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RESEARCH AND DEVELOPMENT CENTER ANNUAL REPORT

November 2018

Background

In 2009, Iowa Senate File 470 created the Iowa Research and Development Center for Education Innovation at the University of Northern Iowa (UNI). The goals for this Center, as outlined in Senate File 470, were:

- To raise and sustain the level of all PK-12 students' educational attainment and personal development through innovative and promising teaching practice.
- To enhance the preparation and professional competence of the educators in this state through collaborative inquiry and exchange of professional knowledge in teaching and learning.
- To focus on research that transforms teaching to meet the changing needs of Iowa's educational system.

In April 2013, UNI received a \$2 million award from the Carver Trust to establish the Center for Educational Transformation (CET), an entity intended to fulfill the mission of the Iowa Research and Development Center for Education Innovation. On October 24, 2013, the Board of Regents, State of Iowa approved the CET. The Carver Trust grant concluded in the 2017-2018 academic year.

Vision

The Center for Educational Transformation (CET) seeks to redefine the face of educational research in Iowa and beyond. Founded upon the values of partnership and innovation, the CET responds to and is inclusive of all education stakeholders. This intrinsic connectivity allows the CET to become embedded in the Iowa educational landscape, so that partners not only “reach in” to access the CET's expertise, but the CET “reaches out” to promote best practices from research results and to connect partners with one another. This model enables national research-based educational transformations to be situated in a local context. The transformation is evidenced through the CET's commitment to learners, educators, and systems.

Mission

The Center for Educational Transformation (CET) serves as Iowa's PK-12 education research and development center supporting and conducting transformative education research, building collaborative relationships across Iowa, and sharing innovative, research-based best practices to inform policy and drive practice.

Executive Summary

During the past year, CET activities and deliverables advanced our purpose of transforming K-12 schools through producing and disseminating research and information to address current issues confronting schools across our state and nation. Key accomplishments include:

- Expanding the scope and reach of research projects that link theory to practice on critical issues such as trauma-informed practice for students with adverse childhood experiences, equitable and effective school, ELL parental engagement, literacy, and STEM education. CET projects have engaged 58 school districts statewide.
- Hiring a second Postdoctoral Fellow to provide additional research support and technical assistance to our funded researchers. In addition, our CET Fellows assisted in the evaluation of the Greater Cedar Valley Alliance and Chamber’s Leader in Me program—a leadership development program for students enrolled in schools across the Cedar Valley.
- Hosting the 2017 UNI Education Summit to bring educators and stakeholders from across the state to share new and innovative research and practical strategies for addressing critical issues affecting our schools.
- Hiring a nationally recognized education scholar (Dr. Lisa Hooper) to direct the CET. Dr. Hooper will provide strategic leadership and oversight of all functions and programs of CET. Dr. Hooper will help CET expand the reach and impact of our research while helping to develop partnerships with other scholars who can inform the Center’s work.
- Establishing the National Advisory Council to inform activities of the CET. Council members will provide guidance to address critical and emerging topics in PK-12 education, both in Iowa and nationally.

Importantly, the CET is in a period of transformation. Entering its sixth year of operation, the CET is in a strong position to deepen the impact of its work to improve schools and educational systems by strengthening connections between research, practice, and the educators and stakeholders who can translate and transport this knowledge to address problems. Specific strategies for the year ahead include:

- Connect UNI to state and national education research relevant to the field, including the formation of multi-disciplinary research teams to explore and develop strategies and practices for addressing critical and complex problems.
- Serve as a connector for other faculty at UNI and local universities, in Iowa schools and districts, and educational agencies and organizations locally, statewide, and nationally (e.g., University of Iowa, Iowa State, Drake University officials, faculty members, and Center directors, and school officials from Hudson, Cedar Falls, Des Moines, and Cedar Rapids).
- Align more strongly with existing PK-12 grants, centers, and initiatives on campus, to leverage and supplement existing efforts.
- Reach across traditional disciplinary, departmental, college, and university boundaries to work with faculty members and others in the procurement of grant funding to examine important, multifactorial, complex problems.
- Co-create research publications and presentations that will inform the research base, practice, and policy at the state and national levels.

In the sections that comprise the full report, we provide a detailed description of our progress in producing and disseminating scholarship, engaging our community of educators and stakeholders, and deepening the work of CET as a national voice for the transformation of schools. Appendices of the report summarize CET’s sponsored research projects, describe CET programs and events, and list members of CET’s councils.

NOTE: In 2017-18, the CET was in an interim period while a new Director was being sought. The ongoing research projects were supported, all previous projects were concluded, a National Advisory Council was formed, the Ed Research Afternoons events continued, and the Ed Summit was held, but no major new initiatives were undertaken. The Director search resulted in the hiring of Dr. Lisa M. Hooper (see p. 16), who began the position on August 1, 2018.

RESEARCH

The CET supports and conducts research that transforms practice to meet the changing needs of Iowa’s educational system.

2017-18 Research Grants

In fall 2016, the CET released its annual Request for Proposals (RFP). This RFP sought proposals for \$15,000 Seed Grants for projects to take place in AY 2017-18 within a single Iowa classroom or school. Only Seed Grants were awarded for 2017-18.

For this RFP, the CET Research Council—a committee of seven Iowa education experts, including representatives of higher education, the Iowa Department of Education, the Iowa Board of Educational Examiners, and Iowa school districts¹—identified the following topics as “critical and emerging” issues in Iowa education. Each proposal was required to address one or more of the following topical strands in a manner that could transform PK-12 education in Iowa and nationwide:

- Deeper Learning (also known as competency-based education, problem-based learning, innovative learning, personalized learning, etc.)
- Teacher Preparation and Professional Development
- Instructional Technology
- Chronic Truancy and Absenteeism
- Multitiered Systems of Support (MTSS)

¹ Members of the CET Research Council for the 2017-18 Research Grants competition included:

- Dr. Robert Boody, University of Northern Iowa
- Dr. Anne Estapa, Iowa State University
- Dr. Jason Harshman, University of Iowa
- Dr. Ann Lebo, Iowa Board of Educational Examiners
- Dr. Trace Pickering, Cedar Rapids Community School District
- Dr. Jay Pennington, Iowa Department of Education
- Dr. Anthony Voss, Hudson Community School District

Successful proposals made the case both for the importance of the selected strand(s) to Iowa education and how the proposed project represented an appropriate, timely, and innovative approach to that strand/those strand(s).

The 2017-18 RFP process drew nine proposals, including at least one from each Regent university. The CET Research Council reviewed these proposals and funded three of them—one from each Regents institution. In addition, one UNI-based project was renewed (Mason Kuhn’s “Enhancing the ‘Argument-Based Strategies for STEM-Infused Science Teaching’ [ASSIST] Approach Through Dialogic Teacher Feedback”).

Table 1.
2017-2018 Funded Projects

| Project Name, Investigator | Strand(s) | Partner Districts/AEAs |
|--|--|---|
| What’s Your Excuse? Chronic Absenteeism in a Rural Majority-Minority High School <i>Ain Grooms, University of Iowa</i> | Chronic truancy and absenteeism | Columbus CSD |
| Making Writing a Digital, Participatory Process <i>Emily Howell, Iowa State University</i> | Teacher preparation and professional development Instructional technology | Ames CSD |
| Investigating the Effectiveness of Tier II and Tier III Mental Health Supports in a Rural School District <i>Nicole Skaar, University of Northern Iowa</i> | Multitiered Systems of Support (MTSS) | North Mahaska CSD Oskaloosa CSD Great Prairie AEA |
| Enhancing the “Argument-Based Strategies for STEM- Infused Science Teaching” (ASSIST) Approach Through Dialogic Teacher Feedback (<i>project renewed from 2016-17</i>) <i>Mason Kuhn, University of Northern Iowa</i> | Teacher preparation and professional development | BCLUW CSD Bondurant-Farrar CSD Cedar Falls CSD Charles City CSD Clarksville CSD Clear Lake CSD Denver CSD Dike-New Hartford CSD Gladbrook-Reinbeck CSD Hudson CSD Janesville CSD Mason City CSD Pella CSD South Hardin CSD Waterloo CSD Waukee CSD Waverly-Shell Rock CSD |

Note: CSD = Community School District; AEA = Area Education Agencies

The 2017-18 CET research projects have submitted final reports. Their findings include:

CET Fellow and Principal Investigator, Dr. Ain Grooms, University of Iowa

What's Your Excuse? Chronic Absenteeism in a Rural Majority-Minority High School

- School, district, and community leadership are committed to reducing chronic absenteeism, yet struggle with how to do this effectively. There remains disagreement among school personnel and between school and community stakeholders about attendance strategies, thus impeding impactful policy implementation.
- Survey results indicate a persistent belief that family factors are the primary source of absenteeism, contributing to the fact that students see attendance as “optional.” There is also a deficit perspective placed on low-income families of all races.
- The practice of sending letters home to parents is the primary means of addressing absenteeism, but this may not be effective.
- The school uses Positive Behavior and Supports (PBIS) and respondents worry that extrinsic motivation for high school students is not enough.
- Respondents also recognized school factors that impact attendance, including students feeling a lack of belonging and a dearth of engaging curriculum and teaching strategies.

