in student learning; (b) tools for rapid low-cost experimentation, data capture, data analytics, and machine learning; (c) anonymized data; (d) a community of researchers with important hypotheses to test; and (e) collaborations among educational researchers, educational institutions, and educational technology companies leading to innovations and large-scale use.

The White House and the National Science Foundation seek to recruit a Presidential Innovation Fellow to help design and launch a "Virtual Learning at National Scale" initiative. We need a fellow who, ideally, has a background in both education and data analytics that can help the Administration develop and execute a national strategy in this area that builds on activities including, but not limited to:

- The Administration's $200 million Big Data Initiative;

- NSF's Cyberlearning Transforming Education and Science of Learning Centers programs;

- DARPA's investment in FoldIt and ENGAGE;

- The recent study supported by the Department of Education on learning analytics and educational data mining;

- Digital Promise/League of Innovative Schools; and

- Private sector and non-profit activities related to online learning, MOOCs, adaptive learning, etc.

With the work done by the Presidential Innovation Fellow, we hope to see:

- New collaborations among companies/non-profits, educational researchers, and schools to create an infrastructure for "continuous improvement" in core subjects. The Fellow would help define and broker these relationships.

- Student performance in subjects (e.g., mathematics) improves as a result of innovative strategies unique to digital environments. For instance, technological environments that allow students, teachers, and parents to get constant feedback on how they are doing on "formative" assessments as opposed to end-of-year/end-of-semester tests that are used for accountability.

Longer-term, we hope to see data—and the tools needed to analyze those data—leading to new insights about how to help students come to understand  a given concept or progression of concepts

**Skill Sets Needed**

The White House and the National Science Foundation are seeking a highly motivated and entrepreneurial innovator with a technical background in areas such as big data, machine learning, analytics, science and mathematics learning, and A/B testing, and an interest in applying these techniques to education research and online learning.  He or she will also have excellent communications skills, and a demonstrated ability to create high-impact partnerships involving government, education, the private sector, and the research community.  The expected term of service is six to twelve months beginning in Spring 2013.

For more information about the Presidential Innovation Fellows program and to submit your resume or CV, please see: [WhiteHouse.gov/InnovationFellows](WhiteHouse.gov/InnovationFellows).