

Characterizing Noyce Scholars' Classrooms with RTOP

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Abstract

In 2009, we proposed an extension of the Robert Noyce Teacher Scholarship Program at Buffalo State College to support an additional 35 scholars seeking initial STEM teacher certification over the next five years (beyond our initial 42 scholars). As a component of the Phase 2 Noyce Project at Buffalo State College, We proposed a Teacher Effectiveness Study including research and evaluation of the Noyce participants. Several Noyce scholars in their first few years of teaching have been observed and evaluated using the Reformed Teaching Observation Protocol (RTOP). We will be reporting on the results from several classrooms.

Background

RTOP

The Reformed Teaching Observation Protocol (RTOP) was developed as a classroom observation instrument to provide a standardized means for detecting the degree to which K-20 classroom instruction in mathematics or science is reformed.

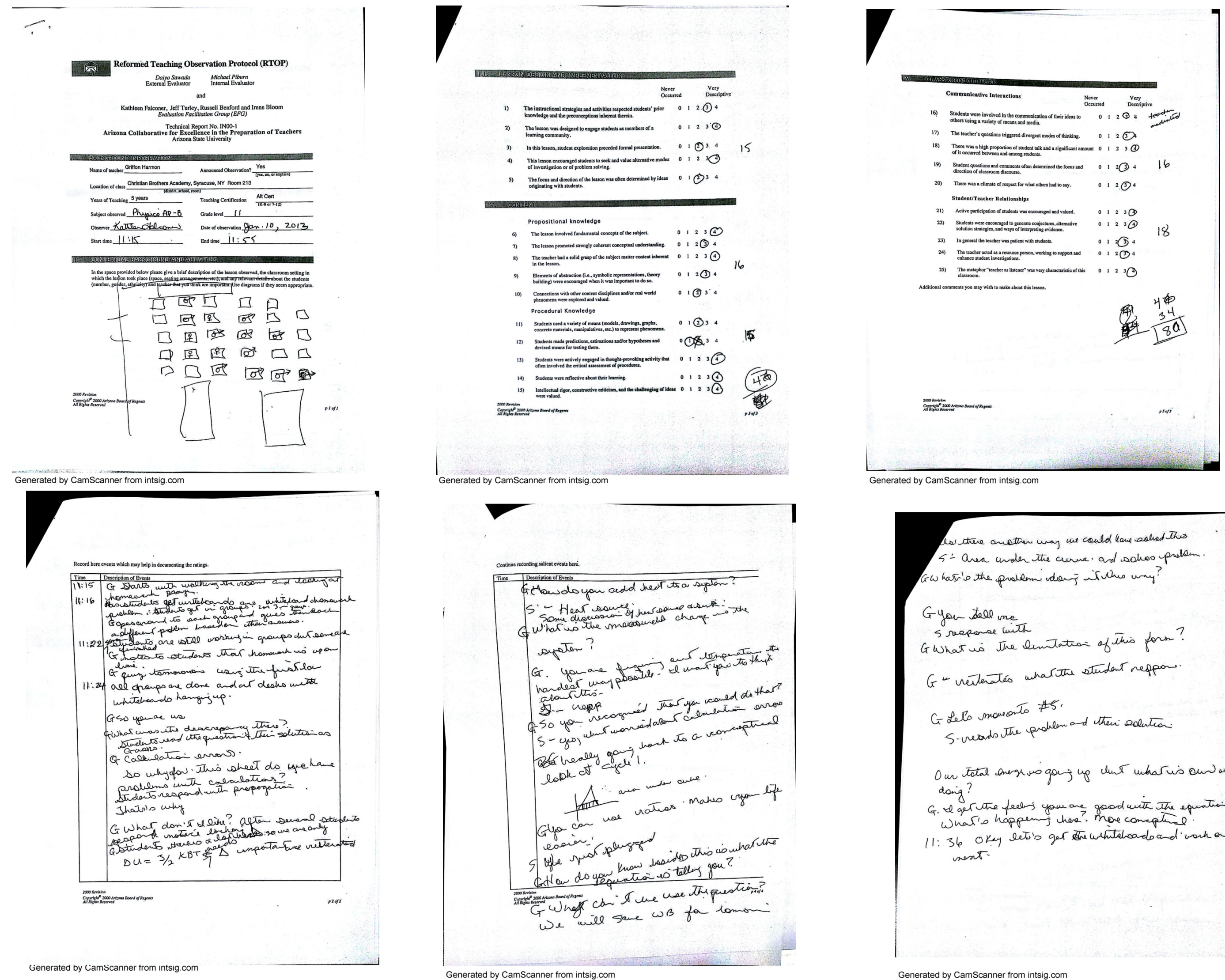
RTOP was developed, refined, and validated over a period of two years (1998-2000). In its final form, the RTOP is a highly reliable instrument with strong predictive validity RTOP has been used in thousands of K-20 science and mathematics classrooms to provide a precise quantitative reading of the degree to which teaching is reformed. RTOP both operationally defines and assesses reformed teaching in the classroom.

NOYCE

Over a five year period spanning April, 2004 to late September 2009, the Western New York Noyce Scholars Project for New Science and Mathematics Teachers supported forty-two individuals seeking initial science, technology or mathematics teacher certification with scholarships and stipends of between \$4,200 and \$17,000 totaling just over four hundred and fourteen thousand dollars. These included twenty-one women and twenty-one men, and ten under-represented minority students in STEM teaching fields. All of these individuals had service obligations requiring either two or four years of full time employment in high needs (disadvantaged) school districts, and about 75% of these recipient teachers have certified as teachers and are satisfying or have satisfied their service obligations as of this date. Some of the local educational authorities these teachers have been employed by include: Buffalo Public Schools (employing several scholars), Charlotte Valley Central School District, Cheektowaga-Sloan Union Free School District, Holy Angels High School, Hornell City School District, Lansing Central School District, Oakfield Alabama Central School District, Christian Brothers Academy, Springfield Public Schools (PA), and the Western New York Maritime Charter School.