CET Fellow and Principal Investigator, Dr. Emily Howell, Iowa State University

Making Writing a Digital, Participatory Process

- Curriculum and standards do not align with the changes needed to implement new media literacies.
- Student engagement with both current and future writing curriculum needs further investigation.
- Teachers desire to integrate technology into literacy curriculum but can become cognitively overwhelmed by tools to the neglect of principles.
- Professional development must become nimbler and more cross-sectional to help teachers not just integrate digital tools but transcend that integration.

CET Fellow and Principal Investigator, Dr. Nicole Skaar, University of Northern Iowa

Investigating the Effectiveness of Tier II and Tier III Mental Health Supports in a Rural School District

- Students who received mental health care through the project improved their scores on the Strengths and Difficulties Questionnaire (SDQ) and Center for Epidemiologic Studies Depression Scale-Revised (CESD-R) and maintained or improved their academic scores (based on report card data).
- Based on interview data, the school principal spent less time in crisis with students who accessed school mental health services.
- Based on survey information, most parents were satisfied with the mental health care received, although they wished the social worker could see their child more often.

CET Fellow and Principal Investigator, Dr. Mason Kuhn, University of Northern Iowa
Enhancing the “Argument-Based Strategies for STEM- Infused Science Teaching”
(ASSIST) Approach Through Dialogic Teacher Feedback

- Teachers’ epistemic cognition predicted their ability to use dialogic feedback in science lessons.
- Teachers with reform-based epistemic cognition used a greater amount and variety of dialogic feedback in their science classrooms.
- Teachers’ ability to use dialogic feedback predicted student achievement on a standardized science test.
- Five main categories of dialogic feedback were observed in the science teachers who participated in the research project.
- Student beliefs about their ability to overcome failure in science lessons predicted their performance on standardized tests.

2014-18 Research Grant Summary

Taken together, the funded projects were embedded in **58 districts** across Iowa, included **25 investigators** from Drake University, Iowa State University, the University of Iowa, and the University of Northern Iowa, and engendered important findings. Approximately **1500 teachers, 85 students, 38 parents, and 49 administrators** were implicated in the funded projects. **Figure 1** provides a visual overview of the school districts involved in CET projects from 2014-2018.

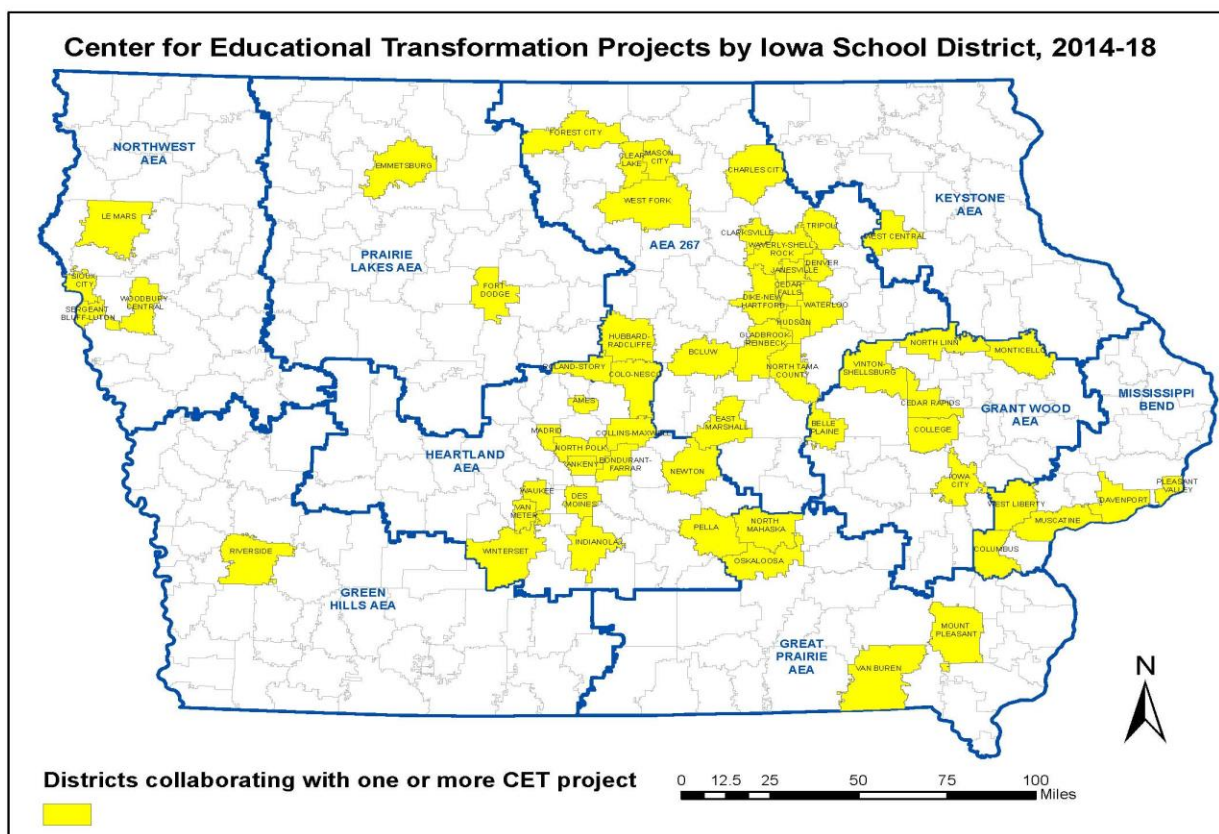


Figure 1
Map of Districts Involved in CET Projects, 2014-18

CONNECTIONS AND PARTNERSHIPS

The CET builds and leverages partnerships across the state to inform decision-makers and drive policy grounded in research results.

Ed Perspectives

No events in the Ed Perspectives series were held in 2017-18.

Ed Research Afternoons

At the Ed Research Afternoons events, a UNI faculty member or CET Fellow presents on a research project, methodology, or topic. The Ed Research Afternoons aim to build research capacity and collegiality among UNI education faculty. They are a collaboration between the CET and the Department of Educational Psychology and Foundations.

Table 2.

2017-2018 Ed Research Afternoon Events

| Date | Presenter | Topic |
|------------------------------|---|---|
| October 24, 2017 | Jim Kelly and Ellen Neuhaus, Rod Library | Sharing Your Scholarship in a Digital World |
| November 29, 2017 | Stephanie Schmitz, Educational Psychology & Foundations Jennifer Waldron, KAHHS Susan Etscheidt, Special Education | Education Research Ethics Symposium |
| March 6, 20, and 27, 2018 | Mark Jacobson, Statistical Consulting Center | Workshops on R Statistical Software |
| April 11, 2018 | Mary Losch, Center for Social and Behavioral Research | Focus Groups: Do's, Don'ts, and Further Considerations |

2017 Education Summit

The CET co-sponsored the 2017 semi-annual UNI Education Summit, entitled *Inclusive Praxis for 21st Century Education: Advocacy, Challenges, and the Public Good*, in partnership with the Richard O. Jacobson COE Strategic Program Endowment. It was held November 6-7 at UNI. Education stakeholders from across the Midwest—including teachers, teacher-leaders, principals, superintendents, higher education faculty, legislators, and UNI students—attended. Keynote speakers included LeDerick Horne and Lisa Delpit. Breakout sessions encompassed four strands: community engagement and partnerships, diversity and cultural competence, personalized and blended learning, and social-emotional learning. Presenters represented institutions of higher education in Iowa and elsewhere, Iowa school districts and AEAs, and education policy organizations.

