University at Albany, State University of New York

Project Title: Seeking Stronger Evidence of School Library Effects on Student Outcomes

Research Grant Summary: How do we generate rigorous evidence that school libraries and librarians (SLs) effect student outcomes? To answer this, we will build on our previous IMLS research grant (IMLS Grant RE-04-15-0081-15) in which we detailed weaknesses in prior school library (SL) research and developed statistical modeling techniques to address them. This grant will enable us to provide evidence of the SL effect and the influence of experience, scheduling, curriculum, pedagogy, instruction and support on student outcomes. We will focus not only on academic outcomes, but will include school-behavior related outcomes, such as attendance and discipline and share findings with practitioners and researchers via annual webinars and research publications. This three-year request for $498,865 will allow us to extend our analyses across eight school years of data making this the first longitudinal study ever of SL effects on both academic and behavioral outcomes using empirical analyses and replication across multiple years.

Statement of Broad Need: An ongoing research question has been "Does the SL have a positive effect on student achievement?" The perception of SL researchers and practitioners is that there is strong evidence of this SL effect. As a first step in prior research, we conducted a topical and methodological review of decades of SL research and found serious weaknesses throughout: 1) lack of an underlying theory of action 2) conflation of correlation with causation 3) disproportionate reliance on descriptive data 4) problems in measurement and statistical analyses 5) absence of replication studies 6) weak designs without comparability between library and non-library groups, and 7) evidence of publication bias focusing on positive results. Methodologically weak positive results have been widely accepted by SL researchers and practitioners as undisputed evidence. Once aware of SL's weak research foundation, our prior grant activities set out to address them. We applied a range of statistical modeling techniques and examined four years of data on the effect of certified SLs (staffing and library functions, library capabilities, instructional methods, operation and resources) on students' English language arts and math achievement, while taking into account prior achievement, student demographic variables, and building level characteristics in every public school in New York State. Although results have been mixed (statistically significant positive and negative), as responsible researchers we cannot cherry pick positive results to justify SL claims (https://sites.google.com/view/slesany/home). Our results, published in highly respected, peer reviewed venues, are not always well received by SL researchers or practitioners who may feel we are diminishing the value of SLs. In truth, we are trying to strengthen the quality of SL research using rigorous empirical techniques to show causal effects of SLs on student outcomes.

Current Findings: To address design and analysis shortcomings of prior SL studies, we have used four years of statewide data, examining four achievement outcome measures in conjunction with 45 SL variables, while controlling for other characteristics. Despite mixed results showing generally non-significant SL effects on student achievement, such results are important as they push SL theory forward and demonstrate the challenge of identifying SL effects on student outcomes. We are using structural equation modeling, treatment effects modeling, and quantile regression, along with a "beating the odds analysis" on a wide range of input (prior year achievement, economic, demographic, school climate, etc.), context variables (SL resources, scheduling, instructional activities, etc.) and output variables (school achievement) in higher and lower academically performing schools having certified SLs. Findings thus far indicate a higher % of top outliers: have flexible schedules; describe teachers as accompanying classes to the library; report teachers reaching out to collaborate; participate in curriculum development activities; align what is taught in their library to classroom activities; and perceive an administration supportive of collaboration. Our proposal is an important first step to construct replicable, valid and trustworthy research

Project Design and Work Plan: We will use a three-pronged approach. First, we will extend our six-years of longitudinal data to eight (2011-2019) for all public schools in NYS using data from New York State's Education Department, including demographic, SL, and student achievement data. Second, we will conduct statewide SL web surveys. The survey data–along with the larger set of school data that can be matched at the school building

level–will allow us to identify what and how staffing, resources, library activities, and library structures affect student outcomes. Third, we will meet virtually twice a year with an Advisory Board to represent researchers, practitioners, and school administrators (Dr. Ruth Small, Dr. David Loertscher, Sara Kelly Johns, John Brock, Sheri McNair and Terrence Clark) to share our findings and gather vital stakeholder feedback. Each advisory board member has been selected because of their expertise and leadership in their respective professional roles. An external reviewer, Dr. William Doane, (research staff member with IDA Science & Technology Policy Institute) will provide on-going advice on research design, data collection and analyses methods**.**

We will expand our models to include non-academic SL outcomes such as attendance, discipline referrals, and suspensions. The use of statistical modeling is powerful, as it allows us to examine over 45 SL variables and how those variables interact with each other to determine whether or not they contribute to the effectiveness of the SL. Such variables include educational background, experience, scheduling (e.g., hours the SL is staffed and open, schedule type: fixed, flex and mixed), staffing, instructional resources, frequency and type of instructional and collaboration activities, administrative support, school culture, technology, summer reading programs, and others. We will continue to employ the use of a "beating the odds" strategy to examine SL variables in the top (and bottom) 10% of schools that exceed (or fall below) predicted outcomes based on the statistical models. We will use results from our prior statewide SL web surveys and conduct additional surveys to reveal the characteristics of SL's in the top performing schools, so that we can formulate theoretical models based on SL variables that truly make a difference and share these findings with practitioners. Year one will focus on SL effects on non-academic outcomes across all years. Years two and three will focus on both academic and non-academic outcomes for 2017-18 and 2018-19 data as well as applying the beating the odds strategy for these years. Our ability to replicate analyses and models across outcomes and years allows the strongest confirmation of effect based on the scientific principle of reproducibility. Deliverables will include papers submitted to peer-reviewed publications for SL researchers (*School Library Research* and *School Libraries Worldwide*) as well as educational researchers (AERA and SREE publications). Proposals will also be submitted to both SL and educational venues (ALA, AASL, IASL, AERA, and SREE). Another set of deliverables will be papers submitted to practitioner based publications such as *Knowledge Quest* and yearly interactive presentations, hosted by SLMSSENY for practitioners, SL, and educational researchers to share our research findings and encourage practitioners to integrate theory generated from our research within their schools and researchers to expand upon our findings.

Diversity Plan: NYS is a highly diverse state with 733 school districts, 4,458 school buildings and 2,640,250 students--reflecting urban, suburban, and rural locations. Our student populations reflect the widest range of backgrounds and abilities, mirroring the entire U.S. population. We have an ongoing commitment from the Office of Diversity and Inclusion on campus to help us recruit at least one doctoral student. We will help to socialize him/her into the profession and help him/her to understand and hopefully construct replicable, valid and trustworthy science.

Broad Impact Performance Goals and Outcomes: Our prior IMLS funded research unquestionably demonstrates our ability to provide rigorous research that pushes the boundary for SL research. Identifying the elements and variables that influence SLs' effectiveness on student learning and behavior is of critical importance to all educators. SL characteristics, when demonstrated to positively effect student outcomes, could then be integrated into PreK-12 and higher education instructional practices, as well as in SL preparation programs and curricula. Thus, by allowing us to extend our work, we can begin this important first step toward providing a more credible SL research foundation of new understandings for practitioners, and researchers.

Budget Summary: Principal Investigator, years 1-3= $85,548, fringe benefits = $36,377. One PhD student years 1 and 2 = $31,916, fringe = $4,952, student tuition = $17,123. Independent evaluator, years 1-3 = $18,999. Database/Statistical Modeling Subcontractor years 1-3 = $165,000. Advisory Board (7 members) = years 1-3 = $8,400. Travel years 1-3 = $10,000.