In 2009, we proposed an extension of the Noyce project to support an additional thirty-five scholars seeking initial science and mathematics teacher certification over the next five years. Currently, fifteen scholarships have been funded. This renewal and extension included research and evaluation of the Noyce participants. The research portion of the grant was proposed to better monitor and support the Noyce scholars in their studies and in their first few years of teaching by observation and critical evaluation and feedback using RTOP. RTOP was used to measure and characterize Noyce scholar's classrooms. Teacher and students interactions was observed in working high school STEM classrooms.

RTOP Forms



Permission Forms

New York is a very litigious state (one of the most litigious in the US.) As a result, we have had some problems with parental permission for observation of students. The following statement is considered a problem. Many parents want the risk to be no risk at all. *“Risks: There should be minimal risk to you as a result of participating in this research study.”* Many high schools/superintendents were unwilling to agree to even present the idea to parents.

Buffalo State

The Noyce Phase 2 STEM Teachers Project at SUNY Buffalo State College

Assent Form
Introduction: As a high school student at _____, you are being asked to participate in a research study measuring the learning effectiveness of classroom teacher and student behaviors in Science, Technology, Engineering and Mathematics (STEM) classrooms. As a parent or guardian of a high school student, you are being asked to allow your child to participate in this research study. This assent form is constructed from the student's point of view.
Procedure: If you decide to participate in this study, you may be asked to complete a quiz asking you about your understanding of science or mathematics at the start and end of the semester. The survey will be used to determine your conceptual learning gains. The survey will take approximately thirty minutes to complete. Your classroom will also be observed and video recorded during at least three lessons to describe classroom activities. Your standardized state assessment (e.g. Regents Physics, Regents Math etc.) scores will be collected from the local educational authorities or your teachers.
Risks: There should be minimal risk to you as a result of participating in this research study.
Benefits: There are no specific benefits to you as a result of your participation, other than the knowledge that you have contributed to the advancement of the study of science and mathematics teaching and learning.
Voluntary Participation: Your participation in this study is completely voluntary. You may quit at anytime without penalty.
As part of this research project, we will be making videotape recordings of your classroom. Please initial the statement of use you are willing to consent below. We will only use the videotape in ways that you agree to. In any use of the videotape, your name would not be identified. If you do not initial any of the spaces below, you will be positioned in the classroom such that you will not be videotaped. These videotapes will be edited and not be destroyed at the end of this research but will be retained indefinitely.
• The videotape can be studied by the research team for use in this research project.
Please initial: _____ (Student) _____ (Parent or Guardian)
• The videotape can be used for scientific and educational publications and/or presentations.
Please initial: _____ (Student) _____ (Parent or Guardian)

• The videotape can be distributed to people interested in learning to teach science and mathematics via the internet.
Please initial: _____ (Student) _____ (Parent or Guardian)
(Continued over)
Confidentiality: All quiz, survey and standardized state assessment information that I obtain from you is strictly confidential. The results reported from this information obtained from you will not identify you in any way. The edited video recordings may be used as you indicated above.
Please call Dr. David Wilson at 716 878 6218 with any questions concerning this study.
If you are unable to reach a member of the research team and have general questions, or you have concerns or complaints about the research study, research team, or questions about your rights as a research subject, please contact Gina Gagne, The Research Foundation of SUNY Office of Sponsored Programs by phone, (716) 878-6700 or by email at gagene@buffalostate.edu or in person at Bishop Hall 17, 1300 Elmwood Avenue, Buffalo, NY 14222.
If you wish to participate in this study, please sign below. I have read the above description and give my consent for the use of the videotape as indicated above.

Parent/Guardian's Signature _____ Date _____ Investigator's Signature _____ Date _____
Parent/Guardian's Printed Name _____ Investigator's Printed Name _____
Minor's Signature _____ Date _____
Minor's Printed Name _____

Data

There have been forty two Phase I Noyce Scholars and fifteen Phase II Noyce Scholars funded. Of these, two physics Noyce Scholar have been RTOPed and videotaped. Pre-post FCI scores have also been collected. The RTOP scores ranged from 62 to 80. The average scores was 68 ± 8.2 over the two participants. Both participants showed growth throughout the observation and mentoring process.

All the instructors of the university physics courses taken by these Noyce scholars, which are integral to the Physics programs, have been RTOPed. The RTOP scores ranged from 43 to 84. The scores indicated the instruction for the physics Noyce participants is reformed. The normalized gains ($\langle g \rangle$) on the conceptual instruments ranged from 0.03 ± 0.30 on the FMCE in summer 2012 to 0.58 ± 0.08 on the TUG-K in summer 2010. The majority of the $\langle g \rangle$ were above 0.30, which indicates a good level of concept development. The attitudinal and efficacious results were mixed. There was not a clear trend in the data.

Conclusion

The physics preparation for the Noyce Scholars is reformed.

Since the numbers of participants in the high school are so low, we will only report that both teachers' RTOP scores were reformed and not report the FCI results.

For many reasons, there has been very limited response to requests for RTOPing and videotaping in the high school classrooms.

There needs to be a reward for participating in the research for the school or school district. Many of the teachers were willing, but the LEA (local educational authority) was not.

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