DISSEMINATION

The CET shares innovative and best practices grounded in research to inform and drive policy and practice.

E-Connections

In 2017-18, the CET continued to build its electronic presence. Informational articles and announcements were posted to the CET Facebook page several times a week. These posts include: CET opportunities (e.g., RFPs, job openings, events) mentions of CET Fellows in the media, Iowa education news, information on the state of PK-12 education in the U.S., resources on doing and understanding education research, information on sources of funding for education research, and findings of recent education research.

Research Project Dissemination

All CET-funded research projects are now concluded. Accordingly, we asked all CET Fellows for an update on the impact of their projects (defined as reach, presentations publications and grants applied for and received to further the project). Taken together, the funded projects were embedded in **58** districts across Iowa, included **25** investigators from Drake University Iowa State University, the University of Iowa, and the University of Northern Iowa, and engendered important findings. Toward this end, the CET Fellows and their colleagues made approximately **50** state and national conference presentations, produced approximately **18** peer-reviewed publications, applied for **22** grants, and were awarded **6** of them.

Select Presentations on CET Research Projects, 2014-18

- Appelgate, M., Jackson, C., Delaney, A., & Jurgenson, K.** (2018, April). *Using mathematically-focused text messages to communicate with parents*. Paper presented at the research conference of the National Council of Teachers of Mathematics, Washington, DC.
- Boesdorfer, S. B.** (2017). *Could engineering help improve chemistry teachers' use of reform-based practices in their classrooms?* Paper presented at the international conference of the Association for Science Teacher Education, Des Moines, IA.
- Boesdorfer, S. B.** (2015). *How some high school chemistry teachers are incorporating engineering in their classes*. Paper presented at the ChemEd Conference, Kennesaw, GA.
- Boesdorfer, S. B.** (2015). *Engineering activities for high school chemistry*. Workshop presented at the ChemEd Conference, Kennesaw, GA.
- Boesdorfer, S. B.** (2015). *Teaching engineering design to in-service teachers*. Presented at the international conference of the Association for Science Teacher Education, Portland, OR.
- Boesdorfer, S.** (2014). *Engineering practices in chemistry: It can be about processes*. Workshop presented at the conference of the Iowa Science Teaching Section of the Iowa Academy of Science, Ames, IA.
- Bruhn, A. L., & Wills, H.** (2018, February). *Emerging technology: Self-monitoring for students with challenging behavior*. Paper presented the conference of the Council for Exceptional Children, Tampa, FL.
- Bruhn, A. L., Rila, A., & Estrapala, S.** (2017, September). *Improving student outcomes through data-based individualization*. Poster presented at the National PBIS Forum, Chicago, IL.
- Bruhn, A. L.** (2017, August). *Tier 2 progress monitoring for behavior: Using data for decision making*. Invited workshop provided at the Iowa School Climate Summit, Des Moines, IA.
- Bruhn, A. L.** (2017, August). *Managing challenging behavior using data-based individualization*. Invited presentation at the Iowa School Climate Summit, Des Moines, IA.
- Bruhn, A. L., Pipala, S., Rila, A., & Fernando, J.** (2017, April). *Improving intervention implementation using data-based individualization*. Paper presented at the conference of the Council for Exceptional Children, Boston, MA.
- Bruhn, A. L., Wehby, J., Hasselbring, T.S., Hendrickson, J., Schaeffer, A., Rila, A., . . . Gilmore, A.** (2017, April). *Continue, discontinue, or adapt? Data-based decision-making for behavior*. Paper presented at the conference of the Council for Exceptional Children, Boston, MA.
- Bruhn, A. L.** (2017, March). *Data rich, but information poor? Not anymore!* Invited presentation at the 14th international conference of the Association for Positive Behavior Support, Denver, CO.
- Colvin, C.** (2016, April). *Sharing "Life Stories": Immigrant parents and teachers in conversation*. Paper presented at the conference of the American Educational Research Association, Washington, DC.
- Colvin, C.** (2017, May). *Pursuing educational opportunities for immigrant children in the rural Midwest*. Paper presented at the conference of the American Educational Research Association, San Antonio, TX.
- Colvin, C.** (2018, April). *(Re)instituting democracy and civil discourse between immigrant parents and teachers through the use of story*. Paper presented at the conference of the American Educational Research Association, New York, NY.
- Colvin, C.** (2016, November). *Exploring the diversities of truth: Stories from immigrant parents*

- and rural teachers*. Paper presented at the conference of the Literacy Research Association, Nashville, TN.
- Colvin, C.** (2017, November). *Exploring the diversities of truth (Part 2): Stories from immigrant parents and teachers discussing immigration*. Paper presented at the conference of the Literacy Research Association, Tampa, FL.
- Colvin, C.** (2018, November). *Exploring the diversities of truth (Part 3): Stories from immigrant parents and teacher discussing education*. Paper presented at the conference of the Literacy Research Association, Palm Springs, CA.
- Cowley, D., Gallagher, D., & Petersen, A.** (2018, April). *The trouble with love is: Educators' voices of inclusive change*. Paper presented at the conference of the American Educational Research Association, New York, NY.
- Cowley, D., Gallagher, D., Petersen, A.,** Garmon, I., Menke, T., Ragen, J., & Short, A. (2016, April). *Sustainable inclusive reform: A university-school district partnership for socially just schooling*. Paper presented at the conference of the American Educational Research Association, Washington, DC.
- Estrapala, S., Rila, A., & **Bruhn, A. L.** (2018, April). *Is it working? Using data and technology to improve behavior*. Poster presented at the conference of the International Association for Positive Behavior Support, San Diego, CA.
- Estrapala, S., Rila, A., & **Bruhn, A. L.** (2017, September). *Implementing a data-based, individualized intervention: Teachers' perceptions and perspectives following a professional development series*. Poster presented at the National PBIS Forum, Chicago, IL.
- Feldhaus, C. A., & **Diesburg, S.** (2018, February). *Motion Virtual Manipulatives: A study with 3rd graders*. Paper presented at the Midwest Mathematical Meeting of the Minds (M4), Omaha, NE.
- Feldhaus, C. A., & **Diesburg, S.** (2016, October). *Motion Virtual Manipulatives and elementary school mathematics*. Paper presented at The Rural Education National Forum, Columbus, OH.
- Feldhaus, C. A., & **Diesburg, S. M.** (2016, March). *Motion Virtual Manipulatives and elementary school mathematics*. Invited presentation at the conference of the Iowa Association of Mathematics Teacher Educators, Cedar Falls, IA.
- Feldhaus, C. A., & **Diesburg, S. M.** (2016, January). *Using Motion Virtual Manipulatives to teach elementary school mathematics*. Paper presented at the conference of the Association of Mathematics Teacher Educators, Irvine, CA.
- Gallagher, D., Petersen, A., Cowley, D., & Iqtadar, S.** (2017, June). *A sentimental education: Insights for inclusive reform from a university/school district partnership*. Paper presented at the Disability Studies in Education Conference, Minneapolis, MN.
- Grooms, A.** (2018, October). *Addressing chronic absenteeism in a rural, predominantly Latinx high school in Iowa*. Paper presented at the Latinx Educational Excellence in the Midwest Conference, Iowa City, IA.
- Howell, E., & Perez, S.** (2017, December). *Modifying the curriculum for creation and justice*. Paper presented at the conference of the American Reading Forum, Sanibel, FL.
- Kuhn, M.** (2017, April). *A Response to Intervention model for argument-based inquiry: The importance of using student writing to find out what they really know*. Paper presented at the conference of the National Science Teacher Association, Los Angeles, CA.
- Kuhn, M., & McDermott, M. A.** (2017, April). *The relationship between dialogic teacher feedback and student outcomes on standardized science assessment*. Paper presented at the

- conference of the National Association for Research in Science Teaching, San Antonio, TX.
- Petersen, A., Gallagher, D., & Cowley, D.** (2018, April). *Teaching in the in-between: Opportunities for and resistance to inclusive reform*. Paper presented at the conference of the American Educational Research Association, New York, NY.
- Skaar, N.** (2018, October). *Effectiveness of a school mental health program in rural schools*. Presentation at the Iowa Youth Mental Health Conference, Des Moines, IA.
- Smith, C. K., Wojciak, A. S., Powers, J., & Range, B.** (2016, March). *Adverse childhood experiences and trauma informed practice in elementary schools*. Workshop presented to Iowa City Community School District Principals and Administrators.
- Smith, C. K., Wojciak, A. S., Powers, J. & Range, B.** (2016, April). *Trauma-informed practice in schools*. Lecture presented at administrator professional development, Iowa City Community School District.
- Tharp, B., & **Kuhn, M.** (2018, January). *Using the growth mindset to improve opportunities for negotiation in argument-based inquiry elementary classrooms*. Paper presented at the international conference of the Association of Science Teacher Educators, Baltimore, MD.
- Thoma, J., & Woodward, L.** (2017, December). *Literacy coaching in the state of Iowa*. Paper presented at the annual meeting of the Literacy Research Association, Tampa, FL.
- Wills, H., & **Bruhn, A. L.** (2018, April). *Self-monitoring for students with challenging behavior: Technological innovations, research, and real-world examples*. Paper presented at the conference of the International Association for Positive Behavior Support, San Diego, CA.
- Wojciak, A. S.** (2017, September). *Trauma informed work in elementary schools*. Two-day workshop provided at Building a Resilient Iowa.
- Wojciak, A. S.** (2017, April). *The importance of implementing trauma informed practices in schools in Iowa*. Presentation at the Iowa Governor’s Conference on Public Health, Des Moines, IA.
- Wojciak, A. J., & Smith, C. K.** (2016, April). *Trauma informed practice in elementary school: Results and implications for school wide training*. Poster presented at the conference of the American Education Research Association, Washington, DC.
- Wojciak, A. S., & Smith, C. K.** (2017). *Building resilience in elementary schools: Pilot data from a school wide intervention*. Paper presented at the conference of the Society for Prevention Research, Washington, DC.
- Wojciak, A. S.** (2016, May). *What is trauma informed care in the context of the education system?* Presenter of the Resiliency Triumphs over Trauma: Working with the Whole Person Workshop sponsored by *Just Living*, A social justice theme semester, University of Iowa.
- Wojciak, A. S.** (2016, April). *What can we do to change our paradigm on how to provide services to those in need?* Presenter of the Resiliency Triumphs over Trauma: Working with the Whole Person Workshop sponsored by *Just Living*, A social justice theme semester, University of Iowa.
- Woodward, L., & Thoma, J.** (2018, April). *Perceptions of teacher leadership: Literacy coaching in a midwestern state*. Paper presented at the conference of the American Educational Research Association, New York, NY.

Select Publications on CET Research Projects, 2014-18

- Appelgate, M., Jackson, C., Jurgenson, K., & Delaney, A.** (2018). Using text messages to connect linguistically diverse families with their child’s mathematics classroom learning. Proceedings to be included in T. Hodges, G. Roy, & A. Tyminski (Eds.), *Proceedings of the 40th annual meeting of the North American Chapter of the International Groups for the Psychology of Mathematics Education*. Greenville, SC: South Carolina University.
- Boesdorfer, S. B.** (2017). Is engineering inspiring change in secondary chemistry teachers' practices? *Journal of Science Teacher Education*, 28(7), 609-630. DOI: 10.1080/1046560X.2017.1389224
- Bruhn, A. L., Estrapala, S., Mahatmya, D., Rila, A., & Vogelgesang, K.** (in review). Training teachers on data-based individualization: A mixed methods study. *Manuscript submitted for publication at Behavioral Disorders*.
- Bruhn, A. L., Rila, A., Mahatmya, D., Estrapala, S., & Hendrix, N.** (in press). Analyzing the effects of data-based, individualized interventions using multilevel modeling and visual analysis. *Journal of Emotional and Behavioral Disorders*.
- Diesburg, S. M., Feldhaus, C. A., Oswald, C., Boudreau, C., & Brown, B. (2018). *Evaluating elementary student interaction with ubiquitous touch projection technology*. In Proceedings of the 17th ACM Conference on Interaction Design and Children (IDC ‘18), 357-364. ACM: New York, NY.
- Gallagher, D., Petersen, A., Cowley, D., & Iqtadar, S.** (in press). A sentimental education: Insights for inclusive reform from a university/school district partnership. *SAGE Handbook of Inclusion and Diversity in Education*.
- Kuhn, M.** (in press). Using the ASSIST Approach to enhance students’ understanding of vocabulary and text. *Science & Children*.
- Kuhn, M., & McDermott, M.** (2017). Methods and strategies: Using argument-based inquiry strategies for STEM infused science teaching. *Science & Children*, 54(5), 80-87.
- McDermott, M. A., & **Kuhn, M.** (2017). Introducing the ASSIST approach to preservice STEM teachers. *Innovations in Science Teacher Education*, 2(1).
<http://innovations.theaste.org/introducing-the-assist-approach-to-preservice-stem-teachers/>
- Woodward, L. & Thoma, J.** (in review). Perceptions of literacy coaching: A survey study of a midwestern state. *Teacher Development*.

Select Listing of Grants Sought to Further Work on CET Research Projects, 2014-18

Sarah Boesdorfer

Not Funded:

Engineering Activated Chemistry Teaching (EnACT). National Science Foundation Faculty Early Career Development Program (CAREER). \$864,156. 8/01/2018-7/31/2023.

Engineering Activated Chemistry Teaching (EnACT). National Science Foundation Faculty Early Career Development Program (CAREER). \$831,756. 8/01/2017-7/31/2022.

Allison Bruhn

Funded:

Iowa Measurement Research Foundation, 2017-2018: *A Comparison of Teacher Ratings and Direct Observation* (\$36,223).

Pending:

U.S. Department of Education, 2018: *Supporting Educator Effectiveness in Data-Based Individualization for Students with Challenging Behaviors*. (\$4.2 million).

Institute of Education Sciences, 2018: *DBI-PD: Providing Authentic Learning Experiences and Building Teacher Self-Efficacy in Data-Based Individualization* (\$1.4 million).

Not Funded:

U.S. Department of Education, 2017: *Supporting Educator Effectiveness in Data-Based Individualization for Students with Challenging Behaviors*. (\$4.2 million).

Institute of Education Sciences, 2017: *DBI-PD: Providing Authentic Learning Experiences and Building Teacher Self-Efficacy in Data-Based Individualization* (\$1.4 million).

Amy Hutchison

Funded:

National Science Foundation, 2018: *Preparing K-5 Teachers to Integrate the Computer Science Standards of Learning in Inclusive Classrooms to Support Students with High Incidence Disabilities*. (\$999,423.00). 10/1/18-9/30/21.

Nicole Skaar

Funded:

Mahaska County Community Foundation, 2018: *Investigating the Effectiveness of Tier II and Tier III Mental Health Supports in a Rural School District*. (\$5,000).

Pending:

Anonymous foundation funder, 2018: *A Study of the Effectiveness of School-based Behavioral Health Multi-tiered System of Support in a Rural School*. (\$162,636).

Financial Report

UNI provided \$176,104.51 in support for CET staffing, supplies, and services. The remainder of the CET's funding was from external grants. The majority of these resources were directed to the CET's 2017-18 Research Grant program.

The CET works in collaboration with the UNI Office of Research and Sponsored Programs and the UNI Foundation in pursuit of strategic grant opportunities, contracts, and external foundation support to advance its mission.

Moving into Phase II

In 2017-18, the CET carried out several activities which laid the groundwork for the next phase of its existence—what we have come to call Phase II. These activities included forming a National Advisory Council to guide the CET’s efforts and hiring a new Director.

Forming a National Advisory Council. In 2017-18, the National Advisory Council (NAC) was formed. Dean Jean-Marie guided the selection and recruitment of the ten (10) advisory council members. Ten prominent education researchers (see **Table 3**) from across the country agreed to serve on the NAC. Going forward, the NAC will identify promising areas of research, development, and dissemination in the field of PK-12 education in the U.S. to which the CET may be positioned to contribute. The NAC consists of thought leaders in educational research and practice to tie critical and emerging national educational issues to PK-12 needs in Iowa and to shape and prioritize the CET’s work. The national advisory board will meet four times per year (once in person if practicable) and will complement the CET’s local and state advisory boards by bringing national perspectives and connections helping to extend the CET’s impact beyond Iowa.

On October 28-29, 2018, the NAC will come to UNI for its inaugural annual meeting. This event comprises presentations on Iowa demographics and UNI students, Phase I of the CET, and select CET research projects; networking events and meals; and designated time to discuss the CET’s vision and mission, infrastructure, and identification of funding opportunities.

Table 3.
National Advisory Council

| Name | Title | Organization or Institution |
|--------------------|--|---------------------------------------|
| Dr. Terry Ackerman | Lindquist Chair | University of Iowa |
| Dr. Kenneth Coll | Dean, College of Education | University of Nevada, Reno |
| Dr. Sarah Diem | Associate Professor, Educational Leadership and Policy Analysis | University of Missouri |
| Dr. André Green | Associate Dean, College of Education and Professional Studies | University of South Alabama |
| Dr. Diane Horm | George Kaiser Family Foundation Endowed Chair of Early Childhood Education; Founding Director, Early Childhood Education Institute | University of Oklahoma |
| Dr. Sonya Horsford | Associate Professor, Education Leadership; Research Associate, Institute for Urban and Minority Education | Teachers College, Columbia University |
| Dr. Amy Hutchison | Associate Professor, Literacy and Reading | George Mason University |
| Dr. Ann O’Connell | Director, Research Methodology Center; Professor, Educational Studies | Ohio State University |
| Benjamin Riley, JD | Founder and Executive Director | Deans for Impact |
| Dr. Natalie Tran | Chair, Department of Secondary Education; Professor, Educational Leadership | California State University-Fullerton |

Hiring a nationally-recognized educational research scholar as Director for the CET. In 2017-18, UNI conducted a national search for an education researcher with strong scholarly credentials and extensive experience working in collaboration with schools and districts to direct the CET. Dr. Lisa M. Hooper of the University of Louisville was hired for this position. A brief biographical summary appears below.

Dr. Hooper has served as educator, scholar, researcher, mentor, and leader for the past 18 years, since receiving her Ph.D. from George Washington University. Early in her career she served as an investigator, project director, and research instructor at Georgetown University School of Medicine, and later as a tenured professor at the University of Alabama and the University of Louisville directing research focused on the intersection between systems (e.g., school, family, neighborhood, community, health care) and race, ethnicity, and culture. She has had four major lines of psychology and education research:

1. the link among family, teacher, and student factors on culturally responsive schools, cultural competence, leadership in school systems, and academic achievement;
2. the influence of family-of-origin factors (e.g., parentification, differentiation of self, attachment style) on the wellbeing and psychopathology of adolescents, adults, and families;
3. comorbidity research (i.e., influence of common medical conditions on mental health); and
4. minority health and health disparities related to family systems-focused cultural competence, culturally-tailored care (e.g., diagnosis, measurement and assessment equivalence, treatment).

Dr. Hooper's research constitutes a collaborative, integrative, approach to ecological systems, psychology, education, and whole-person outcomes (e.g., academic, emotional, and physical). The idea of systems and whole-person care applies to individuals from cradle to grave, including K-20 populations, and to diverse ecological systems, including schools.

Dr. Hooper has published over 90 peer-reviewed publications, books, book chapters, and encyclopedia entries. Her research has been published in the following top-tier outlets: *Urban Education*, *Middle Grades Research Journal*, *Youth & Society*, *School Mental Health*, *Journal of Counseling and Development*, *Counseling and Values*, *Medical Care Research and Review*, *Journal of Clinical Psychology*, *Journal of Multicultural Counseling and Development*, and *Journal of Mental Health Counseling*. Dr. Hooper also serves on several editorial boards.

Dr. Hooper directed and maintained a research lab (*Family, Culture, and Health*) for 14 years, and many of her lab members (undergraduate, graduate, doctoral students) and colleagues have co-lead research projects and co-authored works with her. She also mentors many early and mid-career faculty members across the nation.

Dr. Hooper has procured and led grants funded by the National Institutes of Health, the National Institute of Mental Health, and most recently the Jefferson County Public School System (Diversity, Equity, and Poverty Programs Division) in Louisville, KY. Since 2005, she has served as a NIH Health Disparities Scholar. Currently, she is collaborating with the Office of Minority Health at the U.S. Department of Health and Human Services to create an educational initiative focused on cultural and linguistic competency.

Dr. Hooper will work with Dr. Chris Opsal and Ms. Holly Boehmer. Dr. Opsal has been Program Manager of the CET since January 2015. Previously, she worked at a center in the College of Education at the University of Minnesota for 13 years in a variety of roles, including communications/dissemination, research, and grant writing. Specifically, she worked in the center's publications office and was publications coordinator for a national technical assistance center, and she was a researcher on projects funded by the U.S. Department of Education and the U.S.

Department of Labor. Her Ph.D. is from the University of Minnesota’s Department of Educational Policy and Administration. Her responsibilities at the CET include communications, supporting funded projects, planning events, and identifying potential funding opportunities.

In addition, Holly Boehmer has joined the CET as Secretary II. Previously, Ms. Boehmer served as secretary to the College of Education Advising office. Her responsibilities at the CET include maintaining the daily operations of the office, keeping financial records, and event coordination.

Conclusion

Going forward, the CET will strategically serve as a connector for other faculty at UNI and local universities, in Iowa schools and districts, and educational agencies and organizations locally, statewide, and nationally. In addition, the CET will align more strongly with existing PK-12 grants, centers, and initiatives on campus, to leverage and supplement existing efforts. With proposed work such as this, the CET has the potential to reach across traditional disciplinary, departmental, and college boundaries to work with faculty in addressing important problems and achieving common goals, collaboratively pursue grants and engage in research publications, and make significant contributions to inform research, policy, and practice at the state and national levels through research initiatives.

In conclusion, UNI is dedicated to a vision for the CET to impact PK-12 student learning and teacher effectiveness across the state and to inform the national education landscape. UNI continues to support the vision of the CET as a new, original model in which the state can both address its research and development needs and engage in projects of national significance utilizing the strategies of field-based and action-oriented research, yielding innovative educational practices and effective policy analysis. We believe UNI is now well-positioned to build on the strong foundation that has been created and further elevate the CET’s research and development enterprise.

Appendix A
CET Research Projects by Subject Area, 2014-18

ELL PARENT ENGAGEMENT

Using Mathematically-Focused Text Messages to Improve Connections between Linguistically-Diverse Parents and Their Child's Classroom Learning

Researchers: Mollie Appelgate and Christa Jackson, Iowa State University

District Partner: Des Moines CSD

Project Duration: 2016-17

Abstract: Iowa is diversifying--culturally and linguistically. In schools, this presents a challenge for teachers, the vast majority of whom are mono-linguistic English speakers. Teachers want to work closely with parents and view them as partners in a child's learning, but this becomes more difficult when teachers do not speak the same language as parents and teachers may have multiple home languages represented in their classrooms.

In literacy, parents have long been viewed as important partners, particularly in growing children's reading skills. However, this same emphasis on the value of a parent's role has not been true for mathematics. Parents are not encouraged to "talk mathematics" with their child in the same way they are encouraged to read every day with their child.

This study aims to address both of these issues by improving the connection between parents and teachers through the use of mathematically-focused text messages based on classroom learning and parents' funds of knowledge. The study used texting via cell phones to communicate with kindergarten parents about their child's mathematical work in class, as well as how to build upon mathematical talk at home.

Using a sequential transformative approach, this study used mixed methods to answer the following questions:

1. How do we create relevant and useful mathematically-focused text messages that build on parents' funds of knowledge and create stronger connections to school?
2. How does mathematically-focused texting improve connections between teachers and parents?
3. How can texts to parents be used to build on students' mathematical thinking?

Exploring Models of Bicultural Parent Engagement to Address Academic Achievement for Immigrant Youth

Researcher: Carolyn Colvin, University of Iowa

District Partners: Columbus CSD, West Liberty CSD

Project Duration: 2016-17

Abstract: Rural school districts in Iowa have been transformed by the arrival of immigrant families. Both school faculty/administrators and immigrant parents are challenged in the way

they must learn to effectively communicate across differences in language and culture. Parent-teacher communication most often takes place around the institutionalized activities of parent-teacher conferences as it is these points of contact that provide opportunities to share and discuss information concerning academic progress for the children of immigrant parents. Extensive research exists that documents mainstream parents' involvement in schools (for example, see Epstein, 1986; Epstein Dauber, 1991). More recently, researchers have begun to examine parent involvement for immigrant parents, specifically Latino parents (Valdez, 1997). However, parent involvement models tend to reflect dominant mainstream practices for how parents can serve as advocates for their children. Notably, in much of the existing research, parent voices and perspectives are absent.

For this study, four elementary teachers, four Spanish-speaking parents, and four parents from Laos were recruited to explore through interviews how each participant understood the purposes of and prepared for parent-teacher conferences. Questions guiding this research included the perceived purposes of parent-teacher conferences, conference preparation, and participants' perceptions of conferences as sites for effective communication. Analysis will occur using grounded theory (Corbin & Strauss, 1998). The outcome of data analysis will inform a model for bicultural parent engagement for possible implementation at the local school site where I am involved. A parent engagement model might be applicable for other school sites where large numbers of immigrant/recently-arrived families reside.

EQUITABLE AND EFFECTIVE SCHOOLING

Improving Individualized Implementation Using Data-Based Individualization

Researcher: Allison Bruhn, University of Iowa

District Partner: Iowa City CSD

Project Duration: 2016-17

Abstract: Schools across the country, including in the state of Iowa, are being called to account for student progress in social-behavioral skills as well as academic skills. For students with or at risk for disabilities who are receiving interventions, monitoring progress on a frequent-ongoing basis is imperative to determining their response and making accurate decisions accordingly.

In the behavioral domain, the data-based decision-making process can be cumbersome and complicated because most educators are not trained in it (Wayman, 2005), professional development on data use is often inadequate or non-existent (Massell, 2001), and there are no behavioral standards with accompanying decision rules like in academic progress monitoring. For teachers who are not trained in using data to make individualized decisions, data mentors or coaches with expert-level knowledge have been recommended (Nichols & Singer, 2000).

This project will address the critical need for data-based decision making support for teachers intervening with students who have challenging behavior. This will be done with an empirically-supported, technology-based intervention, SCORE IT, which will be used to improve students' self-regulatory behavior. We will provide a series of high-quality professional development

sessions related to implementing intervention, analyzing behavioral progress monitoring data, and making decisions on an ongoing basis. Teachers will then implement strategies learned from the PD with participating students. Then, student outcomes will be measured, as will teacher perceptions of training, implementation, and outcomes.

Sustainable Inclusive Reform: A University-School District Partnership for Equitable and Effective Schooling

Researchers: Danielle Cowley, Deborah Gallagher, and Amy Peterson, University of Northern Iowa

District Partner: Mount Pleasant CSD

Project Duration: 2015-17

Abstract: A team of UNI faculty and 35 educators from the Mount Pleasant Community School District have taken up the urgent and critical task of becoming a more inclusive school district in order to ensure access and progress in the general education curriculum for *all* students. The faculty team has established an innovative Inclusive Education Teacher Preparation program at UNI for this cohort and will now begin a collaborative, participatory research project to examine the process and results of partnering for inclusive school reform.

Using an action-research framework and mixed methods from both qualitative and quantitative traditions, we will examine research questions related to:

- building capacity in educators as they work toward inclusive change;
- planning for systematic, inclusive restructuring; and
- the impact of inclusive policies and practices on educational outcomes for all students.

The proposed project addresses needs related to innovative research, policy, and practice. Anticipated outcomes include:

- improving the knowledge, skills, and dispositions of inclusive educators;
- addressing the shortage of special education teachers in Iowa;
- improved Iowa compliance with LRE;
- narrowing the significant achievement gap experienced by Iowa's students with disabilities; and
- creating and evaluating a sustainable process for inclusive change.

What's Your Excuse?: Chronic Absenteeism in a Rural Majority-Minority High School

Researcher: Ain Grooms, University of Iowa

District Partner: Columbus CSD

Project Duration: 2017-18

Abstract: Chronic absenteeism is defined as missing 10% or more of a school year--the equivalent of 18 days--for excused or unexcused reasons (Chang & Romero, 2008). Chronic absenteeism, by definition, includes chronic truancy, which refers to frequent unexcused absences. Chronic absenteeism can be a barometer of academic success, future dropout, and job earning potential (Chang & Romero, 2008; Gottfried, 2011). Under guidelines established by the

Every Student Succeeds Act (ESSA), states must report chronic absenteeism rates and can receive funding to address the concern. ESSA guidelines also require that, in addition to reporting test scores, states use a school quality indicator to measure school performance; states may choose to use their chronic absenteeism rates as that indicator.

Iowa is becoming more diverse, with Hispanic/Latino students comprising 10% of the state's total PK-12 school population (Iowa Department of Education, 2016). Data show high absentee rates among Hispanic high school students nationwide (21%), and the Hispanic/Latino population is growing substantially in the state's rural areas. Thus, this study will use a rural high school with a significant Hispanic population as its research site.

This research will investigate how rural school personnel, often with limited resources and expertise, are addressing chronic absenteeism, and how collaborative approaches with community organizations are being implemented to reduce chronic absenteeism and improve daily school attendance. This research will provide a practical understanding of how schools can find solutions for absenteeism and build coalitions with community organizations to address issues affecting students, including absenteeism.

Student Voice for School Change

Researchers: Gail Seiler and Julio Cammarota, Iowa State University

District Partner: Ames CSD

Project Duration: 2016-17

Abstract: Mirroring national and statewide trends, students of color in the Ames Community School District experience disparities in achievement and overrepresentation in disciplinary actions. In an effort to understand and change these differential outcomes, a pilot study will be undertaken in which Youth Participatory Action Research (YPAR) will be employed with a cohort of middle school students in Ames.

YPAR is a process of inquiry that privileges student voice and creates opportunities for young people to study their own social contexts and learn how to improve conditions and create greater equity within them. With guidance from university researchers, youth will become investigators and conduct research using standard social science research techniques, and then draw upon creative expressive forms such as spoken word, poetry, visual arts, music, and theater to present their findings.

This research will investigate the impact that student voice can have on school policy and practices, particularly as it relates to the educational experiences of students of color, as well as its impact on the students themselves, as evidenced in their engagement and success in school. Despite the precarious position of students of color in our educational system, rarely do we draw on their voices, knowledge, and experiences to address the issues that affect them. This research will attempt to counter that and to extend the use of a YPAR framework to middle school students in a predominantly White school.

Investigating the Effectiveness of Tier II & Tier III Mental Health Supports in Two Rural School Districts

Researcher: Nicole Skaar

District Partners: Oskaloosa CSD, North Mahaska CSD, and Great Prairie AEA

Project Duration: 2017-18

Abstract: Approximately one-fifth of students experience mental health difficulties and cannot fully benefit from the available academic and extracurricular opportunities. Students with mental health difficulties experience a variety of negative outcomes, including lower academic achievement and disengagement from school. Teachers and administrators are also impacted as they must spend time supporting student mental health and behavior, which leads to less time focused on academic instruction and other positive interactions.

School-based mental health programs are being implemented in schools across the country through partnerships with community-based mental health providers; however, rural schools are at a disadvantage because they are located in communities with reduced access to community-based mental health providers. Existing school-based mental health programs, which were developed in large cities, are thus difficult to replicate in rural schools.

This project aims to supplement existing universal-level supports by developing and implementing mental health assessment and intervention supports at Tier II and Tier III within two rural school districts in Iowa. We will assess the effectiveness of the program through both quantitative and qualitative measurement of both student- and systems-level variables. Student-level variables will include mental health measures, school behavior, and academic achievement. School-level variables will include amount of time administrators and counselors spend working through crises with students and stakeholder acceptability of program elements.

The Hip-Hop and Higher Education Program

Researcher: Shuaib Meacham, University of Northern Iowa

District Partner: Waterloo CSD

Project Duration: 2014-16

My research aims to draw from the cultural resources of communities of color as a means of addressing educational problems experienced by the students from those communities. Specifically, my research looks at the ways in which hip-hop culture functions as an educational resource for students needing to develop a purpose for education as well as needing to see the ways in which a college education is relevant to their lives and personal aspirations. To that end, this study examined the relevant workplace skills students cultivate and exhibit within the context of an experience in hip-hop composition, recording, and performing culture.

LITERACY

Making Writing a Digital, Participatory Process

Researcher: Emily Howell, Iowa State University

District Partner: Ames CSD

Project Duration: 2017-18

Abstract: This study is focused on developing professional development (PD) for upper-elementary school teachers and investigating how it can be integrated into teachers' instruction to improve their ability to make writing a more digital, participatory process.

Theoretical perspectives pertaining to technology use in education specify that this use should emphasize students creating rather than consuming information from media sources and that this creation process should be social. However, recent research on preadolescents has shown that while these students are using technology more in schools, they are often using it to consume rather than create information.

Further, literacy teachers, in particular, have identified barriers to integrating technology effectively into their curriculum. Thus, there is a critical need for PD that helps teachers more effectively integrate technology into their classrooms.

The objective of this study is to develop a PD model that helps teachers engage students in writing as both a digital and social process. The essential elements studied in this model include the following:

- sustained PD including the gradual release of teacher inquiry,
- writing as a social practice, and
- the use of digital tools to engage students in writing.

The researcher will study the implementation of this PD model in summer institutes and in teacher classrooms through both qualitative and quantitative data.

Instructional Coaching in Iowa: An Exploration of Practices and Perceptions

Researchers: Lindsay Woodward and Jennifer Thoma, Drake University

District Partners: Colo-NESCO CSD, Collins-Maxwell CSD, Fort Dodge CSD, Indianola CSD, Le Mars CSD, North Polk CSD, Roland-Story CSD, Sergeant Bluff-Luton CSD, Sioux City CSD, Van Meter CSD, Vinton-Shellsburg CSD, Waverly-Shell Rock CSD, Winterset CSD, and Woodbury Central CSD

Project Duration: 2016-17

Abstract: In an effort to raise student achievement and utilize the expertise of Iowa's top teachers, the Iowa Legislature passed an education reform package in 2013, from which the Teacher Leadership and Compensation (TLC) system was developed. As of March 2016, every school district in Iowa was approved to implement a teacher leadership system as part of TLC (Rasey & Slater, 2016). Most new teacher leaders receive professional development along with

increased responsibilities and compensation. One such responsibility is serving as an instructional coach. Moving forward, it is important to understand the different ways instructional coaching, in all of its forms, has been implemented across the state to determine how districts and schools use coaching positions in their unique contexts.

This study explores the types of instructional coaching provided across Iowa, how coaching roles are supported and how teachers transition to teacher leaders, how districts define successful coaching, and how coaches support various initiatives implemented in their schools.

Additionally, exploring how instructional coaches support teachers' use of instructional technology is especially relevant, as Iowa districts continue to invest in digital devices for students. Finally, this study seeks to describe subject-specific coaching, such as literacy coaching (McKenna & Walpole, 2008; Neuman & Wright, 2010), that occurs throughout the state. This study uses mixed methods to explore coaching in districts of varying size, location in Iowa, and year of implementation of TLC funding.

Implementation and Evaluation of the Technology Integration Planning Cycle for Literacy and Language Arts

Researcher: Amy Hutchison, George Mason University (formerly at Iowa State)

District Partners: Ankeny CSD

Project Duration: 2014-16

I worked with K-12 teachers to provide professional development on using the Technology Integration Planning Cycle for Literacy and Language Arts (Hutchison & Woodward, 2014). This instructional planning cycle, which is based on the Technological Pedagogical Content Knowledge (TPACK) conceptual framework (Mishra & Koehler, 2006), identifies seven critical elements that influence literacy teachers' instructional planning involving digital technology and the success or failure of the resulting classroom instruction.

This study: (1) examined literacy teachers' ability to implement the planning cycle to provide effective learning experiences for students that integrate digital technology; (2) determined what contextual factors lead to the most successful integration when the planning cycle is used; (3) determined what barriers teachers face when integrating digital technology into their literacy instruction with the Technology Integration Planning Cycle for Literacy and Language Arts; and (4) determined how to best support teachers in integrating digital technology into their instruction to teach Iowa Core Standards.

STEM EDUCATION

Motion Virtual Manipulatives in the Elementary Math Classroom

Researchers: Sarah Diesburg and Adam Feldhaus, University of Northern Iowa

Project Duration: 2015-17

Abstract: Manipulatives are a powerful tool to help students grasp the foundational concepts of mathematics. This is especially true of elementary school mathematics when it is integral that students learn mathematical concepts and how they can be used to solve problems and compute solutions. One way to introduce manipulatives into the elementary school classroom and increase student engagement with STEM-based technologies is through the use of motion-sensing input devices such as the Microsoft Kinect. These devices interpret user movements and translate the movements into a gaming environment displayed on a screen.

The researchers propose to create an environment where students use motion-sensing input devices to interact with mathematics manipulatives in an engaging environment. The goal of this project is to create a new toolset that will be called motion virtual manipulatives (MVMs).

MVMs will:

- introduce manipulatives into the elementary school classroom using motion-sensing input devices,
- be an effective tool for teaching core mathematical concepts, and
- potentially reach students who do not respond to typical mathematics instruction.

This software will be available at little to no cost to students or teachers. Once developed, the researchers will take the program into schools to evaluate it with the intent of improving the software and expanding implementation to other grade levels, mathematical manipulatives, and school settings.

Enhancing the "Argument-based Strategies for STEM-Infused Science Teaching" (ASSIST) Approach through Dialogic Teacher Feedback

Researcher: Mason Kuhn, University of Northern Iowa

District Partners: BCLUW CSD, Bondurant-Farrar CSD, Cedar Falls CSD, Charles City CSD, Clarksville CSD, Clear Lake CSD, Denver CSD, Dike-New Hartford CSD, Gladbrook-Reinbeck CSD, Hudson CSD, Janesville CSD, Mason City CSD, Pella CSD, South Hardin CSD, Waterloo CSD, Waukee CSD, Waverly-Shell Rock CSD

Project Duration: 2016-18

Abstract: In 2015, the state of Iowa adopted the Next Generation Science Standards (NGSS) as its state science standards. The previous Iowa Core science standards were written to promote inquiry, but the NGSS go a step further and support a specific type of inquiry: Argument-Based Inquiry (ABI).

Research has identified two main types of teacher feedback patterns, Verification and Elaborative (Siddiquee & Ikeda, 2013). Elaborative feedback patterns align with ABI approaches (Shute, 2008) and thus also align with the intent of the new science standards. The Elaborative approach to feedback uses a dialogic perspective and suggests that teachers use dialogic feedback in classrooms (Chin, 2007).

This project will focus on the type of feedback teachers provide their students when they teach science using an argument-based, STEM-infused approach. We will explore possible correlations between the type of feedback a teacher uses in their classroom and their epistemological beliefs about science. We will also evaluate how student achievement is affected by teacher epistemological beliefs about science and their ability to enact quality dialogic feedback.

Teachers will attend a five-day professional development (PD) where they will learn how to implement the Argument-based Strategies for STEM-Infused Science Teaching (ASSIST) approach. These teachers and a control group that will not attend the PD will submit videos of their science teaching and their ability to enact dialogic feedback with their students will be assessed. We will evaluate the two groups' epistemological beliefs about science and use of dialogic feedback, as well as their students' achievement in science.

Literacy Through Science

Researchers: Beth Van Meeteren, Mason Kuhn, Sohyun Meacham, and Sarah Vander Zanden, University of Northern Iowa

District Partners: Dike-New Hartford CSD, Emmetsburg CSD, North Tama County CSD

Project Duration: 2015-17

Abstract: The current emphasis on literacy assessments in early childhood is driving many kindergarten classrooms to do away with science experiences for children to focus solely on literacy instruction. This study will use mixed methods to determine the effects of nature-based science project work in preschool and kindergarten classrooms on student achievement in literacy.

This proposal reflects a unique opportunity to join a team dedicated to increasing science nature investigations with young children. The Lakeside Laboratory Regents' Resource Center at Okoboji asked the Regents' Center for Early Developmental Education (RCEDE) at UNI to examine the effects of their Young Investigators teacher professional development program.

Young Investigators is an organization dedicated to facilitating early access to science inquiry through nature-based project work. It uses a method of teaching in which in- depth study of a particular topic is conducted by a child or a group of children. Activities engaged in during project work include drawing, writing, reading, recording observations, and interviewing experts (Katz, 1994).

Engineering Activities for Teaching Chemistry

Researcher: Sarah Boesdorfer, Illinois State University (formerly at UNI)

District Partners: Ankeny CSD, BCLUW CSD, Belle Plaine CSD, Cedar Rapids CSD, Charles City CSD, Davenport CSD, East Marshall CSD, Forest City CSD, Iowa City CSD, Madrid CSD, Monticello CSD, Muscatine CSD, Newton CSD, North-Linn CSD, Oskaloosa CSD, Pleasant Valley CSD, Riverside CSD, Tripoli CSD, Van Buren CSD, Vinton-Shellsburg CSD, Waukee CSD, West Central CSD, West Fork CSD

Project Duration: 2013-15

The Next Generation Science Standards (NGSS) recommend incorporating engineering practices within the K-12 science classroom. Ideas about engineering can be used by chemistry teachers to enhance their teaching and hopefully engage and interest their students even more. Yet many science teachers, especially chemistry teachers, do not know how to incorporate engineering in their classroom. Only 7% of science teachers report feeling "very well prepared" to teach engineering (Banilower et al., 2013).

The purpose of my CET project was to help local chemistry teachers, or teachers teaching chemistry content, begin to incorporate engineering practices in their classroom. The teachers supplemented what they were already doing by revising current practices to include more engineering design or designing new lessons/units to be included in their classrooms. As the teachers and I worked through this process, I explored the effects explicitly including engineering content in the science classroom had on teachers' beliefs and practices for teaching science.

Diverse Female Elementary Students Learn About the Careers of Diverse Women in Mathematics

Researcher: Audrey Rule, University of Northern Iowa

District Partner: Waterloo CSD

Project Duration: 2014-16

To compete in a global market, America must increase production of highly-educated workers in STEM fields. There are few women and minorities in many STEM areas; therefore, it is urgent that girls have appropriate role models, be educated to resist cultural barriers, and be taught to develop a growth mindset toward STEM subjects.

This research project will teach a diverse group of elementary girls at an urban school about successful contemporary women of different races/ethnicities with careers in mathematics. The elementary girls will view illustrated PowerPoints of the women's lives and accomplishments, discussing the barriers they overcame and their interesting jobs. Students will gain spatial and creative skills as they construct dioramas of the women's lives and careers with a creative pop-up scene on the back illustrating the student's essay about career aspirations related to mathematics and connections to the role model. Lessons will include foundational practice in place value with numeral cards and manipulatives to improve understanding of mathematical concepts.

The impact of the lessons will be evaluated for mathematics self-efficacy, attitudes toward mathematics careers, place value understanding, math career content, and racial identity using a pretest-posttest design. Student comments during discussions, the dioramas they construct, and their essays will be analyzed for themes.

The CET also supported Dr. Rule’s “*Highly Gifted Middle School Students Make Dioramas of Mammals that Explore Spatial Thinking Skills and Unifying Concepts of Science: Form and Function and Evidence, Models, and Explanations*” project (2014-16; Cedar Falls CSD, Waterloo CSD).

Assessing the Impact of the Waterloo Community Schools/UNI Mathematics Coaching Project

Researcher: Brian Townsend, University of Northern Iowa

District Partner: Waterloo CSD

Project Duration: 2014-16

The Center for Teaching and Learning Mathematics (CTLM) at UNI provides professional development to Iowa teachers through grants and contracts. The data collected on this professional development for project evaluation is a rich source for further research into teachers' change in practice, increase in their content knowledge for teaching, and impact on student achievement. Through the support provided by the CET, I analyzed data collected by the CTLM on the work of improving professional development to improve mathematics instruction.

TRAUMA-INFORMED PRACTICE FOR ADVERSE CHILDHOOD EXPERIENCES

We can! Testing a Trauma-Informed Care Training in Iowa Elementary Schools

Researchers: Armeda Wojciak and Carol Smith, University of Northern Iowa

District Partner: College CSD

Project Duration: 2016-17

Abstract: Adverse childhood experiences (ACEs)--including physical abuse, emotional abuse, sexual abuse, physical neglect, emotional neglect, a parent with a mental illness, separation from a parent as a result of incarceration or death, domestic violence, parental substance use, and divorce (Felitti et al., 1998)--impact children early in their development, specifically their health and educational outcomes. In Iowa, an estimated 33% of all children will experience 1 or 2 ACEs before the age of 18, with 12% experiencing 3 or more as measured by the National Child Abuse and Neglect Data System (Sacks, Murphey, & Moore, 2014).

Blodgett (2012) demonstrated that ACEs exposure is a principal predictor of behavioral and attendance problems at school and the second biggest predictor of academic failure. Elementary school provides an opportunity, as a universal system that serves the majority of children, to offer trauma-informed care practices to students to improve student success.

This project will test *We Can!: An Educator's Guide to Trauma-Informed Practice*, a trauma-informed intervention, across multiple elementary schools in Eastern Iowa. The project PIs developed *We Can!* with an Iowa elementary school principal and school counselor. The intervention will be delivered to all teachers and paraprofessionals in all five elementary schools in College Community School District.

We will conduct a quasi-experimental repeated measures study. This project will employ qualitative and quantitative methods to examine the influence of the trainings on 1) increasing awareness and knowledge of trauma and trauma-informed practices in the elementary setting, 2) improving school climate and culture, and 3) decreasing undesirable student behaviors. Results will be disseminated locally and nationally with implications for teachers, school counselors, school administrators, and policymakers. This project will continue to build the foundation of an evidence-based intervention that can be implemented in all Iowa schools.

Appendix B CET Councils

National Advisory Council

Terry Ackerman, Lindquist Chair, University of Iowa

Kenneth Coll, Dean College of Education, University of Nevada, Reno

Sarah Diem, Associate Professor, Educational Leadership and Policy Analysis, University of Missouri

Andre Green, Associate Dean, College of Education and Professional Studies, University of South Alabama

Diane Horm, George Kaiser Family Foundation Endowed Chair of Early Childhood Education; Founding Director, Early Childhood Education Institute

Sonya Horsford, Associate Professor, Educational Leader; Research Associate, Institute for Urban and Minority Education

Amy Hutchison, Associate Professor, Literacy and Ready, George Mason University

Ann O’Connell, Director Research Methodology Center; Professor, Educational Studies, Ohio State University

Benjamin Riley, Founder and Executive Director, Deans for Impact

Natalie Tran, Chair, Department of Secondary Education; Professor, Educational Leadership, California State University – Fullerton

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Bob Kressig, Iowa House of Representatives

Nancy Langguth, Clinical Professor, College of Education, University of Iowa

Jane Lindaman, Superintendent, Waterloo Community School District

Jon McKenzie, Director of Assessment and Improvement, AEA 267

Katie Mulholland, Retired, Board of Regents

Tom Penaluna, President/CEO, CBE Companies, Inc.

Jay Pennington, Bureau Chief, Iowa Department of Education

Marlene Strathe, Director, School of Education, Iowa State University

Stacy Van Gorp, Executive Director, McElroy Trust

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